Franklin University Switzerland
Università Cattolica del Sacro Cuore
Forum-Nexus Program
Course Syllabus

BIO 490-SIS
Science, Engineering, and Technology in Europe

Course Description

This course examines the evolution of science, engineering, and technology within the European Union (EU) over the past two decades. It focuses on major scientific and technological innovations, the roles of leading European companies and organizations, and comparative analyses with the United States. Students will explore policy frameworks, funding mechanisms, and regulatory environments that have influenced technological progress in the EU. The course also addresses ethical, economic, and geopolitical dimensions of EU scientific and technological developments.

Learning Objectives

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

1. Analyze key developments in science, engineering, and technology in the EU from 2005 to 2027.
2. Identify and assess the contributions of leading European companies, organizations, and research institutions.
3. Evaluate EU policies, funding strategies, and regulatory frameworks affecting scientific progress.
4. Discuss ethical, social, and economic implications of EU technological advancements.
5. Compare and contrast the EU's scientific and technological advancements with those of the United States.

Course Requirements

This course requires independent research, organization, and academic discipline. Students are expected to complete the required and additional readings in pace with their assignments and the course outline. Each student is required to participate in a minimum of three professional visits and eight independent cultural visits (ICVs). Students are expected to meet with their SIS Coordinator regularly throughout the course for consultation and assistance. Please note that your SIS Coordinator may ask you to attend a regularly-scheduled class when that material is

relevant. Grading will consist of four essay assignments, a midterm, an oral presentation, and a final, handwritten exam.

Participation in “Europe Today: An International IQ Seminar”

All students also attend **Europe Today: An International IQ Seminar**, a daily session with occasional distinguished guest lectures. In this seminar, students learn about the culture of each country, gain an understanding of essential European geography and current events, discuss their experiences and cross-cultural interactions, get language tips, and identify ways to have an even more immersive study abroad experience. The material covered in the seminar complements the syllabus for this course, and there will be some exam questions based on the seminar. Knowledge from and participation in the International IQ Seminar is factored into the grade for this course.

Assignments and Grading:

Essays

After completing the reading assignment for the unit, students are expected to write 1000-1250 word essays responding fully to the prompts listed below. Students are expected to make explicit reference to the readings and to cite their references properly (Chicago footnotes style). An essay should have an introduction and conclusion.

1. **The Role of Leading European Organizations:**
   Analyze the contributions of one of the major European organizations (e.g., CERN, ESA, EIT, Airbus, ASML, ESFRI, EOSC) in shaping scientific and technological progress in the EU. How have these organizations influenced global advancements in their respective fields?
2. **The European Green Deal and Sustainability Innovation:**
   Evaluate the role of the European Green Deal in fostering innovation in green technologies. What are the major successes and challenges in achieving the EU’s sustainability goals through scientific and technological advancements?
3. **Structuring Research & Innovation: Infrastructures, Horizon Europe and Research Funding:**
   Discuss the impact of Horizon Europe and other EU research funding initiatives on scientific and technological innovation. How have these programs influenced collaboration within the EU and with international partners? Consider as well the impact of Research Infrastructures and how they represent a European will to structure research and development across the continent.
4. **Artificial Intelligence and the Digital Transition in the EU:**
   Analyze the EU’s approach to artificial intelligence (AI) and digital transformation. How do policies such as the AI Act and GDPR shape AI research, development, and ethical considerations compared to those in other regions, particularly the United States?

Presentation

Deliver a 10-minute PowerPoint presentation summarizing the main findings of your independent study. You should reflect not just on the material from the essays, but also from all the assigned readings. Presentations are expected to be synthetic, placing all the knowledge

learned in context, and drawing general conclusions on trends in the history of European religious violence. After your presentation, the professor will ask questions to assess your knowledge.

Midterm & Final Exams

The midterm and final exams will assess your overall progress throughout the study abroad semester. You will be asked not only to demonstrate knowledge based on the readings, but also to make connections between the various course units and reflect holistically on the knowledge you have gained in this independent study.

Components of Final Grade

Essay #1	10%
Essay #2	10%
Essay #3	10%
Essay #4	10%
Midterm Exam	20%
Final Exam	20%
Final Presentation	20%

Grading Scale

93-100 %	A
90-92.9 %	A-
87-89.9 %	B+
83-86.9 %	B
80-82.9 %	B-
77-79.9 %	C+
73-76.9 %	C
70-72.9%	C-
67-69.9 %	D+
63-66.9 %	D
60-62.9 %	D-
Below 60 %	F

Required Textbook

European Commission. *Science, Research and Innovation Performance of the EU 2024: Building a Sustainable Future in Uncertain Times.* Publications Office of the European Union, 2024.

The professor will share other shorter readings with students for specific classes as needed.

Additional Readings

1. European Commission. *Horizon Europe Strategic Plan 2025-2027.* Publications Office of the European Union, 2024. Link

2. Directorate-General for Research and Innovation. *Supporting the Transformative Impact of Research Infrastructures on European Research*. Publications Officer of the European Union, 2020. Link.
3. OECD. *OECD Agenda for Transformative Science, Technology and Innovation Policies.* OECD Publishing, 2024. Link
4. European Commission. *The New European Innovation Agenda.* Publications Office of the European Union, 2022. Link
5. OECD. *Science, Technology and Innovation Outlook 2024: Times of Crisis and Opportunity.* OECD Publishing, 2024. Link
6. European Commission. *European Union and United States Sign Joint Statement Reaffirming Commitment to Transatlantic Research.* 2025. Link

Course Outline:

- Module 1: Introduction to Science, Engineering, and Technology in the EU
- Module 2: Major EU Scientific and Technological Advancements (2005–2025)
- Module 3: Leading European Companies and Organizations (e.g., Airbus, Siemens, ASML, CERN, ESA, EIT)
- Module 4: Research Infrastructure: How Europe structures it's research and innovation.
- Module 5: EU vs. US: Innovation, Investment, and Regulation
- Module 6: EU Funding Mechanisms: Horizon Europe and European Innovation Council
- Module 7: Artificial Intelligence and Digital Transformation in the EU
- Module 8: Green Technology and Sustainability in the EU: The European Green Deal
- Module 9: The Role of the European Space Agency and Space Innovation
- Module 10: Biotechnology and Biomedical Advances in the EU
- Module 11: Ethical and Policy Considerations in EU Science and Technology

Attendance Policy

Attendance is a critical component of this course. Students are expected to attend all scheduled class sessions throughout the program, including International IQ as well as meetings with your SIS professor. Excused absences are granted only under specific circumstances: documented illness, physical injury requiring medical attention, or other situations that Forum-Nexus staff determine to be valid and appropriate reasons for missing class. Any unexcused absence will lead to a reduction to the overall grade.

Academic Integrity

Franklin University Switzerland, and Università Cattolica del Sacro Cuore place a high value on the integrity, good conduct, and academic honesty of all students. Students are expected to maintain high standards of academic integrity at all times. Any instance of academic dishonesty, including plagiarism, will result in a grade of F for the course.

AI Policy

The use of generative AI tools (e.g. ChatGPT, Dall-e, Grammarly, etc.) is permitted in this course for the following activities:

- Brainstorming and refining your creative ideas for specific writing assignments;

- Finding information on relevant topics related to the course;
- Checking spelling on your writing assignments and presentations.

The use of generative AI tools is not permitted in this course for the following activities:

- Generating a draft of your writing assignments and final presentation.
- Writing entire sentences, paragraphs or responses to complete class assignments.

In sum, any content that you hand in must not be generated by AI software, but it has to represent your intellectual contribution. Unauthorized use of artificial intelligence tools to write your paper or disguise plagiarized work is considered unauthorized assistance in this course and will result in a failing grade on the assignment.