

# Department of Automobile Engineering

## COURSE OUTCOMES

**Academic Year: 2018-2019**

**Semester: ODD**

**Class: S. E. Automobile**

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**1) Name of the Course: Applied Mathematics- III**

**Course Code: AEC 301**

Learner will be :

1. Able to state Cauchy's Integral theorem, Cauchy's Residue theorem, properties of Laplace transform, define orthogonal set of functions, analyticity of the given functions, solve differential equation by Laplace transform & inverse Laplace transform, solution of wave equation & heat equation by numerical method, Apply Parseval's identity for the given function.
2. Able to find Laplace and inverse Laplace transform of the given function, analytic function, orthogonal trajectories for the given family of curves, image of the given region under given transformation, bilinear transformation, poles, residues & singularities of the given function, correlation coefficient, lines of regression, equation of curve by using least square method, obtain Laurent's & Taylors series, solution of wave & heat equation, Test analyticity of the given function.
3. Able to evaluate definite integral by Laplace transform and inverse Laplace transform of the given function, integral by Cauchy's integral formula & Cauchy's residue theorem.

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**2) Name of the Course: Thermodynamics**

**Course Code: AEC 302**

Learner will be :

1. Able to state and describe basic definitions and terminology as well as special definitions related to thermodynamics point of view, why and how the natural process occurs only in one direction.
2. Able to classify, compare and differentiate types of thermodynamics process, gas power cycles, vapor power cycle, flow, and non-flow processes.
3. Able to solve the problems Steady flow energy equation, laws of thermodynamics, calculate the efficiencies and relate them to what occurs in an actual power plant, the reactive system, determine what changes of state will result in improving the performance.
4. Able to analyze and test cycles based on thermodynamics, compare the performance of various cycles for energy production, Draw conclusions on the behavior of various cycles operating between temperature limits.

5. Able to create, design and draw P-V, T-S diagrams, formulate mathematical models for thermal efficiency of cycle.
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**3) Name of the Course:** Strength of materials

**Course Code:** AEC 303

Learner will be able to :

1. Demonstrate fundamental knowledge about various types of loading and stresses induced.
  2. Draw the SFD and BMD for different types of loads and support conditions.
  3. Analyse the stresses induced in basic mechanical components.
  4. Estimate the strain energy in mechanical elements.
  5. Analyse the deflection in beams.
  6. Analyse buckling and bending phenomenon in columns, struts and beams.
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**4) Name of the Course:** Production process- I

**Course Code:** AEC 304

Learner will be able to :

1. Demonstrate understanding of casting process.
  2. Illustrate principles of forming processes
  3. Demonstrate applications of various types of welding processes.
  4. Differentiate chip forming processes such as turning, milling, drilling, etc.
  5. Illustrate the concept of producing polymer components and ceramic components.
  6. Distinguish between the conventional and modern machine tools.
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**5) Name of the Course:** Material Technology

**Course Code:** AEC 305

Learner will be able to :

1. Identify various defects and failure mechanisms .
2. Explain effect of alloying elements on properties
3. Differentiate microstructure of different materials.

4. Select appropriate heat treatment process for specific requirements.
  5. Interpret Iron - Iron carbide, TTT & CCT diagram & their significance.
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**6) Name of the Course:** Computer Aided Machine drawing      **Course Code:** AEL 301

Learner will be able to:

1. Visualize and prepare detail drawing of a given object.
2. Read and interpret the drawing.
3. Draw details and assembly of different mechanical systems. Able to analyze stability using Root locus, Bode plot & Nyquist plots.
4. Convert detailed drawing into assembly drawing using modelling software.
5. Convert assembly drawing into detailed drawing using modelling software.
6. Prepare detailed drawing of any given physical object/machine element with actual measurements.

# Department of Automobile Engineering

## COURSE OUTCOMES

**Academic Year: 2018-2019**

**Semester: ODD**

**Class: T. E. Automobile**

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**1) Name of the Course: Internal Combustion Engine**

**Course Code: AEC 501**

Learner will be:

1. Able to define and describe the various parts of reciprocating, rotary engines, methods of scavenging, objectives of MPFI system and variable specific heats with their functions.
2. Able to classify, compare and differentiate the various engines, combustion in SI and CI engines, detonation in SI and CI engines, methods of turbo charging and supercharging.
3. Able to prepare the heat balance sheet on SI and CI engines, Pressure crank angle dia. For SI and CI engines with their essential stages.
4. Able to calculate Air standards cycle efficiencies, mixture strength requirement in carburetor, fuel injection time and various performance characteristics of internal combustion engine.
5. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.

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**2) Name of the Course: Mechanical Measurement & Control**

**Course Code: AEC 502**

Learner will be :

1. Able to state define basic concepts and classify different measurement and control systems.
2. Able to explain and compare various measuring devices, concepts of stability.
3. Able to compute time domain specification parameters, steady state error, error coefficient for different type of systems using step, ramp & parabolic inputs.
4. Able to analyze stability using Root locus, Bode plot & Nyquist plots.
5. Able to design mathematical model of system / process for standard input responses.
6. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.

**3) Name of the Course: Heat Transfer**

**Course Code: AEC 503**

Learner will be able to :

1. Identify the three modes of heat transfer (conduction, convection and radiation).
  2. Illustrate basic modes of heat transfer.
  3. Develop mathematical model for each mode of heat transfer.
  4. Develop mathematical model for transient heat transfer.
  5. Demonstrate and explain mechanism of boiling and condensation.
  6. Analyse different heat exchangers and quantify their performance.
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**4) Name of the Course: Automotive Systems**

**Course Code: AEC 504**

Learner will be:

1. Able to practically identify different automotive systems and subsystems
  2. Able to practically identify different automotive components.
  3. Able to illustrate working and functions of various automotive components.
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**5) Name of the Course: Press Tool Design**

**Course Code: AEDLO 5011**

Learner will be :

1. Able to demonstrate various press working operations for mass production of sheet metal parts.
2. Able to identify press tool requirements to build concepts pertaining to design of press tools
3. Able to prepare working drawings and setup for economic production of sheet metal components
4. Able to select suitable materials for different elements of press tools
5. Able to illustrate the principles and blank development in bent & drawn components
6. Able to elaborate failure mechanisms of pressed components, safety aspects and automation in press working.

**6) Name of the Course: Design of jigs & Fixtures**

**Course Code: AEDLO 5013**

Learner will be :

1. Able to write methodically, the sequence of operations of simple work-piece
  2. Able to identify and select locating and clamping points on work-piece
  3. Able to demonstrate construction of drill jig
  4. Able to illustrate construction of milling fixture
  5. Able to identify appropriate combination of tools, jigs and fixture, suitable for a particular machining operation
  6. Able to design assembly of jigs and fixtures on simple work-piece
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**7) Name of the Course: Business Communication and Ethics**

**Course Code: AEL 506**

Learner will be able to :

1. Design a technical document using precise language, suitable vocabulary and apt style.
2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships.
3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
5. Deliver formal presentations effectively implementing the verbal and non-verbal skills.

# Department of Automobile Engineering

## COURSE OUTCOMES

**Academic Year: 2018-2019**

**Semester: ODD**

**Class: B. E. Automobile**

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**1) Name of the Course: Chassis Body Engineering**

**Course Code: AEC 701**

Learner will be :

1. Able to list, state and describe chassis, body, body material, various aerodynamic forces, moments and loads on the vehicle.
  2. Able to identify, classify, sketch and discuss types of structure, car, bus, and commercial vehicle body details and overall criteria for vehicle Comparison
  3. Able to explain the design and requirements of vehicle visibility, vehicle safety, Driver seat, Passenger seat, child seat, preliminary design, Shear Panel Method and the latest trends in design, manufacturing, and materials.
  4. Able to analyses and calculate drag, loading cases and various body optimization techniques for minimum drag.
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**2) Name of the Course: CAD/CAM/CAE**

**Course Code: AEC 702**

Learner will be able to :

1. Identify proper computer graphics techniques for geometric modeling.
2. Transform, manipulate objects and store and manage data.
3. CAM Tool path Creation and NC- G code output.
4. Use rapid prototyping and tooling concepts in any real life applications.
5. Identify the tools for Analysis of a complex engineering component.

**3) Name of the Course:** Automotive Design

**Course Code:** AEC 703

Learner will be able to :

1. Design automotive component to meet desired needs.
  2. Apply the fundamental knowledge of Applied Mechanics, Strength of Materials, Engineering Materials and Theory of Machine for actual design problems.
  3. Answer oral questions/queries by examiner/evaluators and write assignments and answers in English.
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**4) Name of the Course:** Product Design & Development

**Course Code:** AEC 704

Learner will be able to :

1. State and describe the concepts, functions and applications of chip formation, dynamometer, presses, indexing devices, NTM processes, Additive manufacturing etc.
  2. Compare, discuss and explain, Merchant's theory, tool forces, dynamometers, tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures.
  3. Compare, discuss and explain, Merchant's theory, tool forces, dynamometers, tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures.
  4. Differentiate sheet metal dies, Jig and Fixtures, EDM and ECM, AJM and WJM, AM and CNC machining and calculate total pressure, Scrap strip layout, other elements of press
  5. Answer oral questions/queries by examiner/evaluators and write assignments and answers in English.
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**5) Name of the Course:** Transport Management Motor Industry, **Course Code:** AEE 7017

Learner will be able to...

1. Demonstrate transport management systems
  2. Implement advance techniques in traffic management
  3. Demonstrate understanding of motor vehicle act.
  4. Interpret about vehicle insurance and taxation.
  5. Illustrate the knowledge of Passenger transport operation.
  6. Illustrate the knowledge of Goods transport operation.
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# Department of Automobile Engineering

## COURSE OUTCOMES

**Academic Year: 2018-2019**

**Semester: EVEN**

**Class: S. E. Automobile**

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**1) Name of the Course: Applied Mathematics- IV**

**Course Code: AEC 401**

Learner will be :

1. Able to State Cayley Hamilton theorem, uses of Chi-square test, Explain Type I and Type II error, one tailed and two tailed test, Find Eigen values and Eigen vectors of matrix, quadratic forms, mean, variance and probability, directional derivative, unit vector, work done, angle between surfaces, Use Cayley Hamilton theorem, Solve LPP.

2. Able to Show the matrix is diagonalizable, derogatory, Prove solenoidal, irrotational vector field, Prove statement on function of square matrix.

3. Able to Verify Cayley Hamilton theorem, green's theorem, Evaluate surface integral using Stoke's, Gauss divergence theorem.

4. Able to Test hypothesis for large, small samples, non parametric test, equality of variance.

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**2) Name of the Course: Fluid Mechanics**

**Course Code: AEC 402**

Learner will be able to...

1. Define properties of fluid and classification of fluid

2. Evaluate hydrostatic force on various surfaces and predict stability of floating body

3. Formulate and solve equation of the control volume for fluid flow system

4. Apply Bernoulli's equations of the control volume for fluid flow system

5. Calculate resistance to flow of incompressible fluid.

6. Apply fundamentals of compressible fluid flows to relevant system.

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**3) Name of the Course: Industrial Electronics**

**Course Code: AEC 403**

Learner will be able to :

1. Able to illustrate construction, working principles and applications of power electronic switches..
  2. Able to identify digital circuits for industrial applications.
  3. Able to solve the problems on semi converter, full converter, number system, Boolean algebra.
  4. Able to analyze speed-torque characteristics of electrical machines for speed control.
  5. Able to design circuits using op-amp, timer555, and microcontroller.
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**4) Name of the Course: Production process- II**

**Course Code: AEC 404**

Learner will be able to :

1. State and describe the concepts, functions and applications of chip formation, dynamometer, presses, indexing devices, NTM processes, Additive manufacturing etc.
  2. Compare, discuss and explain Merchant's theory, tool forces, dynamometers, and tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures.
  3. Sketch and draw Merchant circle, Dynamometers, cutting tool geometry, press tool dies, jigs and fixtures elements, NTM processes, AM systems etc
  4. Differentiate sheet metal dies, Jig and Fixtures, EDM and ECM, AJM and WJM, AM and CNC machining and calculate total pressure, Scrap strip layout, other elements of press in the design of Blanking die, Piercing die.
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**5) Name of the Course: Kinematics of Machinery**

**Course Code: AEC 405**

Learner will be :

1. Able to state define and describe basic concepts of kinematics and kinetics of machine
2. Able to explain and compare various types of mechanism & power transmission devices.
3. Able to compute different parameters of cam & follower, belts, chains, gear & gear train mechanism. Also DOF of mechanisms.
4. Able to plot displacement-time, velocity-time, acceleration-time & jerk-time diagrams for cam profile. Also draw cam profile.

5. Able to draw velocity diagram by Instantaneous Centre method. Also draw velocity & acceleration diagrams for four bar mechanism & for slider crank mechanism by relative method.
  6. Able to develop & build mechanisms to provide specific motion..
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**6) Name of the Course:** Data Base and Information Retrieval      **Course Code:** AEL 401

Learner will be able to:

1. Identify data models and schemes in DBMS
2. Demonstrate the features of database management systems and Relational database
3. Use SQL- the standard language of relational databases
4. Demonstrate understanding of functional dependencies and design of the database
5. Design graphical user Interface for specific application.
6. Create visual software entities

# Department of Automobile Engineering

## COURSE OUTCOMES

**Academic Year: 2018-2019**

**Semester: EVEN**

**Class: T. E. Automobile**

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**1) Name of the Course: Chassis and Body Engineering**

**Course Code: AEC 601**

Learner will be :

1. Able to list, state and describe chassis, body, body material, various aerodynamic forces, moments and loads on the vehicle.
2. Able to identify, classify, sketch and discuss types of structure, car, bus, and commercial vehicle body details and overall criteria for vehicle Comparison
3. Able to explain the design and requirements of vehicle visibility, vehicle safety, Driver seat, Passenger seat, child seat, preliminary design, Shear Panel Method and the latest trends in design, manufacturing, and materials.
4. Able to analyses and calculate drag, loading cases and various body optimization techniques for minimum drag.

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**2) Name of the Course: Machine Design - I**

**Course Code: AEC 602**

Learner will be able to :

1. Demonstrate understanding of various design considerations.
  2. Illustrate basic principles of machine design.
  3. Design machine elements for static as well as dynamic loading.
  4. Design machine elements on the basis of strength/ rigidity concepts.
  5. Use design data books in designing various components.
  6. Acquire skill in preparing production drawings pertaining to various designs.
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**3) Name of the Course: Finite Element Analysis**

**Course Code: AEC 603**

Learner will be able to :

1. Solve differential equations using weighted residual methods
  2. Develop the finite element equations to model engineering problems governed by second order differential equations.
  3. Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements.
  4. Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements.
  5. Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system
  6. Use commercial FEA software, to solve problems related to mechanical engineering.
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**4) Name of the Course: Mechanical Vibrations**

**Course Code: AEC 604**

Learner will be able to:

1. Develop mathematical model to represent dynamic system.
  2. Estimate natural frequency of mechanical system.
  3. Analyze vibratory response of mechanical system.
  4. Estimate the parameters of vibration isolation system.
  5. Balance an existing unbalanced rotating and reciprocating system completely/partially.
  6. Comprehend the application of condition monitoring and fault diagnosis on a live project/case study.
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**5) Name of the Course: Mechatronics**

**Course Code: AEDLO 6021**

Learner will be :

1. Able to identify the suitable sensor and actuator for a Mechatronics system.
2. Able to select suitable logic controls.
3. Able to analyse continuous control logics for standard input conditions.
4. Able to develop ladder logic programming.
5. Able to design hydraulic/pneumatic circuits.
6. Able to design a Mechatronics system.

# Department of Automobile Engineering

## COURSE OUTCOMES

**Academic Year: 2018-2019**

**Semester: EVEN**

**Class: B. E. Automobile**

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**1) Name of the Course: Autotronics**

**Course Code: AEC 801**

Learner will be able to :

1. To study basic and advance Automotive Electronics systems.
  2. To study working of different Automotive Electronics systems and subsystems.
  3. To study basic and advance electronics technologies like Battery, Fuel Cell, ECM etc.
  4. To have basic idea about how automotive electrical systems are developed.
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**2) Name of the Course: Vehicle Dynamics**

**Course Code: AEC 802**

Learner will be able to :

1. Analyze the vehicle directional stability.
  2. Enumerate the suspension systems, tire dynamics & directional stability of the vehicle.
  3. Develop physical and mathematical models to predict the dynamic response of vehicles
  4. Demonstrate the ride characteristic of the vehicle.
  5. Analyze the vehicle roll behavior
  6. Comprehend the various trends in Vehicle Dynamics.
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**3) Name of the Course: Vehicle Maintenance**

**Course Code: AEC 803**

Learner will be able to :

1. Effectively use automotive diagnostic tools in industries.
  2. Improve existing vehicle maintenance practices in industries.
  3. Answer oral questions/queries by examiner/evaluators and write assignments and answers in English.
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**4) Name of the Course: Vehicle Safety**

**Course Code: AEE 8022**

Learner will be able to :

1. Comprehend Vehicle design from safety point of view.
  2. Apply concepts of accident reconstruction analysis in real world.
  3. Enumerate interrelation ship among occupant, restraint systems and vehicles in accidents.
  4. Illustrate role and significance of seat in Rear crash safety
  5. Demonstrate different active and passive safety systems available in vehicles
  6. Illustrate various standards related to vehicle safety.
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