MECH3660 Gas Turbines and Jet Propulsion

Course Code: MECH3660	**Course Title:** Gas Turbines and Jet Propulsion
Required Course Or Elective Course: Required for BEng (AE) Major Elective for BEng(MECH)	**Terms Offered (Credits):** Spring (3 credits)
Faculty In Charge: Xin ZHANG	**Pre/Co-Requisites:** Prerequisite(s): (MATH2111 OR MATH2350 OR MATH2351), MECH3640

Course Structure: 2 classes (1.5 hours) per week; Tutorial: 1 hour per week

Textbook/Required Material:

1. "Jet Propulsion" by Nicholas Cumpsty, Second ed., Cambridge University Press, 2013
2. Class notes

Course Description:

Jet Propulsion, Gas Turbine, Engine Types, Performance, Turbojet and Turbofan Engines, Designs of Compressor, Combustor, and Turbines. For Science and Engineering Students in Their Third Year of Study or Above.

Course Topics:

1. Introduction to jet propulsion and engine classification
2. Jet propulsion evolution and outlook
3. Introduction to gas turbine
4. Aerodynamics fundamentals
5. Gas turbine performance
6. Real gas turbine cycle and layout
7. Bypass ratios
8. Dynamics scaling and dimensional analysis
9. Compressor design
10. Combustor design
11. Turbine design
12. Turbomachinery: compressor and turbine
13. Engine noise
14. Industry lectures: engine maintenance and testing
15. Engine test site visit
16. Introduction to rockets and ram jets

Course Objectives:	1. Students will establish understanding of propulsion systems in aircraft that are essential to graduate engineers who are intended to work in aircraft system/component manufacturing/maintenance environments. 2. Students should be able to describe and appreciate the key aeronautical engineering features of the context in which the relevant industry operates.
Course Outcomes:	A. Students will gain skills in problem solving for aircraft propulsion systems, in particular gas turbine engines. B. Students will gain ability to carry out a cyclic analysis of a gas turbine engine, including turbofan.

	C. Students will be able to determine the applicability of a given propeller system for a given aircraft. D. Students will understand the working of various parts of gas turbines.	
Assessment Tools:	Homework assignments Mid Term exams Final Exam	10% 30 % 60%