		L	T	P	C
1152AU125	**SUPER CHARGING & TURBO CHARGING**	**3**	**0**	**0**	**3**

1. Preamble

The course Super Charging & Turbo Chargingis to impart knowledge about supercharger and turbocharger to the students.

2. Pre-requisite

NIL

3. Course Outcomes

Upon the successful completion of the course, learners will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
C01	Know the principles of supercharging	K2
C02	Study about performance and various types of supercharger	K2
C03	Know the principles of turbo charging	K2
C04	Understand the development of turbo charging systems	K2
C05	Understand the concept of matching turbocharger to the engine	K2

4. Correlation with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	H	H	M	L	H							M	M
CO2	H	H	H	M	L	H							L	M
CO3	H	H	H	M	L	H							M	M
CO4	H	H	H	M	L	H							M	M
CO5	H	H	H	M	L	H							M	M

H- High; M-Medium; L-Low

5. Course content

UNIT I SUPERCHARGING

L-9

Objectives - Effects on Engine Performance - Engine Modification Required - Thermo-Dynamics of Mechanical Supercharging and Turbocharging - Turbocharging Methods - Engine Exhaust Manifolds Arrangements.

UNIT II SUPERCHARGERS

L-9

Types Of Compressors - Positive Displacement Blowers - Centrifugal Compressors - Performance Characteristic Curves - Suitability For Engine Application - Surging - Matching Of Supercharger Compressor And Engine - Matching Of Compressor, Turbine Engine.

UNIT III TURBOCHARGING

L-9

Turbocharging Requirements - The Principles of Operation of Turbo Machines - Exhaust Gas Energy Utilization - Charge Air Cooling and Other Applications of Turbochargers.

UNIT IV TURBOCHARGING SYSTEM DEVELOPMENTS **L-9**

Exhaust Waste Gate - Variable Geometry Systems - Turbo Compounding - Waste Gate - Variable Geometry and Compound Systems Compared - Exhaust Gas Recirculation - Electric Drive Turbocharger - Two-Stage Or Series - Turbo Charging - Sequential Turbo Charging – Complex - Hyper Bar And Other Systems

UNIT V MATCHING THE ENGINE AND THE TURBOCHARGER **L-9**

Introduction - Matching an Engine and Turbocharger at a Given Operating Condition - Modeling a Turbocharged Engine - Turbocharged Engine Operation

Total: 45 periods

6. Text Book

1. Vincent, E.T., Supercharging the I.C. Engines, McGraw-Hill.
2. Watson. and Janota, M.S., Turbocharging the I.C. Engine, MacMillan Co.,1982.

7. References

1. Obert, E.F., Internal Combustion Engines and Air Pollution, Intext Education Publishers, 1980.
2. Richard Stone, Internal Combustion Engines, SAE, 1992.
3. Vincent, E.T., Supercharging the I.C.Engines, McGraw-Hill.
4. Watson. and Janota, M.S., Turbocharging the I.C. Engine, MacMillan Co.,1982.