San José State University
Aerospace Engineering
AE 199 UAVs, Fall 2016

Instructor:	Prof. Jimmy Rico
Office Location:	E272F
Email:	jimmy.rico@sjsu.edu
Office Hours:	M 6:30 – 7:30 pm
Class Days/Time:	MW 7:30 – 8:45 pm
Classroom:	E164
Prerequisites:	Upper Division standing or Instructor Consent

Course Description

An understanding towards the design and development of an autonomous aerial vehicle with an emphasis on mathematical modeling, aircraft dynamics, sensor fusion, telemetry, system identication and verication though embedded systems and hardware applications.

Course Learning Outcomes (CLO)

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

1. Explain the history and current purpose of UAVs in industry
2. Analyze aircraft equations of motion and de ne their purpose in UAVs
3. Explain the concept of System Identi cation and how it applies to UAVs
4. Determine the stability of a model through transfer function anlaysis
5. Undertand the di erence between longitudinal and lateral aircraft dyn.
6. Develop a self stabilization controller for lateral and longitudinal dyn.
7. Expalin the purpose of feedback design
8. Explain the di erence between nonlinear and linearized models
9. Explain the purpose of lters and apply to aircraft sensors
10. Use Matlab/Simulink to simulate real world dynamical systems
11. Develop a ight controller for euler angle and rate estimation

Required Texts/Readings

Textbook

Instructor Notes

Grading Information

Letter Grade Distribution:

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<= 59.99	F

Determination of Grades

Assignments	20%
Project	30%
Quizzes	10%
Two Exam	30%
Presentations	10%

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/.

AE Department and SJSU policies are also posted at http://ae.sjsu.edu/program-policies.

AE 199 UVAs Fall 2016 Course Schedule

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	8/31	Course Introduction
2	9/5 & 9/7	History of UAVs and Applications
3	9/12 & 9/14	Design Process
4	9/19 & 9/21	Longitudinal Dynamics: Transfer Functions and State Space Rep.
5	9/26 & 9/28	Lateral Dynamics: Transfer Functions and State Space Rep.
6	10/3 & 10/5	Linear and Nonlinear Models
7	10/10 & 10/12	Control Law Design: PID Feedback Design
8	10/17 & 10/19	System Identication and Verication Analysis

Week	Date	Topics, Readings, Assignments, Deadlines
9	10/24 & 10/26	Microcontrollers and their applications
10	10/31 & 11/2	UAV Hardware & Sensors
11	11/7 & 11/9	Arduino & Embedded Programming
12	11/14 & 11/16	PWM & Interrupts
13	11/21	Hardware and Software Filters
14	11/28 & 11/30	Servos, DC Motors, & Encoders
15	12/5 & 12/7	Project Workshop
16	12/12 & 12/14	Project Presentations