VEHICLE BODY ENGINEERING AND SAFETY

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – VIII

Subject Code	15AU81	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
Credits	04		

Course objectives: at the end of this course, students will be able to:

1. Classify the vehicles and define basic terms.
2. Select appropriate body material.
3. Calculate various aerodynamic forces and moments acting on vehicle.
4. Calculate load distribution in vehicle body.
5. Explain the ergonomics, stability the vehicle.
6. Identify the various safety aspects in a given vehicle.
7. Identify various sources of noise and methods of noise separation.

Module-I	
Classification of coachwork : Styling forms, coach and bus body style, layout of cars, buses and coach with different seating and loading capacity, commercial vehicle types, Vans and Pick ups. Terms used in body building construction, Angle of approach, Angle of departure, Ground clearance, Cross bearers, Floor longitudes, posts, seat rail, waist rail, cant rail, Roof stick, Roof longitude, Rub rail, skirt rail, truss panel, wheel arch structure, wheel arch, post diagonals, gussets.	10 Hours
Module-II	
Vehicle Body Materials: Aluminium alloys, Steel, alloy steels, plastics, Metal matrix composites, structural timbers - properties, glass reinforced plastics and high strength composites, thermoplastics, ABS and styrenes, load bearing plastics, semi rigid PUR foams and sandwich panel construction. Paints adhesives and their properties, corrosion and their prevention.	10 Hours
Module-III	
Aerodynamics: Basics, Vehicle drag and types, Various types of forces and moments, effects of forces and moments, various body optimization techniques for minimum drag, Principle of wind tunnel technology, flow visualization techniques, tests with scale models, aerodynamic study for heavy vehicles. **Load distribution:** Type of body structures, Vehicle body stress analysis, vehicle weight distribution, Calculation of loading for static loading, symmetrical, longitudinal loads, side loads, stress analysis of bus body structure under bending and torsion.	10 Hours
Module-IV	
Interior Ergonomics: Introduction, Seating dimensions, Interior ergonomics, ergonomics system design, seat comfort, suspension seats, split frame seating, back passion reducers, dash board instruments, electronic displays, commercial vehicle cabin	10 Hours

ergonomics, mechanical package layout, goods vehicle layout. Visibility, regulations, drivers visibility, methods of improving visibility, Window winding and seat adjustment mechanisms. **Vehicle Stability:** Introduction, Longitudinal, lateral stability, vehicle on a curvilinear path, critical speed for toppling and skidding. Effect of operating factors on lateral stability, steering geometry and stabilization of steerable wheels, mass distribution and engine location on stability.	
Module-V	
Noise and vibration: Noise characteristics, Sources of noise, noise level measurement techniques, Body structural vibrations, chassis bearing vibration, designing against fatigue, methods of noise suppression. **Impact protection:** basics, Physics of impact between deformable bodies, Design for crash worthiness, occupant and cargo restraint, passive restraint systems, side impact analysis, bumper system, energyabsorbent foams, laws of mechanisms applied to safety	10 Hours

Course outcomes: After completion of above course, students will be able to:

1. Classify the vehicles and define basic terms.
2. Select appropriate body material.
3. Calculate various aerodynamic forces and moments acting on vehicle.
4. Calculate load distribution in vehicle body.
5. Explain the ergonomics, stability the vehicle.
6. Identify the various safety aspects in a given vehicle.
7. Identify various sources of noise and methods of noise separation

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 16 marks.
3. There will be 2full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Body Engineering -Sydney F page, Chapman & Hall Ltd, London, 1956
2. Vehicle body engineering - Giles J Pawlowsky, Business books limited, 1989
3. Vehicle body layout and analysis - John Fenton, MechanicalEngg. Publication ltd, London.

Reference Books:

1. Hand book on vehicle body design – SAE publication.
2. Automotive chassis - P.M. Heldt, Chilton & Co, 1970
3. Vehicle Safety 2002 -Cornwell press, Townbridge, UK, ISBN 1356 -1448.
4. Redesign of bus bodies – part I & part II – CIRT pune (Report), 1983
5. Aerodynamics of Road Vehicles - Ed W.H. Hucho, 4th Edition, Butter worth's 1987
6. Road Vehicle Aerodynamics - Scibor-Rylski A. J.,Pentech press, London 2nd Edition 1984
7. Low Speed Wind Tunnel Testing - Rae W.H. & Pope A, Wiley & Sons, USA 1984

MECHANICAL VIBRATIONS

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – VIII

Subject Code	15AU82	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
Credits	04		

Course objectives: at the end of this course, students will be able to:

1. Classify different types of vibration / damping associated with systems and vibration measuring instruments.
2. Calculate natural frequency, damping, logarithmic decrement and other parameters of single degree of freedom un-damped / damped free vibrating systems
3. Compute the response of single degree of freedom damped vibrating systems to different excitation forces.
4. Determine the natural frequencies and the modes of two degree of freedom free vibrating systems
5. Compare the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods

Module-I	
Introduction: Types of vibration, Simple harmonic motion and definition of some terms of vibration, Vector method and complex form of representing harmonic motions, addition of simple harmonic motions. **Undamped free vibration**: Introduction, Newton's second law of motion method, D'Alembert's principle, Energy method, Single degree of freedom systems, Natural frequency of free vibration, equivalent stiffness of springs, effect of spring mass.	10 Hours
Module-II	
Damped free vibration: Single degree of freedom systems, types of damping, concept of critical damping and its importance, study of viscous damped systems - under damping, critical damping and over damping, logarithmic decrement, structural and coulomb damping. **Whirling of shafts**: Whirling of shafts with and without air damping, discussion of speeds above and below critical speeds.	10 Hours
Module-III	
Forced vibration: Single degree of freedom systems, steady state solution with viscous damping due to harmonic force, concept of frequency response, reciprocating and rotating unbalance, vibration isolation and transmissibility, energy dissipated by damping, equivalent viscous damping, Structural damping, sharpness of resonance, base excitation.	10 Hours
Module-IV	
Two degree of freedom systems: Introduction, principle and normal modes of vibration, co-ordinate coupling,	10 Hours

generalized and principal co-ordinates, orthogonality principle, Lagrange's equation, semi-definite systems, forced vibrations, harmonic excitation. Applications: Vehicle suspension, Dynamic vibration absorber, dynamics of reciprocating engines. **Vibration measuring instruments** Vibrometer, Accelerometer and frequency measuring instruments.	
Module-V	
Multi degree of freedom systems: Introduction, influence coefficients, Maxwell's reciprocal theorem, orthogonality principle, Dunker ley's equation, determination of natural frequencies using matrix iteration method, Holzer's method for systems with free, fixed free and fixed ends, stodola method, Rayleigh's method for beam vibration	10 Hours

Course outcomes: After completion of above course, students will be able to:

1. Classify different types of vibration / damping associated with systems and vibration measuring instruments.
2. Calculate natural frequency, damping, logarithmic decrement and other parameters of single degree of freedom un-damped / damped free vibrating systems
3. Compute the response of single degree of freedom damped vibrating systems to different excitation forces.
4. Determine the natural frequencies and the modes of two degree of freedom free vibrating systems
5. Compare the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 16 marks.
3. There will be 2full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Mechanical Vibrations, G. K. Grover and S. P. Nigam, Nemchand and Brothers, Roorkee.
2. Mechanical Vibrations: V.P. Singh, DhanpatRai and Sons, New Delhi

Reference Books:

1. Theory and Problems of Mechanical Vibrations - William W. Seto, McGraw Hill International BookCo., Singapore (Schaum's outline series)
2. Mechanical Vibrations -S. S. Rao, Pearson Education Inc.,
3. Mechanical Vibrations -S. Graham Kelly, Schaum's Outline Series, Tata McGraw Hill Publishing Co.Ltd., New Delhi
4. Theory and Practice of Mechanical vibrations - J. S. Rao and K. Gupta, New Age InternationalPublications, New Delhi
5. Elements of Vibrations Analysis - Leonard Meirovitch, Tata McGraw Hill, New Delhi

TOTAL QUALITY MANAGEMENT

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – VIII

Subject Code	15AU831	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
Credits	03		

Course objectives: at the end of this course, students will be able to:

1. Explain basic concepts of TQM
2. Describe leader ship qualities, different factors of customer satisfaction and benefits of involvement of employee in quality management
3. Describe various techniques for continuous process improvement and to understands its benefits
4. Apply various tools and techniques in industries to achieve the higher productivity
5. Describe importance of HR dept. recruitment process, importance of training of employees
6. Understand use of various graphical representation of process behavior in TQM

Module-I	
Introduction to TQM Introduction-Definition, Basic Approach, and Contribution of Gurus - TQM framework, Historical Review,Benefits of TQM, TQM organization. **Leadership, Customer Satisfaction and Employee Involvement:** Characteristics of quality leaders, Customers satisfaction, Customer perception of quality, Feedback, Using customer's complaints, Employee involvement - Introduction, Teams, Cross functional teams, Quality circles, Suggestion system, Benefits of employee involvement.	08 Hours
Module-II	
Continuous process Improvement and tools techniques: The juran trilogy, improvement strategies, types of problems, the PDSA cycle, problem solving methods, Kaizen, reengineering, six sigma, Process of benchmarking, quality function deployment, quality by design, failure mode and FME analysis, case studies	08 Hours
Module-III	
Quality Mangement tools Why- why forced filed analysis, nominal group techniques, affinity diagram, interrelationship diagram, Tree diagram, matrix diagram, process decision programme chart, activity network diagram, prioritization matrices	08 Hours
Module-IV	
Human Resource Practices: Scope of Human Resources Management, leading practices, designing high performance work systems-work and job design, Recruitment and career development, Training and education, Compensation and recognition, Health, safety and employee well-being, performance appraisal.	08 Hours
Module-V	
Statistical process control Paratodigram, process flow diagram, fishbone diagram, histograms, check sheets, statistical fundamentals. Control charts, types of control charts, scattered	08 Hours

diagrams case studies and numerical problems	

Course outcomes: After learning all the modules of the course, the studentswill be able to

1. Explain basic concepts of TQM.
2. Describe leader ship qualities, different factors of customer satisfaction and benefits of involvement of employee in quality management
3. Describe various techniques for continuous process improvement and to understands its benefits
4. Apply various tools and techniques in industries to achieve the higher productivity
5. Describe importance of HR dept. recruitment process, importance of training of employees
6. Understand use of various graphical representation of process behavior in TQM

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 16 marks.
3. There will be 2 full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Total Quality Management - Dale H. Besterfield, Pearson Education India, ISBN: 8129702606, Edition 03/e Paperback (Special Indian Edition)
2. The management and control of Quality - James R. Evans and William M.Lindsay, ISBN: 981-243-552-0 , Publisher - Thomson South-Western, Edition –6

Reference Books:

1. Total Quality Management for Engineers - M. Zairi, ISBN: 1855730243, Woodhead Publishing.
2. 100 Methods for Total Quality Management -Gopal K. Kanji and Mike Asher , ISBN: 0803977476, Publisher: Sage Publications, Inc.; Edition – 1

DATABASE MANAGEMENT SYSTEM

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – VIII

Subject Code	15AU832	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
Credits	03		

Course objectives:The at the end of this course, students will be able to:

1. Explain the advantages of using DBMS as an approach to bookkeeping
2. Discuss entity-relationship model as the basis for the design of DBMS
3. Describe relational model and relational algebra as the basis for the design of DBMS languages like SQL
4. Apply SQL statements against an existing DBMS
5. Develop a specimen database using SQL in conformance with the rules of normalization.
6. Describe transactional management and its intricacies.

Module-I	
Introduction: Introduction; Characteristics of Database approach; Advantages of using DBMS approach; Data models, schemas and instances; Three-schema architecture and data independence, The database system environment; Centralized and client-server architectures; Classification of Database Management systems. **Entity-Relationship Model:** Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams, Naming Conventions and Design Issues; Relationship types of degree higher than two.	08 Hours
Module-II	
Relational Model and Relational Algebra : Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations : JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra; Relational Database Design Using ER- to-Relational Mapping.	08 Hours
Module-III	
SQL – 1: SQL Data Definition and Data Types; Specifying basic constraints in SQL, Schema change statements in SQL, Basic queries in SQL, More complex SQL Queries. **SQL – 2 :** Insert, Delete and Update statements in SQL, Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL, Additional features of SQL, Database programming issues and techniques.	08 Hours
Module-IV	

Database Design: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form, Properties of Relational Decompositions; Algorithms for Relational Database Schema Design; Multivalued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form; Inclusion Dependencies; Other Dependencies and Normal Forms.	08 Hours
Module-V	
Transaction Management: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock- Based Concurrency Control; Performance of locking; Transaction support in SQL; Introduction to crash recovery; 2PL, Serialiazability and Recoverability; Lock Management; Introduction to ARIES; The log; Other recovery-related structures; The write-ahead log protocol; Check pointing; Recovering from a System Crash; Media Recovery; Other approaches and interaction with concurrency control.	08 Hours

Course outcomes: After learning all the modules of the course, the student will be able to

1. Explain the advantages of using DBMS as an approach to bookkeeping
2. Discuss entity-relationship model as the basis for the design of DBMS
3. Describe relational model and relational algebra as the basis for the design of DBMS languages like SQL
4. Apply SQL statements against an existing DBMS
5. Develop a specimen database using SQL in conformance with the rules of normalization.
6. Describe transactional management and its intricacies.

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 16 marks.
3. There will be 2full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Fundamentals of Database Systems- RamezElmasri and Shanmkanth B. Navathe, 3rd Edition, Addison Pearson.
2. Database Management System Use - by Raghu Ramakrishnan, Tata McGraw Hill, 3rd Edn. 2002.

Reference Books:

1. Database Managaement and design - by Gray W.Hansen and James V. Hansen, 2nd Edn. PrinticeHall India Pvt. Ltd., 2002.
2. Database Management Systems- Designing and Building business applications, Gerald V. Post, 3rd Edition, Tata McGraw Hill Publishing company Ltd., - 2005
3. Project Management with PERT and CPM, Moder Joseph J and Phillips Cerel, R., VAN Noserand,
4. Reinhold, 2nd Edn., 1976.

ADVANCED I.C. ENGINES

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – VIII

Subject Code	15AU833	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
Credits	03		

Course objectives:at the end of this course, students will be able to:

1. Explain combustion phenomenon in SI and CI Engines also factors effecting combustion variations in these engines
2. Calculate mixture requirement and pollutants produced in internal combustion engines.
3. Determine efficiency and power output from brayton cycle
4. Explain basic concepts of lean burn engine, sterling engine, cam less engine, multi valve engine etc.
5. Explain working of modern engines.

Module-I	
Combustion in Spark Ignition Engines: Thermodynamic analysis of SI engine Combustion: Burned and unburned mixture states. Analysis of cylinder pressure data, Combustion process characterization, Flame structure and speed; flame structure, laminar burning speeds, flame propagation relations, Cyclic variations in combustion, partial burning and misfire: definitions, causes of cycle – by – cycle and cylinder to cylinder variations, partial burning, misfire and engine stability. Spark Ignition: Ignition fundamentals, conventional ignition systems, alternative ignition systems, alternative ignition approaches, Abnormal Combustion: knock and surface ignition, knock fundamentals, fuel factors.	08 Hours
Module-II	
Combustion in Compression Ignition Engines: Types of diesel combustion systems: Direct injection systems, indirect injection systems, comparison of different combustion systems, Analysis cylinder pressure data; combustion efficiency, DI engines, IDI engines, Fuel spray behaviour: Fuel injection, overall spray structure, atomization, spray penetration, droplet size distribution and spray evaporation, Ignition delay: definitions and discussion, fuel ignition quality, auto ignition fundamentals, physical properties affecting delay, effect of fuel properties.	08 Hours
Module-III	
Equilibrium charts: Charts for burnt mixture, charts for unburned Mixture, transmission from unburned to burnt mixture, non- equilibrium Problems. **Gas Turbine combustion:** Simple brayton cycle, working of a gas turbine, modification of the simple cycle, intercooling reheat and regeneration, determination of efficiency and power output, numerical problems.	08 Hours
Module-IV	
Modern Developments in I. C. Engines: Lean burn engines, ceramic and adiabatic engines, Multi-valving, Tuned	08 Hours

manifolding, camless valve gearing, variable valve timing, Turbo and supercharging – Waste gating, EGR, Part-load charge stratification in GDI systems. Sports vehicle engines, Stirling engines, MPFI engines – operation and performance.	
Module-V	
Special types of Engines; Introduction to working of startified charged engines, Wankel engine, variable compression engine, Surface ignition engines, free piston engines, Current engines and future trends (e.g. Convergence of SI and CI engine technology, Control developments, fuel quality), Effect of air cleaners and silencers on engine performance.	08 Hours

Course outcomes: After learning all the modules of the course, the student will be able to

1. Explain combustion phenomenon in SI and CI Engines also factors effecting combustion variations in these engines
2. Calculate mixture requirement and pollutants produced in internal combustion engines.
3. Determine efficiency and power output from brayton cycle
4. Explain basic concepts of lean burn engine, sterling engine, cam less engine, multi valve engine etc.
5. Explain working of modern engines.

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 16 marks.
3. There will be 2full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

Text books:

1. Internal Combustion Engines Fundamentals - John B. Heywood, McGraw Hill International Edition,
2. A course in I.C. Engines - Mathur& Sharma, DhanpatRai& sons, New Delhi,1994.

Reference books:

1. Internal Combustion Engines- Ganesan, V, Tata McGraw Hill Book Co., 1995.
2. Internal Combustion Engine Fundamentals- John B. Heywood, McGraw Hill Book, 1998.
3. Internal Combustion Engine and Air Pollution- Obert, E.F., International Text Book Publishers, 1983.
4. I.C. Engines by Maleev- CBS Publications, New Delhi.

MAINTENANCE ENGINEERING

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – VIII

Subject Code	15AU834	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
Credits	03		

Course objectives:at the end of this course, students will be able to:

1. Explain maintenance strategies.
2. Plan maintenance schedule and methods for preventive and bre4ak down maintenance.
3. Find most optimal maintenance frequency.
4. Explain use of computers in maintenance of machinery.
5. Analysis of accident records and accident Safety standards for Mechanical equipment.
6. Explain safety standards for mechanical, electrical and chemical systems.

Module-I	
Introduction to Maintenance System: Definition, Scope, Objective, functions and Importance of maintenance system, Type of maintenance system, Break down maintenance system. Preventive maintenance, Predictive maintenance, design out maintenance, corrective maintenance, planned maintenance, total productive maintenance, condition monitoring. Problems on selection of methods like preventive or breakdown maintenance,	08 Hours
Module-II	
Maintenance of Machinery: Causes of machine failure, performance evaluation, complete overhauling of Machines tools. Maintenance planning and scheduling. Repair order control manpower requirement, Maintenance job analysis spare parts control.	08 Hours
Module-III	
Economics in Maintenance: Repair, replacement, Repair complexity, Finding out most optimal preventive maintenance frequency. Numerical treatment required **Maintenance Planning:** Planning of maintenance junctures manpower allocation, long range planning, short range planning. Planning techniques and procedures. Estimation of maintenance work. Maintenance control.	08 Hours
Module-IV	
Computers in maintenance: Features and benefits of Computer aided maintenance. Application of computers to maintenance work. **Industrial Safety:** Economic importance of accidents, Types of safety organizations, Analysis of accident records, accident investigations, Analysis of accident Safety standards for Mechanical equipment	08 Hours
Module-V	
Safety standards: Safety standards for Electrical equipment and systems. Chemical hazards,	08 Hours

material handling, exhaust systems, welding, Plant housekeeping-building, Aisles, passages, floors, tool cribs, washrooms, canteens.

Industrial Pollution Control:

Dust control -Fibre collectors, mechanical dust collectors, wet type collectors, Electro static precipitators, Noise pollution Control - Noise measurement and control. Industrial vibration and its control.

Course outcomes: After completion of above course, students will be able to

1. Explain maintenance strategies.
2. Plan maintenance schedule and methods for preventive and bre4ak down maintenance.
3. Find most optimal maintenance frequency.
4. Explain use of computers in maintenance of machinery.
5. Analysis of accident records and accident Safety standards for Mechanical equipment.
6. Explain safety standards for mechanical, electrical and chemical systems.

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 16 marks.
3. There will be 2full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1 Maintenance Engineering and Management - R.C.Mishra and K.Pathak, Prentice Hall of India, 2002

1. Maintenance Engineering Hand book - Morrow.

Reference Books:

1. Hand book of Maintenance Management - Frank Herbaty
2 Hand book of Industrial Engg& Management - W. Grant Lreson& Eugene L-Grant
3 Industrial Pollution Control Handbook - LUND *A.*
4 Industrial Maintenance - H P Garg
5 Maintenance Engineering Hand book- Lindrey Higgins, McGraw Hill, 5th edition, 2003.

Internship/Professional Practice
[As per Choice Based Credit System (CBCS) scheme]
SEMESTER –VII

Subject Code	15AU84	IA Marks	50
Number of Lecture Hours/Week		Exam Marks	50
Total Number of Lecture Hours		Exam Hours	03
Credits	02		

Course objectives: At the end of the course the student will be able to:

1. Apply classroom and laboratory concepts and principles in an industry work environment.
2. To demonstrate the ability to work as a team member to successfully complete the assigned work

The duration and modalities for internship will be as per VTU rules and regulations.

Project work Phase II
[As per Choice Based Credit System (CBCS) scheme]
SEMESTER –VII

Subject Code	15AUP85	IA Marks	100
Number of Lecture Hours/Week		Exam Marks	100
Total Number of Lecture Hours		Exam Hours	03
Credits	06		

Course objectives: At the end of the course the student will be able to:
Identify the practical problem, finalize the methodology to solve it and practically implement it.

The duration and modalities for project work will be as per VTU rules and regulations.

Seminar [As per Choice Based Credit System (CBCS) scheme] SEMESTER –VII			
Subject Code	15AUS86	IA Marks	100
Number of Lecture Hours/Week	04	Exam Marks	
Total Number of Lecture Hours		Exam Hours	03
Credits	01		
The topic for seminar should be relevant to the recent developments in Automotive Technology.			