KARPAGA VINAYAGA COLLEGE OF ENGINEERING AND TECHNOLOGY

Chinna Kolambakkam, Maduranthakam(TK), Chengalpattu (DT), PIN 603 308

DEPARTMENT OF AUTOMOBILE ENGINEERING

Course Outcomes (R-2013)

C101/HS6151 Technical English – I	
CO	**Outcomes**
C101.1	Listen, understand and respond to others in different situations
C101.2	write with clarity in simple, apt and flawless language with coherence and cohesion
C101.3	Explain the basic grammar techniques and utilize it in enhancing language development.
C101.4	Read and comprehend a variety of texts adopting different reading skills
C101.5	Develop flair for any kind of writing with rich vocabulary and proper syntax
C101.6	Write technical articles and present papers on any topic of any genre.
C101	**Average**

C102/MA6151 Mathematics – I	
CO	**Outcomes**
C102.1	Explain mathematical techniques to problems in a wide range of practical engineering problems
C102.2	Constructs arguments to prove and justify results
C102.3	Manipulates algebraic expressions involving exponential functions
C102.4	Manipulates algebraic expressions involving logarithmic functions
C102.5	Apply techniques of integration to calculate areas and volumes
C102.6	Interpret and communicate mathematics in a variety of problem solving.
C102	**Average**

C103/PH6151 Engineering Physics – I	
CO	**Outcomes**
C103.1	Explain the Young's modulus and Rigidity modulus of elasticity of materials and its determination through experimental methods
C103.2	Describe the characteristics of laser light and their application in semiconductor laser
C103.3	Discuss the principle behind the propagation of light through an optical fibre and its application in sensors.
C103.4	Explain the different modes of heat transfer
C103.5	Relate and explain the quantum concepts in electron microscopes
C103.6	Describe the unit cell characteristics and the growth of crystals
C103	**Average**

C104/CY6151 Engineering Chemistry – I	
CO	**Outcomes**
C104.1	Explain basics of polymer chemistry
C104.2	Describe the types of polymers, polymerization reactions, polymerization techniques and fabrication methods of polymers for engineering applications
C104.3	Explain second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines
C104.4	Explain phase rule in the alloying and the behavior of one component and two component systems using phase diagram
C104.5	Explain importance of photo physical and photochemical processes and spectroscopy
C104.6	Explain basics of nano materials, their properties and applications
C104	**Average**

C105/GE6151 Computer Programming	
CO	**Outcomes**
C105.1	Elaborate the organization of digital computer and design the solution for simple computing problems using algorithm, flowchart and pseudo code.
C105.2	Apply the different looping structure to solve simple scientific and statistical problems.
C105.3	Identify the solutions for simple problems using arrays and strings
C105.4	Demonstrate the usage of dynamic memory allocation and pointer variables.
C105.5	Explain the concepts of structure and union with an example programs.
C105.6	Develop simple software and applications
C105	**Average**

C106/GE6152 Engineering Graphics	
CO	**Outcomes**
C106.1	Discuss about conics and orthographic views of engineering components
C106.2	Illustrate the projection of points, lines and planes
C106.3	Classify solids and projection of solids at different positions
C106.4	Explain sectioned view of solids and development of surface
C106.5	Illustrate isometric projection and perspective views of an object/solid
C106.6	Apply the concept of drawing in practical applications
C106	**Average**

C107/GE6161 Computer Practices Laboratory	
CO	**Outcomes**
C107.1	Explain fundamental concepts and basics commands in C
C107.2	Develop, compile and debug programs in C language
C107.3	Formulate problems and implement algorithms in C.
C107.4	Select programming components that efficiently solve computing problems in real-world.
C107.5	Apply good programming design methods for program development.
C107.6	Develop recursive programs.
C107	**Average**

C108/GE6162 Engineering Practices Laboratory	
CO	Outcomes
C108.1	Identify Tools and Techniques used for Sheet Metal Fabrication
C108.2	Use welding equipment to join the structures.
C108.3	Measure various electrical quantities
C108.4	Explain the working of electronic components and its utilization
C108.5	Apply electronic principles to develop circuits for primitive application
C108.6	Demonstrate Plumbing requirements of domestic buildings
C108	**Average**

C109/GE6163 Physics and Chemistry Laboratory - I	
CO	Outcomes
C109.1	Assess optical fibre parameters using laser properties.
C109.2	Measure the velocity of ultrasonic waves in a given liquid medium
C109.3	Compute the wavelength of mercury spectrum using properties of light
C109.4	Compute the thermal conductivity of a bad conductor using Lee's method.
C109.5	Estimate acids and bases quantitatively based on the conductance of the solution
C109.6	Estimate acids and bases quantitatively based on pH level of the solution
C109	**Average**

C110/HS6251 Technical English – II	
CO	**Outcomes**
C110.1	Breakdown the ideas in to its elementary constituents, analyze and act after a meaning full thought process
C110.2	Analyze the phrase and passage and explicitly pass on the ideas meaning fully
C110.3	Manage to interpret the given phrase or the graphical rendering and review the contents well individually or as a group
C110.4	Concentrate on the communication aspect of complicated ideas and respond positively
C110.5	Debate the issues and find the rudiments of the problem individually and as a group.
C110.6	Respond intelligently and seek clarification and understand completely.
C110	**Average**

C111/MA6251 Mathematics – II	
CO	**Outcomes**
C111.1	Apply Laplace transform technique to solve the given ordinary differential equation
C111.2	Explain concepts of vector calculus, needed for problems in all engineering disciplines.
C111.3	Compute line, surface and volume integral using Gauss divergence, Green's and stoke's theorem.
C111.4	Find the singularities and its corresponding residues for the given function.
C111.5	Find double integral over general areas and triple integral over general volumes
C111.6	Apply Gauss Divergence theorem for evaluating the surface integral.
C111	**Average**

C112/PH6251 Engineering Physics – II	
CO	**Outcomes**
C112.1	Explain the use of magnetic materials.
C112.2	Explain the use of semiconducting materials.
C112.3	Describe modern engineering materials and its applications
C112.4	Explain dielectric materials and its applications
C112.5	Explain advance engineering materials and its applications
C112.6	Explain various types of materials and their applications in engineering and technology
C112	**Average**

C113/CY6251 Engineering Chemistry – II	
CO	**Outcomes**
C113.1	Interpret the food chains, food webs and ecological pyramids
C113.2	Describe about the environmental pollution such as air pollution, water pollution, soil pollution and thermal pollution
C113.3	Understand the forest resources, food, resources, land resources and water resources
C113.4	Interpret the resettlement and rehabilitation of people
C113.5	Create awareness environment and human health, human rights and value education
C113.6	describe the role of information technology in environment and human health
C113	**Average**

C114/GE6252/Basic Electricals, Electronics and Instrumentation Engineering	
CO	**Outcomes**
C114.1	Describe the Basic circuit components
C114.2	Apply Ohms Law and Kirchhoff's Law to determine the voltage and Current
C114.3	Demonstrate the housing wiring and industrial wiring
C114.4	Interpret the Principles of operation and characteristics of electrical Machines
C114.5	Describe the electronics devices and circuits
C114.6	Classify the Transducers and Instruments
C114	**Average**

C115/GE 6253 Engineering Mechanics	
CO	**Outcomes**
C115.1	Describe the equilibrium of a particle in space using principle of laws of mechanics
C115.2	Calculate the equilibrium of rigid bodies in two dimensions and in three dimensions.
C115.3	Calculate the principal moment of inertia of plane areas.
C115.4	Solve the problems using equation of motions and analyze impact of elastic bodies on collision.
C115.5	Solve the problems of simple system with sliding friction and calculate linear and angular acceleration of moving body in general plane motion.
C115.6	Apply the Laws of Mechanics for solving problem on Vector representation of forces
C115	**Average**

C116/GE6261 Computer Aided Drafting and Modeling Laboratory	
CO	**Outcomes**
C116.1	Describe the Code of practice for Engineering Drawing,
C116.2	Prepare the production drawings and reading of part and assembly drawings
C116.3	Draw the elliptical curve using cad software
C116.4	Develop isometric views using CAD
C116.5	Draw the cut section of cone using 2D drafting
C116.6	Do the practice in handling 2D drafting and 3D modeling software systems.
C116	**Average**

C117/GE6262 Physics and Chemistry Laboratory - II	
CO	**Outcomes**
C117.1	Demonstrate the application of a diode laser to determine the characteristics of a given optical fibre
C117.2	Demonstrate the estimation of hydrochloric acid present in the given solution using pH meter
C117.3	Estimate the mixture of acids by conductometry
C117.4	Determine Coefficient of viscosity of a liquid using Poiseuille‟s method
C117.5	Determine Rigidity modulus using torsion pendulum
C117.6	Determine CaO in cement
C117	**Average**

C201/MA6351/Transforms and Partial Differential Equations	
CO	**Outcomes**
C201.1	Students would get familiarize about the Fourier series to generate a sequence of waves
C201.2	Students would have learnt about the Fourier Transform to a sequence non parabolic waves to a general function.
C201.3	Students will be familiar with the construction of partial differential equation and finding methods to solve it
C201.4	Students would gain knowledge about the applications of PDE in Chemical Engineering
C201.5	Students would have acquired knowledge on Z Transforms for a 3D model and its solution
C201.6	Formulate and solve some of the physical problems
C201	**Average**

C202/ME6301 Engineering Thermodynamics	
CO	**Outcomes**
C202.1	Analyze and solve real time flow and non – flow processes
C202.2	Apply second law of thermodynamics for evaluating the performance of thermal system
C202.3	Explain the properties of pure substances and analyze the performance of vapour power cycle
C202.4	Compare ideal and real gas and deduce the thermodynamics relations
C202.5	Solve the properties of gas mixtures
C202.6	Apply the principles of psychometric to analyze refrigeration & air conditioning systems
C202	**Average**

C203/CE6451 Fluid Mechanics and Machinery	
CO	**Outcomes**
C203.1	Calculate fluid properties and characteristics of flow using mathematical knowledge.
C203.2	Calculate loses in circular conduits using conservation laws
C203.3	Make dimensional analysis of a given set of variables using Buckingham's π theorem and relate the model and prototype
C203.4	Analyze the performance of pumps
C203.5	Analyze the performance of hydraulic machines
C203.6	Apply mathematical knowledge to predict the properties and characteristics of a fluid
C203	**Average**

C204/AT6301 Automotive Engines	
CO	**Outcomes**
C204.1	Explain the working principles of SI and CI engines
C204.2	Explain the different types of fuel systems used in IC engines
C204.3	Explain the working of combustion systems used in IC engines
C204.4	Describe the engines' emission standards its performance and emissions
C204.5	Explain the working of different types of cooling and lubrication systems for IC engines
C204.6	Develop a strong understanding for future improvements in the automobile industry
C204	**Average**

C205/AT6302 Mechanics of Machines	
CO	**Outcomes**
C205.1	Describe the concepts of machines, mechanisms and related terminologies.
C205.2	Analyze simple mechanisms for displacement, velocity and acceleration Graphically.
C205.3	Analyze various motion transmission elements like gears, gear trains, cams, belt drive and rope drive.
C205.4	Apply analytical, mathematical and graphical aspects of kinematics of machines for effective design.
C205.5	Evaluate friction and its effects in mechanical components.
C205.6	Design the kinematic linkages for a given mechanism.
C205	**Average**

C206/ME6352 Manufacturing Technology	
CO	**Outcomes**
C206.1	Apply the knowledge of various metal casting processes.
C206.2	Describe the various welding techniques with their equipment, process capabilities and principle of operations.
C206.3	Apply the knowledge of metal working processes and the physics behind in it and focus on forging operations.
C206.4	Identify the various sheet metal forming processes for a specific application.
C206.5	Describe the properties and bonding techniques of plastics and various plastic molding techniques.
C206.6	Explain formability, characteristics, test methods and working principle of sheet metals.
C206	**Average**

C207/AT6311 Automotive Components Laboratory	
CO	**Outcomes**
C207.1	Identify and assemble the automobile components
C207.2	Describe different types of frames used in various automobiles
C207.3	Describe the petrol engine fuel system
C207.4	Construct the diesel engine fuel system
C207.5	Identify and assemble the driveline system
C207.6	Identify dismantling of multi cylinder diesel engine
C207	**Average**

C208/CE6461 Fluid Mechanics and Machinery Laboratory	
CO	**Outcomes**
C208.1	Do experiments and drawing the characteristic curves of centrifugal pump/ submergible pump
C208.2	Determination of the Coefficient of discharge of given Venturi meter
C208.3	Do experiments and drawing the characteristic curves of Kaplan turbine.
C208.4	Determination of friction factor for a given set of pipes.
C208.5	Calculate the rate of flow using Rota meter.
C208.6	Do experiments and drawing the characteristics curve of reciprocating pump.
C208	**Average**

C209/ME6465 Manufacturing Technology Laboratory	
CO	**Outcomes**
C209.1	Prepare the taper turning operation for a given specification
C209.2	Make thread cutting operation as per the diagrams and compare with standard thread gauges
C209.3	Calculate the eccentricity value for the required stroke length and practice eccentricity turning operation in a lathe
C209.4	Produce square head using shaper machine as per given drawing and estimate the machining time
C209.5	Calculate the material removal rate and perform hexagonal head shaping on a given cylindrical work piece as per given drawing
C209.6	Demonstrate and fabricate Eccentric Turning using the machine tools
C209	**Average**

C210/MA6452 Statistics and Numerical Methods	
CO	**Outcomes**
C210.1	Relate basic hypothesis testing and analysis of variance
C210.2	Describe the concept of algebraic and transcendental equations
C210.3	Compute the Eigen values of matrix numerically
C210.4	Express approximate interpolating polynomials for equal and unequal intervals.
C210.5.	Extending the concepts of numerical differentiation and integration to calculate velocity, acceleration and the area of the region boundary by curves.
C210.6	Solve the ordinary and partial differential equations by numerical methods.
C210	**Average**

C211/AT6401 Applied Thermodynamics and Heat Transfer	
CO	**Outcomes**
C211.1	Explain Otto cycle and Diesel cycle
C211.2	Describe the construction details of reciprocating air compressor
C211.3	Distinguish the various gas power cycles
C211.4	Explain the basic concepts into various thermal applications
C211.5.	Describe the various mode of heat transfer and their engineering application
C211.6	Explain about radiation shields
C211	**Average**

C212/ME6403 Engineering Materials and Metallurgy	
CO	**Outcomes**
C212.1	Illustrate phase diagram for multi component systems and explain the various microstructures of steel and cast iron
C212.2	Describe various types of heat treatment process and sketch isothermal transformation.
C212.3	Compare the composition and properties of various ferrous and non-ferrous alloys.
C212.4	Describe properties and applications of polymers and composite materials
C212.5	Explain various mechanical testing methods of ferrous and non-ferrous materials.
C212.6	Analyze the fatigue and creep failure mechanisms.
C212	**Average**

C213/CE6306 Strength of Materials	
CO	**Outcomes**
C213.1	Calculate the deformation behavior of simple structures.
C213.2	Analyse problem and solve the problems related to mechanical elements
C213.3	Analyse the deformation behavior for different types of loads.
C213.4	Determine the deflection of helical springs
C213.5	Determine the Shear force and bending moment in beams
C213.6	Calculate the deformation of simple and compound bars
C213	**Average**

C214/EC6464 Electronics and Microprocessors	
CO	**Outcomes**
C214.1	Explain the fundamentals of electronics and write its application
C214.2	Discuss the basic interfacing concepts
C214.3	Describe the architecture of 8085 Microprocessor
C214.4	Explain the applications of microprocessor temperature control
C214.5	Discuss simple programs using arithmetic and logical operations.
C214.6	Describe the fundamental concept of semi conductors, Transistor
C214	**Average**

C215/AT6402 Automotive Chassis	
CO	**Outcomes**
C215.1	Describe the concepts of various vehicle frames, front axles and steering systems.
C215.2	Illustrate the construction and working principle of final drives.
C215.3	Discuss about the rear axle and suspension system.
C215.4	Explain the conditions for true rolling motion of wheels during steering.
C215.5	Explain about the constructional feature of wheels and tyres.
C215.6	Explain the Steering geometry and types of steering gear box
C215	**Average**

C216/PR6412 Computer Aided Machine Drawing Laboratory	
CO	**Outcomes**
C216.1	Describe the Code of practice for Engineering Drawing,
C216.2	Prepare the production drawings and reading of part and assembly drawings
C216.3	Draw the Bush bearing and Plummer block
C216.4	Develop knuckle, Gibs & Cotter, strap, sleeve & cotter joints using CAD
C216.5	Draw the safety and non-return valves using 2D drafting
C216.6	Do the practice in handling 2D drafting and 3D modeling software systems.
C216	**Average**

C217/EC6466 Electronics and Microprocessors Laboratory	
CO	**Outcomes**
C217.1	Draw speed characteristic of PN Junction Diode
C217.2	Draw speed characteristic of Uni Junction Transistor
C217.3	Explain the different types of logic Gates
C217.4	Do the test on speed characteristic of different microprocessor machine
C217.5	Do the test on Stepper Motor Interfacing
C217.6	Use microcontroller and programming
C217	**Average**

C218/CE6315 Strength of Materials Laboratory	
CO	**Outcomes**
C218.1	Differentiate the values of yield stress, breaking stress and ultimate stress of the given specimen under tension test.
C218.2	Experiment the Rockwell hardness test over with Brinell hardness and measure the hardness of the given specimen
C218.3	Do the torsion test to determine the modulus of rigidity of given specimen
C218.4	Calculate the stiffness of the open coil and closed coil spring and grade them.
C218.5	Analyze the microstructure and characteristics of specimen.
C218.6	Experiment Double shear test on Mild steel and Aluminum rods
C218	**Average**

C301/GE6351 Environmental Science and Engineering	
CO	**Outcomes**
C301.1	Discuss Public awareness and explain environmental is at infant stage.
C301.2	Explain the interrelationship between living organism and environment.
C301.3	Discuss the different types of pollution, effects and control measures of various types of pollution.
C301.4	Explain Global warming, acid rain and ozone layer depletion.
C301.5	Development and improvement in std. of living has lead to serious environmental disasters.
C301.6	Explain human population and the environment
C301	**Average**

C302/ME6503 Design of Machine Elements	
CO	**Outcomes**
C302.1	Discuss the stresses and strains in machine elements subjected to various loads.
C302.2	Design the components for transmission like shafts and couplings.
C302.3	Analyze the structural joints such as riveted joints, welded joints, Bolts, Knuckle and cotter joints.
C302.4	Design the machine elements like springs, flywheel.
C302.5	Analyze and design the automobile components like crank shaft and connecting rod.
C302.6	Design and select suitable bearings for Engineering applications.
C302	**Average**

C303/AT6501 Automotive Transmission	
CO	**Outcomes**
C303.1	Explain the construction and working of clutches and gearbox
C303.2	Illustrate the working principle of Torques convertor and fluid coupling used in automobiles.
C303.3	Describe the working of epicylic gearboxes used in automatic transmission
C303.4	Discuss the applications of automatic transmission systems.
C303.5	Explain the working principle of hydrostatic and electric drive used
C303.6	Explain the concepts of manual and automatic transmission of an automobile
C303	**Average**

C304/AT6502 Automotive Electrical and Electronics System	
CO	**Outcomes**
C304.1	Discuss Cranking motor construction and testing methods.
C304.2	Explain the principle of alternator and to test the alternator
C304.3	Illustrate the various ignition systems in IC Engine
C304.4	Discuss the various sensors used in automobiles.
C304.5	Discuss about the wiring & lighting systems for automobiles.
C304.6	Explain the electrical components used in vehicles
C304	**Average**

C305/AT6503 Vehicle Design Data Characteristics	
CO	**Outcomes**
C305.1	Illustrate the basic design principle of vehicle
C305.2	Discuss functions of several variables pertaining to vehicular design.
C305.3	Determine the performance curves pertain to engine.
C305.4	Calculate the gear ratios
C305.5	Evaluate the performance curves pertain to chassis.
C305.6	Design the different types of gear box
C305	**Average**

C306/AT6504 Automotive Fuels and Lubricants	
CO	**Outcomes**
C306.1	Discuss the concepts of manufacturing fuels & lubricants
C306.2	Discuss about various fuels & lubricants for IC engines
C306.3	Explain the testing methods of lubricants
C306.4	Illustrate the testing methods of automotive fuels
C306.5	Develop the strong base for combustion methodology of automotive fuels and lubricants.
C306.6	Determine the calorific value of the fuel
C306	**Average**

C307/GE6563 Communication Skills - Laboratory Based	
CO	**Outcomes**
C307.1	Make effective presentations
C307.2	Participate confidently in Group Discussions.
C307.3	Attend job interviews and be successful in them.
C307.4	Develop adequate Soft Skills required for the workplace
C307.5	Recognize differences between groups and teams
C307.6	Developed a long term career plan-making career changes
C307	**Average**

C308/AT6511 Automotive Electrical and Electronics Laboratory	
CO	**Outcomes**
C308.1	Solve the faults in electrical systems.
C308.2	Solve the faults in electronics systems and rectify it.
C308.3	Demonstrate the battery test using hydrometer
C308.4	Analysis and Diagnosis of ignition system faults
C308.5	Identify Fault Diagnosis of various sensors
C308.6	Do the test of starting motor and generators
C308	**Average**

C309/AT6512 Automotive Fuels and Lubricants Laboratory	
CO	**Outcomes**
C309.1	Analyze the lubricants and fuels used for IC engines
C309.2	Experiment the test of fuels
C309.3	Discuss the International and National standards for fuels and lubricants.
C309.4	Identify the Octane and Cetane Number of fuels.
C309.5	Do the characteristic and chase the fuels and lubricants for the automobiles.
C309.6	Determine the calorific value of given fuel
C309	**Average**

C310/MG6851 Principles of Management	
CO	**Outcomes**
C310.1	Explain the purpose of management & managerial roles in local and global organization
C310.2	Prescribe the decision making model under different conditions
C310.3	Explain the process of staff selection and career development
C310.4	Demonstrate creativity and innovation, and explain the motivational theories
C310.5	Explain the process of different types of control, and planning operations in management
C310.6	Explain the System and process of controlling
C310	**Average**

C311/AT6601/Automotive Engine Components Design	
CO	**Outcomes**
C311.1	Describe the concepts of Limits, Fits and tolerances pertaining to automotive engine components
C311.2	Evaluate the design concepts for cylinder, piston and connecting rod.
C311.3	Design the crankshaft of an engine under different loading conditions.
C311.4	Determine the design criteria associated with flywheel for an engine.
C311.5	Design the Camshaft and valves for an IC engine.
C311.6	Design the engine components used in an automobile.
C311	**Average**

C312/AT6602/Automotive Chassis Components Design	
CO	**Outcomes**
C312.1	Discuss about various vehicular structures.
C312.2	Evaluate engineering problems related to automobile drive line components.
C312.3	Explain about the performances of various axles and to design the same.
C312.4	Design the various braking systems.
C312.5	Design the various suspension systems.
C312.6	Design the automotive components like frame, axel.
C312	**Average**

C313/AT6603/Two and Three Wheelers	
CO	**Outcomes**
C313.1	Explain about the Engines employed for two and three wheelers.
C313.2	Discuss about the Chassis and its sub-systems.
C313.3	Discuss about the functionality of Brakes and wheels.
C313.4	Illustrate the specific Case studies of major Indian models.
C313.5	Explain about Servicing, maintenance and trouble shooting of two and three wheelers.
C313.6	Develop the sub system of two and three wheeler
C313	**Average**

C314/AT6604/Vehicle Dynamics	
CO	**Outcomes**
C314.1	Explain the concept of mechanical vibrating system
C314.2	Analyze fundamentals of vibration theory and familiar with their mathematic models.
C314.3	Solve the suspension and tire related vibrations
C314.4	Develop themselves about the vibration control techniques & stability of vehicle
C314.5	Apply the numerical methods in automobiles
C314.6	Analyze the longitudinal dynamics and control
C314	**Average**

C315/AT6002 Alternative Fuels and Energy System	
CO	**Outcomes**
C315.1	Explain the different types of alternative fuels
C315.2	Explain the fuel air cycle and actual cycle
C315.3	Discuss the working of hydrogen fuel engine
C315.4	Explain the production methods of biogas
C315.5	Discuss the concept of hybrid and fuel cell vehicle
C315.6	Determination of ignition delay and combustion duration
C315	**Average**

C316/AT6611 Computer Aided Engine and Chassis Design Laboratory	
CO	**Outcomes**
C316.1	Draw the piston and connecting rod.
C316.2	Draw the crankshaft and flywheel.
C316.3	Use the modeling tool to draw piston and connecting rod.
C316.4	Draw the clutches and gearbox.
C316.5	Draw the rear axle and final drive bearings.
C316.6	Do the practice in handling 2D drafting and 3D modeling software systems.
C316	**Average**

C317/AT6612/ Two and Three Wheelers Laboratory	
CO	**Outcomes**
C317.1	Experiment on dynamometers.
C317.2	Use tools to assemble the engine components
C317.3	Experiment on two and three wheelers.
C317.4	Experiment on compression test on spring tester
C317.5	Experiment on shock absorber test.
C317.6	Use tools to dismantling and assembling of three wheeler steering system
C317	**Average**

C401/AT6701 Engine and Vehicle Management System	
CO	**Outcomes**
C401.1	Explain the role of various sensor
C401.2	Illustrate the working principle of influence in controlling pollution
C401.3	Discuss the modern control strategies like Fuzzy logic and adaptive control
C401.4	Explain the basics of Vehicle Motion Control and telemetric system
C401.5	Explain the different types of sensors used in automotive system
C401.6	Explain the fundamentals of automotive electronics
C401	**Average**

C402/ME6603 Finite Element Analysis	
CO	**Outcomes**
C402.1	Solve problems by applying standard finite element techniques.
C402.2	Analyze 1-D finite elements and to build the stiffness matrix.
C402.3	Examine 2-D finite element continuum for structural applications.
C402.4	Solve 1-D and 2-D heat transfer problems using finite element approach.
C402.5	Apply axisymmetric formulation for specific applications and Make use of finite element principles in iso parametric applications.
C402.6	Apply the concepts of finite element principles in iso parametric applications
C402	**Average**

C403/AT6702 Vehicle Maintenance	
CO	**Outcomes**
C403.1	Explain the procedure for dismantling and assembling the engine
C403.2	Discuss Gain skills in handling situations where the vehicle is likely to fail.
C403.3	Describe the maintenance procedures like repairing, overhauling etc.,
C403.4	Explain the concept of fault diagnosis
C403.5	Discuss the various advances in fault diagnosis
C403.6	Develop a strong base for understanding of automotive brake bleeding
C403	**Average**

C404/AT6703 Automotive Pollution and Control	
CO	**Outcomes**
C404.1	Discuss the current scenario of Automobile Emissions and standards.
C404.2	Explain about the formation of Emissions from SI Engines.
C404.3	Explain about the formation of Emissions from CI Engines.
C404.4	Discuss Emission and control Techniques in SI and CI Engines.
C404.5	Describe the measuring techniques of Emission and test procedure.
C404.6	Explain various control techniques
C404	**Average**

C405/AT6007/New Generation and Hybrid Vehicles	
CO	**Outcomes**
C405.1	Explain the working principle of lean burn engine
C405.2	Explain the working principle of aerodynamic drag
C405.3	Illustrate the basics of Vehicle Motion Control and telemetric system
C405.4	Discuss the recent development pertain to newer vehicle
C405.5	Discuss the Recent technologies in the area of suspension systems, brakes, aerodynamics
C405.6	Develop a strong base for understanding of automotive braking system
C405	**Average**

C406/AT6011 Automotive Safety	
CO	**Outcomes**
C406.1	Design the body of vehicle inside
C406.2	Explain the speed and acceleration characteristics of passenger compartment
C406.3	Explain the safety equipments
C406.4	Discuss the various safety concepts used in passenger cars.
C406.5	Explain the basics of vehicle collision and its effects.
C406.6	Describe the recent technologies in automobile
C406	**Average**

C407/AT6711 Engine Performance and Emission Testing Laboratory	
CO	**Outcomes**
C407.1	Use the knowledge of test engines
C407.2	Analyze the performance and heat balance test on IC engines using various dynamometers.
C407.3	Conduct exhausts gas analysis.
C407.4	Examine and control the emission
C407.5	Draw the Valve timing and port timing diagram
C407.6	Discuss to handle different equipments to conduct performance test.
C407	**Average**

C408/AT6712 Vehicle Maintenance Laboratory	
CO	**Outcomes**
C408.1	Do the test engine analysis using diagnostic systems.
C408.2	Evaluate wheel balancing and alignment.
C408.3	Calculate the timing and test a fuel injection pump.
C408.4	Solve the faults and knowledge on maintenance
C408.5	Experiment of fault diagnosis and service of Electrical system like battery
C408.6	Experiment of fault diagnosis and service of vehicle air conditioning system
C408	**Average**

C409/AT6801/ Vehicle Body Engineering	
CO	**Outcomes**
C409.1	Explain the different types of car body.
C409.2	Discuss the constructional details of the bus body.
C409.3	Explain the regulations and constructional details of a commercial vehicle body.
C409.4	Describe the role of various aerodynamic forces and moments, measuring instruments
C409.5	Explain the materials used in body building, tools used and procedure for body repairs.
C409.6	Design and construct the external body of the vehicles.
C409	**Average**

C410/AT6013 Transport Management	
CO	**Outcomes**
C410.1	Explain the various transport system
C410.2	Write the training procedure
C410.3	Explain the various types of fare collecting method
C410.4	Describe the factors of bus scheduling
C410.5	Discuss about the motor vehicle act
C410.6	Interpret the maintenance aspects of transport
C410	**Average**

C411/AT6811/Project Work	
CO	**Outcomes**
C411.1	Develop the ability to solve a specific problem
C411.2	Select the proper tool and machine to carry out the experiment
C411.3	Identify the problem of the project
C411.4	Analyze the mechanical and thermal characteristic
C411.5	Apply the mechanism to execute the project
C411.6	Calculate the stress and thermal values using formula
C411	**Average**