Maulana Abul Kalam Azad University of Technology, West Bengal

(Formerly West Bengal University of Technology)

SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Semester-VI

Subject Code : PC-AUE601	**Category:** Professional Core Courses
Subject Name : Automotive Transmission	**Semester**: Sixth
L-T-P: **3-0-0**	**Credit: 3**
Pre-Requisites: Theory of Machine and Design of Machine Element	

Objectives:

This course provides the knowledge, principle of operation and performance of various components and drives in an automotive transmission system.

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	**Clutch:** Requirements, Types- Construction, working and operating characteristics of single plate clutch, multi plate clutch, semi centrifugal, centrifugal clutch. Construction and working of cone clutch , electromagnetic clutch , over running clutch. Clutch linkage – mechanical and hydraulic. Clutch energy dissipated. Clutch lining materials. Deriving the equation for torque capacity of a single plate and multi-plate clutch. Problems involving torque capacity and axial force of single plate and multi-plate clutch. Trouble shooting. Service procedure.	6
2	**Gearbox:** Necessity. Construction and working of sliding mesh, constant mesh, synchromesh gearbox. Over drive mechanism. Gear shift mechanisms. Total resistance to motion- traction and tractive effort - acceleration - calculation of gear ratio for vehicles - design of three speed gear box and four speed gear boxes. Performance characteristics in different speeds. Speed synchronizing devices. Gear materials. Gear lubrication. Transfer case, Problems in gear box involving gear ratios and various gradients and total resistance calculation. Design the clutch and gear box for a given engine power and vehicle load.	7
3	**Hydrokinetic Fluid coupling and Torque converter:** Introduction to fluid coupling, Fluid coupling - construction and principle of operation, Drag torque and various drag reducing devices, Performance characteristics of fluid coupling, Problems on design and torque capacity of fluid coupling. Torque converter and converter coupling - construction and principle of operation. Torque converter performance terminology, Multistage torque converter - construction and working, Poly phase torque converter - construction and working.	7

	Performance characteristic of multistage and poly phase torque converters.	
4	**Automatic Transmission:** Relative merits and demerits when compared to conventional transmission, Principle of working of epicyclic gear train, Planetary gear box - construction and working, Automatic gear box consideration, Three speed & reverse transaxle and four speed & reverse longitudinal mounted automatic transmission mechanical power flow, Fundamentals of a hydraulic control system and basic principle of a hydraulic control gear shift mechanism for automatic transmission, Electronic–hydraulic control automatic transmission, continuously variable transmission, semi-automatic transmission system. Problems in automatic transmission involving gear ratio.	7
5	**Hydrostatic Drives and Electric Drives:** Introduction to hydrostatic drives, Working principle and types of hydro static drives, Advantages and limitations of Hydrostatic drive, Comparison of hydrostatic drive with hydro dynamic drive, Construction and working of Janny Hydrostatic drive. Introduction to Electric drive and Layout of Electric drive, Principle of Early Ward Leonard control system of electric drive, Principle of Modified Ward Leonard control system of electric drive, Advantages, limitations and performance characteristics of electric drive.	6
6	**Different Automatic Transmission:** Automated Manual transmission, S-Tronic transmission, Dual Clutch Transmission, Direct shift gear box (DSG), Tiptronic transmission, Electronic control transmission integrated intelligent control system (ECTi).	3

Course Outcomes:

1. A student will understand the constructional, working principle and performance of various types of manual, semi-automatic and automatic transmission of an automobile.
2. Gain the knowledge about various hydrodynamic drives.
3. Understand principle of operation and performance of various hydrostatic and electric drives.
4. Can be able to design a gear box for a given engine power and vehicle load.

Learning Resources:

1. Babu, A.K, Automobile Mechanics, Khanna Publishers, New Delhi
2. Crouse W.H. and Anglin D.L., Automotive Transmission and Power Train Construction, McGraw Hill.
3. Naunheimer H., Bertsche B., Ryborz J. and Novak W., Automotive Transmission: Fundamentals, Selection, Design and Application, 2nd Edition, Springer, 2011.

4. Heldt P.M., Torque Converters, Chilton Book Co.
5. Newton S. and Garrot, Motor Vehicles, SAE International and Butterworth Heinemann, 2001.
6. CDX Automotive, Fundamentals of Automotive Technology, Principles and Practice, Jones & Barlett Publishers, 2013.
7. SAE Transactions 900550 & 930910.
8. Heinz H., Advance vehicle Technology, Butterworth-Heinemann.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PC-AUE 602	**Category:** Professional Core Courses
Subject Name : Hybrid and Electric Vehicles	**Semester** : Sixth
L-T-P : 3-0-0	**Credit: 3**
Pre-Requisites: Basic Electrical and Electronics and Automotive Engine and Chassis	

Course Objectives:

To present a comprehensive overview on electric and hybrid electric vehicles and their operation and control.

Contents:

Module No.	Description of Topic	Contact Hrs.
1	Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.	4
2	Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, mathematicalmodels to describe vehicle performance.	3
3	Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.	4
4	Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.	4
5	Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of different motors drives like DC motor drives, Induction Motor drives etc.	5
6	Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Ultra capacitors and ultra-flywheels energy storage system. Hybridization of different energy storage devices.	5
7	Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems.	4
8	Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies.	4

9	Case Studies: Design of a Hybrid Electric Vehicle (HEV), Design of a Battery Electric Vehicle (BEV).	3

Course Outcomes:

1. A student will be able to choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources.
2. Design and develop basic schemes of electric vehicles and hybrid electric vehicles.
3. Choose proper energy storage systems for vehicle applications.
4. Identify various communication protocols and technologies used in vehicle networks.

Learning Resources:

1. Husain I., Electric and Hybrid Vehicles: Design Fundamentals, CRC Press.
2. Babu A.K., Electric and Hybrid Vehicles, Khanna Publishing House.
3. Ehsani M., Gao Y., Gay S.E. and Emadi A., Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press.
4. Larminie J. and Lowry J., Electric Vehicle Technology Explained, Wiley.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PE-AUE 611A	**Category:** Professional Elective Courses
Subject Name : Electronic Vehicle Management System	**Semester** : Sixth
L-T-P : **3-0-0**	**Credit: 3**
Pre-Requisites: Basic Electrical and Electronics	

Objectives:

At the end of the course, the student will understand the working principle of engines & vehicle electronic management system and it influence in controlling pollution, enhancing safety of the vehicle.

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	Sensors: Inductive, Hall effect, hot wire, thermistor, piezo electric, piezo-resistive, based sensors. Throttle position, mass air flow, crank shaft position, cam position, engine and wheel speed, steering position, tire pressure, brake pressure, steering torque, fuel level, crash, exhaust oxygen level (two step and linear lambda), knock, engine temperature, manifold temperature and pressure sensors, gyro sensors etc.	4
2	SI engine management system: Layout and working of SI engine management systems. Group and sequential injection techniques. Sensors and actuators in SI engine management system, Multipoint fuel injection system (MPFI), Gasoline direct injection (GDI) system, advantages of GDI system, Working of GDI system. Cold start and warm up phases, idle speed control, acceleration and full load enrichment, deceleration fuel cutoff, Fuel control maps, open loop control of fuel injection and closed loop lambda control, Transistorized ignition and Electronic ignition systems and spark timing control, Dwell angle calculation, ignition timing calculation, Closed loop control of knock, Variable valve timing technology, Cam-less engine, Stratified charge engine, Three way and NO_x storage catalytic converter.	9
3	Diesel engine management system: Exhaust gas management for passenger cars, diesel oxidation catalytic converter, storage catalytic converter, Selective catalytic reduction (SCR) system , particulate filter system, New and advanced technologies in Diesel fuel injection, Fuel injection system parameters affecting combustion, noise and emissions in CI engines. Pilot, main, advanced post injection and retarded post injection. Electronically controlled Unit Injection system. Layout of the common rail fuel injection system. Working of components like fuel	9

	injector, injection duration calculation, High pressure fuel pump, Rail, flow limiter, EGR system, Sensors and actuators in CI engine management system.	
4	Vehicle management system: Electronic braking system, Fail safe braking system, Anti-lock brake system (ABS) - its need, layout construction and working. Electronic control suspension – Damping control, Electric power steering, Electronic system for activating air bags, Crash sensor, Seat belt tightening, Cruise control, Electronic stability program, Vehicle security systems- alarms, Vehicle tracking system. Collision avoidance Radar warning system, Traction control system, Power window, adaptive noise control, electric seats, Anti-theft system, Tyre pressure monitoring system, Lane departure warning system, Blind spot detection, Heating, Ventilation and Air Conditioning Systems (HVAC). Electronic Outside Rear View Mirror, Rain Sensing Wiper System, Automatic Climate Control, Adaptive Head Light, Night Vision Assist, Traffic Jam Assist, Drive By Wire System.	9
5	Vehicle network and communications system: Introduction to Vehicle On-board System (VOS), Mobile Data Terminal (MDT), Controller Area Network (CAN), Wireless Sensor Network, Design and difference of various bus system, GPS technology on Vehicle, Radio Frequency Identification (RFID), Smart mobile phone and Personal digital assistant (PDA), Mobile and Satellite Communications Infrastructure, Cyber-cars.	5

Course Outcomes:

1. At the end of the course, the student will understand the role of various sensor, actuators in advanced engine management system and it influence in controlling pollution, enhancing safety of the vehicle.
2. Know the importance of Driver assistance, security and warning system.
3. Gain the knowledge of Safety and comfort system and understand the auxiliary systems of chassis.

Learning Resources:

1. Ribbens W.B., Understanding Automotive Electronics, 6th Edition, Newnes, 2003.
2. Brady R.N., Automotive computers and Digital Instrumentation, A Reston Book, Prentice Hall, Eagle Wood Cliffs, New Jersey, 1988.
3. BOSCH, Automotive Handbook, 6th Edition, Bentley publishers.
4. Bosch R., Diesel Engine Management, SAE Publications.
5. Bosch R., Gasoline Engine Management, SAE Publications.
6. Hollembeak B., Automotive Electricity, Electronics and computer controls, Delmer Publishers.
7. Denton T., Automotive Electronics, SAE.
8. Babu A.K., Automotive Electronics, Khanna Publishing House, 2018.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PE-AUE 611B	**Category:** Professional Elective Courses
Subject Name : Transport Management & Motor Vehicles Act	**Semester** : Sixth
L-T-P : **3-0-0**	**Credit: 3**
Pre-Requisites: Nil	

Objectives:

1. To familiarize with basic concepts of transport management
2. To acquaint with different types of motor insurance.

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	Motor Vehicle Act: Short titles & definitions, Laws governing to use of motor vehicle & vehicle transport, Licensing of drivers & conductors, Registration of vehicle, State & interstate permits, Traffic rules, Signals & controls, Accidents, Causes & analysis, Liabilities & preventive measures, Rules & regulations, Responsibility of driver, Public & public authorities, Offences, penalties & procedures, Different types of forms, Personnel, Authorities & duties, Rules regarding construction of motor vehicles, Tourist and National Permits, Fitness of a Motor Vehicle, Rules for Special Purpose Vehicle (Off Road vehicle, Specially designed vehicle, Government Department Vehicle).	8
2	Taxation: Objectives, Structure & methods of laving taxation, One-time tax, Tax exemption & tax renewal, Types of Tax, Different types of Tax at Vehicle Registration Renewal.	7
3	Insurance: Insurance types & significance, Comprehensive plus zero depreciation, Third party insurance, Furnishing of particulars of vehicles involved in accident, MACT (Motor Accident Claims Tribunal), Solatium Fund, Hit & Run case, Duty of driver in case of accident, Surveyor & Loss Assessor, Surveyor's report, Role of Surveyor, Settlement of Insurance and Procedure of Investigation.	7
4	Passenger Transport Operation: Structure of passenger transport organizations, Typical depot layouts, Requirements and Problems on fleet management, Fleet maintenance, Planning - Scheduling operation & control, Personal & training-training for drivers & conductors, Public relations, Propaganda, publicity and passenger amenities, Parcel traffic, Theory of fares-Basic principles of fare charging, Differential rates for different types of services, Depreciation & debt charges, Operation cost and Revenues, Economics & records, Maintenance management of State Transport Undertaking (STU), Bus Rapid Transport system (BRTS).	7

5	Goods Transport Operation: Scheduling of goods transport, Management Information System (MIS) in passenger/ goods transport operation, Storage & transportation of petroleum products, Intelligent Transport System (ITS).	4
6	Advance Techniques in Traffic Management: Traffic navigation, Global positioning system.	3

Course Outcomes:

A 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.

Learning Resources:

1. Motor Vehicle Act, Government of India Publications.
2. Bhandarkar S.L., Vehicle Transport Management, Dhanpat Rai & Co., 2016.
3. Gupta R.B., Transport Management, Satya Prakashan, 2016
4. CMVR-1989.
5. White P.R., Public Transport: Its Planning, Management and Operation, Natural and Built Environment Series, Kindle Edition, September 2008.
6. Doke J., Fleet Management, McGraw Hill Co.,1984.
7. Kitchin L.D., Bus Operation, 3rd Edition, Illiffe and Sons Co., London.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : HM-HU 611A	**Category:** Humanities and Social Sciences including Management courses
Subject Name : Introduction to Industrial Management	**Semester** : Sixth
L-T-P : **3-0-0**	**Credit: 3**
Pre-Requisites: Nil	

Objectives:

To understand the principles and methods of engineering analysis and design to specify predict and evaluate the results obtained from the integrated systems of people, materials, money, equipment and energy.

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	Introduction: Concept and scope of Industrial Management. Productivity: Definition, measurement, productivity index, types of production system, Industrial Ownership.	8
2	Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Social responsibilities of Management, Introduction to Human resources management: Nature of HRM, functions and importance of HRM.	7
3	Work Study: Introduction, definition, objectives, steps in work study, Method study: definition, objectives, steps of method study, Work Measurement: purpose, types of study- stop watch methods- steps- allowances- standard time calculations- work sampling, Production Planning and Control Inventory Control: Inventory, Cost, Models of inventory control: EOQ, ABC, VED.	7
4	Quality Control: statistical quality control, Control charts for variables and attributes, Acceptance Sampling- Single sampling- Double sampling plans, Introduction to TQM.	6
5	Project Management: Project network analysis, CPM, PERT and Project crashing and resource leveling.	8

Course Outcomes:

At the end of the course, the students will be able to understand

1. The techniques and procedures of work study
2. Plant layout and Material handling
3. Ergonomics of work design, production and productivity measurement

4. Concept of Production Planning and Control

Learning Resources:

1. Sharma S.C. and Banga T.R., Engineering Management (Industrial Engineering & Management), Khanna Book Publishing Co. (P) Ltd., New Delhi.
2. Khanna O.P., Industrial Engineering and Management, Dhanpat Rai Publications Ltd.
3. Selvam P., Production & Operation Management, PHI.
4. Raju N.V.S., Industrial Engineering Management, Cengage Learning.
5. Shankar R., Industrial Engineering Management I, Galgotia.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

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Subject Code : HM-HU 611B	**Category:** Humanities and Social Sciences including Management Courses
Subject Name : Quantitative Methods for Decision Making	**Semester** : Sixth
L-T-P : **3-0-0**	**Credit: 3**
Pre-Requisites: Nil	

Objectives:

The objective of the course is to familiarize the student with advanced quantitative approaches and mathematical optimization techniques used to address managerial and industrial problems. The student will gain insight about modeling and rational approaches to decision- making and their contribution to organizational effectiveness. Analysis and communication are emphasized throughout the course by using real world and practical applications and cases.

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	An overview to quantitative methods and probability: An analytical scientific approach to Problem solving modeling process for Managerial Decision Making.	5
2	Decision making and quantitative techniques: Forecasting methods & Time Series Analysis, Decision Analysis: Decision Trees& Utility Theory, Decision Making under uncertainty, Decision Making under risk, Decision Making under certainty, Job sequencing.	9
3	Linear programming formulation and solution: Linear Programming, Graphical & Simplex method, Dual simplex, Sensitivity Analysis & Duality. Transportation, Transshipment & Assignment Models.	8
4	Inventory and queuing management: Inventory models (static, dynamic, probabilistic & stochastic), MRP I, MRP II. Waiting Line/ Queuing models steady state operation (M/M/1).	8
5	Network models: Shortest route, maximal flow problem, PERT& CPM Techniques & Applications.	6

Course Outcomes:

At the end of this course students will be able to

1. Apply forecasting methods for predicting demands.
2. Make decisions under certainty, uncertainty and conflicting situations.
3. Apply linear programming tools for optimal utilization of resources in various types of industries.

4. Solve transportation problems to minimize cost and understand the principles of assignment of jobs and recruitment polices.
5. Understand the basic elements of a Queuing model
6. Apply PERT/CPM for project scheduling and resource allocation in an optimal way.
7. Manage inventory with cost effectiveness and apply SQC to ensure better quality control.

Learning Resources:

1. Riggs J.L., Production Systems: Planning Analysis & Control, John Wiley & Sons, 1981.
2. Bedi K., Production and Operations Management, Oxford University Press, 2004.
3. Taha H.A., Operations Research, Pearson, 9th Edition, 2014.
4. Sharma J.K., Operations Research –Theory and Application, 2nd revised Edition, Macmillan Publishers, 2003.
5. Vohra N.D., Quantitative Techniques in Management, 4th Ed., McGraw-Hill, 2010.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PC – AUE 691	**Category:** Professional Core courses
Subject Name : Automobile Engineering Lab – III (Automotive Design Lab)	**Semester** : Sixth
L-T-P : 0-0-3	**Credit: 1.5**
Pre-Requisites:	

Objectives:

Acquire basic knowledge on automobile part designing using design software.

Contents (12 experiments/ studies/ problems are to perform/ solve from the list given below or relevant others):

Module 1:
Sketcher: Introduction to CATIA/CREO, History, Basics, GUI, Use of mouse buttons, Sketcher, constraints, profile, setting workbench, Standard toolbar, how to open sketcher, sketch details and important toolbar for sketch, Profile toolbar, Types of constraints, constraint application, constraint colour, Sketch constraint, view toolbar, Operation toolbar, Specification tree use, selecting toolbars, Sketch toolbar, Visualization toolbar 7. Toolbar setting, plane size setting, graphics properties toolbar.

Module 2: Part Design: Introduction to Design tools like Extrude; Revolve; Shell; Pad etc needed to generate solid models using CATIA/CREO software. Learning different tools of modeling software with exercise – Piston, Piston Pin, Connecting Rod, Crankshaft, Cylinder, Camshaft, Flywheel.

Module 3: Assembly Design: Assembly modeling of automotive mechanicals exercises – Piston - Connecting Rod – Crankshaft Assembly, Cam – Follower Assembly, Gear Assembly etc.

Course Outcomes:

1. One will be able to construct sketches and place geometric and topologic constraints on them.
2. Construct parametric and feature models solid models.
3. Perform construction, analysis, and interrogation of Automobile parts models.
4. Build assembly models and fits.
5. Perform basic finite element analysis with CATIA/ CREO or similar 3D modeling software.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PC – AUE 692	**Category:** Professional Core courses
Subject Name : Automobile Engineering Lab IV (Vehicle Maintenance Lab)	**Semester** : Sixth
L-T-P : 0-0-3	**Credit: 1.5**
Pre-Requisites: Nil	

Objectives:

1. To impart knowledge of importance of maintenance at regular intervals.
2. To impart adequate knowledge of maintenance and maintenance methods.
3. To impart knowledge on how proper maintenance of the components results in good fuel economy, least environmental pollution and reliability.

Contents (12 experiments/ studies/ problems are to perform/ solve from the list given below or relevant others):

1. Study of fuel filter (petrol & diesel) and air cleaner (dry & wet),
2. Study of fuel and brake bleeding.
3. Inspection of tyre and tube.
4. Study of BS-IV engine.
5. Tappet adjustment & valve timing diagram of four stroke engine
6. Study the air brake system & antilock braking system and their fault detection
7. Testing of a nozzle
8. Engine compression test
9. Maintenance of vehicle
10. Study of vehicle lifting machine
11. Study and experiment on wheel balancing machine
12. Study and experiment on wheel alignment machine
13. Study and experiment on head light focusing of vehicles
14. Under body inspection of vehicle either by lifting the vehicle or bringing the vehicle over underground inspection pit.

Course Outcomes:

Students will be able to:

1. Understand use of tools and equipments.
2. Compare and understand types of maintenance systems.
3. Check the parts for proper functioning.
4. Execute various adjustments to be done for proper functioning.
5. Execute tuning of assemblies.

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : MC-681	**Category:** Mandatory Courses
Subject Name : Essence of Indian Traditional Knowledge	**Semester** : Sixth
L-T-P : 1-0-0	**Credit: 0**
Pre-Requisites: Nil	

Objectives:

1. The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature.
2. Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
3. The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system.

Content:

1. Basic Structure of Indian Knowledge System (i) Veda (ii) Upa-Veda (iii) Vedanga (iv) Upanga
2. Modern Science and Indian Knowledge System
3. Yoga and Holistic Health care
4. Case Studies.

Course Outcomes:

Ability to understand, connect up and explain basics of Indian Traditional knowledge modern scientific perspective.

Learning Resources:

1. Sivaramakrishna V. (Ed.), Cultural Heritage of India- Course Material, 5th Edition, Bharatiya Vidya Bhavan, Mumbai, 2014.
2. Jitatmanand S., Modern Physics and Vedant, Bharatiya Vidya Bhavan.
3. Capra F., Tao of Physics.
4. Capra F., The wave of Life.
5. Jha V.N., Tarkasangraha of Annam Bhatta (Eng. Trans), International Chinmay Foundation, Velliarnad, Amaku.
6. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata.
7. Jha G.N. and Jha R.N. (Ed.), Yoga-Darshanam with Vyasa Bhashya (Eng. Trans.), Vidyanidhi Prakasham, Delhi, 2016.
8. Jha R.N., Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.
9. Sharma P.R., Shodashang Hridayam (English translation).

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SYLLABUS FOR B. TECH IN AUTOMOBILE ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PW-AUE681	**Category:** Project (Summer Internship)
Subject Name : Project-II	**Semester** : Sixth
L-T-P : **0-0-0**	**Credit: 3**
Pre-Requisites:	

Objectives:

This course is aimed to provide more weightage on project work. The project work could be done in the form of a summer project or internship in the industry or even a minor practical project in the college. Participation in any technical event/ competition to fabricate and demonstrate an innovative machine or product could be encouraged under this course.

Course Outcomes:

Students will be able to understand the procedure to carry out practical projects related to any technical event/ competition to fabricate and demonstrate an innovative machine or product, etc.