Faculty of Engineering & Technology

P. K. University

Shivpuri (MP)

Department Of Automobile Engineering

Evaluation Scheme & Syllabus for

B.Tech -Automobile Engineering

(VII & VIII Semester)

(Effective from session 2025-26)

EVALUATION SCHEME

B.TECH –AUTOMOBILE ENGINEERING 7th SEMESTER

STUDY AND EVALUATION SCHEME FOR B.TECH AUTOMOBILE ENGG.

YEAR 4th/ SEMESTER-7th

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UENTRAU701	Entrepreneurship Development	3	0	0	3	30	-	30	70	-	70	100
UAUTOAU702	Automotive Transmission	3	1	0	4	30	-	30	70	-	70	100
UAUTOAU703	Automotive Electrical & Electronics System	3	0	0	3	30	-	30	70	-	70	100
UCOMPAU704	Computer Aided Design And Manufacturing	3	0	0	3	30	-	30	70	-	70	100
UCOMPAU705	Computational Fluid Dynamics	3	0	0	3	30	-	30	70	-	70	100
UICENAU706	IC Engine & Pollution Control Lab	0	0	2	1	-	25	25	-	25	25	50
UCOMPAU707	Computer Aided Design And Manufacturing Lab	0	0	2	1	-	25	25	-	25	25	50
UINDUAU708	Industrial Training	0	0	2	1	-	25	25	-	25	25	50
UMINOAU709	Minor Project	0	0	2	1	-	25	25	-	25	25	50
Total		15	1	8	20	150	100	250	350	100	450	700

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IV Year VII Semester

L	T	P
3	0	0

UENTRAU701: ENTREPRENEURSHIP DEVELOPMENT

UNIT –I

Entrepreneurship- Definition. growth of small scale industries in developing countries and their positions visa-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. Government policy for small scale industry; stages in starting a small scale industry.

UNIT -II

Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods.

UNIT -III

Accountancy- Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

UNIT -IV

Project Planning and control: The financial functions cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. Profit planning and programming, planning cash flow, capital expenditure and operations. Control of financial flows, control and communication.

UNIT -V

Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. Role of various national and state agencies which render assistance to small scale industries.

TEXT / REFERENCE BOOKS:

1. Forbat, John, –Entrepreneurship‖ New Age International.
2. Havinal, Veerbhadrappa, –Management and Entrepreneurship‖ New Age International
3. Joseph, L. Massod, ―Essential of Management", Prentice Hall of India.

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L	T	P
3	1	0

UAUTOAU702: AUTOMOTIVE TRANSMISSION

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: Requirements of clutches, principle of friction clutches, types of clutches and materials used- cone, single plate, diaphragm-spring, multi-plate, centrifugal, over-running and electromagnetic clutch.

UNIT-III

Gear box: Need of gear boxes, types- sliding mesh, constant mesh and epicyclic, gear boxes; synchronizers: principle, early and later Warner synchronizer, Vauxhall synchronizer- gear materials lubrication and design of gear box;

Hydrodynamic drive: Advantages and limitations, principle of fluid coupling, constructional details, torque capacity performance characteristics, drag torque, methods of minimizing drag torque; Torque converter: performance characteristics; single, multistage and poly phase torque converters, converter-coupling-performance characteristics, coupling-blade angle and fluid flow, converter fluid.

UNIT-IV

Transmission systems-Drive line: Definition, forces & torques acting; types of drives- Hotchkiss, torque tube & radius rod drives; components- propeller shaft, slip joint, universal joints & constant velocity universal joints; front wheel drive;

Final drive: definition; types- worm- wheel, straight-bevel gear, spiral-bevel gear & hypoid-gear drives; double-reduction & twin- speed final drives;

Differential: Function, principle, construction and working; non-slip differential; differential lock; rear axle-loads acting & types; multi-axled vehicles.

UNIT-V

Automatic transmission: Chevrolet –turbo glide transmission, power glide transmission, hydraulic control system of automatic transmission;

Electric drive: advantages and limitations, principle of early and modified Ward-Leonard system, modern electric drive for buses; performance characteristics.

Text / References Books:

1 Heldt P.M.; Torque converters; Chilton Book Co.

2 Giri NK; Automobile Engineering; Khanna Publisher.

3. Newton, Steeds & Garret; Motor Vehicles; B.H. Publication.

4. Judge, A.W., Modern Transmission Systems, Chapman & Hall Ltd.

5. Check Chart; Automatic Transmission; Harper & Row Publication.

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L	T	P
3	0	0

UAUTOAU703: AUTOMOTIVE ELECTRICAL & ELECTRONICS SYSTEM

UNIT-I:

Batteries and accessories:

Principle and construction of lead acid battery, characteristics of battery, rating capacity and efficiency of batteries, various tests on batteries, maintenance and charging.

Lighting system: insulated and earth return system, details of head light and side light, LED lighting system, head light dazzling and preventive methods – Horn, wiper system and trifactor.

UNIT-II:

Starting system:

Condition at starting, behaviour of starter during starting, series motor and its characteristics, principle and construction of starter motor, working of different starter drive units, care and maintenances of starter motor, starter switches.

UNIT-III:

Charging system:

Generation of direct current, shunt generator characteristics, armature reaction, third brush regulation, cut-out. Voltage and current regulators, compensated voltage regulator, alternators principle and constructional aspects and bridge rectifiers, new developments.

UNIT-IV:

Fundamentals of automotive electronics:

Current trends in automotive electronic engine management system, electromagnetic interference suppression, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system.

UNIT-V:

Sensors and activators:

Types of sensors: sensor for speed, throttle position, exhaust oxygen level, manifold pressure, crankshaft position, coolant temperature, exhaust temperature, air mass flow for engine application. Solenoids, stepper motors, relay.

Books & references:

1. Young A.P. & Griffiths. L. “Automotive Electrical Equipment”, ELBS & New Press- 1999.
2. William B.Riddens “Understanding Automotive Electronics”, 5th edition - Butter worth Heinemann Woburn, 1998.
3. Bechhold “Understanding Automotive Electronics”, SAE, 1998.
4. Crouse, W.H “Automobile Electrical Equipment”, McGraw-Hill Book Co., Inc., New York, 3rd edition, 1986.
5. Judge A.W “Modern Electrical Equipment of Automobiles”, Chapman & Hall, London, 1992.
6. Kholi.P.L “Automotive Electrical Equipment”, Tata McGraw-Hill Co., Ltd., New Delhi, 1975.
7. Robert Bosch “Automotive Hand Book”, SAE (5th Edition), 2000.
8. Ganesan.V. “Internal Combustion Engines”, Tata McGraw-Hill Publishing Co., New Delhi, 2003.

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L	T	P
3	0	0

UCOMPAU704: COMPUTER AIDED DESIEGN AND MANUFACTURING (CAD/CAM)

UNIT-I

Computers in Industrial Manufacturing: Product cycle, CAD / CAM Hardware, Basic structure, CPU, Memory types, Input devices, Display devices, Hard copy devices, Storage devices.

Computer Graphics: Raster scan graphics coordinate system, Database structure for graphics modeling, Transformation of geometry, 3D transformations, Mathematics of projections, Clipping, Hidden surface removal.

UNIT II

Geometric Modeling: Requirements, geometric models, Geometric construction models, Curve representation methods, Surface representation methods, Modeling facilities desired.

Drafting and Modeling systems: Basic geometric commands, layers, Display control commands, Editing, dimensioning, Solid modeling.

UNIT III

Numerical Control: NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, Features of Machining center, turning center.

CNC Part Programming: Fundamentals, manual part programming methods, Computer Aided Part Programming.

UNIT IV

Group Tech: Part family, coding and classification, production now analysis, advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

Computer aided Quality Control: Terminology in quality control, The computer in ac, Contact inspection methods, Non-contact inspection methods, optical non-contact inspection methods, non-optical, computer aided testing, integration of CAQC with CAD/CAM.

UNIT V

Computer integrated manufacturing systems: Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, and human labor in the manufacturing systems, CIMS benefits.

Books and References :

1. Automation, Production System and Computer Integrated Manufacturing, by Mikell P. Grover, Prentice Hall of India Pvt Ltd.
2. CAD/CAM – Theory and Practice, by Ibrahim Zeid, McGraw Hill
3. Computer Aided Manufacturing, by Cheng, Pearson India
4. CAD/CAM: Principles and Oerations, by P. N. Rao, McGraw Hill
5. CAD/CAM: Computer Aided Design and Manufacturing, by M. Groover, Pearson India.

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L	T	P
3	0	0

UCOMPAU705: COMPUTATIONAL FLUID DYNAMICS

UNIT- I:

Governing Equations and Boundary Conditions:

Basics of computational fluid dynamics. Governing equations of fluid dynamics. Continuity, Momentum and Energy equations. Chemical species transport. Physical boundary conditions, Time-averaged equations for Turbulent Flow. Turbulent–Kinetic Energy Equations Mathematical behaviour of PDEs on CFD. Elliptic, Parabolic and Hyperbolic equations.

UNIT -II:

Finite Difference Method:

Derivation of finite difference equations. Simple Methods. General Methods for first and second order accuracy, solution methods for finite difference equations. Elliptic equations. Iterative solution Methods. Parabolic equations. Explicit and Implicit schemes. Example problems on elliptic and parabolic equations.

UNIT- III:

Finite Volume Method (FVM) for Diffusion:

Finite volume formulation for steady state One, Two- and Three-dimensional diffusion problems. One dimensional unsteady heat conduction through Explicit, Crank. Nicolson and fully implicit schemes.

UNIT -IV:

Finite Volume Method for Convection Diffusion:

Steady one-dimensional convection and diffusion. Central, upwind differencing schemes properties of discretization schemes. Conservativeness, Boundedness, Transportive, Hybrid, Power-law, QUICK Schemes.

UNIT- V:

Calculation Flow Field by FVM:

Representation of the pressure gradient term and continuity equation. Staggered grid. Momentum equations. Pressure and Velocity corrections; Pressure Correction equation, SIMPLE algorithm and its variants. Turbulence models, mixing length model, Two equation (k-ε) models. High and low Reynolds number models.

Books and References:

1. An Introduction to Computational Fluid Dynamics: The Finite Volume Method, by Versteeg, Pearson,India.
2. Numerical Heat Transfer and Fluid Flow, by Patankar, Tayers& Francis.
3. Computational Heat Transfer, by Jaluriaans Torrance, CRC Press.
4. Computational Fluid Dynamics, by Anderson, Mc Graw Hill.
5. Computational Fluid Dynamics, by Chung, Cambridge University Press.
6. Computer Simulation of flow and heat transfer, by Ghoshdastidar McGraw Hill.
7. Introduction to Computational Fluid Dynamics, by Prodip Niyogi. Pearson India.
8. Computational Fluid Flow and Heat Transfer, by Muralidhar and Sundararajan, Narosa Publishing House.

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L	T	P
0	0	2

UICENAU706: I.C. ENGINE & POLLUTION CONTROL LAB

List of Experiments: (At least 8 experiments out of following in depth and details.)

1. Performance Analysis of Four stroke S.I. Engine- Determination of indicated and brake thermal efficiency, specific fuel consumption at different loads, Energy Balance.
2. Determination of Indicated H.P. of I.C. Engine by Morse Test.
3. Performance Analysis of Four stroke C.I. Engine- Determination of indicated and brake thermal efficiency, specific fuel consumption at different loads, Energy Balance.
4. Study & experiment on Valve mechanism.
5. Study & experiment on Gear Box.
6. Study & experiment on Differential Gear Mechanism of Rear Axle.
7. Study & experiment on Steering Mechanism.
8. Study & experiment on Automobile Braking System.
9. Study & experiment on Chassis and Suspension System.
10. Study & experiment on Ignition system of I.C. Engine.
11. Study & experiment on Fuel Supply System of S.I. Engines- Carburettor, Fuel Injection Pump and MPFI.
12. Study & experiment on Fuel Supply System of C.I. Engines- Injector & Fuel Pump.
13. Study & experiment on Air Conditioning System of an Automobile.
14. Study and testing of NOx emission.
15. Study and testing of SOx emission.
16. Study and testing of CO emission.
17. Experiment on Engine Tuning.
18. Experiment on Exhaust Gas Analysis of an I.C. Engine.

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L	T	P
0	0	2

UCOMPAU707: COMPUTER AIDED DESIGN AND MANUFACTURING LAB

List of practical:

1. Design of machine component or other system experiment: Writing and validation of computer program.
2. Understanding and use of any 3-D Modeling Software commands.
3. Pro/E/Idea etc. Experiment: Solid modeling of a machine component
4 . Writing a small program for FEM for 2 spring system and validation of program or using a FEM Package
5 . Root findings or curve fitting experiment: Writing and validation of computer program.
6. To study the characteristic features of CNC machine
7. Part Programming (in word address format) experiment for turning operation (including Operations such as grooving and threading) and running on CNC machine
8. Part Programming (in word address format or ATP) experiment for drilling operation (point to point) and running on CNC machine
9. Part Programming (in word address format or ATP) experiment for milling operation (contouring) and running on CNC machine

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UINDUAU708: INDUSTRIAL TRAINING

Students shall carryout industrial training as a part of their curriculum after the completion of their 3rd year for 6 WEEKS/ 45 DAYS. After this their performance shall be evaluated during 7th semester by SUBMITTING TRAINING REPORT & CERTIFICATE, taking viva of each and every student.

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L	T	P
0	0	2

UMINOAU709: MINOR PROJECT

The students would be allotted an industrial project or any Research Project in the beginning of the VII semester itself. He/ She may continue this project in details, later in the (8th) semester. The assessment of ESE will be done the faculty member of the other department within the same institute.

EVALUATION SCHEME

B.TECH –AUTOMOBILE ENGINEERING 8th SEMESTER

4th YEAR / SEMESTER-VIII

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	Marks In Evaluation Scheme						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UNONCAU801	Non Conventional Energy Resources	3	0	0	3	30	-	30	70	-	70	100
UAUTOAU802	Automotive Pollution & Control	3	1	0	4	30	-	30	70	-	70	100
UVIHIAU803	Vehicle Body Engineering & Safety	3	1	0	4	30	-	30	70	-	70	100
UPLANAU804	Plant Layout and Material Handling.	3	0	0	3	30	-	30	70	-	70	100
USEMIAU805	Seminar	-	-	3	2	-	25	25	-	25	25	50
UMAJOAU806	Major Project	-	-	12	7	-	100	100	-	200	200	300
Total		12	2	15	23	120	125	120	280	225	505	750

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L	T	P
3	0	0

UNONCAU801 : NON-CONVENTIONAL ENERGY RESOURCES

UNIT-I

Solar Radiation: Extra-terrestrial and terrestrial, radiation measuring instrument, radiation measurement and predictions.

Solar thermal conversion: Basics, Flat plate collectors-liquid and air type. Theory of flat plate collectors, selective coating, advanced collectors, Concentrators: optical design of concentrators, solar water heater, solar dryers, solar stills, solar cooling and refrigeration.

Solar photovoltaic: Principle of photovoltaic conversion of solar energy; Technology for fabrication of photovoltaic devices; Applications of solar cells in PV generation systems; Organic PV cells.

UNIT-II

Wind energy characteristics and measurement: Metrology of wind speed distribution, wind speed statistics, Weibull, Rayleigh and Normal distribution, Measurement of wind data, Energy estimation of wind regimes; Wind Energy Conversion: Wind energy conversion principles; General introduction; Types and classification of WECS; Power, torque and speed characteristics; power curve of wind turbine, capacity factor, matching wind turbine with wind regimes; Application of wind energy.

UNIT-III

Production of biomass, photosynthesis-C3 & C4 plants on biomass production; Biomass resources assessment; Co2 fixation potential of biomass; Classification of biomass; Physicochemical characteristics of biomass as fuel Biomass conversion routes: biochemical, chemical and thermo chemical Biochemical conversion of biomass to energy: anaerobic digestion, biogas production mechanism, technology, types of digesters, design of biogas plants, installation, operation and maintenance of biogas plants, biogas plant manure-utilization and manure values.

Biomass Gasification: Different types, power generation from gasification, cost benefit analysis of power generation by gasification.

UNIT-IV

Small Hydropower Systems: Overview of micro, mini and small hydro system; hydrology; Elements of turbine; Assessment of hydro power; selection and design criteria of turbines; site selection and civil works; speed and voltage regulation; Investment issue load management and tariff collection; Distribution and marketing issues.

Ocean Energy: Ocean energy resources, ocean energy routs; Principle of ocean thermal energy conversion system, ocean thermal power plants. Principles of ocean wave energy and Tidal energy conversion.

UNIT-V

Geothermal energy: Origin of geothermal resources, type of geothermal energy deposits, site selection geothermal power plants;

Hydrogen Energy: Hydrogen as a source of energy, Hydrogen production and storage.

Fuel Cells: Types of fuel cell, fuel cell system and sub-system, Principle of working, basic thermodynamics

TEXT AND REFERENCES BOOKS:

1. Kothari, Singal & Rajan; Renewable Energy Sources and Emerging Technologies, PHI Learn
2. Khan, B H, Non Conventional Energy, TMH.
3. Sukhatme and Nayak, Solar Energy, Principles of Thermal Collection and Storage, TMH.
4. Tiwari and Ghosal, Renewable Energy Resources: basic principle & application, Narosa Publ
5. Koteswara Rao, Energy Resources, Conventional & Non-Conventional, BSP Publication.

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L	T	P
3	1	0

UAUTOAU802: AUTOMOTIVE POLLUTION AND CONTROL

UNIT -I

Introduction: History back ground, exhaust gas pollutants, Vehicle population assessment in metropolitan cities and contribution to pollution, effect on human health and environment, global warming, Greenhouse effect.

UNIT II

SI engine Combustion and Pollutant Formation: Chemistry of SI engine Combustion, HC and CO formation in Four stroke and Two stroke SI engines, NO formation in SI Engines, Effect of operating variables on emission formation.

UNIT III

CI engine Combustion and Emissions: Basic of diesel combustion, Smoke emission in diesel engines, Particulate emission in diesel engines. Colour and aldehyde emissions from diesel engines, Effect of operating variables on emission formation.

UNIT IV

Control Techniques for SI and CI: Design changes, optimization of operating factors, exhaust gas recirculation, control of evaporative emission, air injector PCV system-Exhaust treatment in SI engines-Thermal reactors- Catalytic converters, Catalysts, Use of unleaded petrol. Diesel particulate filter .

UNIT –V

Emission Measurement and standards:

Measurement of CO2 and CO by NDIR analyzer, Measurement of Hydrocarbon emission by Flame ionization detectors, Measurement of NOx by Chemiluminescent analyzer, Gas chromatograph, Smoke meters, Emission standards. driving cycles– USA, Euro and India. Test procedures – ECE, FTP tests. .

References

1. Mathur M. L., Internal Combustion Engines
2. Ganesan. V., Internal Combustion Engines, Tata McGraw Hill Co.
3. Obert. E.F., Internal Combustion Engines.
4. Taylor. C.F., Internal Combustion Engines, MIT Press.
5. Heywood. J.B., Internal Combustion Engine Fundamentals, McGraw Hill Book Co

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L	T	P
3	1	0

UVEHIAU803 : VEHICLE BODY ENGINEERING AND SAFETY

UNIT-I

Materials

Structural materials: Aluminum alloy sheet, extrusion and casting, Austenitic and Ferritic stainless steels, alloy steels. Different types of composites, FRP & metal Matrix Composites. Structural timbers properties designing in GRP and high strength composites different manufacturing techniques of composites. Thermo-plastics, ABS and styrene, Load bearing plastics, semi rigid PUR foams and sandwich panel construction.

UNIT II

Ergonomics and Controls

Shaping and packaging: Product design and concepts, Aesthetics and industrial design, formal aesthetics and shape, computer aided drafting, surface development, interior ergonomics, ergonomics system design, dashboard instruments, advances in electronic display, CV legal dimension.

CV-cab ergonomics, mechanical package layout.: Body Fitting and I Controls: Driver's seat, window winding mechanism, Door lock mechanism, other interior mechanisms, driver's visibility' and tests for, visibility, minimum space, requirements and methods orim proving space in cars, electric wiring and electronic control systems, advanced body electronics, networking or body systems controls.

UNIT III

Aerodynamics and Force Analysis

Aerodynamics: Basics, aero foils, aerodynamics drag lift, pitching, yawing and rolling moments, determination of aerodynamic coefficients (wind tunnel testing), racing car aerodynamics, bluff body aerodynamics, local air flows.

Load Distribution: Types of load carrying structures -closed, integral, open, flat types. Calculation of loading cases static, asymmetric, vertical loads. Load distribution, stress analysis of structure, body shell analysis.

UNIT IV

Structural Dynamics

Noise, Vibration, Harshness: Noise and vibration basics, body structural vibrations, chassis bearing vibration, designing against fatigue, rubber as an isolator.

CV body mountings, automatic enclosures, sandwich panels, structure dynamics applied, surety under impact: Impact protection basics, design for crash worthiness, occupant and cargo restraints. Passive restraint systems, slide impact analysis, bumper system, energy absorbent foams, laws of mechanisms applied 10 safeties.

Vehicle stability: Steering geometry vehicle and a curvilinear path, and lateral stability, effects of tire factors, mass distribution and engine location on stability.

UNIT V

Types of Vehicles

Vans, trucks and buses: Types of mini coach with trailers, single and double dickers, design criteria based on passenger capacity, goods to be transported and distance to be covered, constructional details, weight sand dimensions, conventional and integral type.

Text / References Books:

1. Body Engineering -Sydney F Page
2. Vehicle Body Engineering -Giles J Pawlowski
3. Automotive Chassis -P.M. Heldt. chilton& Co.
4. Handbook on Vehicle Body Design -SAE Publications

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L	T	P
3	0	0

UPLANAU804: PLANT LAYOUT AND MATERIAL HANDLING

UNIT -I

Introduction: Criteria, Strategies/Tactics, Sustainability and Eco-Efficiency in Facility Design, Basic Planning,Alternative Machine Arrangements, Flow Lines, Location Models, Act/Building Details, Aislesand Security, Storage, Shipping and Receiving, Offices, Specialized Areas.

UNIT -II

Workstations, Unit Loads & Containers, Conveyors, Vehicles, Lifting Devices, Workstation Material Handling, Ethics in Facility Design Facilities design procedure and planning strategies, Production, activity and materials flow analysis, Space requirements and personnel services design considerations.

`UNIT -III

Layout construction techniques: systematic layout planning; activity relationship analysis, pairwise exchange, graph-based construction algorithmic. **Material Handling:** Material handling principles; material handling equipment and material handling systems.

UNIT -IV

Computerized Layout and Analytical Methods: ALDEP, CORELAP, CRAFT, BLOCPLAN,etc. **Warehouse operations**: function, storage operations. **Manufacturing operation:** JIT, TQM, AM, CIM, SCM, Facility systems, **Quantitative models**: Layout model, waiting line, AS/RS, simulation model, etc.

UNIT -V

Assessment and evaluation of layout alternatives Projects, Use Spiral software to practice plantLayout design, Apply mathematical and engineering techniques such as systematic layout planning approach, quantitative model, cost estimate to solve practical facility layout problem.

BOOKS AND REFERENCES:

1. Plant Layout and Material Handling, by- James M. Apple, John Wiley & Sons.
2. Plant Layout and Material Handling, by- Fred E. Meyers, Prentice Hall.
3. Facility Layout and Location: An Analytical Approach, by Richard L, Francis, Pearson India.
4. Plant Layout and Material Handling, by- B. K. Aggarwal, Jain Brothers.
5. Plant Layout and Material Handling, by- S. C. Sharma, Jain Brothers.

6 Materials Handling Handbook, by- Raymond A. Kulwiec, John Wiley & Sons

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L	T	P
0	0	3

USEMIAU805: SEMINAR

Students have to present a detailed power point presentation on their own project topics. Tjis seminar will help them to enhance their personality.

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L	T	P
0	0	12

UMAJOAU806: MAJOR PROJECT

This project course may be in continuation of Project allotted in the beginning of the VII semester. Here, the students are supposed to do the detailed work as scheduled in the last semester. Finally, he/she will be required to submit the detailed project report on which viva-voice examination will be conducted by a committee having at least one external examiner.