Aerospace Summer Program
Syllabus 2026

Module 1 in Paris

Launchers System

Location:	ESTACA
Objectives:	The purpose of this course is to be able to understand the system approach for the development of a launcher
Prerequisites:	Basis of mechanics and orbital mechanics
Contents:	- Bases on mission and architecture of a launcher, - Propulsion systems principles, - Guidance and control algorithms and equipment - Workshop for evaluation.
Details on the Workshop:	2 exercises will be proposed: - Sizing of the gambling angle and speed of a launcher's engine during the 1rst stage flight, with atmospheric part, and of the corresponding simplified control law. - Sizing of the gambling angle of a launcher's engine after the 3rd stage separation, without atmosphere, and of the corresponding simplified control law.
Duration:	15 hours: 4 sessions of 3 hours (class) + 1 sessions of 3 hours (Workshop)
Professors from ArianeGroup:	Alain Dufour, Gerald Pignie, Charles Vallet, Didier Gignac
Bibliography:	Given on the courses supports
Evaluation:	Attendance and exercises evaluation

Module 2 in Poitiers

Institut Supérieur de l'Aéronautique et de l'Espace

ENSMA

Radiative Heat Transfer Applied to The Thermal Control of Satellites

Location:	ISAE-ENSMA
Objectives:	The objective of this course is to simulate and control the thermal behavior of a satellite throughout its lifecycle.
Prerequisites:	Fundamentals of Conductive and Radiative Heat Transfer
Contents:	General Overview of Radiative Heat Transfer, Monte Carlo Simulation, Transient Heat Transfer Using Nodal Descriptions, Orbital Dynamics, and Thermal Control Strategies Utilizing Heat Pipes. **Conference:** *Thermal Management of Satellites,* presented by a thermal expert from Airbus Defense and Space.
Duration:	**15 hours total:** - 1 session of 3 hours (lecture) - 2 sessions of 3 hours each (laboratory work) - 4 hours dedicated to the Small Satellite Workshop - Conference presented by a thermal expert from Airbus Defense and Space
Professors:	Gildas Lalizel
Bibliography:	Spacecraft Techniques and Technology, CNES, CEPADUES EDITIONS.
Evaluation:	Written exam (quiz)

Module 3 in Toulouse

Introduction to Earth Observation

Location:	ISAE-SUPAERO.
Objectives:	This course aims to give an introduction to Earth Observation : from the scene to information. It aims to give an overview on applications from satellite observation, mainly environmental and civil applications. It will introduce also some knowledge of Image Processing and Datat Analysis with a small application in Earth Observation
Prerequisites:	Mathematics and signal processing basics
Contents:	Introduction to Earth Observation: remote sensing & sensors, EO applications Introduction to Computer Vision (CV): basics of CV, Colors, panchromatic and multispectral imagery, Resolution, Signal processing, Fourier Transform Data Analysis (DA): basics of DA (principles of classification, confusion matrix…), supervised & unsupervised Classification Algorithms
Duration:	15 hrs plus 5 hrs of practicals under MatLab or Python
Coordinator:	Prof. Emmanuel Zenou
Bibliography:	An *EZ* Introduction to Computer Vision, Emmanuel Zenou An *EZ* Introduction to Data Analysis, Emmanuel Zenou
Evaluation:	Multiple-choice questionnaire

Module 4 in Toulouse

Introduction to Project Management in Aerospace Programs

Location:	ISAE-SUPAERO
Objectives:	This module aims to provide an introduction to the aerospace sector, including for the space sector the issues & perspectives in the context of the "New Space", for the aeronautics sector an introduction to sustainable aviation, and finally for both sectors an introduction to aerospace program management.
Prerequisites:	3nd year of Bachelor in Science or Engineering
Contents:	The module consists of four parts: 1. Stakes & perspectives in the NewSpace context Considering the technical and historical evolutions occurred during sixty-five years of space adventure (since Sputnik 1) we will explore the main current programs of access to space and discovery of new missions. The main objective here is to integrate the stakes in terms of public-private complementarity, of spinoff-spinin relations, and also to understand the opportunities that are opening up, associating the "traditional" space with the approach proposed by the new industrialists of the sector. 2. Introduction to Sustainable Aviation In 2019, air transport was responsible for 2 to 3% of global CO2 emissions, to which must be added non-CO2 climate effects such as contrails. Transition scenarios must therefore be put in place. The objectives of this class are: - Understand the specific climate impacts of air transport and the methodologies for evaluating sustainable scenarios (notion of carbon budget) - Discover the different levers of action available to decarbonize air transport - Be aware of the limits of the transition (e.g. availability of energy resources) 3. Introduction to Aerospace Program Management

	An introduction to project management tools, techniques and approaches, with dedicated focus on aeronautics and space projects and programs. Examples from the space sector, to enable review and practice some very key concepts. Session one is intended to first review standards, and professional baselines (generic standards and aeronautics and space standards for project management). 4. Visits Several visits are scheduled: industrial visits (AIRBUS DS) and museums (Aéroscopia, Cité de l'Espace).
Duration:	18 contact hours
Academic Coordinator:	Emmanuel Zenou
Bibliography:	NASA Space Flight Program and Project Management Handbook NASA systems engineering handbook Aircraft Design Project (Lloyd Jenkinson, Jim Marchman) Aviation Project Management (Dennis Lock and Triant G. Flouris)
Evaluation:	Online MCQs