LORRAINE INP Ensgsi NANCY

ÉCOLE D'INGÉNIEURS
PUBLIQUE GÉNÉRALISTE

COURSES OPEN TO INTERNATIONAL EXCHANGE/ERASMUS STUDENTS

Lectures are delivered in French with course material in English.

The language of tutorials/lab work/exams can be English (on request)

UNIVERSITÉ DE LORRAINE

FALL SEMESTER (September to January)

LEVEL	CODE	COURSE	NUMBER OF HOURS	ECTS	DESCRIPTION
Master	CI4	Innovation engineering	Option 1 : 6h lecture + 9h tutorials Option 2 : 12,5h lecture + 20h tutorials	Option 1 : 2 Option 2 : 3	The course aims to understand the importance of positioning a project within a strategic framework that aligns with the market and innovation, while conducting a technological, strategic, and organizational diagnostic to guide development. It also focuses on identifying development strategies, selecting tools based on the level of innovation, integrating marketing analysis for decision-making, and formalizing an engineering framework that supports the innovation process through the "Intermediary Design Object (IDO)" concept.
Master	CI5	Strategic analysis of actors	4H lecture + 7,5h tutorial	2	The course aims to enable students to analyze the professional ecosystem in which they will operate, anticipating the behaviors and reactions of key players to better guide their decisions. They will learn to master tools for analyzing relationships between actors, negotiate realistic solutions, and develop scenarios and forward-looking strategies to improve interactions and solve problems with innovative and sustainable solutions.
Master	CI6	Intellectual Property and Inventive Design	7.5h lectures + 11.25h tutorials + 2h project presentation	2	The course aims to equip students with a solid understanding of intellectual property fundamentals, enabling them to differentiate intellectual property rights and organize patent database monitoring as a strategic tool for innovation. Students will also learn how to file a patent, describe a product use scenario, and assess the potential evolution of an existing product using the TRIZ method.
Master		Supervised project	90h supervised self-study	10	The teaching module aims to enable students to manage a real innovation project by identifying stakeholders, resources, and the overall context, while defining and systematically executing the action plan using the taught tools. It also encourages the development of autonomous and responsible teamwork, along with personal and managerial growth, by adapting their roles and actions within the project.
Master	MMI4	Multi-criteria Decision Making Methods	9h lectures + 15h tutorials	3	The course aims to identify and formalize a decision-making problem involving multiple criteria, and to select the most appropriate multi-criteria analysis method based on the type of decision, available information, and the decision-maker's preferences. Students will learn to apply the chosen method, conclude on the most suitable decision, and conduct analyses based on the results obtained.
Master	ISys6	Model-Based Systems Engineering (MBSE)	6h lectures + 24h lab	3	At the end of this module, the student will be able to master the processes and principles of Systems Engineering to specify, design (or improve), verify, and validate a solution architecture that meets stakeholder requirements. They will understand the challenges of Model-Based Systems Engineering (MBSE) and will be able to model a system and understand key views (operational, functional, physical... vs. static, dynamic).
Master	GP3	Chemical Process Design	4h lectures + 7h tutorials + 10h self guided study	2	At the end of this module, the student should be able to understand and analyze a process from a flow-sheet in order to perform material and energy balances. The course will consist of two parts: the first part will focus on exercises and a case study, while the second part will involve analyzing a new case through a project by considering the context, exploring different synthesis pathways to build a block diagram, and finally detailing key unit operations. The cases will be selected around the theme of energy production.
Master	GP4	Unit operations	5h lectures + 12h tutorials + 10h self guided study	2	"At the end of this module, the student will be able to: - Understand two-phase flows and the principles behind related processes. - Explain general laws of two-phase flow, including solid-fluid interactions and flow in porous media (sedimentation, fluidization, membranes). - Apply these techniques to develop new products or processes, using C-K theory for innovation. - Understand and explain the operation of complex equipment and have a basic grasp of key processes. - Link course concepts with fluid mechanics and perform basic calculations (pressure drop, fluidization speeds, filtration resistance). - Continue learning independently in a professional context.
Master	CI11	Management Practices for Innovative Companies	6h lectures + 18h tutorials	2	The course aims to equip students with the ability to define an organization's Innovation Management System and conduct a strategic and organizational diagnosis of its innovation capacity. They will also learn to identify strengths and weaknesses based on the context, define and implement a tailored improvement plan, and position the company within a network through outsourcing, client integration, partnerships, and open innovation.
Master	CI12	Research, Innovation, and Development	26h + 15h self guided study	4	This module aims to equip students with the fundamentals of scientific research: targeted literature review, document analysis (primarily in English), synthesizing information by writing an article, preparing and following an experimental protocol, and gaining an initial understanding of the organization and funding models of research. The module is divided into two parts: research methodology and writing workshop.
Master		Technology Resource Management - MRT	15h + 5h self guided study	2	The course aims to equip students with the ability to conduct a technological, strategic, and organizational diagnostic of the organization, as well as to carry out a prospective approach to identify future key challenges. They will learn to develop strategic roadmaps, and identify potential partners to support the organization's technological strategy.
		French as a foreign Language	44 h tutorials	3	Offered by the language centre DEFLE at Lorraine University, these course helps you to adapt to the French academic and cultural context

SPRING SEMESTER (February to June)

LEVEL	CODE	COURSE	NUMBER OF HOURS	ECTS	DESCRIPTION
Bachelor (final semester)	CI2	Innovation Engineering I	14h lectures + 8h tutorials + 10h self-guided study	3	The course aims to equip students with the ability to diagnose a product's innovation potential and performance, as well as to conduct high-level research and investigations on innovations. They will also develop skills in data visualization, selecting and representing an innovation process, and implementing appropriate methodologies.
Bachelor (final semester)	CI3	Introduction to Mechatronic Systems Design	9h lectures + 3h tutorials + 24h lab	4	The course aims to enable students to describe kinematic chains, formalize vector-based representations of simple motion transformation systems, and dimension them appropriately. Students will also learn to design parts using CAD software, simulate kinematics, create electronic control systems for simple mechanisms, and materialize concepts in 2D and 3D using technologies like laser cutting and 3D printing.
Master	CI7	Iterative Design and Evaluation	1h lectures + 24h lab + 5h self-guided study	3	The course aims to enable students to initiate a prototyping process based on a preliminary specification and manage the design project by defining the appropriate technologies. They will also learn to test, adjust, and improve the prototype according to objectives, while considering industrial constraints and making recommendations on materials and processes to facilitate the final prototype's industrialization.
Master	CI8	Innovation Engineering III	6h lectures + 30h tutorials + 5h self-guided study	4	The course aims to equip students with the ability to conduct a technological, strategic, and organizational diagnostic of the organization, as well as to carry out a prospective approach to identify future key challenges. They will learn to formalize prospective scenarios, develop strategic roadmaps, and identify potential partners to support the organization's technological strategy.
Master	CI12	Research methodology + project	6h tutorials + 50h self-guided study	6	This module aims to equip students with the fundamentals of scientific research: targeted literature search, document analysis (mainly in English), synthesizing information in the form of writing an article, preparing and following an experimental protocol, and gaining an initial overview of the organization and funding mechanisms of research. The module is divided into two parts: research methodology (6h TD) and writing practices with a researcher as tutor.
Master		Supervised project	90h supervised self-study	10	The teaching module aims to enable students to manage a real innovation project by identifying stakeholders, resources, and the overall context, while defining and systematically executing the action plan using the taught tools. It also encourages the development of autonomous and responsible teamwork, along with personal and managerial growth, by adapting their roles and actions within the project.
Master		Think Innovation Week	20 or 30h early July (conferences, workshops)	2	An innovation training program designed around three workshops: (1) "48 Hours to Revive Dormant Patents" - 3 days; (2) "Designing a Business Model for an International Market" - 3 days; (3) "Bring Your Ideas to Life" - one day. During these training sessions, students will work on the University of Lorraine's patents, experiment the IDéO method to bring an idea to life and transform it into an entrepreneurial project.
		French as a foreign Language	44 h tutorials	3	Offered by the language centre DEFLE at Lorraine University, these course helps you to adapt to the French academic and cultural context