A. V. GONCHARENKO

AIRCRAFT ENGINES

LECTURE NOTES

(First Preliminary Edition)

INTRODUCTION

AIRCRAFT ENGINES work theoretical principles have a long history rooted deep into the ancient times. It is a part of the heat engines family, which are used to propel flying objects.

That is why there are at least three major backgrounds for the **AIRCRAFT ENGINES** subject. These are the Physics disciplines:

1. Mechanics (including Theoretical Mechanics (comprising Strength of Materials, Aero- and Hydrodynamics));
2. Engineering Thermodynamics;
3. Electro Engineering (including Electro Drivers, Control Theory, and Electronics).

Inventory concepts of engineering in general found their successful application in aircraft propulsion and nowadays the different types of engines got their optimal areas of implementations in aviation. The aircraft engine is the core-element (key-element) of the aircraft powerplant, serving to create thrust for the aircraft motion through the air [119, p. 4]. Further, it is on the thesis about the content of the aircraft power installation, its meaning and importance, and significance of the engine; as well as for the requirements put for the engines at the stage of the aircraft design, projection, manufacturing (building), maintenance, repair, and operation.

All those required features contradict between themselves to one or another degree, therefore, an optimal compromise has to be found.

Two principal types of the aircraft engines are the piston engines (PE) (internal combustion engine (ICE), reciprocating engine (RE)) and gas turbine engines (GTE).

Creating the power needed for the flight of the aircraft the engine supplies it (either through the gears or directly) to the propellant (propeller, exhaust gas jet).

Thus, there are two principles used in most aircraft: propeller and jet propulsion.