INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

ENERG'INSA

3 weeks on Energy Transition
60hrs – 4 ECTS

1st Edition
From June 27th to July 15th 2022

LYON – AN ESSENTIAL EUROPEAN CITY

When you choose Lyon, you choose one of the most attractive cities in Europe, an international competitor and a gateway to the rest of the world. Being France's 2nd most important city, it is located in the heart of the thriving Auvergne-Rhône-Alpes region. The city was classified as World Heritage Site by UNESCO in 1998. Ancient capital of the Gauls, it testifies of 2000 years of history. Lyon has been recognized as France's 1st city for culture outside of Paris and is indeed characterized above all by the balance between its cultural institutions of excellence offering quality programming, its large-scale festivals, and its cultural venues open to all.

With its many fields of excellence, Lyon is a major international hub: Life Sciences, Clean technologies, Tertiary sector, ITC to name a few. The city is also home to internationally-renowned companies and major players, including: Sanofi, Mérial, Lafarge, GL Events, Bank of China, Solvay Rhodia. In addition, many world-renowned organizations have chosen Lyon as the location for their headquarters: Handicap International, World Health Organization, CIRC (International Cancer Research Center), Interpol, Euronews.

Lyon is also a favorite city for foreign students who represent 10% of the student population in Lyon and strengthen the city's international character.

INSA LYON – A LEADING ENGINEERING SCHOOL IN FRANCE

INSA Lyon is amongst the greatest French universities for science and technology. Our five-year program, trains multi-skilled, humanist, innovative engineers equipped with an entrepreneurial spirit and a strong international culture.

Diversity, excellence, openness and innovation are the driving forces that lead INSA Lyon students to become responsible engineers. After more than 60 years of existence INSA Lyon embodies an avant-garde and resolutely modern vision of engineering.

INSA engineers boast excellent scientific and technical expertise, are capable of understanding the issues at the heart of their companies, and actively contribute to the evolution of their world.

On the higher education scene, it ranks among the top 10 engineering schools in Europe. Its purpose is also to become a centre for research and innovation recognized throughout the world, a partner of choice for business and industry.

ENERG'INSA SUMMER PROGRAM

During this 3-week Summer Program, students will learn about energy transition, renewable energies through innovative and interactive teaching. They will acquire valuable international experience, get to know French culture and learn some French.

This Summer Program is also a perfect opportunity for students to discover INSA Lyon, a place they may want to come back to.

COURSE DESCRIPTIONS

Disclaimer

If you have any questions about the ENERG'INSA program, please do not hesitate to contact Tara PIGNAL – Coordinator for the program – energinsa@insa-lyon.fr

TRACK 1 : ENERGY TRANSITION

Hours and Credits: 30 total contact hours; 2 ECTS

Prerequisites: basics in electrical or thermal engineering

Academic coordinator: Eric SELLIN – eric.sellin@insa-lyon.fr

Instructor, Introduction to energy transition, windfarm, solar panel and project tutoring:
Eric SELLIN eric.sellin@insa-lyon.fr

Instructor, HVDC, industrial visits
Dr. Hervé REDARCE, tanneguy.redarce@insa-lyon.fr

Instructor, Solar Thermal and carbon footprint
Dr. Frederic LEFEVRE, Frederic.lefevre@insa-lyon.fr

PART I: INTRODUCTION TO ENERGY TRANSITION

OBJECTIVES AND METHODS

This lecture series provides an overview of different solutions of renewable energy production. The course is practical, and case-study based. To enhance learning, this course introduces practical methods that students can apply immediately through various projects. Classes will typically consist of lectures, guest speakers from both industrial and academic backgrounds, and discussions of case studies.

SYLLABUS

- Basics of Energy and its various form :
  - ⇨ Electricity basics
  - ⇨ Thermal basics
  - ⇨ Carbon footprints
- Introduction to Renewable Energy :
  - ⇨ Wind farm resources, technologies, and production
  - ⇨ Solar panel resources, technologies and production
  - ⇨ Solar thermal technologies and production

  Technical visit of an hydroelectric power plant
- Introduction to Smartgrids and flexibility for grid :
  - ⇨ How works the national electricity markets ?
  - ⇨ What is load management and maximum demand control ?
  - ⇨ How to increase the amount of electric power generation from renewable energies with digitalisation and grid code ?

  Technical visit of solar or windfarm power plant
- Introduction to HVDC:
  - ⇨ What is HVDC ?
  - ⇨ How HVDC can help for energy transition ?
  - ⇨ What are the main challenges to develop HVDC grids ?

  Technical visit of the supergrid institute

This is an entry-level course and the only prerequisites are some knowledge and practical experience of basics in electrical and thermal engineering.

Students will also visit one or more local industrial actors in the field of renewable energy in the city of Lyon.

PART II: RENEWABLE PRODUCTION AND PLATFORM GROUP PROJECT

OBJECTIVES

Students will collaborate with classmates on a renewable group project, where they will estimate both an energy potential and a site to set up a renewable power plant in the application field of their choice (solar production or wind farm production).

SYLLABUS

The project will be structured as follows:

- Creativity session: Students will decide on an application field (isolated site, power plant connected…) and an outline of the project.
- Energy requirements and resources
  - ⇨ Potential of energy: Students will look at the solar or wind resources based on meteo data.
  - ⇨ Energy requirements based on the constraints of consumption of the selected application field

- Implementation:
  - ⇨ Technical architecture: Students will architect the solution that will be deployed in their project (e.g., decide which type of production, which technical design they will use, etc.).
  - ⇨ Technical implementation: Working in small groups, students will implement their solution using the provided materials (computer, geographic information system, specialized software, etc.).

- Presentation: Students will present their project, more particularly:
  - ⇨ What problem is their project trying to solve?
  - ⇨ What is the technical architecture? How was teamwork divided?
  - ⇨ What business plan could fit their project?

EVALUATION:

Multiple choice quiz (30% of the grade) related to Part I.

Project evaluation (70%) based on an oral presentation. The evaluation will be based on project results, the quality of presentation and personal implication.

REFERENCES:

Kundur Power system stability and control, EPRI power system engineering series

John A. Duffie & William A. Beckman, Solar Engineering of Thermal processes, 2nd Edition

Martin Kaltschmitt Renewable Energy: Technology, Economics and Environment 2007th Edition

TRACK 2: FRENCH LANGUAGE, CROSS-CULTURAL COMMUNICATION, INDUSTRY AND SOCIETY

Hours and Credits: 30 total contact hours; 2 ECTS-credit

Prerequisites: none

Academic Coordinator for Interculturality (18Hrs): Aruena DINIC, aruena.dinic@insa-lyon.fr

Academic Coordinator for French Language (12Hrs) : Elisabeth AUMENIER, elisabeth.aumeunier@insa-lyon.fr

PART I.A: INTRODUCTION TO FRENCH LANGUAGE AND CULTURE

OBJECTIVES AND METHODS

The focus of this unit will be on the oral French used in daily life. Using action-based language teaching methods, this class will require the students to use the French they learn in various situations both during in-class activities and in real-life situations on-site in Lyon. The overall goal is to introduce the students to various cultural aspects of life in Lyon.

FINAL PROJECT

During the final class, the students will go on a shopping trip to Les Halles de Lyon with their teachers where they will be expected to use the language skills they have acquired to find their way from the INSA campus to Les Halles and once there, to interact appropriately with the vendors in order to greet, explain their needs, taste local products and make their purchases.

Examples of on-site activities:

- A neighborhood treasure hunt: finding your way around and learning about the neig hborhood
- Discovering French lifestyle, shopping at a street market, going to a café…

Some of the linguistic tools necessary:

- Greeting and taking leave
- Introducing yourself
- Describing where you are and how to get where you are going
- Express your preferences and personal tastes
- Sample, order, purchase, pay

PART I.B: FRENCH LANGUAGE AND THE FRENCH EDUCATION FOR INTERMEDIATE AND ADVANCED STUDENTS; INDEPENDANT STUDY WITH ADVISOR

For high intermediate and advanced students of French, we will arrange for you to sit in on classes of interest to your field and to meet INSA students in the corresponding department. We will ask you to take notes and participate to the extent possible in classes and interview students and teachers in order to write a report after consultation with your advisor. You may be asked to present your findings orally to the group.

PART II: DEVELOPING INTERCULTURAL COMPETENCE

COURSE INTRODUCTION

Why the need for this course?

If we consider today's globalization, internet and the general shrinking of time and space, intercultural/cross-cultural interactions have become a certain necessity in people's daily lives. The course is designed to help tackle the challenges of living in a world in which we are increasingly asked to interact with people who may not be like us in fundamental ways. Its overarching goals are to help one become more sensitive to differences in cross-cultural communication and to provide students with the knowledge and skills that will help them interact successfully with people from cultures other than their own, while connecting it to the language learning.

COURSE CONTENT

This course is designed to interrogate different aspects of cross-cultural communication and cultural differences: language, family life, social relationships, work, government, education, love, and religion. Throughout the exploration of these topics, we will strive to engage in selfreflection, practical experience, and understanding of connections to larger social structures.

OBJECTIVES

Specifically, the goals of this course are to describe, learn about, and see social and cultural differences conformed to a model, to provide a space for students to reflect on their own personal experiences. Students will be encouraged to engage with different cultures in practical ways and to experience cross-cultural communication in meaningful ways.

- Understand the role of communication in culture.
- Recognize cultural variables
- Become familiar with communication norms, rituals, and taboos of other cultures
- Discover barriers to cross-cultural communication, adaptation to other cultures and culture shock
- Practice communication activities as they would in other cultures
- Learn how differences in intercultural communication manifest themselves in different professional contexts
- Increase sensitivity to one's own cultural context and its impact on how one communicates, increase knowledge of ethical issues in cross-cultural communication, and increase sensitivity to communicating with people from different cultures.

PART III: INDUSTRY AND SOCIETY

OBJECTIVES AND METHODS

Using a case-study approach, we will use our location in Lyon, France's 'Second City', as a base for studying the impact of different industries on society and social institutions over time. The students will acquire a knowledge base which will significantly add to what the French refer to as their 'culture générale'.

DOWNTOWN LYON - Industrial and architectural landscapes and their social consequences

Overview of the evolution of Lyon focused on major historical developments: Lugdunum with the Roman Empire, the silk industry and the urban modernization of the 19th. The idea is to present how a local development (the silk industry) has brought in major social developments with national, regional and European resonance; how a national development (urban modernization) has been implemented locally and how the two intertwine leading us to the second visit.

CROIX-ROUSSE District – Industrial, architectural landscapes and their social consequences

In the 19th c. the central hub of the silk industry in Lyon was the Croix-Rousse district. The specific way the silk industry was organized has had major consequences in the way buildings and neighbourhoods were designed. Designs which we can still appreciate today (both inside and outside of the buildings). The social advances for which the workers have fought also prefigure later social movements of the 20th century. The main idea is to study the heritage of the "Canuts" (the Croix-Rousse silk workers) and its contemporary developments. Nowadays, the Croix-Rousse District remains unique in Lyon like a lively and multicultural village in town !

GRADE DISTRIBUTION

Participation – 10%

Group presentations – 15%

(Inter)cultural self-analysis – 20%

"Dear diary" – 10%

Cultural presentation – 20%

Final test – 25%

The ENERG'INSA Team is looking forward to welcoming you next summer !

CONTACT

Tara PIGNAL

Short program Manager

energinsa@insa-lyon.fr

+0033 (0)4 72 43 87 01

Eric SELLIN

Academic Coordinator for the Energy transition track

eric.sellin@insa-lyon.fr

Aruena DINIC,

Academic Coordinator for Interculturality track

Aruena.dinic@insa-lyon.fr

UNIVERSITÉ DE LYON

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

LYON FRENCH TECH