Course Objectives

- To understand the application of fundamental thermal disciplines, including thermodynamics, heat transfer and fluid mechanics, in the analysis of practical thermal systems such as IC and turbojet engine systems.
- To provide a comprehensive review concerning applications, technological advances, and social impacts on the modern development of both IC and jet engines. Students are expected to participate fully in the preparation and presentation of these issues through a corroborative learning experience.

Course Objectives

- To provide an overview of the theories and their operations of engine systems (IC and jet).
- To analyze all major components in the jet engine system and their matching specifications.
- To analyze the overall performance of the jet engine system.
- To simulate the thermodynamic performance of homogeneous charge engine using packaged software and learn how numerical codes can be used for preliminary engine design analysis.

Course Outcomes

- Be able to recognize the relevancy of fundamental thermal principles (thermo, heat transfer and fluid mechanics) and their importance in the analysis of either an IC or a jet engines
- Be able to calculate the performance of either an IC or a jet engine using idealized cycle analysis (Otto and Brayton cycle, respectively)
- Be able to recognize the differences between real and idealized cycles and perform corrected analysis of the ideal cycles using actual operating parameters (including effects of friction, heat loss, fuel-air ratio, etc)

Course Outcomes

- Be able to recognize all major components of an IC and a jet engine; be able to specify their functions and characterize their interrelationship in the operation of the system. (Piston, intake and exhaust manifolds, turbine, compressors, inlets, nozzles, etc)
- Be able to describe the differences in design for systems intended for different applications (ex. turbojet vs. turbofan, etc)

Course Outcomes

- Be able to use the Stanford Engine Simulation Program (ESP) to simulate the thermodynamic performance of homogeneous charge engines.

- Be able to function in a group or as an individual to study and learn specific thermal aspects of a engine system that have not been covered in the class (self-learning). Be able to present finding to fellow students through an oral presentation in a formal classroom setting (learning through teaching). Publish facts found in a web page and summarize experience in a final report.