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Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Automobile Engineering
Semester V (2023-2026)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTAU501A	DC	Fuel and Lubricants	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
1.To understand the properties of fuels and lubricants for the design and operation of the I.C engines.
2. To understand specific requirements for automotive lubricants, oxidation deterioration and degradation of lubricants

Course Outcomes (COs):
Students will:
1. Student Learn the structure of petroleum and refining process
2. Be able to find relative density, calorific value, distillation, vapour pressure, flash point and spontaneous ignition temperature
3. Be able to understand the flame propagation and mechanism of combustion

Syllabus

UNITI- MANUFACTURE OF FUELS AND LUBRICANTS **4hr**

Introduction: Basic requirements of a fuel & lubricant, Types of fuels & lubricants its uses & sources, Theory of origin and accumulation of crude oil Methods of searching crude oil Recovery of crude oil Classification of crude oil Classification of hydrocarbon Structure of various hydrocarbon Fractional distillation and classification of refinery products Various refining processes, Blending and treatment of gasoline

UNITII- THEORY OF LUBRICATION **8 Hrs.**

Engine friction: introduction, total engine friction, effect of engine variables on friction, hydrodynamic lubrication, hydrodynamic lubrication, boundary lubrication, bearing lubrication, functions of the lubrication system, introduction to design of a lubricating system.

UNITIII- LUBRICANTS **7 Hrs.**

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DTAU501A	DC	Fuel and Lubricants	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Specific requirements for automotive lubricants, oxidation deterioration and degradation of lubricants, additives and additive mechanism, synthetic lubricants, classification of lubricating oils, properties of lubricating oils, tests on lubricants. Grease, classification, properties, test used in grease

UNITIV- PROPERTIES AND TESTING OF FUELS **6 Hrs.**

Thermo-chemistry of fuels, properties and testing of fuels, relative density, calorific value, distillation, vapour pressure, flash point, spontaneous ignition temperature, viscosity, pour point, flammability, ignitability, diesel index, API gravity, aniline point etc.

UNITV- COMBUSTION & FUEL RATING **8 Hrs.**

SI Engines – flame propagation and mechanism of combustion, normal combustion, knocking, octane rating, fuel requirements. CI Engine, mechanism of combustion, diesel knock, cetane rating, fuel requirements. Additive - mechanism, requirements of an additive, petrol fuel additives and diesel fuel additives – specifications of fuels

Textbooks:

1. Ganesan.V., “Internal Combustion Engineering”, Tata McGraw-Hill Publishing Co., New Delhi, 2003.
2. M.L. Mathur, R.P.Sharma “A course in internal combustion engines”, Dhanpatrai publication, 2003.
3. Obert.E.F “Internal Combustion Engineering and Air Pollution”, International book Co., 1988.

References:

1. Brame, J.S.S. and King, J.G. – Fuels – Solids, Liquids, Gaseous.
2. Francis, W – Fuels and Fuel Technology, Vol. I & II
3. Hobson, G.D. & Pohl.W- Modern Petroleum Technology
4. A.R.Lansdown – Lubrication – A practical guide to lubricant selection – Pergamon press – 1982.
5. Raymond.C.Gunther – Lubrication – Chilton Book Co., - 1971.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTAU501B		Modern Vehicle Technology	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives: -

The primary objective of the course is to impart knowledge of (A) Transducers, Sensors & Actuators, and their applications (B) advancement in engines and engine related systems, (C) security, safety and alarming technology and modern features of modern vehicles.

Course Outcomes: -

After completion of this course the students will be able to understand and describe the followings:

1. Applications of Transducers, Sensors & Actuators.
2. Advance Ignition system
3. Hybrid vehicles, solar car and other fuel vehicles.
4. Security, safety, and alarming technology
5. Modern Features of Automobiles.

Syllabus

Unit-I **9 Hrs.**

Applications of Transducers, Sensors & Actuators: Concept of general measurement systems, Measurement of Temperature, Measurement of Speed, Measurement of Force, Electrical method for moisture measurement, Electromechanical Type Transducers, Basic requirement of Sensors, Functions, Applications and Circuitry arrangement of various Sensors, Working Principal and Functions of various, Actuators such as Solenoid Actuators, Motorized Actuators, and Stepper motors, applications transducers, sensors & actuators in modern vehicle.

Unit-II **9 Hrs.**

Advance Ignition system: Electrical & electronics ignition system, Modern Spark Ignition system (e.g., D.T.S.I, T.D.S.I., Multi electrode etc. System), Insulated coils, Concept of Non-battery Energy Storage: Ultra capacitors and Flywheels, applications in S.I. and C.I. Engines.

Unit-III **9 Hrs.**

Advancement in Engines and related components: Introduction & types of hybrid vehicle, Hybrid drives systems, Compressed air car, Solar Cars, Hydrogen operated Engine, Basic concepts of Blue Motion Technologies like DSG, TSI, TDI, GDI variable valve timing system,

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DTAU501B		Modern Vehicle Technology	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit-IV: **10 Hrs.**

Modernization in Peripheral systems: Security Systems. Remote keyless entry, Anti-theft system, Alarm system, Entertainment and peripheral systems, Integrated communications, Proximity sensors, Global positioning satellites (GPS).

Advance Safety System and devices: Seat Belts, Seat Belts pre-tensioners, Smart seatbelt reminder, Concepts of Crash test, Crash sensors, Air bag; Introduction of air bags, Dual stage air bags, Side Airbags. Tire pressure monitoring system, Pedestrian Protection & Night vision with pedestrian detection.

Unit-V **8 Hrs.**

Modern Features in Automobiles: Power Sliding doors, electronic stability / Skid-control system, Traction control system, Telescopic steering wheel / adjustable pedals, Rear mounted Radar & Cameras, Electromagnetic suspension and levitation, Automatic Lift Axle, Regenerative Braking Systems, Continuous Variable Transmission, Intelligent Parking Assist System, Self-Parking.

Textbooks:

1. John turner "Automotive Sensors" momentum press, 2009.
2. J. Marek, H.-P. Trah, Y.Suzuki, I. Yokomori "Modern Production/ operation managements" Willey, 2006.
3. Barbara J. Peters, George A. Peters "Automotive Vehicle Safety" CRC Press, 2002.

Reference Book:

1. A. K. Sawney "Electrical and Electronics measuring Instruments", Dhanpat Rai, 2012.
2. Mehrdad Ehsani, Yimin Gao, Ali Emadi "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles" CRC Press, 2009.
3. James D. Halderman "Hybrid and Alternative Fuel Vehicles" Pearson, 2016.
4. K. Venkateswwrlu and B.S.R. Murthy "Alternative Fuels and Advanced Vehicle Technologies" PHI, 2021.

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DTAU501C	DC	Motor Vehicle acts and Loss Assessment	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C- Credit.
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The subject aims to provide the student with:
1. An understanding of basic of motor vehicle acts.
2. To familiarize the working Transport Authorities.

Course Outcomes (COs):
Students will:
1. Learn how to work transport authorities of India.
2. Be able to understand the anatomy of different types of vehicles.
3. Be able to understand the construction equipment and maintenance of motor vehicle, offences, and penalty procedure for traffic control.
4. Be able to understand the importance of the key terms used in the motor vehicle act.
5. Be able to understand the types of vehicle insurance.

UNIT I **8 Hrs.**

Preliminary about Transport Authorities: Functions of Transport authorities, The key terms used in the motor vehicle act, The classification and anatomy of different types of vehicle like Two wheelers, Three wheelers, Four wheelers, Multi wheelers, Imported vehicles and miscellaneous vehicle, The necessity of permit.

UNIT II **9 Hrs.**

Construction Equipment and Maintenance of Motor Vehicle

General provisions regarding construction and maintenance of motor vehicle, Provisions regarding: Lamps, Brakes, Horn, Silencer, Mirror, Safety glass, Wind screen wiper, Tyres, Speedometer, Steering, Springing, Direction indicator and stop light, First Aid Box, Emission of smoke, vapour and grit, for attaching side-car to a motor-cycle

UNIT III **8 Hrs.**

Offences and Penalty Procedure for Traffic Control: Limits of Speed and loading limit of vehicle with respect to power to weight ratio, Provisions regarding vehicle with Left-hand control the

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DTAU501C	DC	Motor Vehicle acts and Loss Assessment	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C- Credit.
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

duties of driver and owner, Punishment of offences, Offences relating to Licences, Driving while under the influence of drink or drugs

UNIT IV **8 Hrs.**

Types Of Vehicle Insurance: Origin, history and development of insurance, Act liability only , Third party only, Comprehensive policy, Policies with Zero Depreciation Option, Policy term and condition

UNITV **9 Hrs.**

Insurance Survey and Investigate on of Claim: Role of surveyor and loss adjustor, Licensing authority and controller of insurance, Empanelment of surveyor, Claim Procedure Intimation, Site visit, Garage visit, checking of documents (Paper pertaining related to claim), Photography, Estimate and claim form, Passing of estimate (i) Cost of parts (ii) Cost of repairing (iii) Labour, Preparation of survey reports and submission

Textbooks:

1. Government of India Motor vehicles Act, 1989 Government of India
2. Government of Gujarat the Gujarat Motor vehicles Rules, 1989 Government of Gujarat
3. Government of India the Central Motor vehicle Rules,1989 Government of India

References:

1. Universal's Legal Manual Motor Vehicle Laws (Act and regulation) ISBN- 978-81-7534-936-0 Universal Law Publishing Co. Pvt Ltd
2. Dr. L.P.Gupta Insurance claims solutions ISBN- 978-9383303038 Dr. L P Gupta
3. Rudolf Limpert Motor vehicle Accident Reconstruction & Cause Analysis 7th addition Lexis Nexis Publica

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assess-ment*	END SEM University Exam	Teachers Assess-ment*				
DTAU502	DC	AUTOMBILE TRANSMISSION AND MECHANISM	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs)

This course provides a fundamental understanding (A) To develop the basic knowledge of the students in mechanics torque conversion areas(B)To develop the skills of the students in the areas of alternative drives and concepts (C)To develop the basics of the students in the field of transmission system of the vehicle.

Course Outcomes (COs)

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes

1. Students would be able to understand the working principle of the transmission system components.
2. Students would be able to understand the different types of clutches, gearboxes, driveline and final drive and its application.
3. Students would be able to understand about the multi stage and poly-phase torque converters and their performance characteristics.
4. Students would be able to understand about Automatic transmission.

Syllabus

Unit - I

Transmission Requirements: Requirements of transmission system; general arrangement of power transmission; general arrangement of rear engine vehicle with live axles, general Arrangement of dead axle and axles transmission; four-wheel drive transmission.

Unit – II

Clutches: Introduction, Types of clutches; working and principle of cone clutch, single plate, diaphragm spring, multiline, centrifugal.
Gear box: Need of gear boxes; types of gear boxes: sliding mesh, constant mesh, epicyclic gear boxes; Warner synchronizer, Vauxhall synchronizer gear materials lubrication.

Unit - III

Fluid coupling: Principle of operation, Construction details, Torque capacity, Performance characteristics, Reduction of drag torque.
Torque converter: Principle of operation, Constructional details, Performance characteristics;

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assess-ment*	END SEM University Exam	Teachers Assess-ment*				
DTAU502	DC	AUTOMBILE TRANSMISSION AND MECHANISM	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Construction, Free wheel, Characteristic performance.

Unit - IV

Automatic Transmission: Principle and working of Epicyclic gear train; Construction and working principle of Ford T model gear box, Wilson gear box, construction, working and derivation of gear ratios; Octal electromagnetic transmission; Automatic over-drive; Hydraulic control system for automatic transmission,

Unit-V

Hydrostatic drives: Advantages and disadvantages; principles of hydrostatic drive systems, construction and working of typical hydrostatic drives; Janney Hydrostatic drive.
Electrical drives: Advantages and limitations, principles of Ward Leonard system of control Modern electric drive for buses.

Reference Books:

1. *"Torque converters", by Heldt P.M; Publisher; Chilton Book Co., 4th ed., 1951.*
2. *"Motor Vehicles", by Newton, Steeds & Garret; Publisher: B.H. Publication, 2000.*
3. *"Modern Transmission Systems", by Judge, A.W., Publisher: Chapman& Hall Ltd, 1969.*
4. *"Automatic Transmission", by Check Chart; Publisher: Harper & Row Publication, 1973.*
5. *"Automobile Engineering" Vol. 1, by Dr. Kripal Singh; Publisher: Standard Publishers Distributors, 2017.*

List of Experiments

1. Demonstration of garage, garage equipment' sand tools, preparation of different garage layout.
2. Demonstration of washing & greasing of vehicle.
3. Engine oil change & periodic maintenance of vehicle.
4. Dismantling & assembly of Clutch (light / heavy duty vehicle).
5. Dismantling & assembly of Constant mesh gearbox and synchromesh gearbox.

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DTAU503	DC	AUTOMBILE COM-PONENT DESIGN	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

To make the students understand (A)the design concept and principles of various engine Components(B) Selection of proper material for engine components (C) Developing the ability to analyze problem, weight alternatives and find the suitable solution

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes

1. Students would be able to understand the fundamental aspect of Design.
2. Students will be able to select and design the different automobile components.
3. Students will be able to standardize the different parts.
4. Students will be able to give reasons of assumptions made while designing the component with reference to manufacturing assembly, thermal and wear considerations point of view.

Syllabus

Unit – I

Introduction: Engineering materials and their properties applied to design; selection of materials, factor of safety, endurance limit, notch sensitivity; principles of design optimization, future trends, and computer aided drafting.

Unit – II

Limits, Fits, Tolerances, Surface Finish, Shafts and springs: Definitions, types of tolerances and fits; design considerations for interference fits, surface finish, surface roughness; design of power transmission shafts and design of helical springs.

Unit – III

Design of Cylinder and Piston: Choice of material for cylinder and piston, piston friction, piston slap; design of cylinder, piston, piston pin, piston rings, piston failures, lubrication of piston assembly.

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DTAU503	DC	AUTOMBILE COM-PONENT DESIGN	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit – IV

Design of Connecting Rod, Crankshaft: Material for connecting rod; determining minimum length of connecting rod, small end and big end design, shank design, design of big end cap bolts; connecting rod failures; balancing of I.C. Engines, significance of firing order; material for crank-shaft, design of crankshaft under bending and twisting, balancing weight calculations.

Unit-V

Design of Valves and Flywheel: Design aspects of intake and exhaust manifolds; inlet and Exhaust valves, valve springs, tappets, valve train; Materials and design of flywheel.

Reference Books:

1. *"An Introduction to Modern Vehicle Design" by Julian Happian-Smith, BH, 2001.*
2. *"Automobile Chassis Design and calculations", by P. Lukin, Mir Publishers, 2002.*
3. *"Automotive Mechanics" by N. K. Giri, Khanna Publishers, 1998.*
4. *"Machine Design", by Sadhu singh, Khanna Publishers, 2015.*
5. *"Automobile Chassis Design", by Dean Averns,Lllife Books Ltd., 1992.*
6. *"Automobile Engineering Vol-I & II", by Kirpal Singh, Standard Pub., 2011.*
7. *"Automobile Engineering Vol-I & II" by K.M.Gupta, Umesh Pub., 2001.*
8. *"Mechanical Engineering Design", Fourth Edition, by Joseph E. Shigley& Larry D. Mitchell, McGraw- Hill International Book Company, 1993.*

List of Experiments

1. To standardize the given automobile part for size, torque and power point of view.
2. To design the spur, helical, bevel and worm gear for given situation of automobile vehicle.
3. To design the engine cylinder for given situation of automobile vehicle.
4. To design the piston for given situation of automobile vehicle.
5. To design the flywheel for given situation of automobile vehicle.
6. To design the valve and valve mechanism for given situation of automobile vehicle.
7. To design the connecting rod for given situation of automobile vehicle.
8. To give reason of design.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTAU504	DC	VEHICLE BODY ENGINEERING	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs)

This course provides a fundamental understanding (A) to present a problem oriented in depth Knowledge of automobile chassis and body engineering (B) to address the underlying concepts and methods used for automobile chassis and body engineering.

Course Outcomes (COs)

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes

1. Understand and have knowledge about different aspects related to body and chassis.
2. Understand various safety provisions.
3. Design the chassis and able to select the section of same.
4. Design the cabin and frame component to transfer the force and optimize from safety and cost point of view.

Syllabus

Unit-I

Vehicle Chassis: Introduction, Chassis frame operating and design considerations; Chassis frame components, sections used; Types of joints; Types of chassis frame; Vehicle components location and attachment.

Unit-II

Car Body: Classification of vehicle based on body types; Types of car bodies, Integral body construction details: Requirements of body, loads on the vehicle body: Static load, Acceleration and Braking, Moments and Torque due to driving conditions (torsion and bending moments); Types of materials used in body construction, Analysis and Selection of body member sections;
Engine, transmission, and body structure mounting.

Unit-III

Bus Body and Commercial Vehicle body: Classification of bus bodies-Based on distance traveled, based on capacity of the bus, and based on style & shape. Types of metal section used in the construction and regulations; Construction of conventional and integral type buses and comparison;

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COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTAU504	DC	VEHICLE BODY ENGINEERING	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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Classification of commercial vehicle bodies. Construction of Tanker body and Tipper body, Driver cabin design for compactness Design of frames for bus and commercial vehicles

Unit-IV

Ergonomic: Introduction of ergonomics; anthropometric dimensions of standard occupant; Concept of H-point referencing, interior design for ergonomics and comfort, seat design for ride comfort, suspension seats, split frame seating, back passion reducers; dashboard instruments, pedal controls and electronic displays; Driver seat design of bus body and commercial vehicle body.

Unit-V

Vehicle Safety: Safety aspects in design, Types of safety (Active and Passive), Safety features: overview of requirement for occupant protection (frontal, side, rear and rollover impact) and pedestrian safety, Airbags and Seatbelts; Visibility: Regulation, Driver's visibility, Methods of improving visibility, Introduction of crash test, Chassis and body alignment test.

Reference Books:

1. *"Vehicle Body Engineering", by Jnusz Pawlowski, Publisher: Business books limited, 1970.*
2. *"An Introduction to Modern Vehicle Design", by J H Smith Publisher: Butterworth-Heinemann, 2001.*
3. *"Motor Vehicle Structure: Concepts and Fundamentals'', by J Brown, A J Roberstson, S Serphento, Publisher: Butterworth-Heinemann, 2002.*
4. *"Advanced Vehicle Technology", by Heinz Heizler, Publisher: Butterworth-, London, 2002.*
5. *"Automobile Engineering :Power train, chassis system and vehicle body", by David A Crolla, Publisher: Elsevie, 2009.*
6. *"Ergonomics in Automotive Design", by V D Bhinse, Publisher: CRC Press, 2011.*
7. *"Handbook of Automotive Body and Systems Design", by John Fenton Publisher: Wiley India, 2013.*
8. *"Handbook of Automotive Body Construction and Design Analysis", by John Fenton, Publisher: Wiley India, 1998.*

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DTAU504	DC	VEHICLE BODY ENGINEERING	60	20	20	30	20	2	1	2	4

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List of Experiment

1. Study of Development and construction of vehicle body
2. Study of body repairing tools and shop equipment.
3. Study of minor body Repairing work.
4. Study of major body Repairing work.
5. Study of glass and door fitting and Repairing work process.
6. Study of various body materials.
7. Study of various types of car bodies.
8. Study different types of bus and commercial vehicle body.
9. Study the ergonomics associated with automobile body design.
10. Study of vehicle safety aspects and safety features.

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DTAU505	PW	MINOR PROJECT	0	0	0	30	20	0	0	4	2

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Syllabus

Purpose:
To conduct a design project in one of the specializations of the program with substantial multidisciplinary component.

Instructional Objectives:
To guide the students in such a way so that they conduct a work on a topic as a forerunner to the full-fledged project work to be taken subsequently in VI semester; the project work shall consist of substantial multidisciplinary component

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DTAU506	AEC	INDUSTRIAL TRAINING	0	0	0	30	20	0	0	4	2

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Course Educational Objectives (CEOs):

(A) To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same (B) To train the students in preparing project reports and to face reviews and viva voce examination.

Course Outcomes (COs):

After completion of this course the students are expected to be able to

1. Identify real world problems of mechanical engineering and related systems.
2. Interpret the working of mechanical engineering systems.
3. Apply the principles of mechanical engineering in real world systems.
4. Criticize and experiment to arrive at solutions for real world mechanical engineering problems.
5. Analyze and evaluate to obtain solution for problems in mechanical engineering systems.
6. Develop a prototypes/models, experimental set-up, and software systems necessary to meet the objectives.
7. Identify methods and materials to conduct experiments/develop code.
8. Reorganize the procedures with a concern for society, environment, and ethics.
9. Analyze and discuss the results to draw valid conclusions.
10. Prepare a report as per recommended format and defend the work.

Syllabus

1.Internship:

A student is encouraged to take an industrial tour with reputed organizations or firms chosen by the institute. In such cases the student will stay with the firm and conduct the project (if any). The

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DTAU506	AEC	INDUSTRIAL TRAINING	0	0	0	30	20	0	0	4	2

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project will be guided by the faculty member and the concerned officer in the industry. However, reviews will be conducted in the institute which the student shall attend.

2.1 Course Description:
An internship experience provides the student with an opportunity to explore career interests while applying knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks.

2.2 Learning Goals:
The internship will provide students with the opportunity to:

1. Gain practical experience within the business environment.
2. Acquire knowledge of the industry in which the internship is done.
3. Apply knowledge and skills learned in the classroom in a work setting.
4. Develop a greater understanding about career options while more clearly defining personal career goals.
5. Experience the activities and functions of business professionals.
6. Develop and refine oral and written communication skills.
7. Identify areas for future knowledge and skill development.

3. General Rules of Selection/Allotment of Dissertation-I Title and Its Submission:
3.1) The selection of dissertation title should be non-trivial, analytical, practical/hardware implementation based, application oriented (relevant to the need of industries) and should involve the elementary research and/or development effort based on a specific theme.

3.2) Students may be encouraged to undertake industry defined dissertation. For the industry defined dissertation there shall be one external supervisor of the industry and one internal supervisor of student's own department. It will be the sole responsibility of internal supervisor to

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DTAU506	AEC	INDUSTRIAL TRAINING	0	0	0	30	20	0	0	4	2

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define the research problem, scope, methodology and outcome from the dissertation in consultation with external supervisor.

3.3) Supervisors for the dissertation can suggest the titles of dissertation considering their long-term goal for research.
3.4) Students can also discuss the titles of their choice or titles given from industries with the supervisors and if feasible and accepted by supervisors, can be included in the list of suggested titles.

3.5) Consolidated list of suggested dissertation titles will be communicated to the students in semester VI

3.6) In case, if two students give choice for same title; title will be allotted based on merit.

3.7) Final allotment of titles and supervisors will be published on notice board in consultation with Head of the Department.

3.8) Requirement of change in the title of dissertation work should be applied to the Head of the Department with sufficient reasons for the change, before the exam of Dissertation Progress Review-I.

3.9) After Dissertation Progress Review-I exam, change of the title will be permitted based on the comments of internal examiner. Such cases should apply for the change in titles and should get approval from the Head of the Department.

4. Dissertation-I Work in Collaboration with Industry:
4.1) It is preferable that students, with the approval of the Head of the Department, visit industry or a Research Laboratory for data collection, discussion of the dissertation, experimental work,

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survey, field studies, etc. during the project period. Projects sponsored by the Industries or R&D organizations will be encouraged and a close liaison with such organizations will be maintained.

4.2) Students shall acknowledge the involvement and / or contribution of an Industries or R&D organizations for their dissertations.

4.3) Satisfactory completion certificate issued by the Industry or R&D organization should be attached with the dissertation report.

4.4) Internal supervisor, should monitor the progress of his/her students by remaining in contact with the students and external supervisors by emails, video conferencing and/or by making visits to the industries at least once in a month, depending on the need of project and as decided by concerned Head of the Department.

5. Supervisors:
5.1) Students shall be assigned one or two supervisors(s) from the Institute.

5.2) In case any supervisor leaves the Institute permanently or temporarily for a period exceeding one semester, the Head of the Department shall appoint new supervisor for the concern students. Any such arrangements made, should get approval from Head of the Institute.

5.3) A faculty can supervise maximum 6 (Six) Dissertations at a time.

5.4) In case of interdisciplinary areas, at least one supervisor must belong to the discipline in which the student is registered.

6. Dissertation-I Evaluations:

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DTAU506	AEC	INDUSTRIAL TRAINING	0	0	0	30	20	0	0	4	2

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6.1) For continuous evaluation (*CE), a comprehensive internal assessment of the dissertation work should be made by an internal review panel formed by Head of the Department, supervisor and at least two senior faculty with expertise in same field of dissertation work.

6.2) Internal review panel will review the progress of the students in the last week of 1st, 2nd, 3rd and 4th month of semester VI (i.e. four presentation in front of internal review panel) and finally give his/her assessment of the work done by the students for internal continuous evaluation marks with comments of the review.

6.3) Dissertation-I and External Viva-Voce:

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