

UNIT I

**Chapter 1 : Recent Trends in Automobile Industry
1-1 to 1-40**

Syllabus :

- 1.1 Hybrid cars** - Manufactures, Types-Micro Hybrid, Mild Hybrid, Full Hybrid, Series hybrid, Parallel Hybrid
- 1.2 E-vehicles** - Manufacturers, specifications, Types of Batteries, Li-ion batteries, Sodium nickel Chloride Batteries, Sodium Sulphur Batteries, Fuel Cell, Charging - Charging Methods and Modes. Issues with e-vehicles
- 1.3 Safety in Automobile** - Air bags, Automatic Emergency Braking, Adaptive Cruise Control, Electronic stability programmer, Anti Collision system, Active Passive Integration system.

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UNIT II

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Syllabus :

- 2.1 Process Boilers - Steam and Condensate loop in process industries,
- 2.2 Introduction to ultra-super critical Boilers.
- 2.3 Hyperbolic cooling towers.
- 2.4 Waste heat recovery-process industry.

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UNIT III

**Chapter 3 : Recent Trends in Manufacturing Industry
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- 3.1 Smart Manufacturing Technology : introduction, Elements and applications
- 3.2 Automation : Need, Basic elements of automated systems, automation principles and strategies, Benefits. 3.3 Types of Automation : fixed, programmable, flexible, hard and soft automation.
- 3.4 Industrial Robotics : robot anatomy, robot control systems, end effectors, sensors in robotics, industrial Robot applications.
- 3.5 4-D Printing Technology : Printing Techniques, 3D scanning Technology- Function, Applications.

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UNIT IV

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- 4.1 Standards and labelling standard(HVAC)
- 4.2 Energy Monitoring and Targeting
- 4.3 Energy Management and Audit

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