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Automobile Engineering — Complete Syllabus

BTEUP Diploma in Mechanical Engineering (Production) • 5th Semester • Session 2026–27

Subject 5.6.6 (Open Elective-III, Qualifying) • 50 Marks Internal Only • 2 Credits • L 2 – P 0

Qualifying subject — read this first: you must PASS this subject, but its marks are **not** added to your awarded division or final marks. It is assessed internally for 50 marks only, with no external examination. It is an Open Elective-III option: you choose ONE of Computer Aided Design & Manufacturing, Reverse Engineering, Artificial Intelligence, Automobile Engineering, or any minimum-2-credit course (NPTEL/SWAYAM/AICTE-ELIS/C-DAC/IIT-NIT/ISRO/Tata Tech). **Note:** this is an Open Elective-III option for Production students. It is NOT the same as the Automobile sub-branch's 5.5 practicum (Automobile Maintenance, Servicing & Repair), which is a different subject with its own syllabus.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.6.6	Automobile Engineering	Qualifying	2 – 0	2	50	—	50†

What This Subject Aims To Do

These days, the automobile has become a necessity instead of a luxury. Diploma holders in this course are required to supervise production and repair and maintenance of vehicles. For this purpose, knowledge and skills are required to be imparted to them regarding the automobile industry as a whole. This subject aims at developing the required knowledge and skills in this area.

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Detailed Contents — 3 Units

Unit I — Introduction to Basic Structure of an Automobile

Introduction to basic structure: automobile and its development; classification; layout of chassis; types of drives (front wheel, rear wheel, four wheel); introduction to electric and hybrid vehicles. Governing of fuel: carburetor; electronic control module (ECM, i.e. 8 bit, 16 bit and 32 bit computers); concept of double overhead cam, single overhead cam, twin cam 16 valve technology in 4 cylinder engine. Types and use of catalytic converters; selective catalytic reduction methods for emission control; emission norm standards (Bharat norms).

Unit II — Transmission System

Clutch: function; constructional details of single plate and multi plate friction clutches, centrifugal and semi-centrifugal clutch, cone clutch, hydraulic clutch. Gear box: function; working of sliding mesh, constant mesh and synchromesh gear box; torque converter and overdrive; introduction to automated manual transmission, automatic transmission and continuously variable transmission. Propeller shaft and rear axle: function; universal joint; differential; axles and axle drives. Wheels and tyres: types of wheels; toe in, toe out, camber, caster, kingpin inclination; wheel balancing and alignment; factors affecting tyre life.

Unit III — Steering, Suspension and Braking System

Steering system; Ackerman and Davis steering gears; types of steering gears; power steering (hydraulic and electrical). Function and types of coil spring, leaf spring, air suspension, shock absorber (telescopic type). Constructional details and working of mechanical, hydraulic, air and vacuum brake; relative merits and demerits. Details of master cylinder, wheel cylinder; concept of brake drum, brake lining/pad and brake adjustment; introduction to anti-lock braking system and its working.

Course Outcomes

At the end of the subject, the students will be able to:

- **CO1:** Explain the basic structure of an automobile, chassis layout, engine technologies, fuel governing systems, emission control methods, and Bharat emission norms.
- **CO2:** Describe and analyze the construction, working, and applications of automobile transmission systems including clutch, gear box, torque converter, axles, wheels, and tyres.

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- **CO3:** Explain the principles, construction, and working of steering, suspension, and braking systems including power steering, suspension types, and anti-lock braking systems.

The Five Study Units in the Notes

The official syllabus has only three units, but the matching notes and practice paper split them into five study units so the practice paper follows the board's five-question pattern. Nothing is added and nothing is dropped: **Study Unit 1** = Syllabus Unit I, introduction, chassis, drives, electric and hybrid vehicles; **Study Unit 2** = Syllabus Unit I, fuel governing, valves and emission control; **Study Unit 3** = Syllabus Unit II, clutch and gear box; **Study Unit 4** = Syllabus Unit II, propeller shaft, rear axle, wheels and tyres; **Study Unit 5** = Syllabus Unit III, steering, suspension and braking.

Note: the official syllabus prints no unit-wise periods and no marks-distribution table for this subject, so no weightage is shown here.

How to Prepare

This is a qualifying subject - you must pass it, so take the internal assessment seriously even though the marks do not count towards your division. Unit II is the biggest: learn the clutch types, the three gear box types and the differential first, then the alignment angles. The one worked example in the notes is the gear ratio calculation (20 teeth driving 60 teeth gives 3:1; 3000 rpm in, 1000 rpm out). Unit III rewards short, labelled descriptions: steering gears, springs, brake types and ABS. Revise from the notes unit by unit, then write the likely question at the end of each unit.

Reference Books (as listed in the syllabus)

- Automobile Engineering Vol I, II, Kirpal Singh, Standard Publishers Distributors, Delhi, 2012.
- Automobile Mechanics, A.K. Babu, S.C. Sharma, Khanna Publications, New Delhi.
- Automotive Mechanics: Principles and Practices, Joseph Heitner, East West Press.
- Automotive Mechanics, S. Srinivasan, 2nd Edition, Tata McGraw Hill.
- Automobile Engineering Vol I and Vol II, K. M. Gupta, Umesh Publications.
- Automotive Engineering, Jain and Asthana, Tata McGraw Hill.
- Website for reference: http://swayam.gov.in

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Source: BTEUP IRDT Kanpur NEP-2020 curriculum for Diploma in Mechanical Engineering (Production), effective session 2026-27, approved by the Board of Technical Education U.P. Lucknow in the C.D.C. meeting held on 16.07.2026 (urise.up.gov.in). Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.