# San José State University
# School/Department
# Aviation 91, Aircraft Turbine Engines, Fall 2017

**Course and Contact Information**

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| **Instructor:** | Mr. Dennis Romano |
| **Office Location:** | Industrial Studies 133D |
| **Telephone:** | (408) 924-3195 |
| **Email:** | Dennis.Romano@sjsu.edu |
| **Office Hours:** | Tuesdays and Thursdays 1115-1145, other times by arrangement |
| **Class Days/Time:** | Tuesdays and Thursdays 1200-1315 |
| **Classroom:** | Industrial Studies 216 |
| **Prerequisites:** | Avia 43 |

**Course Format**

Lecture slides presented in class and other course material (including homework assignments) will be posted on Canvas. The material will normally be posted the evening of the class meeting in which it was discussed.

**Course Description**

A study of gas turbine fundamentals, including various gas turbine cycles, components and component efficiency, thrust, specific fuel consumption, duct flow and inlet diffuser, centrifugal and axial compressors, combustion chambers and jet nozzles for aircraft propulsion.

**Course Learning Outcomes (CLO)**

Upon successful completion of this course, students will be able to:

- Successfully start a gas turbine engine
- Safely operate a gas turbine engine (turbojet, turbofan, turboprop and turboshaft) while obtaining optimum performance on the ground and in flight
- When a problem occurs with a gas turbine engine, perform the appropriate mitigation procedures with the minimum impact on safe operation of the aircraft
- Make a reasonable assessment of the result of off-nominal operation or failure of any of the major subsystems of a gas turbine engine and perform appropriate mitigation procedures
- Be able to respond correctly if there is an over-temperature condition or fire related to the gas turbine engine

## Required Texts/Readings

### Textbook

Kroes & Wild, Aircraft Powerplants, Glencoe Aviation Technology Series, 8th Edition (2014), ISBN 978-0-07-179913-3

## Course Requirements and Assignments

Homework will be assigned for the student to demonstrate mastery of the Course Learning Outcomes. Each homework assignment is of the same weight. Homework will be due one week after it is assigned unless otherwise noted. **Late homework will not be accepted**, as it will be discussed in class the day it is due. If you cannot attend class the day that a homework assignment is due, it may be emailed to the instructor prior to the start of class. Homework assignments must be typed. The homework assignment with the lowest grade will be dropped.

## Final Examination

The Final exam will be of the same format as the mid-term exams. The final exam will be comprehensive (will cover all course material).

## Grading Information

### Evaluation:

| | | **Percentage** |
|---|---|---|
| Homework | | 15% |
| 2 Mid-term Exams | | 25% each, 10/5/17 and 11/16/17 |
| 1 Final Exam | | 35%, 12/13/17 |
| | **TOTAL** | **100%** |

The first two mid-term exams will cover the material discussed during that portion of the course as noted on the course schedule. The final exam will cover all course material.

| **Average** | **Grade** |
|---|---|
| 94-100 | A |
| 90-93 | A- |
| 87-89 | B+ |
| 83-86 | B |
| 80-82 | B- |
| 77-79 | C+ |
| 73-76 | C |
| 70-72 | C- |
| 60-69 | D |
| below 60 | F |

Note: Grading will be based on either the percentages noted above, or pending overall class performance, the instructor may elect to apply a grading curve.

## Classroom Protocol

To facilitate learning, **please have all cell phones on "silent" during class**. Please **do not send text messages during class,** as this is a distraction to you and the other students. Computers may be used for taking notes, but other uses are a distraction and not permitted. No food is allowed in the classroom. Students are expected to attend class regularly, arrive on time and be prepared to participate; late arrival to class is disruptive to the other students, so please arrive by the class start time. For safety, closed toe shoes are required for any lab activities in the aircraft hangar or airport parking ramp areas.

## University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

### Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course.

- Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.
    - Contact the instructor if you wish permission to record any part of the course.

- Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.

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## Course Schedule

***August 20, 2017***

*Note that this schedule is subject to change. I will attempt notify everyone not later than the class meeting prior to the change, via email, or both.*

| Week | Date | Topics | Reading Assignment |
|---|---|---|---|
| 1 | 8/24 | Introduction | Syllabus |
| 2 | 8/29 | Theory, Design, Types, FAA Regulations Part 1 | pp. 307-314 |
| 2.5 | 8/31 | Operating principles | pp. 315-324 |
| 3 | 9/5 | Turbine engine Components and design details | pp. 325-348 |
| 3.5 | 9/7 | | |
| 4 | 9/12 | | |
| 4.5 | 9/14 | Fuels and fuel systems | pp. 349-379 + figure above Fig 15-15 in color section |
| 5 | 9/19 | | |
| 5.5 | 9/21 | Ignition and starting systems | pp. 395-411 + Fig 15-15 in color section, 541-546 |
| 6 | 9/26 | | |
| 6.5 | 9/28 | Lubricants and lubrication systems | pp.381-394 |
| 7 | 10/3 | Review | |
| 7.5 | 10/5 | **Mid-term Exam 1**– Material from Weeks 1 through 6. Does not include Lubricants and lubrication systems | |
| 8 | 10/10 | Lubricants and lubrication systems (continued) | |
| 8.5 | 10/12 | Turbofan engines | pp. 413-478 + both sides of last color page |
| 9 | 10/17 | | |
| 9.5 | 10/19 | | |
| 10 | 10/24 | Turboprop engines | pp. 479-520 |
| 10.5 | 10/26 | | |
| 11 | 10/31 | | |
| 11.5 | 11/2 | Turbopropellers and control systems | pp. 615-648 |
| 12 | 11/7 | | |
| 12.5 | 11/9 | Turboshaft engines | pp. 521-539 |
| 13 | 11/14 | Review | |
| 13.5 | 11/16 | **Mid-term Exam 2** – Material from Weeks 6.5 through 12. Does not include Turboshaft engines. | |

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|---|---|---|---|
| 14 | 11/21 | | |
| 14.5 | 11/23 | **No Class - Thanksgiving** | |
| 15 | 11/28 | Engine indication & control; fire warning & protection | pp.693-710 |
| 15.5 | 11/30 | | |
| 16 | 12/5 | FAA Regulations Part 2,<br>Operation, inspection, troubleshooting, maintenance, and overhaul | pp. 546-580 |
| 16.5 | 12/7 | Last day of class: Course Wrap-up & Final exam review | |
| 17 | 12/12 | **No Class** | |
| **18** | **12/13 (Wed)** | **FINAL EXAM – 0945-1200, IS 216** | |