

## Course Syllabus: AENG 3000 Performance

*Credits:* 3

*Prerequisite:* AENG2000 Intro to Aeronautics and Astronautics

Core requirement: AENG

Fall 2016

TR- 16:00 – 17:15

### Introduction

The Performance analysis of aircraft is the investigation of those aspects of flight such as maximum and minimum flight speeds, maximum range and endurance, fuel requirements to complete a mission and aircraft behavior at different altitudes. These performance measures depend on the forces acting on the aircraft: such as aerodynamic load (lift and drag), engine thrust and aircraft weight. In this course we will analyze the basic aspects of flight and how to perform aircraft performance analysis effectively.

### Instructor

The instructor for this course will be Hector Barrio Crespo. He completed both his B.S. and M.Sc. in Aerospace Engineering at Saint Louis University and also holds an MBA from IE Business School. He has worked as an engineer for EADS-CASA, ITP and GAMESA, in operations and maintenance management departments.

### Course Objectives

The basic objectives of this course are:

- 1- Understand the main forces acting on an aircraft.
- 2- Understand airfoil theory and associated physics.
- 3- Understand the fundamentals of aircraft motion analysis.
- 4- Understand climb and glide performance analysis.
- 5- Understand take-off and landing performance analysis.
- 6- Be able to perform range and endurance calculations
- 7- Be able to generate computer models of aircraft behavior
- 8- Understand the basics of aircraft autopilot

### Learning Outcomes

By the end of this course, you will be able to:

- Understand aircraft behavior in flight
- Be able to predict and design aircrafts for specific missions
- Understand the concepts of stability and control of aircraft
- Be able to program and simulate aircraft in flight

## Course Outline

The following schedule is tentative and may be subject to minor changes during the course:

Week 1: Introduction and basic concepts

Week 2: Airfoil and Wing Theory Refresher

Week 3: Airfoil and Wing Theory

Week 4: Airplane Drag

Week 5: Airplane Propulsion

Week 6: **Midterm Exam – Date to be agreed**

Week 7: Fundamentals of Performance

Week 8: Climb and Glide Performance

Week 9: Take-off and landing Performance

Week 10: Range Performance

Week 11: Endurance Performance

Week 12: Maneuver Performance

Week 13: Automatic Control

Week 14: Autopilot Basics

**Final Exam – As scheduled: visit [spain.slu.edu/calendar](http://spain.slu.edu/calendar)**

## Recommended Textbook

Airplane Aerodynamics and Performance, Authors Jan Roskam, Chuan-Tau Edward Lan,  
Edition 3

## Grading System

Evaluation methods and their contribution towards the student's final grade are:

Weekly Homework 10%  
Final Project 20%  
Midterm Exam 20%  
Final Exam 40%  
Class Attendance and Participation 10%

This methods and their relative contribution to the grade may vary. Depending on class performance a second midterm may be given that will modify the final exam, midterm exam and final project weight.

Participation in the class discussions is highly encouraged, positive additions that helps understand the topic and/or arising alternative views will be welcome. Engineering is partly based in accumulation of knowledge and the only way for this to happen is sharing your thoughts with others.

There will be one midterm exam and one final exam covering the full content of the course. The letter grading scale will be the following:

A	90-100%
A-	87-89%
B+	84-86%
B	80-83%
B-	77-79%
C+	74-76%
C	70-73%
C-	66-69%
D	60-65%
F	< 60%

\*Note that late submissions will be penalized with an automatic 15% grade reduction. Minor variations to grading system may be introduced

## Office Hours

The office hours will be on Tuesdays and thursdays 17:00 to 18:30. You can contact me at [barrioh@slu.edu](mailto:barrioh@slu.edu) or call 680301847 for urgent matters.

## Policies

- Students are encouraged to participate in class discussion and to ask questions.
- All information for the course will be found in SLUGlobal, the official means of communication will be SLUGlobal Announcements section for the course and institutional SLU email.
- Students are responsible for all lecture material, handouts, homework and assigned reading.
- It is mandatory to attend all classes and be on time unless a reasonable excuse is given.

- No paper work will be collected, all homework has to be submitted in digital form, the preferred method is computer based calculation tools, legible pictures and scanned hand-written pages are also acceptable.

## Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy can be accessed on the Provost's Office website at: [http://www.slu.edu/Documents/provost/academic\\_affairs/University-wide%20Academic%20Integrity%20Policy%20FINAL%20%206-26-15.pdf](http://www.slu.edu/Documents/provost/academic_affairs/University-wide%20Academic%20Integrity%20Policy%20FINAL%20%206-26-15.pdf).

Additionally, SLU-Madrid has posted its academic integrity policy online: <http://www.slu.edu/madrid/academics>. As a member of the University community, you are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions and appeals. The professor will review these policies during the first weeks of the term: please direct questions about any facet of academic integrity to your professor, the chair of the department of your academic program or the Academic Dean of the Madrid Campus.

## Accommodation Statement

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. Students who think they might benefit from these resources can find out more about:

- Course-level support (e.g., faculty member, departmental resources, etc.) by asking your course instructor.
- University-level support (e.g., tutoring/writing services, Disability Services) by visiting the Academic Dean's Office (San Ignacio Hall) or by going to <http://www.slu.edu/madrid/learning-resources>.

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course. Please contact Disability Services at [disabilityservices-madrid@slu.edu](mailto:disabilityservices-madrid@slu.edu) or +915 54 58 58, ext. 230 for an appointment.

Confidentiality will be observed in all inquiries. Once approved, information about the student's eligibility for academic accommodations will be shared with course instructors via email from Disability Services. For more information about academic accommodations, see "Student Resources" on the SLU-Madrid webpage.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact to Disability Services.

## Collection of Student Work

In order to maintain quality academic offerings and to conform to accreditation requirements, SLU-Madrid regularly assesses its teaching, services and programs for evidence of student learning. For this purpose, SLU-Madrid keeps representative examples of student work from all courses and programs on file, including assignments, papers, exams, portfolios and results from student surveys, focus groups and reflective exercises. Copies of your work for this course may be kept on file for institutional research, assessment and accreditation purposes. If you prefer SLU-Madrid not to retain your work for this purpose, you must communicate this decision in writing to your professor.

## Title IX Statement

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX deputy coordinator, Marta Maruri, whose office is located on the ground floor of Padre Rubio Hall, Avenida del Valle, 28 ([mmaruri@slu.edu](mailto:mmaruri@slu.edu); 915-54-5858, ext. 213) and share the basic fact of your experience with her. The Title IX deputy coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the SLU-Madrid's Counseling Services on the third floor of San Ignacio Hall ([counselingcenter-madrid@slu.edu](mailto:counselingcenter-madrid@slu.edu); 915-54-5858, ext. 230) or Sinews Multipletherapy Institute, the off-campus provider of counseling services for SLU-Madrid ([www.sinews.es](http://www.sinews.es); 917-00-1979). To view SLU-Madrid's sexual misconduct policy and for resources, please visit:

<http://www.slu.edu/Documents/Madrid/campus-life/SLUMadridSexualMisconductPolicy.pdf>.