DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.S.S/ Sci & Tech./M.Voc/NEP/23/2025.

It is hereby inform to all concerned that, on recommendation of the Dean, Faculty of Science & Technology **Academic Council at its meeting held on 19th May, 2025 has accepted the following 1} M. Voc in Industrial Automation 2} M. Voc in Automobile Technology Two Years Industry Embedded P. G. Program** under the Faculty of Science & Technology run at the Deen Dayal Upadhyay Kaushal Kendra, Dr. Babasaheb Ambedkar Marathwada University as appended herewith.

This is effective from the Academic Year 2024-25 onwards under the Faculty of Science & Technology.

All concerned are requested to note the contents of the circular and bring notice to the students, teachers and staff for their information and necessary action.

University campus,
Chhatrapati Sambhajinagar-431004.
Ref. No. S.S/P. G. Course/2024-25/1486-88
Date: 12/ 06/ 2025

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Deputy Registrar,
Syllabus Section

Copy forwarded for Information and necessary action:-

1] **The Director, Deen Dayal Upadhyay Kaushal Kendra, Dr. Babasaheb Ambedkar Marathwada University.**
2] **The Director, Board of Examinations & Evaluation,**
3] **The Director,** University Network & Information Centre, UNIC, with **a request to upload the curriculum along with this Circular on University Website.**
Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR-431004 (M.S.), INDIA

FACULTY OF SCIENCE AND TECHNOLOGY

Master of Vocation in Automobile Technology

(M. VOC. in Automobile Technology)

(2 Years Industry Embedded P.G. Program)

As Per

National Education Policy-2020

Course Structure and Outcome based Curriculum

For University Department

Deen Dayal Upadhyay KAUSHAL Kendra

(Department with Academic Autonomy)

Effective from the Academic Year 2024-25

SYLLABUS FOR SEMESTER - II

Course and Credit Distribution Structure
For
Two Years Post Graduate Programme
M. VOC. First Year, Semester: Second
Subject: Automobile Technology

Course Type	Course Code	Course Name	Teaching Scheme (Hrs./Week)		Credits Assigned		Min Marks	Max Marks
			Theory	Practical	Theory	Practical		
Discipline Specific Core Course (DSC) Mandatory	MATT/ MJ/550	Electrical Vehicles	2	--	2	--	20	50
	MATT/ MJ/551	Advanced Hydraulics and Pneumatics	2	--	2	--	20	50
	MATT/ MJ/552	Transmission System Design	2	--	2	--	20	50
	MATT/ MJ/553	Project Management-II	2	--	2	--	20	50
	MATP/ MJ/554	Practical Based on MATT/MJ/550	--	4	--	2	20	50
	MATP/ MJ/555	Practical Based on MATT/MJ/551	--	4	--	2	20	50
	MATP/ MJ/556	Practical Based on MATT/MJ/552	--	4	--	2	20	50
DSE (Choose any one from pool of course)	MATT/ DSE/557A	Automobile Body Engineering	2	--	2	--	20	50
	MATP/ DSE/557A	Practical Based on MATT/DSE/557AT	--	4	--	2	20	50
	OR							
	MATT/ DSE/557B	Vehicle Aerodynamics and Design	2	---	2	---	20	50
	MATP/ DSE/557B	Practical/ Case Study Based on MATT/DSE/557BT	--	4	---	2	20	50
OJT/FIELD PROJECT	MAT/OJT/FP/558 (Field Project)		--	8	--	4	40	100
			10	24	10	12	220	550

MATT/MJ/550: Electrical Vehicles

Total Credits : 02 Total Contact Hours : 30 Hrs
Maximum Marks : 50

Course Outcomes (COs) :

After completion of the course, students will be able to –

i. Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals
ii. Explain plug – in hybrid electric vehicle architecture, design and component sizing and the power electronics devices used in hybrid electric vehicles
iii. Analyze various electric drives suitable for hybrid electric vehicles

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3
CO 1	H										
CO 2	H										
CO 3	H										

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	**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. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, mathematical models to describe vehicle performance	**10 Hrs**
II	**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. 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.	**10 Hrs**
III	**Electric Propulsion unit** Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency	**10 Hrs**

Text Books:

1. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003 ISBN 0203009398, 9780203009390.
2. Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004, ISBN 0-8493-3154-4.
3. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003, ISBN: 978-1-119-94273-3.

MATP/MJ/554: Practical Based on Electrical vehicle

Total Credits: 02 Total Contact Hours: 60 Hrs
Maximum Marks : 50

Course Outcomes (COs):

After completion of the course, students will be able to -

1. Identify the voltage, current, and load requirements for three phase AC and DC motors
2. Identify the voltage, current, and load requirements for three phase AC and DC generators
3. Evaluate effect of parameter settings on the performance of various types motor and generators
4. Design and implement various safety interlocks for motors and generators

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1		H										
CO 2		H										
CO 3		H										
CO 4		H										

List of Experiments

1. Familiarization of the electrical vehicle components
2. To study the Load Characteristics of DC shunt generator
3. Speed Control of DC motor by field resistance control
4. Speed Control of DC motor by armature resistance control
5. To perform speed control of DC motor by using Ward- Leonard Method of speed control
6. Determination of Transformer equivalent circuit from Open Circuit and Short Circuit Test
7. To Study Magnetisation Characteristics of DC Shunt Generator.
8. Speed control of slip ring Induction Motor.

MATT/MJ/551: Advanced Hydraulics and Pneumatics

Total Credits : 02 Total Contact Hours : 30 Hrs
Maximum Marks : 50

Course Outcomes (COs) :

After completion of the course, students will be able to –

1. Identify the conditions of fittings, oil, pipes, seals & packing of hydraulic systems in automobile vehicles.
2. Carry out troubleshooting and maintenance of Hydraulic & Pneumatic Systems
3. Construct the Hydraulic circuits for various applications.
4. Construct the Pneumatic circuits for various applications.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3
CO 1	H										
CO 2	H										
CO 3	H										
CO 4	H										

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	**Introduction to fluid power** Classification, application in various fluids of engineering, various hydraulic and pneumatic ISO/JIC Symbols, transmission of power at static and dynamic states, Types of hydraulic fluids and their properties, effect of temperature on fluids.	**10 Hrs**
II	**Hydraulic system elements** Control of fluid power elements- Pressure control, direction control, flow control valves, pilot operated, relief, pressure reducing, quick exhaust, sequence valves, flow control valves and their types, meter-in and meter-out circuit and flow through circuit. Types of direction control valves, Actuators – linear and rotary, hydraulic motors, types of hydraulic cylinders and their mountings. Hydraulic servo-system for rotary and linear motion	**10 Hrs**
III	**Pneumatic Systems** Application of pneumatics, physical principles, basic requirement of pneumatic system, Comparison with hydraulic systems, Elements of Pneumatics, Air	**10 Hrs**

	compressors, Pneumatic control valves, Pneumatic actuators - types and the mountings, Air motors – types, Pneumatic circuits – Basic pneumatic circuit, impulse operation, speed control, pneumatic motor circuit, sequencing of motion, time delay circuits and their applications. Pneumatic servo-system for linear and rotary motion	

Text Books:

1. Industrial Hydraulic & pneumatics – J.J. Pippenger - McGraw Hill, ISBN-13: 978-0070501409
2. Fluid with applications – A. Esposito- PHI Publishers, ISBN: 9781292023878
3. Industrial Hydraulic Manual by Vicker Sperry, ISBN 10: 0963416200
4. Practical guide to Fluid Power by H.S. Stewart
5. ISO 1219 Fluid systems and components
6. Hydraulic and Pneumatic Controls, K. Shanmuga Sundaram, S. Chand Publication, ISBN : 81-219-2635-1
7. Introduction to Hydraulics and Pneumatics, S. Ilango and V. Soundararajan, PHI Learning Private Limited, New Delhi, ISBN: 9788120330795
8. Hydraulic and Fluid Mechanics, Dr. P N Modi Dr. SM Seth, Standard Book House, Delhi, ISBN No, 978-81-89401-26-9
9. Hydraulic & pneumatics- Andrew Parr-Jaico Publishing House, ISBN-9780080966748

MATP/MJ/555: Practical Based on Advanced Hydraulics and Pneumatics

Total Credits: 02 Total Contact Hours: 60 Hrs
Maximum Marks : 50

Course Outcomes (COs):

After completion of the course, students will be able to -

1. To study single-acting and double-acting cylinder and direction control valve.
2. To select the proper cylinder and direction control valve.
3. To build a pneumatic circuit.
4. To understand the working of the control valve.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3	PSO 4
CO 1		H										
CO 2		H										
CO 3		H										
CO 4		H										

List of Experiments

i. Select pneumatic cylinder for given load and speed requirement
ii. Develop pneumatic circuit to operate direct single acting cylinder
iii. Develop pneumatic circuit to operate direct double acting cylinder
iv. Develop hydraulic circuit to operate direct single acting cylinder
v. Develop hydraulic circuit to operate direct double acting cylinder
vi. Construct and operate speed control Hydraulic circuit for speed control of Double Acting Cylinder by Meter in- Meter out, By pass methods

MATT/MJ/552: Transmission System Design

Total Credits: 02 Total Contact Hours: 30
Maximum Marks: 50

Learning Objectives of the Course:
1.To understand the design procedure of various transmission elements
Course Outcomes (COs):

After completion of the course, students will be able to -

CO1	Analyze the stresses in shaft and design the shaft for any application.
CO2	Design the single plate, Multi plate and centrifugal clutch for automotive application
CO3	Select Belt drive and chain drive for automotive application.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO10	PO12		PSO 1	PSO 2	PSO 3
CO 1	H															
CO 2	H															
CO 3	H															

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	**Design of Shaft** Pure torsion, bending moment, Compound stresses and strain, Twisting moment, Shafts, design of shaft, Material selection for shaft, Stresses in shaft, shafts in series, shaft in parallel, composite shaft.	**10 Hrs**
II	**Design of Clutch** Design of single plate clutch, multi plate clutch, design of centrifugal clutch, cone clutch, energy dissipated, torque transmitting capacity of clutch, design of clutch components, uniform pressure theory, uniform wear theory.	**10 Hrs**
III	**Belt, Rope, and Chain Drive** Introduction, Selection of Belt Drive, Types of Belt drive, Material used for belts, Velocity ratio, Slip, Creep of Belt, power transmitted by belt, Maximum Tension, V-Belts and pulley, Rope drives, fibre ropes, Advantages of rope drive, wire ropes, Designation of wire ropes, Chain drive, Terms used in chain drive, Classification of chains	**10 Hrs**

Text Books:

1. "Automobile Mechanics", Giri.N.K, Khanna Publisher, New Delhi- 2008, ISBN-10: 8174092161
2. "Mechanical Engineering Design", Keith J Nisbett and Richard G Budynas, Mcgraw Hill Series, 2013, ISBN 13: 9780073529288.
3. "Automobile Chassis Design", Dean Averns, Illiffe Publisher, London, ISBN-13: 978-1444600049,
4. Design of Machine Elements, V.B.Bhandari, Tata McGraw Hill publication, 3rd Edition, (2010), ISBN-10: 0070681791 ISBN-13: 9780070681798
5. Machine Design, P.Kannaiah, Scitech, (2010) ISBN 10: 8183711510 / ISBN 13: 9788183711517

NPTEL/SWAYAM courses: *https://nptel.ac.in/courses/112106424*

MATP/MJ/556: Practical Based on Transmission System Design

Total Credits: 02 Total Contact Hours : 60 Hrs

Maximum Marks : 50

Course Outcomes (COs):

After completion of the course, students will be able to –

1. Analyze the stress profile in Automotive components
2. Design Automobile components using computer aided softwares.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		PSO 1	PSO 2	PSO 3
CO 1		H														
CO 2		H														

List of Practical:

1. Study of Single plate clutch and Multiplate Clutch.
2. Study of Centrifugal clutch and Cone Clutch.
3. Select the belt for particular application by using specification- A case study.
4. Study of Chain drive and Selection of Chain drive.
5. Study of Rope Drive and Selection of rope drive.
6. Design of shaft for particular application on strength basis.

MATT/DSE/557A: Automobile Body Engineering

Total Credits: 02 Total Contact Hours: 30 Hrs Maximum
Marks : 50

Learning Objectives:

The course should enable students:

1. To understand the construction of vehicle and concept of aerodynamics.
2. To understand different types of cars and passenger bus bodies.

Course Outcomes (COs) :

After completion of the course, students will be able to –

1. Analyze the physics of fluid flow over vehicle body and its optimization techniques.
2. Demonstrate the various car body parts and its functions
3. Identify painting defects and describe their causes and remedies.
4. Carry out repair methods of body and repainting.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3
CO 1	H										
CO 2	H										
CO 3	H										
CO 4	H										

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	**Car Body** Types - Saloon, Convertibles, Limousine, Estate Car, Racing and Sports Car. Visibility - Regulations, Driver's Visibility, Tests For Visibility, Methods of Improving Visibility and Space In Cars. Safety - Safety Design, Safety Equipments For Cars. Car Body Construction - Design Criteria, Prototype Making, Initial Tests, Crash Tests on Full Scale Model, Dummies and Instrumentation	**10 Hrs**
II	**Bus Body** Types - Mini Bus, Single Decker, Double-Decker, Two Level and Articulated Bus. Bus Body Layout - Floor Height, Engine Location, Entrance and Exit Location, Seating Dimensions. Constructional Details - Frame Construction, Double Skin Construction, Types of Metal Sections Used, Regulations, Conventional And Integral Type Construction.	**10 Hrs**
III	**Body Materials, Trim and Mechanisms** Steel Sheet, Timber, Plastic, GRP, Properties of Materials - Corrosion, Anticorrosion Methods. Selection of Paint And Painting Process. Body Trim Items. Body Mechanisms Motor drives, drive system efficiency	**10 Hrs**

Text Books:

1. Vehicle Body Engineering – Pawloski J., Business Books Ltd., ISBN 10: 0220689164
2. The Automotive Chassis: Engineering Principles – Reimpell J., ISBN:9781493302864
3. Vehicle Body Layout and Analysis – John Fenton, Mechanical Engg. Publications Ltd. London, ISBN: 9780852984451
4. Body Construction and Design – Giles J. G., Illife Books, Butterworth and Co., ISBN: 1-4051-5592-2.

MATP/DSE/557A: Practical Based on Automobile Body Engineering

Total Credits: 02 Total Contact Hours: 60 Hrs

Maximum Marks : 50

Course Outcomes (COs):

After completion of the course, students will be able to -

1. Understand the factors affecting driver visibility and methods to improve it.
2. Learn how modern safety equipment enhances vehicle safety.
3. Learn about the different configurations and uses of various bus types.
4. Understand how materials can be protected from corrosion.
5. Learn about the importance of proper painting techniques in vehicle aesthetics and protection.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3	PSO 4
CO 1		H										
CO 2		H										
CO 3		H										
CO 4		H										
CO 5		H										

List of Experiments

1. Conduct a practical test with different vehicles to evaluate driver visibility.
2. Analyze the safety features of various cars, including airbags, crumple zones, and seatbelt mechanisms.
3. Visit a bus depot or transit museum to study different bus types such as mini buses, single-decker, double-decker, and articulated buses.
4. Perform corrosion tests on different materials and apply various anticorrosion methods to observe effectiveness.
5. Visit an automotive painting workshop to observe the selection of paint and the painting process, including surface preparation and finishing.
6. Demonstrate the operation of body mechanisms like motor drives, window regulators, and door locking systems.

MATT/MJ/553 : Project Management – II

Total Credits : 02 Total Contact Hours : 30 Hrs
Maximum Marks : 50

Learning Objectives of the Course:

To provide students with-

1. Basics knowledge of crashing project, risk management
2. Understanding of outsourcing negotiation

Course Outcomes (COs) :

On completion of the course, students should be able to-

1. Holistic view of project management covering among others project risk and quality management, procurement and contract management
2. Developing leadership skills and managing PM team, project performance evaluation, project audit and closure.

CO –PO – PSO Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1						H	H	H	H	H	H	H				
CO2						H	H	H	H	H	H	H				
CO3						H	H	H	H	H	H	H				

Module No.	Course Content	Contact Hours
I	**Introduction** Reducing Project duration - Crashing project activities to speed up a project Project Risk Management - Identification, quantification, and mitigation of risks	10 Hrs
II	**Outsourcing** Project Outsourcing, Negotiation, and Managing inter-organizational Relations Project Procurement and Contract Management	10 Hrs
III	**Evaluation** Project Evaluation, Project progress and Performance Management Project Closure, and Project Oversight	10 Hrs

Text Books:

- Fundamentals of Quality Control and Improvement by Mitra, Amitava; Wiley India Pvt Ltd, ISBN- 9781118491645
- Project Management (A Strategic Managerial Approach) by Meredith ISBN: 0471073237

Reference Books:

- The certified six sigma Green Belt Handbook,by Roderick A. Munro and Govindarajan Ramu and Daniel J. Zrymiak,; ASQ Quality Press and Infotech Standards India Pvt. Ltd. , ISBN-978087389891:
- The Certified Six Sigma Black Belt Handbook by T. M. Kubiak and Donald W. Benbow; Pearson Publication, ISBN- 9788131728697

Online Reference:

https://nptel.ac.in/courses/110105167

MATT/DSE/557B: Vehicle Aerodynamics and Design

Total Credits: 02 Total Contact Hours: 30 Hrs
Maximum Marks : 50

Learning Objectives:

The course should enable students:

1. To calculate the lift and drag forces on vehicle.
2. To explain shape optimization of cars and passenger bus bodies

Course Outcomes (COs) :

After completion of the course, students will be able to –

1. Explain vehicle aerodynamics.
2. Analyze stability, safety and comfort of vehicles.
3. Explain wind tunnels and testing techniques.
4. Analyze the lift and drag forces on vehicle.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3
CO 1	H										
CO 2	H										
CO 3	H										
CO 4	H										

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	**Fundamentals of Aerodynamics** Scope and Historical Development Trends - Fundamental of Fluid Mechanics - Flow Phenomenon Related To Vehicles - External & Internal Flow Problem - Resistance To Vehicle Motion - Performance - Fuel Consumption And Performance - Potential of Vehicle Aerodynamics, Cars as a Bluff Body - Flow Field Around Car - Drag Force - Types of Drag Force - Analysis of Aerodynamic Drag -Drag Coefficient of Cars - Strategies for Aerodynamic Development - Low Drag Profiles, Lift, Body Styling	**12 Hrs**
II	**Shape Optimization of Cars** Front End Modification - Front And Rear Wind Shield Angle - Boat Tailing - Hatch Back, Fast Back And Square Back - Dust Flow Patterns at the Rear - Effects of Gap Configuration - Effect of Fasteners. The Origin of Forces and Moments on Vehicle - Side Wind Problems - Methods to Calculate Forces and Moments - Vehicle Dynamics Under Side Winds - The Effects of Forces and Moments.	**10 Hrs**
III	**Vehicle Handling** Characteristics of Forces and Moments - Dirt Accumulation on the Vehicle - Wind Noise - Drag Reduction in Commercial Vehicles, Flow visualization techniques, Road testing methods, Wind noise measurements	**08 Hrs**

Text Books:

1. Aerodynamics of Road Vehicles,– W.H. Hucho, Butterworth and Co., 2004
2. Boundary Layer Theory, Schlichting, H ,McGraw Hill, New York, 1999
3. Low speed Wind Tunnel Testing, Pope, A., John Wiley and Sons, New York, 1999
4. Vehicle aerodynamics, SAE, 1996.
5. Aerodynamics for Engineering students, E.L.Houghton & P.L.Carpenter, Butterworth Heinman (2003)

MATP/DSE/557B: Practical Based on Vehicle Aerodynamics and Design

Total Credits: 02 Total Contact Hours: 60 Hrs

Maximum Marks : 50

Course Outcomes (COs):

After completion of the course, students will be able to -

1. Understand the factors affecting driver visibility and methods to improve it.
2. Learn how modern safety equipment enhances vehicle safety.
3. Learn about the different configurations and uses of various bus types.
4. Understand how materials can be protected from corrosion.
5. Learn about the importance of proper painting techniques in vehicle aesthetics and protection.

CO-PO Attainment Matrix for Course
(L = Low, M = Medium, H = High)

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7		PSO 1	PSO 2	PSO 3	PSO 4
CO 1		H										
CO 2		H										
CO 3		H										
CO 4		H										
CO 5		H										

List of Experiments

1. Study terminologies related to vehicle aerodynamics and SAE vehicle aerodynamic axis.
2. Measure and study effect of vehicle aerodynamic on fuel economy and power consumption.
3. Prepare /study any vehicle scale model for wind tunnel testing using standard procedure.
4. Perform and study wind tunnel testing for simple bodies like plate, sphere, aerofoil to measure drag and lift.
5. Perform and study wind tunnel testing for pressure distribution and flow pattern around any small scale vehicle (car/bus) model.
6. Study the effect of different aerodynamic aids for reduction of vehicle drag and control of lift.
7. Study/Measure the drag reduction aids for any commercial vehicle/vehicle model.
8. Study drag measurement using road testing e.g. Coast down tests, crosswind tests, on-road cooling tests, soiling of windows and chassis parts, wind noise etc.

MAT/OJT/FP/558 Field Project

Total Credits: 04 Total Contact Hours: 120 Hours

Maximum Marks : 100

Course Outcomes:

On completion of this course, students should be able to –

1. Recognize the underlying factors of problem identification/manufacturing support in industrial realm
2. Apprehend the procedural steps towards root cause analysis and comprehensive solution approach
3. Conceptualize financial planning issues in commissioning a project
4. Realize pay off and benefit cost analysis

Activity

1. Student should identify one industrial project commissioned in industry - to alleviate certain problem/to support existing manufacturing facility. They are expected to study the project in depth and submit a detailed report to the department on –

   i. Problem identification process
   ii. Justification for machineries installation
   iii. Economic Considerations (elements of cost, capital cost, facility cost etc.)
   iv. Payoff and cost benefit analysis
   v. Installation aspects & safety measures installed
   vi. Co-working of the project with existing systems in the plant
   vii. Benefit factors

   Final evaluation will be based on presentation, and viva-voce examination