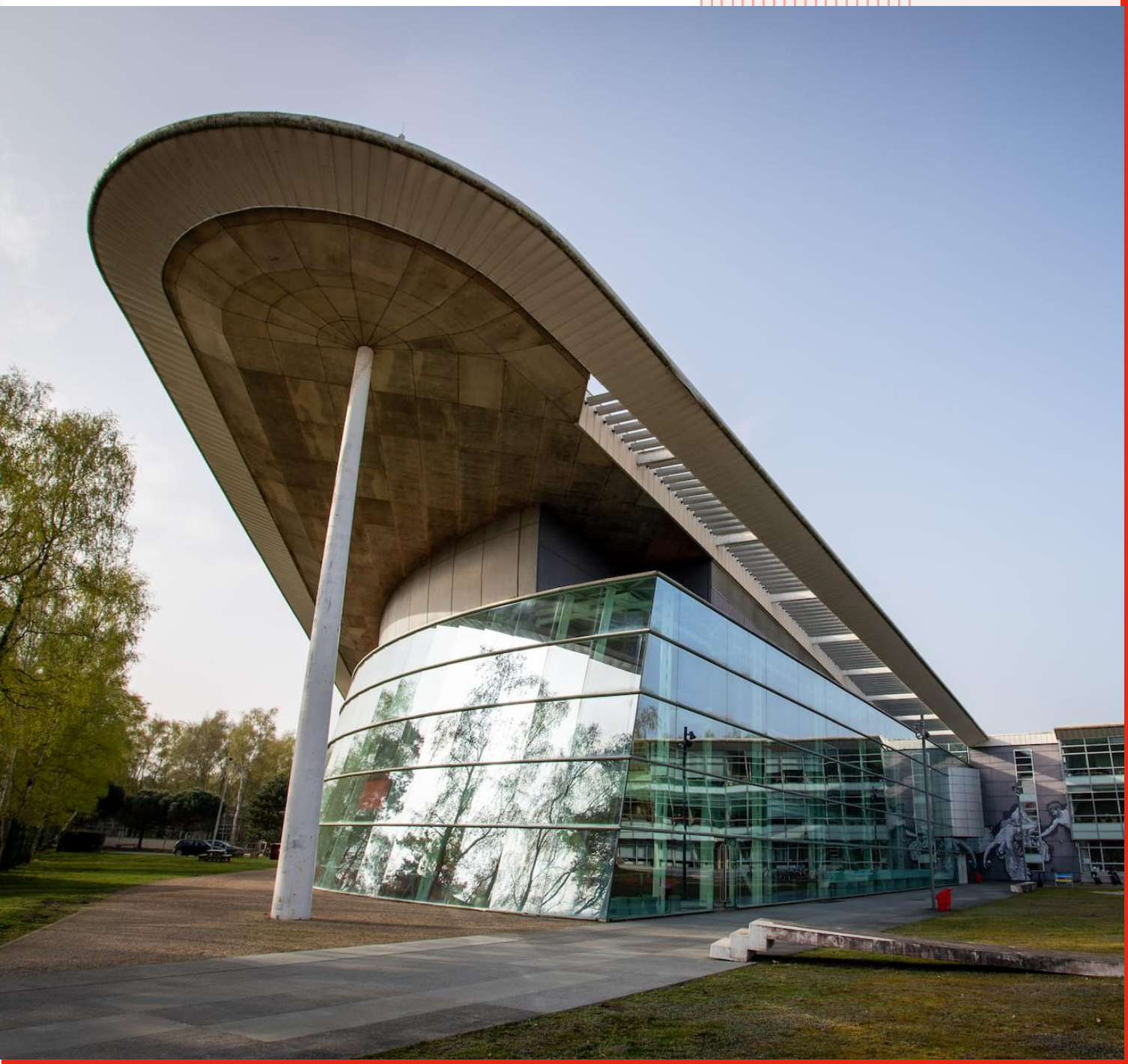
INSA
INSTITUT NATIONAL
DES SCIENCES
APPLIQUÉES
ROUEN NORMANDIE

ENGINEERING COURSES TAUGHT IN ENGLISH AT
INSA ROUEN NORMANDIE

FOR EXCHANGE STUDENTS



INTRODUCTION

INSA Rouen Normandie holds a very strong position within the French higher education system of engineering schools. Our missions revolve around four poles of expertise associated with an interdisciplinary theme: risk management.

The INSA curriculum is a 5-year program that leads to the **"Diplôme d'Ingenieur"** which is equivalent to a Master of Science. The first two years are made of a common core for all engineering students to ensure strong fundamental knowledge. At the end of the second year, students choose a department in which to specialize for the remaining three years.

Exchange students can select courses from one of the seven specialized departments. If the department schedule allows it, they can attend courses in other departments.

Lastly, there are research opportunities for exchange students wishing to gain hands-on experience. Students can partake in research part-time or full-time.

Humanities and Social Sciences
Humanities and Social Sciences represent 20% of the curriculum at INSA Rouen Normandie. They include business Training [Management & Economics, Enterpreneurship, Communication & Interpersonal Skills], Foreign Languages & Culture, and Physical Education. Among elective courses, students can take artistic classes [Drama, Choir and Music] taught by professionals.

Find information about the "Welcome to France" here

INSA, a French engineering school at a glance

Year of study	Semester	
1st year	Semester 1 (Fall)	Bachelor level
	Semester 2 (Spring)	
2nd year	Semester 3 (Fall)	
	Semester 4 (Spring)	
3rd year	Semester 5 (Fall)	
	Semester 6 (Spring) + Technician internship	
4th year	Semester 7 (Fall)	Master level
	Semester 8 (Spring) + Specialty internship	
5th year	Semester 9 (Fall)	
	Semester 10 (Spring) + Engineer internship	

Fall semester: *September- January*
Spring semester: *February - June*

7 departments from which to choose

Computer Science and Information Technology *Informatique et Technologies de l'Information*	**ITI**
Mechanical Engineering *Mécanique*	**MECA**
Industrial Risk Management and Process Engineering *Maîtrise des risques industriels et environnementaux*	**MRIE**
Energy engineering *Energetique et propulsion*	**EP**
Chemistry and chemical engineering *Chimie Fine et Ingénierie*	**CFI**
Mathematical and Software Engineering *Génie mathématique*	**GM**
Civil and Urban Engineering *Génie civil et constructions durables*	**GCCD**

Research opportunities in

- **COBRA**: Organic and Bio-Organic Chemistry – Reactivity and Analysis
- **CORIA**: Inter-professional Research Complex in Aerothermal Chemistry
- **GPM**: Group for Physics of Materials
- **LITIS**: IT Laboratory, Information Processing and Systems
- **LMI**: INSA Mathematics
- **LMN**: Normandy Mechanics Laboratory
- **LSPC**: Laboratory for Chemical Process Safety
- **PBS**: Polymer and Bio-polymer Surfaces

Access the laboratories websites here

COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

The ITI engineer is a computer engineer with expertise in information systems. Software development, networks, decision support techniques (machine learning, data mining), perception systems (signal or image acquisition and processing) as well as mastering large IT projects (management, quality) are examples of skills acquired in this training.

3RD YEAR	
FALL – S5	
ITI31-ELEC: **Electronics for embedded systems** This course introduces the basic notions of analog and digital electronics to 3rd year engineering students. The objective is to enable them to understand the role of electronic components in the design of calculators, microprocessors, computers. How electricity and semiconductors enable complex calculations or represent binary states. Students should be able to design electronic systems from existing components (sensors and actuators) based on predefined specifications by the end of this course.	5 ECTS
4TH YEAR	
FALL – S7	
ITI41-OPTIM : **Introduction to Numerical Optimization** To acquire a basic knowledge in numerical optimization	3 ECTS
ITI41-DM: **Introduction to Machine Learning** The course introduces the machine learning methods and applications. It covers supervised and unsupervised learning methods, model evaluation and assessment. Labworks and a challenge are implemented to practice the machine learning methods	5 ECTS
ITI41-TW2: **Web Technologies II** This E.C. aims at deepening students' knowledge with various aspects linked with internet: dynamic server web in Java (J2EE), event programming and asynchronous programming.	3 ECTS
SPRING – S8	
ITI42-BGD : **Big Data** The objective of this course is to enable students to choose, compare, and combine batch and stream processing techniques in order to build data-intensive distributed applications.	5 ECTS
ITI42-DM2: **Machine Learning** The purpose of this lecture is to familiarize the student with learning and data mining methods on huge amount of data.	5 ECTS
ITI42-IR : **Distributed programming** This E.C. aims at providing the students with basis competencies to develop distributed applications	5 ECTS
5TH YEAR	
FALL—S9	
ASI51-APPC: **Advanced Machine Learning** This course aims at providing advanced notions in machine learning related to dictionary learning for signal and image representation, matrix factorization for recommendation system and adapted recent convex optimization methods. adapted to this task.	5 ECTS
ASI51-IHME: **Evoluted Human Machine Interactions** To acquire the essential skills for developing applications that allow intuitive interactions according to the user and to the context ; To illustrate the concepts of a proactive behavior and/or adapted information that would propose an advanced HMI, even without any explicit user request ; To illustrate these concepts in concrete examples	5 ECTS
ASI51-MLSP: **Machine Learning/Signal Processing** Use the machine learning paradigm to address signal processing issues. Acquire solid notions of statistical signal processing. Master the problems of estimation and detection of signals disturbed by random noise.	5 ECTS

FRENCH AS A FOREIGN LANGUAGE (FFL)

FFL courses are available for international students throughout the academic year. 2 ECTS

INDUSTRIAL PROJECTS

ITI42-PIC: **4th year Industrial Project (Fall semester only)** 15 ECTS
Software production in collaboration with a company a team of 5 to 9 students working professionally with a company.

ASI51-PIC: **5th year Industrial Project (Fall semester only)** 15 ECTS
Software production in collaboration with a company a team of 5 to 9 students working professionally with a company.

RESEARCH AND DEVELOPMENT PROJECT

Students can conduct research alongside an experienced professor who will act as a mentor. 15 ECTS PT
Research topics are developed by the professor in the fields of Information Systems, Data Engineering or Vision oriented Embedded Systems. 30 ECTS FT

PT: Part-time
FT: Full-time

> ASSOCIATED LABS

LITIS

https://www.insa-rouen.fr/recherche/laboratoires/litis

iti@insa-rouen.fr

Find more information about the department on Youtube here

MECHANICAL ENGINEERING

The Mechanical Engineer is involved at all levels of the industrial process: general or detailed design, choice of materials, implementation, manufacturing, maintenance. He masters modeling, optimization as well as product development or new materials.

4TH YEAR	
FALL- S7	
MECA41-MVAR: **Variational Methods** Initiation to the variational methods applied to mechanics: how to transform a continuous problem into a variational one, how to define the set of functions of the variational problem, its properties (Hilbert space), how to check the existence and the unicity of the solution, how to deduce a linear system of equations from a discretization of the geometrical domain. Based on a simple 1D problem.	3 ECTS
5TH YEAR	
FALL – S9	
M51- FIA: **Reliability Engineering** The purpose is to introduce the main aspects of the reliability applied to the problems of mechanics of materials or structures. Notion of failure and safety scenario and probability of failure.	3 ECTS
MECA51-MTNIC1: **Embedded Systems Technology** Learn the theory of mechatronic systems.	1 ECTS
MECA51-MTNIC2: **System architecture and embedded modeling**	1 ECTS
MECA51-ROAD : **ROAD**	1 ECTS
MECA51-MLEARN : **Machine Learning** Theoretical and numerical tools that allow the modeling of a linear elastodynamic structure during its interaction with the environment, taking into account material or geometric hazards.	1 ECTS
MECA51-LBM: **Lattice Boltzmann Method** Use of the numerical simulation tool in the design process and the dimensioning of aeronautical structures.	2 ECTS
MECA51-PROPUL: **Propulsion Systems** The course gives a theoretical basis for the operation of a turbo machine (centrifugal pump, compressors, turbines), essentially from the point of view of fluid mechanics.	1 ECTS
MECA51-WIND: **Wind** Modeling turbulence in the near wall region. Aerodynamics of helicopter rotors.	2 ECTS
M21-IC-CBI: **Bio-inspired conception** Introduce fundamental concepts of Bio-Inspired Mechanical Design, an approach that seeks solutions to human challenges within the natural world. Methods and solutions from structural mechanics and materials will be studied.	3 ECTS
MECA51-IAM: **Artificial Intelligence for Mechanics** Know the main techniques of optical fields measurements used in experimental mechanics.	1 ECTS
MECA51-AGD: **Advanced Gas-Dynamics** The objective of this course is an introduction to the measurement techniques used to develop, characterize and control aeronautical propulsion systems.	1 ECTS
MECA51-FSI: **Fluid-Structure Interaction** The objective of this course is the study of compressible flows and sizing of wings in supersonic and hypersonic flow (2D).	1 ECTS
MECA51-MODEL: **Turbulent reacting flow modeling** The turbulent flames and their applications are presented.	2 ECTS
MECA51-TURBUL: **Turbulence Modeling** The objective of this course is the introduction to gas phase combustion. This point is essential for the apprehension of (turbulent) combustion in an aeronautical combustion chamber.	1 ECTS
M51- AERO-0: **Aeronautics** The objective of this race is to light up the context in which aeronautical propulsion system technologies develop and evolve.	1,5 ECTS
M51- AERO-A: **Aeroacoustics** The objective of this course is the introduction to linear acoustics as well as aeroacoustics for flows with low Mach numbers.	1,5 ECTS

PROJECT: **Structure or Reliability** This project presents 20 percent of the whole semester's workload (30 ECTS).	9 ECTS
PROJECT: **I2P - Materials** This project presents 30 percent of the whole semester's workload (30 ECTS).	9 ECTS
PROJECT: **AERO** This project presents 20 percent of the whole semester's workload (30 ECTS).	9 ECTS

FRENCH AS A FOREIGN LANGUAGE (FFL)

FFL courses are available for international students throughout the academic year.	2 ECTS

RESEARCH AND DEVELOPMENT PROJECT

Students can conduct research alongside an experienced professor who will act as a mentor. Research topics are developed by the professor in modeling, optimization, product and new materials development.	15 ECTS PT 30 ECTS FT

Specific tracks	Abbreviations
Engineering-Product-Process	I2P
Aerospace	AERO
Structures in their environment	Structure
Materials	Materials
Reliability	Reliability

> ASSOCIATED LABS

CORIA
http://www.coria.fr/
GPM
http://gpm.univ-rouen.fr/
LMN
http://lmn.insa-rouen.fr/

meca@insa-rouen.fr

Find more information about the department on Youtube here

CHEMISTRY AND CHEMICAL ENGINEERING

Chemical engineers are general engineers with expertise in fine chemistry, chemical process engineering and polymer materials. Health, safety at work and the environment are at the heart of their concerns.

	4TH YEAR
SPRING – S8	
CFI42-OCS: **Observation and control of systems** Introduction to process automation. Automatic control and observation of a process, without human intervention.	2 ECTS
CFI42-HSA: **Heterochemistry and Asymmetric Synthesis** Organic chemistry course on properties and synthesis of compounds comprising Phosphorus, Sulfur and Silicon atoms (Wittig, Staudinger, Mitsunobu, Swern, Peterson...). The second part is dedicated to enantioselective synthesis bases.	2 ECTS
CFI42-HOM: **Heterocycles and Organometallics** Organic chemistry course on heterocycles chemistry, organometalics and transition metal catalysis.	2 ECTS
CFI42-ANASOL: **Anasol** Main solid analysis techniques	2 ECTS
CFI42-CORR: **Corrosion** Different corrosion mechanisms and means of struggle against corrosion	2 ECTS
CFI42-TPGP: **Process Engineering Practical Lab Session** Experiments are carried out on industrial pilot units.	2 ECTS
CFI42-POLTP: **Polymer practical lab session – II** Macromolecular analysis practical course.	2 ECTS

FRENCH AS A FOREIGN LANGUAGE (FFL)

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RESEARCH AND DEVELOPMENT PROJECT

Students can conduct research alongside an experienced professor who will act as a mentor. Research topics are developed by the professor in organic chemistry, polymers & materials and chemical engineering. 15 ECTS PT / 30 ECTS FT

PT: Part-time
FT: Full-time

> ASSOCIATED LABS

COBRA
http://www.lab-cobra.fr/
PBS
http://pbs.univ-rouen.fr/
LSPC
http://lspc.insa-rouen.fr/

cfi@insa-rouen.fr

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ENERGY ENGINEERING

The Energy Engineer is at the heart of current environmental issues. She or he has increased skills in the fields of energy management, control and renewal as well as in the development of terrestrial, aeronautical and space propulsion systems.

3RD YEAR	
FALL – S5	
EP31-MATH: **Mathematics** Survival mathematical toolkit and concepts for EP engineering topics: fluid mechanics, combustion, turbulence, chemical kinetics, multi-phase flow, etc...	3 ECTS
4TH YEAR	
FALL – S7	
EP41-COMB: **Combustion 2** Laminar flame characteristics: diffusion flames & premixed flames	2,5 ECTS
EP41-TPTH: **Practical works on heat transfer, fluid mechanics, thermodynamic** The students have to work with teaching installations and to apply the theories learned in the courses.	4,5 ECTS
EP41-DDRS: **Project on Sustainable Development** Research project on a specific subject dedicated to an open question linked to sustainable development. Oral presentation and report	2,5 ECTS
EP41-CFD : **Numerical simulation of flows** The objective of this course is to help the future engineers on how to rationally use a computer software dedicated to fluid dynamics related problems. This type of numerical tools is currently very useful in the design and the analysis of complex fluid flows. In the framework of this course, the open-source software, OpenFoam, is used to illustrate the capability of the current CFD. Some selected test cases are simulated to assess the accuracy and the robustness of the code. The objective is to be familiar with a conceptual tool in fluid dynamics.	3 ECTS
EP41-TURB : **Turbulence** Introduction to the concepts of turbulence	2,5 ECTS
EP41-2PHAS : **Two-phase flow – Fundamentals** Learn and understand the link between les local (and exact) transport equations and the 1D model pour two phase flows. Know how to calculate the pressure drop in pipes for two phase flows. Be able to design the main two-phase flow configurations. Know how to calculate the heat and mass transfer in two-phase flow (boiling, condensation)	2 ECTS
SPRING – S8	
EP42-TMACH2: **Turbomachinery** Design and efficiency of axial/centrifugal turbomachinery	2,5 ECTS
EP42-2PHAS2: Two-phase flow - Applications Know how to calculate the pressure drop in pipes for two phase flows. Be able to design the main two-phase flow configurations. Know how to calculate the heat and mass transfer in two-phase flow (boiling, condensation).	2 ECTS
EP42-VIB: **Vibration** Study of systems with one degree of freedom (DOF), Study of systems with n DOF, Analytical dynamics of discrete systems: Lagrange equations, Kinetic and potential energies of a simple continuous system, Simplified study of a bending rotor	2,5 ECTS

	5TH YEAR
FALL – S9	
EP51-EDCFD: **Numerical modelling and flow simulations** Introduction and extensive use of CFD tools (Openfoam) for flow simulations. *Track: RE*	5 ECTS
EP51 ED-ENB: **Building Energy** Establish heating requirement for every single room, calculate energy consumption for heating, cooling, lighting and hot water providing, check conformity to French Thermal Regulation. *Track: RE*	5 ECTS
EP51-ATOM: **Atomization and spray** To introduce the main physical concepts in atomization. Definition of the basic tools to treat a problem related to the atomization. *Track: PS*	1,5 ECTS
EP51-AERO: **Aerodynamics** This course extends fluid mechanic concepts to the aerodynamic performance of wings and bodies in subsonic and incompressible regime. The course has three components: (i) fundamentals of viscous and non-viscous flows, including forces and moments and laminar/turbulent boundary-layer results for the prediction of the flow separation on profiles; (ii) non-viscous flows, including 2D potential flows; (iii) aerodynamics of 2D airfoils, including thin airfoil theory. *Track: PS*	3 ECTS
EP51-SP-NVH: **Noise, Vibration and Acoustics** To understand the main phenomena in general acoustics. To be able to calculate the main parameters used in acoustics. *Track: PS*	1,5 ECTS
EP51-SP-LESDNS: **LES/DNS** Presentation in details of numerical methods for CFD (LES/DNS). *Track: PS*	2 ECTS
EP51-SP-CFD: **Advanced Computational Fluid Dynamics (CFD)** To understand in deep the turbulence models and the numerical methods to solve complex flows. *Track: PS*	3 ECTS
EP51-SP-COMBT: **Turbulent Combustion** Detailed study of transport equations in reactive flows and corresponding turbulent combustion models. Application of YALES2.0 LES code to solve these equations for basic cases. *Track: PS*	2,5 ECTS
EP51-SP-TP: **Practical works (engine, Optical diagnostics** Application of optical diagnostics for turbulent and reactive flows: PIV, LII, PLIF. The course includes laboratory exercises that are divided in two parts: 1) Optical exercises where the three laser diagnostics are discovered. 2) Exercises for common engine technologies (car engine, cogeneration, annular combustor), which have been taught in previous courses in the EP department." *Track: PS*	4 ECTS

FRENCH AS A FOREIGN LANGUAGE (FFL)

FFL courses are available for international students throughout the academic year. — 2 ECTS

INDUSTRIAL PROJECT

Project with an industrial partner. — 14 ECTS

RESEARCH AND DEVELOPMENT PROJECT

Students can conduct research alongside an experienced professor who will act as a mentor. Research topics are developed by the professor in organic chemistry, polymers & materials, and chemical engineering. — 15 ECTS PT / 30 ECTS FT

PT: Part-time
FT: Full-time

Specific tracks	Abbreviations
Renewable Energy	RE
Propulsion System	PS

> ASSOCIATED LABS
CORIA
http://www.coria.fr/
GPM
http://gpm.univ-rouen.fr/

ep@insa-rouen.fr

Find more information about the department on Youtube here

INDUSTRIAL RISKS AND PROCESS ENGINEERING

The IRM engineer intervenes at all levels of the industrial risk problem. Its role is to ensure the integration of the various aspects of security either internally as a security manager, or externally as an expert belonging to supervisory authorities, insurance companies or consulting firms.

3RD YEAR	
FALL – S5	
MRIE32-RAC: **Radiation Combustion** Basic knowledge necessary for the understanding of the phenomena of combustion and the thermal radiation necessary for the quantification of the effects of fires and explosions.	3 ECTS

4TH YEAR	
FALL – S7	
MRIE42 : **Reliability** Modeling systems • Functional Analysis: Failure Mode, Effect and Criticality Analysis (FMECA), Failure Tree • Analysis, Event Tree, Reliability Block Diagram, State Graph and Markov Graph. • Functional analysis of the networks • Combinatorial Logic Analysis of states (operations, failures, gradients, ...) • Fault data, statistical data processing and databases (SdF, Reliability, Maintenance) Probabilistic Analysis of Safety and Functioning of Systems (probability, distributions, ...) • Probabilistic Analysis of the Reliability of Structures • Simulation by the Monte Carlo Method • Maintenance Oriented Reliability	6 ECTS

5TH YEAR	
FALL- S9	
MRIE51-REX: **Experiences Feedback** Feedback, investigation after accidents, technical factors to organizational and human factors in industrial safety and nuclear safety	3 ECTS
MRIE51-SRC: **Chemical Reactor Stability** The objective of this study is to develop a general method to determine thermal runaway boundaries for refining and petrochemical processes which may potentially undergo reaction thermal runaways.	3 ECTS
MRIE51-EQR: **Quantitative Risk Assessment** Introduce students to a Quantitative Risk Assessment (QRA), a quantified risk assessment method used in international oil and gas projects.	3 ECTS
MRIE51-PTA: **Advanced Unit Operations and Pollution Treatments** Gas pollution treatment and processes. Absorption- Absorption with chemical reaction	3 ECTS
MRIE-PRORECH: Research Project Immersion Project with LSPC and CORIA Research Teams	9 ECTS
MASTER-M2-EFE-GP-CER: **Chemical Engineering Reaction** In the first part, we will study the different method to measure the non-ideality of a chemical reactor and then, how to predict the conversion in such reactor. In the second part, we will study the transient state in continuous reactor.	3 ECTS
MRIE51-MFC: **Turbulent Flows** This course Introduce basic properties of turbulence: Random vortical fluctuating structures over a large range of length- and time-scales. Introduce the importance of turbulent mixing and transport of momentum in practical flows. Expose the students to theoretical, numerical and experimental techniques used to describe and quantify the effects of turbulence.	3 ECTS

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RESEARCH AND DEVELOPMENT PROJECT

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LSPC
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mrie@insa-rouen.fr

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MATHEMATICAL AND SOFTWARE ENGINEERING

The Mathematical Engineer is distinguished by his analytical and conceptual approach to problems. He or she can quickly learn new ideas and techniques to apply them in practice. He or she must master the different techniques related to Mathematics and Computer Science which are his main tools.

	5TH YEAR
FALL- S9	
Modeling and Numerical Simulation This course covers several important aspects of mathematical modeling and numerical simulations for various applications. - Perturbations and inverse problems - Numerical methods for front propagation - Advanced numerical methods for the wave equation - Mathematical Modelling and numerical simulation: theory and applications to image processing, energy and coastal morphodynamics - - Variational methods for image processing	8 ECTS
Optimization for Operations Research and Data Science This course covers several important aspects of optimization, from exact methods with mathematical programming to approximate methods with or without performance warranty. Applications to operations research or data science include practical homework and computing. - Large Scale Optimization: main results in general optimization and some advanced technics like decomposition methods - Network Design: solving optimization problems including a network or a graph model - Complexity and Approximate Algorithms: NP-complete problems, design of approximate methods with some proof on the performance ratio, some results on complexity for parallel algorithm. - Metaheuristics: approximate methods for combinatorial optimization problems. - logic programming and constraint programming	8 ECTS
Stochastic control and Finance Basic and advanced methods for modeling and solving problems in mathematical finance. - Optimal Control and applications - Stochastic control and applications to finance - Stochastic Calculus and Finance	8 ECTS
Advanced concepts in artificial intelligence - Explainable AI - Virtual and Augmented Reality	5 ECTS
Machine Leaning and Data Approximation Applied to Image Processing and Big Data During this course, we focus on applications of machine learning to image processing. More precisely, we will study of Adaboost method, often used in image processing, which has the distinction of using ML. The importance of the definition of descriptor vectors will be underlined, where is the necessary and sufficient information to deduce the underlying model by learning will be treated. Convergence, genericity, parades to over-learning are also studied. We will then introduce the use of machine learning applied to data science (big data), and we will study artificial neural networks (ANN) method.	1 ECTS

GM

PROFESSIONAL OR RESEARCH PROJECT
The course is made up of a mid-term presentation and a final defense. The topics are to be discussed with the professors of the department and can have a non-negligible research component, either in mathematics or in computer science, according to the skills the exchange student wants to develop. — 15 ECTS PT

FRENCH AS A FOREIGN LANGUAGE (FFL)
FFL courses are available for international students throughout the academic year. — 2 ECTS

PT: Part-time
FT: Full-time

> ASSOCIATED LABS
LITIS
http://www.litislab.fr/
LMI
http://lmi.insa-rouen.fr/

gm@insa-rouen.fr

Find more information about the department on Youtube here

CIVIL AND URBAN ENGINEERING

The GCCD specialty prepares engineers capable of leading the design, implementation, operation, management and renovation of construction works and infrastructure. They gain expertise in many fields such as Sustainable Construction, Environment, and Building Security and Risk Analysis.

Rouen Campus

	5TH YEAR
FALL - S9	
EP51 ED-ENB: **Building Energy** Establish heating requirement for every single room, calculate energy consumption for heating, cooling, lighting and hot water providing, check conformity to French Thermal Regulation.	5 ECTS
M51-CBI: **Bio-Inspired Mechanical Design** Introduce fundamental concepts of Bio-Inspired Mechanical Design, an approach that seeks solutions to human challenges within the natural world. Methods and solutions from structural mechanics and materials will be studied.	4 ECTS
MRIE51-REX**: Experience Feedback** Feedback, investigation after accidents, technical factors to organizational and human factors in industrial safety and nuclear safety.	3 ECTS
MECA51-DYNA**: Digital Modeling and Simulation in Structural Dynamics** Theoretical and numerical tools that allow the modeling of a linear elastodynamic structure during its interaction with the environment, taking into account material or geometric hazards.	4 ECTS
MECA51-DYNAE: **Experimental dynamics, model validation and verification** Learning theoretical, numerical and experimental tools that allow the measurement of the dynamic properties of a structure and the validation of numerical models.	4 ECTS
GC51-ISIS-STRUC: **Structural Reliability (available in 2024-2025)** Fundamental theory of structural reliability, risk assessment, uncertainty quantification and propagation, First order and second order reliability methods, Monte Carlo simulations, finite element and reliability coupling.	4 ECTS
GC51-ISIS-GEOT: **Geotechnical risks (available in 2024-2025)** Decision making in engineering design considering geotechnical risk.	2 ECTS
FRENCH AS A FOREIGN LANGUAGE (FFL) FFL courses are available for international students throughout the academic year.	2 ECTS
RESEARCH AND DEVELOPMENT PROJECT Students can conduct research alongside an experienced professor who will act as a mentor.	15 ECT PT 30 ECTS FT

> ASSOCIATED LABS

CORIA
http://www.coria.fr/

PBS
http://pbs.univ-rouen.fr/

LSPC
http://lspc.insa-rouen.fr/

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Le Havre Campus

	5TH YEAR
SPRING – S10	
Mechanical design and aerodynamics *Track: Wind Energy*	2 ECTS
Blade design & composite materials *Track: Wind Energy*	2 ECTS
Project management for the creation of wind farms *Track: Wind Energy*	2 ECTS
Numerical aspects related to wind turbines *Track: Wind Energy*	2 ECTS
Project of wind energy *Track: Wind Energy*	2 ECTS
Marine renewable energy (Wave, Current and Tidal) *Track: Marine Energy*	2 ECTS
Offshore wind energy *Track: Marine Energy*	2 ECTS
Offshore structures *Track: Marine Energy*	2 ECTS
Environmental impact of marine renewable energy *Track: Marine Energy*	2 ECTS
Project of marine energy *Track: Marine Energy*	2 ECTS
Photovoltaic solar energy *Track: Solar and earth energy*	2 ECTS
Thermal solar energy *Track: Solar and earth energy*	2 ECTS
Geothermal energy and positive energy buildings *Track: Solar and earth energy*	2 ECTS
Biomass and waste energy *Track: Solar and earth energy*	2 ECTS
Projects of solar and earth energy *Track: Solar and earth energy*	2 ECTS
Civil engineering: generalities and costing *Track: Civil engineering*	2 ECTS
Onshore foundation for renewable energy *Track: Civil engineering*	2 ECTS
Management of civil works for renewable energy projects *Track: Civil engineering*	2 ECTS
Fundamentals of electrotechnics and energy converters *Track: Humanities and electrotechnics*	2 ECTS
Grid integration, intermittency, and energy storage *Track: Humanities and electrotechnics*	2 ECTS
Energy savings and legal aspects, project management *Track: Humanities and electrotechnics*	2 ECTS
Global warming, world energy situation and geopolitical aspects *Track: Humanities and electrotechnics*	2 ECTS

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gccd@insa-rouen.fr

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