SYLLABUS
EML 5515 SPRING 2020

Gas Turbines and Jet Engines

INSTRUCTOR: William E. Lear
105 MAE-C 352-392-7572 lear@ufl.edu
Office Hours Monday and Friday 10:45 – 11:45 a.m.

GRADER: Kavya Navaneetha kavya.navaneetha@ufl.edu

TEXTBOOK: *Mechanics and Thermodynamics of Propulsion*, Hill & Peterson, Addison-Wesley, 1992, 2nd Edition.

COURSE OBJECTIVES:

1. Utilize the fundamental principles of fluid mechanics and thermodynamics to analyze aircraft engines.
2. Understand the common gas turbine aircraft propulsion systems and be able to determine the applicability of each.
3. Be able to perform system studies of aircraft engine systems for specified cruise conditions at the preliminary design level.
4. Be able to perform preliminary aerothermal design of turbomachinery components.
5. Be able to analyze and perform preliminary design of terrestrial gas turbine systems, including alternative cycles.

Period	Date	Subject	Text Ref.
1	Jan. 6	Introduction	1.1 – 1.3
2	8	Conservation Eqns	2.1 – 2.3
3	10	“”	
4	13	Equilibrium Combustion	2.4
5	15	“”	
6	17	“”	
	20	Holiday	
7	22	Equil. Comb with STANJAN	Notes
8	24	Review of Gasdynamics	3.1 – 3.2
9	27	“”	3.3 – 3.5
10	29	“”	3.6
11	31	Examples	
12	Feb. 3	Review	
	3	**Test #1** 8:20-10:20 pm	
13	5	Thermo of jet engines	5.1 – 5.2
14	7	Ramjets	5.3
15	10	Gas turbine engines	5.4 – 5.6
16	12	“”	
17	14	Engine/aircraft performance	5.7 – 5.8
18	17	“”	
19	19	Inlets, combustors & nozzles	6.1
20	21	Inlets	6.2 – 6.3
21	24	Combustors	6.4 – 6.6
22	26	“”	
23	28	Nozzles	6.7
	Mar. 2 - 6	Spring Break	
24	9	Review	
	9	**Test #2** 8:20-10:20 pm Room 327 MAE-A	

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25	11	Axial compressors	7.1 – 7.3
26	13	Single and multi-staging	7.4 – 7.5
27	16	Instabilities	7.6
28	18	Efficiency	7.7 – 7.8
29	20	Radial equilibrium	7.9
30	23	Centrifugal compressors	9.1 – 9.2
31	25	Axial turbines	8.1 – 8.3
32	27	“”	
33	30	Cooling and performance	8.5 – 8.6
34	Apr. 1	Matching compressor & turbine	8.7
35	3	Examples	
36	6	Review and project assignment	
	6	**Test #3** 8:20-10:20 pm Room 327 MAE-A	
37	8	Intro to terrestrial gas turbines	Notes
38	10	Terrestrial systems	“”
39	13	Combined cycles	“”
40	15	“”	“”
41	17	Advanced cycles	“”
42	20	“”	“”
43	22	“”	
	24	Project due 4:00 pm (in lieu of exam)	

GRADING:

Homework	15%
Project	15%
Tests	30% Best score
	15% Worst score
	25% Other score

The final grade will be determined using the breakpoint method. The class averages will be sorted and the appropriate gaps selected for the breaks between grades. The judgment of the instructor will be the determining factor in the placement of the breaks, influenced by such things as difficulty of exams and overall quality of the class. The grade ranges will be no stricter than the following: [A >92],[A- 90-92],[B+ 88-90],[B 82-88],[B- 80-82],[C+ 78-80],[C 72-78],[C- 70-72],[D+ 68-70],[D 62-68],[D- 60-62],[E <60].

HOMEWORK POLICIES:

1. You may work with your classmates in this course, e.g. discussing concepts or approaches to problems. However, the homework papers and project report which you submit must be your own individual work. Copying or comparison of final answers is not permitted. The University of Florida honor code is in force for this course.

2. Homework papers are due at the beginning of the period, without prior arrangements with the instructor or a written medical excuse. A paper submitted later than five minutes after the start of the period is late and will be penalized (one letter grade per calendar day). No papers will be accepted after the following class meeting. All papers are to be submitted electronically, by scanning (or photographing) and uploading via Canvas.

EXAM POLICIES:

1. Distance students will have a 3-day window following the in-class exam date to schedule and complete exam with their proctor.
2. Exam conflicts must be discussed with instructor at least two weeks prior to scheduled date.

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