Syllabus for Diploma Engineering

Automobile Engineering

Semester – III

Subject Name: Automobile Manufacturing Processes

Subject Code: 09AE0304

Diploma branch in which subject is offered:- Automobile Engineering

Rationale

This subject of automobile manufacturing processes provides knowledge regarding different types of manufacturing processes used to produce variety of metal products used in automobiles and other machines. It also develops understanding that can be used to suggest and manipulate vital process parameters related to different manufacturing processes so that the high quality component may be produced at low cost and in minimum time. As a technician the knowledge and practical skills in different manufacturing processes are essential and hence emphasis is also given in this course towards skills development. Further the technician should be able to handle machine, equipment, tools and accessories in the recommended manner and also follow safety precautions.

Credits Earned: 3

Course Outcomes:

After learning the course the students should be able to:

- Identify need and scope of various manufacturing processes.
- Explain construction of lathe machines and demonstrate various operation carried out on lathe machines
- Choose appropriate casting method suitable for a given industrial component, identify casting defects, their causes and suggest remedies
- Explain various types of welding process and select particular welding process depending upon various applications.
- Apply various drilling and grinding techniques as a material removal process

Pre-requisite of course: Elements of Mechanical Engineering

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
0	0	6	3	00	30	20	25	25	100

Contents:

Sr. No.	Topics	Teaching hrs.	Weightage
1	**Introduction To Manufacturing Processes** Nature, role and scope of manufacturing process, Classification of manufacturing processes, Introduction and application of each process, Types of production.	04	8
2	**Metal Cutting Lathes** Engine Lathes, construction all arrangement and principal units of engine lathes, type and size range of engine lathes, Operations carried on engine lathe , attachment extending the processing capacities of engine lathes, description of other types of lathes, Plain truing lathes, facing lathes, multiple tool lathes, simple purpose lathes, turret lathes, horizontal and vertical. Alignment tests of lathes.	12	22
3	**Metal Casting** Introduction to casting, Working principles of different methods of casting-Sand Casting, Investment casting, pressure die casting, centrifugal casting, Casting defects, Remedial measures	10	20
4	**Drilling Machines** Purpose and field of application of drilling machines upright drill processes, radial drills, alignment tests of drilling machine.	08	15
5	**Metal Joining** Introduction and classification of Metal Joining method, Working principles, application, and limitation of Gas Welding, Arc Welding & Resistance Welding, Defects in Welding, Remedial Measures, Working principles & application of Brazing and Soldering, Safety precautions.	10	20
6	**Grinding Machines and Abrasives** Classification of grinding machines, cylindrical grinders, internal grinders, Surface grinders, tool and cutter grinders, grinding wheel surface finishing. Abrasives, manufacture or grinding wheels.	08	15

References:

1. Internal Manufacturing engineering by J. A. Vadher, Atul prakashan. (English version)
2. Manufacturing engineering by J. A. Vadher, Atul prakashan. (Gujarati version
3. Workshop Technology I, II & III by W. A. J. Chapman, Arnold Publication.
4. Workshop Technology I & II by J. A. Schey, Tata MacGraw Hill Education.
5. Workshop Technology (vol-1) by S. K. Hajra Choudhury, MPP.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
30%	40%	30%	0	0	0

Suggested List of Experiments:

1. Demonstrate various machining operation carried out on centre lathe as per the given drawing (Straight Turning, Taper Turning, Grooving, Knurling, Thread cutting)
2. Select component for pattern making and prepare a pattern drawing and core from the given component/drawing.
3. Prepare a mould using prepared pattern, core and moulding sand. Also pour molten metal and get the casting.
4. Demonstrate Oxy-Acetylene Welding Process.
5. Study Resistance Welding and Perform Spot welding process for give Component
6. Prepare a job using arc welding
7. Demonstrate Grinding as a surface finishing operations

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory