Subject name: Industrial conferences	Code EC: INF07-CONF
Number of hours per student: 12	ECTS Number: 0,5
Reference Teacher: Quentin Perez	

Generalities

Objectives *(2000 characters)*

This course aims to complement the curriculum by providing knowledge, practices, and industrial challenges not covered elsewhere in the program. It gives students a better understanding of companies, internal and external ecosystems, and professions. It also helps foster connections between students and businesses.

Description *(2000 characters)*

Conferences led by industrial or scientific professionals cover various themes, including:
- IT in finance
- Creating innovative startups
- User-centered design
- Introduction to corporate information systems organization
- Complex project management
- Continuous integration

These conferences can last 2 hours, span multiple 2-hour sessions, or be organized over a single day.e

Requirements *(2000 characters)*

None

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

Conferences

Number of hours per course type: *(2000 characters)*

CM: 12
TD:
TP:
PR:
CONF:
Others:including 2h ST²

Evaluation *(200 characters)*

Validation based on student attendance.

Bibliography

Bibliography *(2000 characters)*

Contacts

Contacts *(2000 characters)*

quentin.perez@insa-rennes.fr

Other information

Other information

Subject name: CPOO2	Code EC: INF07-CPOO2
Number of hours per student: 22h	ECTS Number: 2.5
Reference Teacher: Arnaud Blouin	

Generalities

Objectives *(2000 characters)*

Software development requires thinking ahead about the problems to be solved in order to limit development errors and therefore costs. A number of object-oriented development problems are well known, and generic solutions exist to speed up development, limit errors, and facilitate communication between software engineers. These are known as design patterns. In this course, we take a critical and modern look at the most useful design patterns. Demonstrations in different object-oriented programming languages (Java, Scala, etc.) are carried out to study how these patterns are implemented, naturally or otherwise, depending on the target language. We will take advantage of this study to introduce various advanced concepts of object-oriented programming (class vs. prototype, type systems, traits, object-oriented lambda expressions, etc.). The course will use basic concepts of object-oriented modeling with UML.

Description *(2000 characters)*

This course aims to master modern concepts of object-oriented programming.
Contents:
* Advanced object-oriented programming (typing system)
* Design patterns
* Software modeling (UML, OpenAPI)

Requirements *(2000 characters)*

Good knowledge of object-oriented programming (e.g., Java).
Good knowledge of object-oriented modeling (UML).

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

Classes, demonstrations, practice sessions, working sessions on table.

Number of hours per course type: *(2000 characters)*

CM: 4h
TD: 18h
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Exam on table.

Bibliography

Bibliography *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.

Contacts

Contacts *(2000 characters)*

arnaud.blouin@irisa.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: OBJECT-ORIENTED PROGRAMMING IN C++	**Code EC: INF07-CPP++**
Number of hours per student: 26	**ECTS Number: 2,5**
Reference Teacher: Eric Anquetil	

Generalities

Objectives *(2000 characters)*

Object-oriented programming is a powerful tool for developing complex software applications.

It enables the stable, reliable and robust development of large-scale software projects, facilitating their evolution and maintenance.

In this module, we will use the C++ programming language to explore the object-oriented paradigm.

C++ is a rich language that emphasises efficiency and performance, and it is widely used by companies.

Mastering object-oriented programming through C++ provides a set of comprehensive, general skills that can be easily transferred to other object-oriented languages, such as Java and C#.

Description *(2000 characters)*

Course outline:

- Object and class concepts in C++: Object construction, Encapsulation
- Basic elements of C++: References, pointers, operators, inner classes and input/output management and streams…
- Memory management: Dynamic allocation, destructors and assignment…
- Object design in C++: Aggregation, inheritance, polymorphism, access control, abstract classes, multiple inheritance, interfaces, inner classes…
- Generic programming: Parameterised classes/templates…
- Standard Template Library (STL)…
- Run-Time Type Identification (RTTI), Functor objects, Lambdas and Smart pointers.
- Exception Handling…
- Interoperability and DLLs
- C++/C++11 evolution: memory management, rvalue/lvalue, etc.

Requirements *(2000 characters)*

Basic knowledge of the C language.

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

The module consists of lectures and practical sessions.

Number of hours per course type: *(2000 characters)*

Lecture: 16h
Practical: 10h

Evaluation *(200 characters)*

Written exam (2 hours)

Bibliography

Bibliography *(2000 characters)*

B. Stroustrup. *A Tour of C++ (Second edition)*, Addison-Wesley. ISBN 978-0-13-499783-4. July 2018.

Contacts

Contacts *(2000 characters)*

eric.anquetil@insa-rennes.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Cryptography Engineering	Code EC: INF09-CRYPT
Number of hours per student: 26	ECTS Number: 2.5
Reference Teacher: Gildas Avoine	

Generalities

Objectives *(2000 characters)*

The objective of this course is to understand the fundamentals of cryptography and their implementation in operational contexts, whether software or hardware designs.

Description *(2000 characters)*

The course consists of 11 chapters:

1. Cryptography History
2. Cryptographic Primitives
3. Hash Functions
4. Block Ciphers
5. Stream Ciphers
6. Message Authentication Codes
7. Authentication Protocols
8. Key-establishment Protocols
9. Example of (Deployed) Weak Protocols
10. Time-memory trade-off
11. Generating Randomness

Requirements *(2000 characters)*

Course Cyber-hygiene (3INFO)

Course requirements and assessments

Teaching Language *(2000 characters)*

Spoken French, but slides and written documents are in English.

Teaching methods *(500 characters)*

Ex-cathedra lectures are given by Gildas Avoine, and hands-on sessions are given by Tristan Claverie (ANSSI).

Number of hours per course type: *(2000 characters)*

CM: 20 hours
TD:
TP: 6 hours
PR:
CONF:
Autres:

Evaluation *(200 characters)*

A 2-hour written exam. Documents, personal notes, and electronic devices are prohibited during the exam.

Bibliography

Bibliography *(2000 characters)*

- Handbook of Applied Cryptography, A. Menezes, P. van Oorschot, and S. Vanstone, CRC Press, 1996.* Cryptography: Theory and Practice, Third Edition, D. Stinson, Chapman & Hall, 2005.* Protocols for authentication and key establishment, Colin Boyd and Anish Mathuria, Springer, 2003.* The Codebreakers - The Story of Secret Writing, David Kahn, 1967.* The Code Book: The Secret History of Codes and Code-breaking, Simon Singh, 1999.
- La Cryptographie déchiffrée - Une introduction pratique au chiffrement moderne, Jean-Philippe Aumasson, octobre 2024, Dunod

Contacts

Contacts *(2000 characters)*

Gildas Avoine

Other information

Other information

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Subject name: Project Management	Code EC: INF07-GEST
Number of hours per student: 14	ECTS Number: 1
Reference Teacher: Eric Anquetil	

Generalities

Objectives *(2000 characters)*

'No project can exist without project management.' It is a significant part of an engineer's work. This becomes even more predominant as responsibilities increase. Therefore, it is essential to acquire and apply project management skills.

In this course, we will examine both stakeholders and project management activities, including communication, management, risk management and quality. We will focus particularly on:

- Identification of activities.
- Product and project life cycle.
- Agile methods, which are widely used in innovative projects.
- Estimation and project planning processes.

Description *(2000 characters)*

Lecturer: Industry expert in project management
In this module, we will cover existing methods and approaches and apply them to each student group's project (module INF07-PROJ1). Topics addressed will include: Communication aspects, meeting organisation, work rhythm (daily, weekly, etc.), handling objections, conflicts and negotiations.

Product and project life cycles: determining the 'product' cycle of projects, sub-projects and tasks (workload and expected deadlines), identifying workflow (inputs and outputs), the critical path and slack, deterministic strategies, supervision and confidence levels, and evaluation methods, risk identification and management; risk management strategies; product requirements, Time management (working together on estimations).

Requirements *(2000 characters)*

none

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

This module consists of theoretical lectures and practical work, which will be directly applied to the fourth-year project of each group (see module INF07-PROJ1). The various steps and tasks that the groups carry out should enable them to create a comprehensive project plan.

We will also use a planning tool to develop the initial project schedule.

Number of hours per course type: *(2000 characters)*

Lecture: 10h
Practical: 4h
Others: including 1hST²

Evaluation *(200 characters)*

evaluation: report and defence

Bibliography

Bibliography *(2000 characters)*

Contacts

Contacts *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.eric.anquetil@insa-rennes.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Stochastic Models	Code EC: INF07-MSTOC
Number of hours per student: 26 h	ECTS Number: 2,5
Reference Teacher(s): Patrice Leguesdron, Nikolaos Parlavantzas	

Generalities

Objectives *(2000 characters)*

Part I : The study of one particular category of stochastic model: Markov chains. Markov chains distinguish themselves from other models by the fact that their evolution in time depends only on the present and not on the past. Markov chains are used for modelling a number of queuing phenomena, especially those that concern computer system applications. Examples and applications deal mostly with this domain.

Part II : The course also provides an introduction to performance modeling of computer systems, covering operational analysis, queueing theory, and selected case studies, while giving students hands-on experience with performance modeling tools.

Description *(2000 characters)*

Part I / I.1 - Discrete-time Markov chains: Transition probability matrix. Transition diagram. The Chapman-Kolmogorov equations. State classification. Recurrence and transience. Ergodics. Asymptotic behaviour. I.2 - Continuous-time Markov chains: Transition probability. The Chapman-Kolmogorov equations. Infinitesimal generator. Transitory regime. State classification. Asymptotic behaviour. I.3 - Examples of processes: Birth and death process. Poisson process. I.4 - Application to queuing phenomena: Queues M/M/1. M/M/s. M/M/infinite. M/M/s/s.

Part II / II.1. Introduction to performance modeling (fundamental concepts, operational analysis, performance bounds). II.2. Queuing theory (single-queue systems, queuing networks, mean-value analysis). II.3. Performance modeling case studies, including models for parallel systems (Amdahl's law, Gustafson-Barsis law).

Requirements *(2000 characters)*

Part I: Mathematics program (basic concepts).
Part II. Concepts of operating systems; Basic programming skills (shell scripting, C)

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

Part I: lectures/tutorials.
Part II: lectures and practicals.

Number of hours per course type: *(2000 characters)*

CM/TD : 16 h
CM: 6 h
TD:
TP: 4 h
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Two-hour exam at the end of the semester.

Bibliography

Bibliography *(2000 characters)*

Part I / W. Feller. Introduction to Probability Theory and its Applications, Vol. I & II, J. Wiley and Sons, 1971. / Vidyadhar G. Kulkarni. Modeling and Analysis of Stochastic Systems. Chapman & Hall, 1995. / Averill M. Lad, W. Davis Kelton. Simulation Modeling & Analysis. 2nd Edition, McGrall-Hill Int. Editions, 1991. / J. Medhi. Stochastic Models in Queueing Theory. Academic Press, 1991. / A. Ruegg. Processus stochastiques (tome 6). Presses polytechniques romandes. / K. S. Trivedi. Probability and Statistics with Reliability, Queueing and Computer Science Applications.

Part II / "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling", R. Jain, Wiley-Interscience, New York, NY, April 1991 / “Performance by Design: Computer Capacity Planning by Example”, Daniel A. Menascé, Lawrence W. Dowdy, Virgilio A.F. Almeida, Prentice Hall Professional, 2004

Contacts

Contacts *(2000 characters)*

Patrice Leguesdron, Nikolaos Parlavantzas

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Numerical optimisation	Code EC: INF07-OPT
Number of hours per student: 24	ECTS Number: 2
Reference Teacher: Rozenn Texier-Picard	

Generalities

Objectives *(2000 characters)*

The aim of this course is to give a general presentation of problems and basic methods in numerical optimisation in continuous variables. It aims to develop the following skills: modelling a situation as an optimisation problem with or without constraints, specifying the conditions for optimality of the solution, implementing basic methods for approximating solutions.

Description *(2000 characters)*

Part 1: Linear optimisation
Introduction and examples. Graphical resolution
Standard form, canonical form.
Simplex algorithm.
Linear duality

Part2 : Nonlinear optimisation
Optimisation without constraints: optimality conditions, gradient method, Newton's method
Optimisation with constraints: optimality conditions, projected gradient method, penalty methods

Requirements *(2000 characters)*

Elementary linear algebra (matrices, eigenvalues)
Differential calcululs in 2D (gradient, Hessian matrix)

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

The concepts and methods are presented during lectures. A large part of the lectures is dedicated to interactions and students' activity.
The tutorials are dedicated to exercises.
The practicals enable the implementation of numerical methods.

Number of hours per course type: *(2000 characters)*

CM: 12
TD: 6
TP: 6
PR:
CONF:
Autres:

Evaluation *(200 characters)*

One 2-hour written exam (coeff 3)
Two evaluated practicals (coeff 1 for each)

Bibliography

Bibliography *(2000 characters)*

"Programmation mathématique" - M. MINOUX
"Optimisation numérique. Aspects théoriques et pratiques" - J.F. BONNANS, J.C. GILBERT, C. LEMARECHAL, C. SAGASTIZABAL

Contacts

Contacts *(2000 characters)*

Rozenn Texier-Picard

Other information

Other information

Subject name: Project Management: Preliminary Study and Specifications	Code EC: INF07-PROJ1
Number of hours per student: 30	ECTS Number: 3
Reference Teacher: Eric Anquetil	

Generalities

Objectives *(2000 characters)*

The aim of the fourth-year project is to familiarise students with working in groups of five to seven people on a large-scale project involving 1,500 hours of work.

Project topics change every year and are usually related to research or innovation issues in partnership with companies.

The project is supervised by one or more tutors. As well as achieving a technical outcome, the objective is to apply a number of software engineering and project management methods covered in the associated module's lectures (10 hours).

The targeted skills are as follows: - Introduction to teamwork

- Use of software engineering methods and tools

- Time management, planning and communication

- Breaking down work into phases of analysis, specification, implementation and validation

- Reading technical documents

- Writing technical reports

- Acquiring presentation techniques

Description *(2000 characters)*

The first semester is dedicated to studying the application domain and defining the project's functional specifications. This will culminate in the creation of an initial project plan, which will establish the roadmap for organisation, task distribution and synchronisation.

Requirements *(2000 characters)*

none

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

The module is based on weekly in-person meetings with project supervisors.

Students then work independently for approximately seven hours per week.

Number of hours per course type: *(2000 characters)*

Coaching: 2 to 3 hours in-person per week
Homework: independent student work, about 7 hours per week
Others: 4h ST²

Evaluation *(200 characters)*

2 reports + 1 oral presentation

Bibliography

Bibliography *(2000 characters)*

Contacts

Contacts *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.eric.anquetil@insa-rennes.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Computer network security	Code EC: INF07-SECU
Number of hours per student: 26	ECTS Number: 2.5
Reference Teacher: Gildas Avoine	

Generalities

Objectives *(2000 characters)*

The objective of the course is to study the security issues related to IP and mobile networks, understand the technical countermeasures to implement and learn about network monitoring.

Description *(2000 characters)*

The course is divided into three parts:

- IP Network Security (Filtering, Addressing, Naming, Routing)
- Mobile Network Security
- Security Monitoring: Network Intrusion Detection Systems (NIDS) and Security Information and Event Management (SIEM)

Requirements *(2000 characters)*

Fundamentals in computer networks (layered models, protocols ARP, IP, TCP/UDP, DHCP, DNS, routers, switches, and hubs)

Course requirements and assessments

Teaching Language *(2000 characters)*

Spoken French. Some materials are in French and others in English.

Teaching methods *(500 characters)*

Teaching is performed by Jean-Michel COMBES (Orange Innovation) (12 hours), Tristan CLAVERIE (ANSSI) (6 hours) and Chloé HUET-LE RUMEUR (DGA) (8 hours). Only Chloé HUET-LE RUMEUR's part includes hands-on sessions.

Number of hours per course type: *(2000 characters)*

CM: 22 hours
TD:
TP: 4 hours
PR:
CONF:
Autres:

Evaluation *(200 characters)*

A 2-hour written exam covering the lectures and the practical sessions. Documents, personal notes, and electronic devices are not allowed during the exam.

Bibliography

Bibliography *(2000 characters)*

Contacts

Contacts *(2000 characters)*

Gildas Avoine

Other information

Other information

Subject name: Operating system | **Code EC: INF07-SYST**

Number of hours per student: 54h | **ECTS Number: 4**

Reference Teacher: Marin BERTIER

Generalities

Objectives *(2000 characters)*

Provide an overview of the various functions of operating systems, with a focus on the user's perspective.
Show the impact of architecture and design on system usage.
Special attention is given to scheduling as well as to the communication and synchronization tools used between processes.

Description *(2000 characters)*

Introduction to operating systems
- System/User interface
- System calls, traps, and interrupts

Process management
- Lifecycle of a process
- Process environment

Process synchronization: signals, pipes, semaphores, and deadlocks
Introduction to multithreading
Input/Output management
Memory management

Requirements *(2000 characters)*

Programming in Java and C.
Basic knowledge of computer networks.

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*
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Number of hours per course type: *(2000 characters)*
CM: 18h
TD: 16h
TP: 20h
PR:
CONF:
Autres:

Evaluation *(200 characters)*
2 exams

Bibliography

Bibliography *(2000 characters)*
Cliquez ou appuyez ici pour entrer du texte.

Contacts

Contacts *(2000 characters)*
Cliquez ou appuyez ici pour entrer du texte.

Other information

Other information

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Subject name: Concepts from logic to programming	Code EC: INF05-CLP
Number of hours per student: 36h	Nombre crédits ECTS : 2
Reference Teacher:	

Generalities

Objectives *(2000 characters)*

The objective of this module is to present the basics and necessary tools for the processing and analysis of images and videos. The course will first cover the generalities of images, the human visual system, and simple image transformations (quantization, histograms, image enhancement, noise reduction, filtering, mathematical morphology). These simple tools will then be used to introduce more advanced image analysis concepts: binarization, contour detection, filtering, contour segmentation, region segmentation, Kalman filter, 3D registration.

The practical sessions aim to illustrate the concepts seen in class using the Image INSA software, before undertaking a project under OpenCV dedicated to the extraction of shapes from a handwritten document.

Description *(2000 characters)*

Introduction to image and video processing: acquisition, Human Visual System
Fundamental tools for image and video processing: filtering, spectral analysis, histograms
Segmentation of still images and extraction of visual features
Video segmentation: application to object tracking

Requirements *(2000 characters)*

Object-Oriented Programming
Linear Algebra
Data Analysis Techniques

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

Cliquez ou appuyez ici pour entrer du texte.This module includes 12 hours of lectures and 14 hours of practical sessions (in pairs), with 8 hours dedicated to a practical project that applies techniques learned in class.

Number of hours per course type: *(2000 characters)*

CM: 12h
TD:
TP: 6h
PR: 8h
CONF:
Autres:

Evaluation *(200 characters)*

Graded project, oral presentation

Bibliography

Bibliography *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.

Contacts

Contacts *(2000 characters)*

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Other information

Other information

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Subject name: WEB2	Code EC: INF07-WEB2
Number of hours per student: 18h	ECTS Number: 2
Reference Teacher: Arnaud Blouin	

Generalities

Objectives *(2000 characters)*

This teaching module covers advanced concepts in object-oriented programming and modeling and Web front-end development, applied through a development project. This project aims to familiarize students with software development, covering aspects such as modeling, front-end web development, back-end development, REST APIs, and software testing. It is carried out in pairs and represents approximately 100 hours of development.

Description *(2000 characters)*

* Web engineering
* Object-oriented modeling
* Advanced object-oriented programming
* Design patterns
* Continuous integration, automation, software testing, Git, GitLab

Requirements *(2000 characters)*

Good knowledge of object-oriented programming (Java).
Good knowledge of object-oriented modeling (UML).
Good knowledge of software testing (JUnit).
Good knowledge of web development (Spring Boot, REST).

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

Project

Number of hours per course type: *(2000 characters)*

CM: 2h
TD:
TP:
PR: 16h
CONF:
Autres:

Evaluation *(200 characters)*

Project

Bibliography

Bibliography *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.

Contacts

Contacts *(2000 characters)*

arnaud.blouin@irisa.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Robotics	Code EC: INFT1-ROBO
Number of hours per student: 26.00h	ECTS Number: 2.00
Reference Teacher: PASTEAU François	

Generalities

Objectives *(2000 characters)*

The aim of this introductory module is to teach the basics of computer robotics through the use of a mobile platform. It covers the software design of such an application, while addressing the basic mathematical concepts required to control a robot. The chosen robotics platform will also introduce students to essential mechatronic components (odometry, electronic control boards, motors, etc.).
The module will also cover the design of a robot control system, including the use of a microcontroller and the development of a control algorithm.

Description *(2000 characters)*

-Introduction to robotics: sensors and actuators, control/command, servo control, robust algorithms
-Introduction to mobile robotics: development on the GOPIGO mobile platform
-Software design using the ROS (Robotic Operating System) software platform
-Sensor-based servo control: line follower, camera, tof sensor, odometry

Requirements *(2000 characters)*

Object-oriented programming
Architecture concepts
Linear algebra

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

This introductory module to robotics and control consists of 4 hours of lectures and 22 hours of project work, designed as a series of basic robotics building blocks to be completed. The first practical session will be devoted to assembling the robot in order to gain a thorough understanding of the various mechatronic components required to control the robot. The final practical session will take the form of a “challenge” in which all the robotic systems designed by the different groups of students will compete to complete an obstacle course using the mobile platform.

Number of hours per course type: *(2000 characters)*

CM: 4h
TD:
TP: 22h
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Graded project

Bibliography

Bibliography *(2000 characters)*

Gregory Dudek and Michael Jenkin. Computational Principles of Mobile Robotics. Cambridge University Press, New York, NY, USA. 2000.
Roland Siegwart and Illah R. Nourbakhsh. Introduction to Autonomous Mobile Robots. Bradford Co., Scituate, MA, USA. 2004.
Numerous courses and publications are available via the GDR Robotics at: http://www.gdr-robotique.org/cours_de_robotique/

Contacts

Contacts *(2000 characters)*

François Pasteau francois.pasteau@insa-rennes.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Computer Graphics	Code EC: INFT1-IG
Number of hours per student: 28	ECTS Number: 2
Reference Teacher: Maud MARCHAL	

Generalities

Objectives *(2000 characters)*

- Design of interactive graphics scenes in 2D and 3D
- Modeling, animation, rendering and interaction with 3D virtual worlds

Description *(2000 characters)*

- Modeling: data structures for 2D and 3D representations (meshes, curves and surfaces)
- Rendering: rendering of 2D images from 2D and 3D models, projective rendering methods, illumination and textures
- Animation: dynamics simulation of 3D objects, procedural animation and introduction to physics-based simulation

Requirements *(2000 characters)*

Knowledge on geometry, C++ programming

Course requirements and assessments

Teaching Language *(2000 characters)*

English (Supportive material are in English)

Teaching methods *(500 characters)*

Courses and practical hours

Number of hours per course type: *(2000 characters)*

CM: 10
TD:
TP: 18
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Practical courses and project

Bibliography

Bibliography *(2000 characters)*

* OpenGL Programming Guide. J. Kessenich, G. Sellers, D. Shreiner. Ed. Addison Wesley.
* Fundamentals of Computer Graphics. P. Shirley, M. Ashikhmin, S. Marschner. Ed. AK Peters/CRC Press.
* Computer Graphics: Principles and Practice. J. Hughes, A. van Dam, M. McGuire, D. Sklar, J. Foley, S. Feiner, K. Akeley. Ed. Addison Wesley.

Contacts

Contacts *(2000 characters)*

Maud.Marchal@insa-rennes.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Reproducibility of experiments	Code EC: INFT1-REPRO
Number of hours per student: 26h	ECTS Number: 2
Reference Teacher: Mathieu ACHER	

Generalities

Objectives *(2000 characters)*

Understand key concepts and distinctions: reproducibility, repeatability, replicability.
Acquire a “repro” mindset: traceability, transparency, automation, control of environments.
Know how to reproduce and replicate results from scientific articles and industrial experiments (IT and non-IT).
Implement methods, tools, and best practices (containers, CI, dependency management, seeds, data/versioning).
Explore variability (sources of variation, variant space) and aim for consensus between implementations/results.
By the end of the course, be able to design a reproducible experimental protocol, execute it, and document deviations/limitations.

Description *(2000 characters)*

The course clearly introduces the concepts of reproducibility, repeatability, and replicability. We set up controlled environments (containers, locked dependencies, seeds) to eliminate ambiguities in execution.
Automation is systematic via scripts, Makefile, and continuous integration in order to replay experiments identically.
Students learn to trace data, configurations, and versions to ensure transparency and auditability.
We explore sources of variability (libraries, flags, randomness, platforms) and measure their impact on results.
The search for consensus between implementations and configurations serves as a guiding thread for interpreting the observed discrepancies.
Guided practicals serve as a “hello world” of reproducibility before moving on to more ambitious cases.
A mini-project leads each team to reproduce and then replicate a chosen article, with protocol, artifacts, and experiment log.
The tools used include Git/GitHub, Docker/Podman, notebooks or CLI, and a CI that orchestrates the whole process.
At the end of the module, each pair delivers an assessable and executable report documenting the results, variability, threats to validity, and limitations of a real scientific article.

Requirements *(2000 characters)*

Programming basics (Python/R/etc., as desired), Git, command line.
Desirable knowledge: containers (Docker/Podman), CI, basic statistics.
Scientific curiosity

Course requirements and assessments

Teaching Language *(2000 characters)*

French (resources are in English)

Teaching methods *(500 characters)*

Format: Short lectures (concepts + feedback), guided practical work (pairs/teams)

Tools: Docker/Podman, Make/CLI, Git/GitHub, GitHub Actions (CI), Python/R/Julia (your choice), Jupyter, seeds, requirements/lockfiles, simple data versioning, reproducible scripts.

Deliverables: reproducible protocol, scripts, environment(s), datasets (or references), experiment log, report (structure provided), executable artifacts, Quality/Repro checklist.

Number of hours per course type: *(2000 characters)*

CM: 4
TD:
TP: 22
PR:
CONF:
Others: including 16h ST²

Evaluation *(200 characters)*

Reproduction/Replication Project (team) — 50%: reproducible pipeline, quality of scripts/artifacts, results, analysis of variability/threats to validity.
Graded assignments — 50% exercises, automation, reproducibility of “Hello World” cases and variants.

Bibliography

Bibliography *(2000 characters)*

Frictionless reproducibility and deep variability — HAL : https://hal.science/hal-04601752
Teaching Reproducibility and Embracing Variability — HAL : https://hal.science/hal-05190848v1
ACM Conference on Reproducibility and Replicability 2024 : https://acm-rep.github.io/2024/
Practical strategies for teaching reproducibility (Fund et al.)
Forum recherche reproductible : https://forum.recherche-reproductible.fr/
MOOC Reproducible Research II (Legrand, Hinsen, Pouzat, Simonin, …)
École JCJC en Programmation (EJCP) : https://gpl-ejcp.github.io/ejcp2023
Papers With Code, Software Heritage, Reproducible Builds (sites et docs officiels)

https://github.com/acherm/REP-INSA2526/

Contacts

Contacts

Responsable : Mathieu Acher — mathieu.acher@irisa.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

INSA RENNES : 2025/2026

Nom de la matière : Réalité Virtuelle	Code EC: INFT1-RV
Volume horaire total par étudiant: 26h	Nombre crédits ECTS : 2.00
Responsable(s) : Valérie Gouranton	

Généralités

Objectifs, finalités *(2000 caractères)*

This course aims to provide the fundamentals of virtual reality and, more broadly, extended reality (XR). We will mainly cover all the technologies used in the general context of interactive applications, with a particular focus on the following points: principles of real-time visualization; principles of interaction.

Description *(2000 caractères)*

History, definitions, and concepts
Real-time visualizationInteraction
Virtual reality devices, hardware configurations
Interaction paradigms and metaphors, application constraints
The project will be carried out in groups and will be defined with the course instructor.

Pré-requis *(2000 caractères)*

Aucun

Modalités du cours et des évaluations

Langue d'enseignement *(2000 caractères)*

French

Modalités d'enseignement *(500 caractères)*

In-depth study of the course, document research, and methods.

Volume horaire par type de cours : *(2000 caractères)*

CM : 4
TD :
TP :
PR : 22
CONF :
Others: including 2h ST²

Modalités d'évaluation / coefficient *(200 caractères)*

Assessment method: oral presentation of the project, one-page written report, access to Git

Bibliographie

Bibliographie *(2000 caractères)*

Le Traité de la Realité Virtuelle, 2ème édition, Edition des Presses de l'Ecole Nationale des Mines de Paris,Volume 1 et Volume 2, Gratuit en version électronique pour les étudiants http://www.caor.ensmp.fr/interlivre
Articles de recherches dédiés au sujet du projet

Contacts

Contacts *(2000 caractères)*

Valerie.Gouranton@insa-rennes.fr

Autres

Autres informations

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Concepts from logic to programming	Code EC: INF05-CLP
Number of hours per student: 36h	Nombre crédits ECTS : 2
Reference Teacher:	

Generalities

Objectives *(2000 characters)*

This introductory module aims to raise students' awareness of the challenges of digital healthcare, through the design of an innovative application dedicated to the field of health and rehabilitation. The aim is to understand the scientific challenges as well as the development and testing methodologies related to this specific field.
The project aims to aid visually impaired individuals in navigating virtual environments with the assistance of a haptic device.

Description *(2000 characters)*

- Introduction to IT applications for healthcare
- Technical and digital aids for people with disabilities: understanding disability and the role of technical assistance
- Haptics: principles, uses, design
- Designing haptic signals
- Conception and design of virtual environments
- Defining an experimental protocol
- User studies

Requirements *(2000 characters)*

Object-Oriented Programming
Probability and Statistics

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

This module comprises 4 hours of lectures and 18 hours of paired project work. The course is supplemented by practical work on specific topics required to make progress on the project (3D printing, ethical aspects and trials involving the human body, subjective data and questionnaires).

Number of hours per course type: *(2000 characters)*

CM : 4h
TD :
TP :
PR : 22h
CONF :
Autres : including 22h ST²

Evaluation *(200 characters)*

Graded project, demos, oral presentation

Bibliography

Bibliography *(2000 characters)*

[1] https://societeinclusive.ca/
[2] M. Marchal. 3D Multimodal Interaction with Physically-based Virtual Environments. Habilitation à diriger des recherches de l'Université de Rennes 1, Novembre 2014.

Contacts

Contacts *(2000 characters)*

Marie Babel, marie.babel@insa-rennes.fr
Maud Marchal, maud.marchal@insa-rennes.fr
Louise Devigne, louise.devigne@insa-rennes.fr

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Nom de la matière : Allemand	**Code EC: EC-HUMF07-ALL**
Volume horaire total par étudiant: 21heures	**Nombre crédits ECTS :**
	1,5 ECTS
Responsable(s) : Cecile Hölzner-Jacques	

Généralités

Objectives, aims *(2000 caracters)*

Targeted skills:
Mastering a foreign language
Ability to communicate/progress/work in an international and intercultural context
Cultural openness
Communicating/interacting with others, working in a team
Working autonomously
German Level A1: Acquiring the basics of the German language. Be able to understand and hold a simple conversation about everyday life.
German Level A2-B1: Be able to communicate in German, acquire intercultural skills, demonstrate cultural openness. Work in a group on a project, speak up.
German Level B2/C1: Work in a group on a project, speak up, communicate in German, acquire intercultural skills, acquire basic scientific and technical vocabulary. Ask questions, become a responsible engineer, think about the world of tomorrow in an international context.

Description *(2000 caracters)*

Practising written and oral comprehension. Developing oral expression through exercises in small groups and whole-class discussions. Acquire everyday German vocabulary for daily life and professional life.
German Level A2-B1: Grammar revision, consolidate knowledge. Practise reading and listening comprehension using multimedia resources. Develop oral expression skills through small group exercises, presentations or whole class discussions. Prepare students to progress independently in languages. Preparing mobility.
German B2-C1: Practise reading and listening comprehension using multimedia resources. Acquire technical and scientific German vocabulary. Develop oral expression skills through small group exercises, presentations or whole class discussions. Use and improve German language skills in the context of a project. Preparing mobility.

Pré-requis *(2000 caractères)*

German Level A1: none

German Level A2-B1: mastery of the basics of German (A2), second foreign language at secondary school (B1)

German B2-C1: good language skills, first foreign language or bilingual class at secondary school, ABIBAC

Modalités du cours et des évaluations

Langue d'enseignement *(2000 caractères)*

Cliquez ou appuyez ici pour entrer du texte.

Modalités d'enseignement *(500 caractères)*

1.5–2 hours of classes per week.
IAutonomous study time: 14-16 hours Total: 35 hours. Students are encouraged to read German newspapers regularly and watch videos, series and films, in addition to the work assigned between sessions.

Volume horaire par type de cours : *(2000 caractères)*

CM :
TD : 19 hours for the first cycle, 21 hours for the second cycle.
TP :
PR :
CONF :
Autres :
Autonomous study time: 14-16 hours
7 hours of optional project work in the second cycle

Modalités d'évaluation / coefficient *(200 caractères)*

Continuous assessment, oral examination

Bibliographie

Bibliographie *(2000 caractères)*

MOODLE course page
Deutsch für Ingenieure, Maria Steinmetz/Heiner Dintera, VDI/Springer Vieweg, 2014
Deutsch Perfekt, periodical
online: Deutsche Welle, ARD, Der Spiegel, FAZ, die Zeit, das Handelsblatt, VDI (Verein Deutscher Ingenieure), Nachrichten, ZDF Logo
French-German dictionary le visuel, Editions de la Martinière
Übungsgrammatik für die Mittelstufe Hueber-Verlag
Na also! Waltraud Legros, Ellipses
multimedia resources

Contacts

Contacts *(2000 caractères)*

Cecile Hölzner-Jacques : cecile.holzner-jacques@insa-rennes.fr

Autres

Autres informations

Cliquez ou appuyez ici pour entrer du texte.

ENGLISH	Code EC: EC-HUM07-ANGL
Total number of hours per student : 28h	ECTS : 2
Supervisor : Philippe LE VOT	

General information

Objectives and Purposes
General Objectives:
Acquisition of the linguistic tools necessary for work in a company. Achieving the required level (B2) for the awarding of the diploma.

Linguistic Objectives:
Achieve or strengthen the B2 level (required for the validation of the engineering degree and defined by the CEFR).

Cliquez ou appuyez ici pour entrer du texte.

Description

- **Action-oriented approach to language learning:** Learn by doing: speaking and listening, writing a document while leveraging problem-solving, construction, demonstration, and persuasion skills.
- **Expressing oneself with precision** through rigorous use of syntax and phonology. Activities that call on the creativity and responsiveness of students, such as debates, role-playing, individual oral presentations using PowerPoint or Canva, and projects, will focus on current, scientific, and societal topics.
- Writing letters and CVs.
- Syntax structures specific to scientific English.
- Exploring the professional world in an international context.
- Preparation for the TOEIC (2nd semester: specific course "TOEIC Booster").

Prerequisites:
English courses from the 1st, 2nd, and 3rd years or equivalent.

Course and Evaluation Modalities

Language of Instruction
English

Teaching Methods
The classes are two hours long and are held in rooms that are mostly equipped with projectors and sound systems. We have a multimedia language lab as well as computer rooms to provide students with a setting conducive to stimulating learning.

The educational resources used include press articles, audio and video materials (TV reports, excerpts from films or series), and the Internet is used as a documentary source.

Regular personal work is required. Students are expected to be curious and to continue practicing beyond the classroom

Hours by Course Type

- **Lectures (CM):**
- **Tutorials (TD):** 28 hours (14 sessions of 2 hours each)
- **Practical Work (TP):**
- **Research Projects (PR):**
- **Conferences (CONF):**
- **Others:**

Evaluation Methods / Coefficient

1 in-class presentation (see departments) + 1 continuous assessment grade (average of different graded assignments)

Bibliography

Bibliography

Any English-language materials, whether technical or otherwise.

Contacts

Contacts

plevot@insa-rennes.fr

Subject name: CHINESE LV2-LV3	**Code EC: EC-HUMF07-CHI**
Number of hours per student: 21 hours	**ECTS Number: 1,5**
Reference Teacher: Cécile Hölzner-Jacques	

Generalities

Objectives *(2000 characters)*

Targeted skills:

- Mastering a foreign language
- Ability to communicate/develop/work in an international and intercultural context
- Cultural openness
- Communicating/interacting with others, working in a team
- Working independently
- Acquiring the basics of the Chinese language, essential structures and vocabulary
- Comprehension, expression, pronunciation
- Using the language in everyday contexts.

Description *(2000 characters)*

Oral skills:
Corrective phonetics (pinyin system),
Listening to and analysing simple texts and complex sentences,
Oral exercises (learners with each other / learners with teacher)
Learning new characters (pronunciation and tone accentuation).

Written skills:
Theme/version
Written production of simple texts and complex sentences,
Learning and reinforcement of grammatical mechanisms and vocabulary for oral and written production,
Learning new characters (stroke order, keys),
Reading and analysis of texts, commentary on texts.

Requirements *(2000 characters)*

Chinese 1: None
Chinese 2: Completion of Chinese 1
Chinese 3: Completion of Chinese 2

Course requirements and assessments

Teaching Language *(2000 characters)*

Teaching methods *(500 characters)*

Reading lesson texts (in characters), rewriting new characters, exercises applying grammar points, lexical and morphological points, theme and version exercises...

Number of hours per course type: *(2000 characters)*

CM:
TD: 1h30
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

S1: Final mark
S2: Oral examination

Bibliography

Bibliography *(2000 characters)*

1. Chinese as spoken in China, Bernard Allanic, Presses Universitaires de Rennes, 2009
2. Contemporary Chinese, WU Zhongwei, Sinolingua, 2010
3. Experiencing Chinese, ZHANG Rumei, AI Xin, Higher Education Press, 2006
Chinese Language Method (Second Level), Zhitang Yang-Drocourt - Liu Hong – Fan Jianmin
Short Stories for Learning Mandarin Chinese, Zhang Xiaoli, 2025
Standard Course HSK Workbook, Jiang Liping
Other tools will complement these basic textbooks to provide students with a wide range of practical exercises.

Contacts

Contacts *(2000 characters)*

Other information

Other information

Learning Chinese isn't just about tones and characters. It's about connection — to a culture, to people, and to the stories that make language come alive.

Subject name: Entrepreneurship and innovation	**Code EC: EC-HUM07-EI**
Number of hours per student: 48h	**ECTS Number: 3**
Reference Teacher: Fanny GOURRET (STIC), Philippe MENKE (MSN)	

Generalities

Objectives *(2000 characters)*Cliquez ou appuyez ici pour entrer du texte.

The module aims to stimulate the creativity, initiative, and open-mindedness of future engineers through the development of an innovative entrepreneurial project.
This cross-disciplinary module brings together students from various specialties.

Main learning outcomes:

- Demonstrate creativity and initiative,
- Learn to persuade by mastering analytical techniques, logic, and the specific vocabulary of the business world,
- Show critical thinking skills to identify both the key success factors and the potential risks of an innovative project,
- Understand the key players in networks that support business creation and promote technological, economic, or social innovation.

Description *(2000 characters)*

The main topics covered are:

- Creativity techniques;
- The process of an innovative project: defining the need and the innovative offer (state of the art and product positioning), market study and business plan, strategy and operational plan, business model, and economic valuation of projects;
- Legal aspects: issues related to intellectual property (patents, trademarks, designs), company law, and contract law;
- Tax aspects: taxation of innovative companies;
- Financial forecasting: projected income statement and financing plan.

Requirements *(2000 characters)*

CREATIV (S6)

Course requirements and assessments

Teaching Language *(2000 characters)*

french

Teaching methods *(500 characters)*

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A large part of the module is based on the learning-by-doing approach: students gradually develop a product and/or service development plan (intrapreneurship) or a business creation project (entrepreneurship). Prior to this, they take part in creativity sessions focused on trends or societal challenges previously identified by the teaching team.
Throughout the course, students gather the information and guidance needed to build a business plan through lectures and practical sessions. They are also supported by tutors who encourage them to question the relevance and validity of their work. Student teams are encouraged to take part in innovation and entrepreneurship competitions or challenges.
Groups also benefit from tutorial sessions.

Number of hours per course type: *(2000 characters)*

CM: 10
TD: 26
TP:
PR:
CONF:
Autres 12:

Evaluation *(200 characters)*

Cliquez ou appuyez ici pour entrer du texte.
Continuous assessment (collective work)
Progress is evaluated through progress reports in the form of oral presentations.

Bibliography

Bibliography *(2000 characters)*

Provided during the course

Contacts

Contacts *(2000 characters)*

Fanny GOURRET, Philippe MENKE

Other information

Other information

Subject name: PHYSICAL EDUCATION (EPS) SEMESTER 7	**Code EC: EC-HUM07-EPS**
Number of hours per student: 24H	**ECTS Number: 1**
Reference Teacher: Gérard VAILLANT Yvan HINAULT Maïté LOSCHETTER	

Generalities

Objectives *(2000 characters)*

Aims
The program aims to contribute, through the practice of Physical, Sports, and Artistic Activities, to the education and development of future citizens. It seeks to foster individuals who are capable of managing their present and future health, communicating effectively, participating actively in group dynamics, demonstrating innovation, and showing adaptability in various contexts.
Learning Objectives
Upon completion, learners should be able to:

1. Manage their own learning and training processes in a structured and reflective manner.
2. Engage in and take responsibility for the organization and management of a group, a structure, or a collective project.
3. Take charge of their physical, mental, and social health as an ongoing process of well-being and self-regulation.

Description *(2000 characters)*

This course aims to develop students' motor, personal, social, and methodological competencies through the practice of physical, sports, and artistic activities. It fosters autonomy, adaptability, creativity, and responsibility in both individual and collective contexts.
Motor and Cultural Competencies: Master the technical and tactical fundamentals of the chosen activity. Adapt to varying play conditions, environments, and performance spaces. Develop specific physical qualities (endurance, flexibility, strength, speed) and psychological resources (focus, perseverance, stress management, confidence).
Personal Competencies: Take responsibility for one's long-term health and safety. Manage emotions and stress with self-control. Demonstrate innovation and creativity in practice. *Semester 7 focus : Understand one's motor preferences and identify the motivations driving one's practice to ensure long-term engagement throughout life;* Recognize one's strengths and weaknesses in order to use them most effectively.
Interpersonal and Social Competencies: Work effectively in teams—listen, communicate, motivate, and lead. Adopt an eco-citizen approach by respecting others, oneself, the environment, and equipment. *Semester 7 focus:* Adjust verbal and non-verbal communication to suit the group context. Handle conflicts in a way that leads to constructive and mutually beneficial outcomes.
Methodological Competencies: Manage complex projects by setting objectives, planning, and evaluating outcomes. Make informed decisions through observation, reflection, and feedback. *Semester 7 focus:* Commit to a learning project (evaluate one's initial level, identify areas for progression, gather information, and self-assess). Plan practice to achieve realistic goals

Requirements *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.

Course requirements and assessments

Teaching Language *(2000 characters)*

French

Teaching methods *(500 characters)*

Through original and varied situations, this course engages all of the student's resources — motor, cognitive, relational, emotional, and informational.
Through action and experience, students are confronted with complex problem-solving and decision-making processes.
This practice encourages students to take autonomous responsibility for their own health, understood as a state of well-being requiring continuous regulation. It also contributes to preventing risky behaviors, reducing sedentary lifestyles, and promoting social integration.
Enjoyment serves as a key source of motivation, ensuring sustained engagement in both practice and learning

Number of hours per course type: *(2000 characters)*

CM:
TD: 20
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Assessment
Students are evaluated on their participation, progress, and mastery of the competencies developed throughout the cycle.
Grading:

- 10 points for motor and cultural competencies.
- 5 + 5 points for two additional competencies selected by the instructor from personal, interpersonal and social, or methodological competencies.

Bibliography

Bibliography *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.

Contacts

Contacts *(2000 characters)*

Cliquez ou appuyez ici pour entrer du texte.

Other information

Other information

Cliquez ou appuyez ici pour entrer du texte.

Nom de la matière : Spanish	Code EC: EC-HUMF07-ESP
Volume horaire total par étudiant: 21h	Nombre crédits ECTS : 1,5 ECTS
Responsible(s) : Marine Amargos Guilleray	

Généralités

Objectifs, finalités *(2000 caractères)*

1 – Beginner Level:
Establish the grammatical and linguistic foundations of the Spanish language. Introduce students to Spanish and Latin American cultures. Be able to produce simple sentences related to everyday topics.

2 – Intermediate Level:
Maintain and strengthen linguistic skills, and deepen cultural knowledge (Hispanic culture, Spanish and Latin American civilization, social issues).

- Know how to manage a team around a project.
- Be able to integrate into a multicultural environment.

Be capable of taking into account the social, environmental, technological, and economic

3 – Advanced Level:
Consolidation of linguistic skills and deepening of cultural knowledge (Hispanic culture, Spanish and Latin American civilization, social issues).

- Know how to manage a team around a project.
- Be able to integrate into a multicultural environment.
- Be capable of taking into account the social, environmental, technological, and economic challenges of Spanish-speaking countries.

- challenges of Spanish-speaking countries.

Description

Speaking and writing skills, listening and reading comprehension.

Pré-requis *(2000 caractères)*

Spanish A1: None
Spanish A2: Must have A1 level
Intermediate Spanish: Must have B1 level
Advanced Spanish: Must have B2 level

Modalités du cours et des évaluations

Langue d'enseignement *(2000 caractères)*

Spanish

Modalités d'enseignement *(500 caractères)*

Face-to-face tutorials

Volume horaire par type de cours : *(2000 caractères)*

CM :
TD : 21 hours /semester
TP :
PR :
CONF :
Autres :

Modalités d'évaluation / coefficient *(200 caractères)*

Continuous assessment- Coefficient 1,5

Bibliographie

Bibliographie *(2000 caractères)*

"La grammaire active de l'espagnol", le livre de poche. Collection Les langues modernes + "El arte de conjugar en español" -Hatier+ "Passez-moi l'expression en espagnol", Belin + "El español en la prensa", Belin

Contacts

Contacts *(2000 caractères)*

Marine Amargos Guilleray : marine.amargos@insa-rennes.fr

Autres

Autres informations

Cliquez ou appuyez ici pour entrer du texte.

Subject name: French foreign language	**Code EC: EC-HUMF07-FLE**
Number of hours per student: 21 hours (or 2 x 21 hours for the Exchange programme)	**ECTS Number: 1,5**
	3 credits for the Exchange
Reference Teacher: FOURE Dominique	

Generalities

Objectives *(2000 characters)*

The various activities in the FLE and FOS (French for Specific Purposes) programme aim to develop optimal language proficiency and the use of language as a cultural and intercultural vehicle, a tool for work and communication adapted to the context. Students will develop their autonomy through group work and individual work.
Targeted skills/humanities (SHS): ▪ Knowing oneself, managing oneself physically and mentally▪ Working, learning and developing independently▪ Interacting with others, working in a team▪ Demonstrating creativity, innovation and initiative▪ Acting responsibly in a complex world▪ Developing in a professional and social environment▪ Working in an international and intercultural
context

Description *(2000 characters)*

Level A1/A2
1- Language, culture and communication: Help learners feel comfortable in all everyday situations. Language learning is organised around observing how the language works, practising a variety of activities in class and carrying out projects in real or simulated contexts to promote autonomy.

2- Scientific and academic French: Facilitate integration into scientific studies, student life and social life.

Level B1/B2
1- Language, culture and communication: Help learners express themselves fluently in writing and orally on a wide range of general and specialised topics.
Key themes: Studying and living in France/ Understanding and exercising critical thinking in various fields: current affairs/history/art/science and technology, urban planning, the environment, etc.
Social sciences and humanities: socio-ecological transition, business and innovation.

2- Preparation for DELFB2 or DALFC1, compulsory French language diploma required to obtain an engineering degree**.**

Level B2/C1
1- Interculturality - Study of European and international current affairs and in-depth exploration of issues related to SHS
- Communicate and interact
- Decode intercultural references in speech, attitudes and behaviour
- Put one's values, beliefs and behaviour into perspective
- Integrate cultural diversity into group work

2- Professional French
- Prepare effectively for finding an internship or job
- Understand complex issues within the company
- Master societal, political, economic, environmental, ethical and philosophical aspects, etc.
- Act responsibly in the professional world

Requirements *(2000 characters)*

None
Courses range from beginner to advanced levels.
Each student will be placed in a group corresponding to their level and needs
- based on a test at the beginning of the year for new entrants
- based on the level acquired and assessed the previous year for existing students

Course requirements and assessments

Teaching Language *(2000 characters)*

Learners are trained and assessed on the five skills recognised by the Common European Framework of Reference for Languages (CEFR).

Teaching methods *(500 characters)*

Language, communication and intercultural skills are tailored to the target level and the needs of the group (indicated in the group code).

Number of hours per course type: *(2000 characters)*

CM:
TD:
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Continuous assessment in line with the skills to be validated: CE, CO, PE, PO
INSA student programme: 21 hours/semester (1.5 credits)
Exchange programme: Students studying for a semester at INSA Rennes have the opportunity to obtain a total of 4 credits
- 1 Language Project (7 hours/semester) = 1 ECTS
- 2 FLE courses (2X21 hours/semester) e.g. Language, Culture and Communication + Interculturality

Bibliography

Bibliography *(2000 characters)*

Materials selected by the teacher based on the level and objectives to be achieved

Contacts

Contacts *(2000 characters)*

Dominique.foure@insa-rennes.fr

Other information

Other information

https://fle.insa-rennes.fr/

Subject name: ITALIAN LV2-LV3	**Code EC: EC-HUMF07-ITA**
Number of hours per student: 21h	**ECTS Number: 1,5**
Reference Teacher: Cécile HÖLZNER-JACQUES	

Generalities

Objectives *(2000 characters)*

Targeted skills:
Mastering a foreign language
Ability to communicate/develop/work in an international and intercultural context
Cultural openness
Communicating/interacting with others, working in a team
Working independently

Level 1 beginner: Introducing Italian language and culture, expressing ideas in writing and orally.
Level 2 advanced beginner: By the end of the course, students should be able to converse and write in Italian.
Level 3 intermediate: Give students the opportunity to explore topics related to art, civilisation, literature and cinema in greater depth.

Description *(2000 characters)*

Oral expression and comprehension: reading the course material with phonetic and grammatical corrections with the teacher, reading the situations found in the text, watching films and reading literary texts and press articles.
Written expression and comprehension: doing the exercises in the text with particular attention to difficulties, summarising the situations without the text available and the films studied.

Requirements *(2000 characters)*

Beginner level: none.
Advanced beginner level A2: must have attended the beginner Italian course.
Intermediate level B1/advanced level B2: must have a good knowledge of the Italian language.

Course requirements and assessments

Teaching Language *(2000 characters)*

Italian language

Teaching methods *(500 characters)*

The course will cover:.
Grammar concepts;.
Exercises to understand basic linguistic mechanisms;.
Building vocabulary using keywords and translations;.
Presentations and discussions on given topics;.
Asking questions and knowing how to respond;.
Creating dialogues, stories, and discussions based on given keywords;
(All of this will be adapted to the average level of the course.)

1.5 hours of face-to-face lessons per week, 21 hours per semester.
Personal work: 14 hours Read the texts provided in the handouts; 7 hours create a dialogue or short story using the keywords provided and express yourself with them.

Number of hours per course type: *(2000 characters)*

CM:
TD: 21h
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

S1: Final mark
S2: Oral examination

Bibliography

Bibliography *(2000 characters)*

Loesher Archivio di Grammatica, https://italianoperstranieri.loescher.it/archivio-di-grammatica

Harraps, Italian Express Method, Vittoria Bowles and Paul Coggle

Texts taken from Italian novels, poems, essays, daily and weekly newspapers, and films by famous directors

Contacts

Contacts *(2000 characters)*

Paolo Procesi: Paolo.Procesi@insa-rennes.fr

Other information

Other information

Subject name: Japanese	**Code EC: EC-HUMF07-JAP**
Number of hours per student:	**ECTS Number: 1.5**
Reference Teacher: Cécile Hölzner-Jacques	

Generalities

Objectives *(2000 characters)*

Targeted skills:

Mastering a foreign language
Ability to communicate/develop/work in an international and intercultural context
Cultural openness
Communicating/interacting with others, working in a team
Working independently

Beginner level (A1):

-Awareness of specific features (phonetics, syntax)
-Discovering Japanese culture, traditions and customs
-Learning two writing systems (Hiragana and Katakana)
-Mastering spoken Japanese in everyday situations.

Intermediate level (A2):

- Introduction to ideograms (30-60 kanji)
- Reading simple texts (using manga, etc.)
- Writing simple texts
- Mastering spoken Japanese in everyday situations.

Advanced level (B1, B2):

- Learning kanji (60-200)
- Acquiring four skills (reading, listening, writing and speaking) for travelling and studying in Japan.

Description *(2000 characters)*

Description (2000 characters)
Level 1 beginner (A1):
- Improvement of Hiragana and Katakana
- Mastery of Japanese in everyday situations (Marugoto A1).
Lesson 3: Me_ Nice to meet you
Lesson 4: Me_ There are three of us in my family
Lesson 5: Food_ What kind of food do you like?
Lesson 6: Food_ Where shall we eat?
Lesson 7: The house_ It's a three-room flat
Lesson 8: The house_ What a beautiful room you have!

Lesson 9: Everyday life_ What time do you get up?
Lesson 10: Everyday life_ When are you available?
Level 2 Intermediate (A2):
- Continuation of the Marugoto textbook (Lessons 11 to 18)
- Learning new basic grammar points (past tense, potential tense, volitional tense, etc.)
- Improving and discovering new particles (で、に、から/まで, etc.)
- Discovering and learning 30-60 kanji
- Reading and writing simple texts
- Learning to communicate in everyday situations.

Intermediate level (B1, B2):

- Reading manga
- Acquiring four skills (reading and listening comprehension, writing and speaking).

Requirements *(2000 characters)*

Beginner level A1: none.
Beginner level A2: completion of beginner level A1.
Intermediate/advanced level: completion of beginner levels A1/A2.

Course requirements and assessments

Teaching Language *(2000 characters)*

Teaching methods *(500 characters)*

Teaching takes the form of tutorials. Each session consists of an explanation of concepts, which are then illustrated with examples and conversation exercises in which the students participate.

Number of hours per course type: *(2000 characters)*

CM:
TD:21h
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

A1
S1 and S2: Final mark

A2 and B1
S1: Final mark
S2: Oral examination

Bibliography

Bibliography *(2000 characters)*

Level 1 beginner (A1): Margoto A1, Japan Foundation, 2013, Japan.

Level 2 beginner (A2): Margoto A2, Japan Foundation, 2014, Japan.

Contacts

Contacts *(2000 characters)*

Other information

Other information

Nom de la matière : Language Project	Code EC: EC-HUMF07-LV2P
Volume horaire total par étudiant: 7 hours /semestre	Tous semestres
	Nombre crédits ECTS : 0,5
Responsable(s) : C.Hölzner, M.Amargos, D.Fouré	

Généralités

Objectifs, finalités (2000 caractères)

German Project: Mastering a foreign language Ability to communicate/develop/work in an international and intercultural context Cultural openness Communicating/interacting with others, working in a team Working independently Using and improving German language skills within the framework of a project.
Spanish Project: 1- Prepare for the Spanish language certification: the DELE Spanish Project
2- Facilitate oral expression and build students' confidence before studying abroad in a Spanish-speaking country - Acquire fluency and enjoy expressing oneself in Spanish without being constrained by grammar rules.
French as a Foreign Language (FLE) Project: 'International Student Short Film Festival' in conjunction with the Interculturality course. An educational outing (or field study) is proposed to study an issue in social sciences and/or TSE that interests them. The aim is to produce an audiovisual report that may consist of interviews, particularly with experts and professionals, to address the issue on the programme. These meetings will enable them to exchange views and refine their analysis. Finally, students will be asked to present their findings to the public. The reports will be screened at an International Festival on an intercultural theme studied in class.

Description (2000 caractères)

German Project:
- Preparation for the Goethe Institute's 'Zertifikat' exam, level B2 or C1 (external certification)
- Thematic courses: cultural awareness
- Project related to the industrial world: international economics: Germany
- Preparation for mobility
- Preparation: study trip

Spanish Project:
Spanish Project 1
- Written and oral tests
- Written and oral work in preparation for the exam
Spanish Project 2
- Oral expression: debates on current affairs and discussions on the main concerns of students

FLE Project:
- Oral expression, confidence in front of an audience
- Creation of an audiovisual report
- Preparation for oral expression to obtain the DELFB2/DALFC1

Pré-requis *(2000 caractères)*

German Project: German Level B2

Spanish Project: Baccalaureate Level

FLE Project: Levels B1 to C1

Modalités du cours et des évaluations

Langue d'enseignement *(2000 caractères)*

Cliquez ou appuyez ici pour entrer du texte.

Modalités d'enseignement *(500 caractères)*

German Project: 7 hours/semester in class 10 hours of independent and group work Class hours are intended to review students' independent work and project progress. Most of the work is done outside of class, preferably in groups of 2 or 3 students (exception: 'Zertifikat' project with methodological assistance during class).
Spanish Project: Regular training with DELE workbook

Volume horaire par type de cours : *(2000 caractères)*

German Project: 7 hours of tutorials per semester
Spanish Project: 7 hours of tutorials per semester
FLE Project: 7 hours of tutorials per semester

Modalités d'évaluation :

German Project: Semester 1: Final Mark - Semester 2: Final Mark

Spanish Project: Written

FLE Project: Oral/Public presentation as part of an international short film festival

Coefficient: 0.5 (1 for Erasmus exchange students)

Bibliographie

Bibliographie *(2000 caractères)*

German Project: Zertifikat Project: Goethe-Institut exam papers (B2 and C1) in the INSA library
Spanish Project: Books related to the DELE

Contacts

Contacts *(2000 caractères)*

Cliquez ou appuyez ici pour entrer du texte.

Autres

Autres informations

Cliquez ou appuyez ici pour entrer du texte.

Subject name: Intercultural Modul	**Code EC: EC-HUMF07-LV2-OI**
Number of hours per student: 21h par semestre	**ECTS Number: 1.5**
Reference Teacher: Cécile Hölzner-Jacques	

Generalities

Objectives *(2000 characters)*

The course aims to develop students' fluency in both written and spoken communication while fostering philosophical reflection. It not only enhances reading, listening, and expressive skills but also cultivates critical thinking and confident public speaking. Particular emphasis is placed on rigorous reasoning, clear argumentation, and the ability to connect philosophical inquiry with linguistic precision.

Description *(2000 characters)*

Each semester is devoted to a specific philosophical concept. For the first semester of 2025, the theme is *violence*.
The course is divided into two distinct parts. The first part focuses on language development. Each session begins with a warm-up activity designed to encourage oral participation and group interaction. Students engage in creative writing exercises — such as recounting a memory or imagining a story — to stimulate imagination and improve expressive skills. Regular reading of newspaper articles helps strengthen reading comprehension, pronunciation, and vocabulary.
The second part of the course is dedicated to project work, which constitutes the final graded assignment. Through these projects, students synthesize language practice and philosophical reflection, applying both to a concrete and personally meaningful topic.

Requirements *(2000 characters)*

Students should be able to express themselves in English with a reasonable degree of confidence. Mistakes in grammar or pronunciation are not a problem, but a solid foundation in vocabulary and basic grammar is necessary to follow the course. The class usually includes both bilingual students and others with more limited proficiency, so the activities are designed to allow everyone to participate meaningfully and progress at their own pace.

Course requirements and assessments

Teaching Language *(2000 characters)*

The course is conducted primarily in English, although French may occasionally be used for clarification or discussion when necessary.

Teaching methods *(500 characters)*

This is not a traditional lecture-based course but an interactive class built around students 'interests. It is designed as a space for expression and reflection. Written and video materials are regularly used, and students are encouraged to take an active role through role-playing activities and short theatrical performances.

Number of hours per course type: *(2000 characters)*

CM:
TD: 20 h par semestre
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Assessment is based on attendance and participation, but mainly on a creative end-of-term project demonstrating linguistic skills and critical thinking, completed individually or in groups

Bibliography

Bibliography *(2000 characters)*

Books

Camus, Albert. *The Stranger*. Translated by Stuart Gilbert. New York: Vintage Books, 1942.
Dostoevsky, Fyodor. *Crime and Punishment*. Translated by Constance Garnett. New York: Modern Library, 1866.
Flock, Elizabeth. *The Furies: Women, Vengeance, and Justice*. New York: Harper, 2024.
Malm, Andreas. *How to Blow Up a Pipeline: Learning to Fight in a World on Fire*. London: Verso Books, 2021.
Manne, Kate. *Down Girl: The Logic of Misogyny*. Oxford: Oxford University Press, 2017.
Motz, Anna. *If Love Could Kill: The Myths and Truths of the Women Who Commit Violence*. New York: Knopf, 2024.
Thoreau, Henry David. *Civil Disobedience*. Boston: David R. Godine, 1849.
Zinn, Howard. *A People's History of the United States*. New York: Harper & Row, 1980.

Articles and Essays

King, Martin Luther, Jr. "Letter from Birmingham Jail." April 16, 1963.
Schwartz, Alexandra. "When Women Commit Violence." *The New Yorker*, 2024.
Zinn, Howard. "The Problem is Civil Obedience." Speech delivered at Johns Hopkins University, Baltimore, November 1970.

Films and Television

Bong Joon-ho, dir. *Parasite*. Seoul: Barunson E&A, 2019.
Coen, Joel, and Ethan Coen, dirs. *Fargo*. Los Angeles: PolyGram Filmed Entertainment, 1996.
Coen, Joel, and Ethan Coen, dirs. *No Country for Old Men*. Los Angeles: Miramax Films, 2007.
Demme, Jonathan, dir. *The Silence of the Lambs*. Los Angeles: Orion Pictures, 1991.
Fincher, David, dir. *Gone Girl*. Los Angeles: 20th Century Fox, 2014.
Fincher, David, dir. *The Girl with the Dragon Tattoo*. Culver City: Columbia Pictures, 2011.
Fincher, David, dir. *Zodiac*. Los Angeles: Paramount Pictures, 2007.
Gilligan, Vince, creator. *Breaking Bad*. Los Angeles: AMC, 2008–2013.
Kelly, Richard, dir. *Donnie Darko*. Los Angeles: Newmarket Films, 2001.
Lanthimos, Yorgos, dir. *The Killing of a Sacred Deer*. London: A24, 2017.
Lynch, David, and Mark Frost, creators. *Twin Peaks*. Los Angeles: CBS Television Distribution, 1990–1991, 2017.
Martin, Steve, and John Hoffman, creators. *Only Murders in the Building*. Los Angeles: Hulu, 2021–.
Miller, George, dir. *Furiosa: A Mad Max Saga*. Burbank: Warner Bros., 2024.
Miller, George, dir. *Mad Max: Fury Road*. Burbank: Warner Bros., 2015.
Penhall, Joe, creator. *Mindhunter*. Los Gatos: Netflix, 2017–2019.
Pizzolatto, Nic, creator. *True Detective*. Los Angeles: HBO, 2014.
Tarantino, Quentin, dir. *Kill Bill: Vol. 1* and *Kill Bill: Vol. 2*. Los Angeles: Miramax Films, 2003–2004.
Wan, James, dir. *Saw*. Santa Monica: Lions Gate Films, 2004

Contacts

Contacts *(2000 characters)*

Other information

Other information

Subject name: Russian	**Code EC: EC-HUMF07-RUS**
Number of hours per student: 21h	**ECTS Number: 1,5**
Reference Teacher: Cécile HÖLZNER-JACQUES	

Generalities

Objectives *(2000 characters)*

Russian beginner : acquire A1 level
Russian intermediary : acquire A2/B1 level

Description *(2000 characters)*

Acquisition of grammatical basis and commonplace vocabulary.
Training of the 5 skills, oral and written comprehension, oral and written expression, interaction.
The stress is put on written and oral communication, firstly in the frame of daily situations, then with a progressive introduction of other themes and opening on the professional communication.
Training with varied media (written, audio, video)
Individual exercices and works in groups, talks from the intermediate level on.
Grammar program depending on the level.
(Inter) cultural opening

Requirements *(2000 characters)*

Course requirements and assessments

Teaching Language *(2000 characters)*

Teaching methods *(500 characters)*

Number of hours per course type: *(2000 characters)*

CM:
TD: one hour -and-a-half courses per week in SUPELEc
TP:
PR:
CONF:
Autres:

Evaluation *(200 characters)*

Final grade (overseen by SUPELEC).

Bibliography

Bibliography *(2000 characters)*

To be seen with the teacher

Contacts

Contacts *(2000 characters)*

Other information

Other information