SCIENCE, TECHNOLOGY, HEALTH

Computer Science, Data, Applications Engineering Degree

Level of qualification:
Master's degree

ECTS
180 credits

Duration
3 years, 6 semesters

Available tracks

IT, Data, Applications IT, Data, Applications - Work-study program

Presentation

The Computer Science, Data, and Applications program equips students with the skills to manage IT projects and carry out multidisciplinary and cross-functional assignments in a variety of sectors.

Objectives

The objective of this specialization is to train computer engineers with knowledge in software design and development as well as systems, networks, and databases.

In addition to training in computer science and software engineering, the Computer Science, Data, and Applications specialization includes additional training in data science (from mathematics to the humanities and social sciences), enabling Computer Science, Data, and Applications engineers to acquire the skills necessary to evaluate and exploit big data in a responsible and transparent manner, taking security issues into account.

International

100% of students go abroad

- either by completing a semester of training at a foreign university under inter-institutional agreements
- either by doing an internship abroad, in a company or in a laboratory, thanks to the School's network of partners

https://www.polytech.univ-smb.fr/international/ mobilite.html

The advantages of the program

The specificity of the Computer Science - Data - Applications engineer is their ability to leverage data through innovative applications in a wide variety of sectors (health, energy, transportation, construction, commerce, finance, banking, insurance, administration, culture, leisure), in industry or services, in a world undergoing digital transformation.

Organization

Expected enrollment

24 places for students

24 places for apprentices

Study arrangements

The Disability Support Unit and the High-Level Sports (SHN) / High-Level Artist (AHN) program offer study accommodations.

Find out more

Admission

Who is the program for?

- Integrated preparatory class
- CPGE students,
- Undergraduate students (L2, DUT, or equivalent)

http://www.polytech-reseau.org/postuler-a-polytech/cycle-ingenieur/

Apply and register

Apply / Register

And after

Further studies at USMB

- Master's in Business Management and Administration
- Doctorate

Targeted professions and professional integration

- Business intelligence consultant – Big Data;
- Data miner – Data scientist;
- E-business consultant;
- Information manager Information and environmental environmental data;
- Cloud and virtualization engineer;
- Urban planner – Functional architect functional of information system;
- Research and Development Engineer.

Practical information

Contact

Admission Polytech Annecy-Chambéry

admission@polytech-annecy-chambery.fr

Partner laboratories

Laboratory of Computer Science, Systems, Information and Knowledge Processing (LISTIC) https://www.listic.univ-smb.fr/

Campus

Annecy / Annecy-le-Vieux campus

Find out more

Become a Data Usage Computer Engineer

https://www.polytech.univ-smb.fr/formation/ingenieur-informatique-donnees-usages/ingenieur-informatique.html

Program

Computer Science, Data, Applications

IGE3 - Computer Science, Data, Applications

Semester 5

	Nature	Lecture	Tutorial	Practical	Credits
UE501 Gateway to the professional career path	UE				8 credits
English S5 Sports	MODULE		40.5		
Business Management Simulation	MODULE		21		
Skills development support Optional internship S5	MODULE		12		
Support (every Thursday afternoon)	MODULE				
	MODULE	3 hours			
	MODULE				
	MODULE				
UE502 Engineering Sciences and Tools	UE				9 credits
Sustainable Development	MODULE	3 p.m.	12		
Algorithms and Python programming	MODULE	3 hours	6 hours	12	
Databases (basics of business information management) MAraTHon: Support/Refresher course	MODULE	6	4.5	12	
Mathematics Core Curriculum	MODULE				
	MODULE	16.5	37.5		
UE503 Engineering Sciences IDU1	UE				13 credits
Project Management Digital Societies	MODULE	6 hours	6h	28h	
Graphs and Recursion C Programming	MODULE	13.5 hours	22.5h	4h	
Languages and Paradigms	MODULE	12h 6h	12h 6h 9h	16h 12h	
	MODULE	10.5h		16h	

Semester 6

	Type	Lectures	Tutorial	Practical	Credits
UE601 Gateway to a career path	UE				8 credits
Professional experience Financial management	MODULE	10.5 hours	9		
	MODULE				
Introduction to law	MODULE	15 hours	4.5		
Issues in artificial intelligence	MODULE	6 hours	9		
Business-oriented project management techniques	MODULE				
English (TOEIC level not achieved) S6 Modern languages (TOEIC level achieved)	MODULE		40.5		
	MODULE				
English S6	SUBJECT		15		

Modern Language 2	CHOICE				
German TD	SUBJECT		3 p.m.		
Spanish TD Italian	SUBJECT		3 p.m.		
TD Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S6 Optional internship	SUBJECT		3 p.m.		
S6	SUBJECT		9 p.m.		
Support (every Thursday afternoon when FISA staff are present)	MODULE				
	MODULE				
UE602 Mathematics and Algorithms	UE				11 credits
Logic and Programming Algorithmic Project	MODULE	10.5 hours	10.5	20	
Probability and Statistics	MODULE	18	42		
	MODULE		hours		
			18		
			hours		
Object-oriented design and programming	MODULE	9	9 p.m.	8	2.5 credits
UE603 Environment and Applications	UE				11 credits
Database Programming and Website Design Operating Systems and Virtualization	MODULE		13.5		
	MODULE	10.5 hours	13.5	16	
Collaborative platforms APP Data Science	MODULE	13.5 hours	3 p.m.	12	
Project	MODULE		30		

IGE4 - IT, Data, Uses

Semester 7

	Nature	Lecture	Tutorial	Practical	Credits
UE701 Gateway to a career path	UE				6 credits
Resources and professional dynamics Creativity and innovation management English (TOEIC level not achieved) S7 Modern languages (TOEIC level achieved)	MODULE		13.5 hours	3.5	
	MODULE		25.5		
			40.5		
English S7 Modern Language 2	MODULE				
German TD Spanish TD Italian TD Chinese TD Japanese TD Russian TD	MODULE		15		
Advanced English S7 Optional Internship	SUBJECT		15 15		
S7	CHOICE		15 15		
Support (half of Thursday afternoons when FISA staff are present)	SUBJECT		15 15		
			21		
	SUBJECT				
	SUBJECT				
	SUBJECT				
	SUBJECT				
	SUBJECT				
	SUBJECT				
	MODULE				
	MODULE				
UE702 Mathematics and Data	UE				8 credits
Stochastic Modeling	MODULE	12		24	

Security and Cryptography	MODULE	13.5 hours	22.5	4	
Statistical Tests	MODULE	18 hours	18		
UE703 Computer Science and Design	UE				7 credits
Behavior and Dynamic Modeling APP Data Analysis and Visualization	MODULE	7.5 hours	6	24 hours	2.5 credits
Networks and Distributed Systems	MODULE	18	16	20 hours	
	MODULE			4 hours	
UE704 Visualization and Governance	UE				9 credits
Data Analysis and Visualization Full Stack Development	MODULE	12 hours	23.5		
Data Economics and Governance	MODULE	12 hours	24 hours		
	MODULE	15 hours	21 hours	4	

Semester 8

	Nature	Lectures	Tutorial	Practical	Credits
UE801 Gateway to the professional career path	UE				6 credits
Integrated QSE (Quality, Safety, Environment) Management System Management techniques	MODULE	9am 6pm	10.5		
English (TOEIC level not achieved) S8 Modern languages (TOEIC level achieved)	MODULE		7.5		
English S8 Modern	MODULE		40.5		
Language 2	MODULE				
German TD Spanish	MODULE		3 p.m.		
TD Italian TD					
Chinese TD	SUBJECT				
Japanese TD	CHOICE		3 p.m.		
Russian TD			3 p.m.		
Advanced English S8 Optional internship	SUBJECT		3 p.m.		
S8			3 p.m.		
Support (half of Thursday afternoons when FISA students are present)	SUBJECT		3 p.m.		
	SUBJECT		3 p.m.		
			9 p.m.		
	SUBJECT				
	SUBJECT				
	SUBJECT				
	SUBJECT				
	MODULE				
	MODULE				
UE802 Internship	UE				6 credits
Assistant Engineer Internship S8	MODULE				
UE803 Data and Decision Support	EU				9 credits
Big Data	MODULE	7.5 hours		12 hours	
Machine Learning	MODULE	9	9		
				12 hours	
Business Intelligence	MODULE	9 a.m.	9	12 p.m.	
	MODULE		a.m. 8		
APP IT Project Data and Uses Data Flow and Concurrent Access	MODULE		p.m.		
		4	4 p.m.		
UE804 Computer Science and ECO-Design	UE				9 credits
Data and software quality Large-scale distributed systems	MODULE	12 hours	12 hours	4 hours	
Distributed databases Business dimensions	MODULE		13.5 hours	15 hours	
	MODULE	12 hours	6	28 hours	
	MODULE				

6

hours

30

hours

IGE5 - IT, Data, Uses

Semester 9

	Nature	Lecture	Tutorial	Practical	Credits
UE901 Gateway to the professional career path	UE				10 credits
Research and Development Project English (TOEIC level not achieved) S9 Modern Languages (TOEIC level achieved)	MODULE				
English S9 Modern Language 2	MODULE		40.5		
German TD	MODULE				
	SUBJECT		15		
	CHOICE				
	SUBJECT				
Spanish TD Italian	SUBJECT		15 hours		
TD Chinese TD	SUBJECT				
Japanese TD	SUBJECT		15 hours		
Russian TD	SUBJECT				
Advanced English S9	SUBJECT		15 hours		
Optional internship S9	SUBJECT				
	MODULE		15 hours		
			15 hours		
			21 hours		
UE902 Optimization and HPC	UE				10 credits
Optimization and multi-criteria decision support High-performance computing and	MODULE	12 hours	12h 7.5h	16	
cloud computing Project Applications	MODULE	7.5 hours		hours	
	MODULE			24	
				hours	
				40	
				hours	
UE903 Data and Decision Support	UE				10 credits
Machine Learning Innovation and Research	MODULE	12 p.m.	12 p.m.	4 p.m.	
APP Data Science Project	MODULE	6 a.m.	12 p.m.	8 p.m.	
	MODULE			40 p.m.	

Semester 10

	Nature	Lectures	Tutorial	Practical	Credits
UE001 Engineering Internship	UE				30 credits
Engineering Internship S10	MODULE				

IT, Data, Applications - Work-study program

IGE3 - IT, Data, Applications - Work-study program

Semester

	Nature	Lecture	Tutorial	Practical	Credits
UE501 SHES - Languages	UE				8 credits

Support (every Thursday afternoon)	MODULE				
Labor law and corporate structure 1	MODULE	20 hours	12		
Introduction to sustainable development and CSR - Cognitive development	MODULE	4 p.m.	12 hours	4	
English	MODULE		37 hours		
UE502 Work experience	UE				4 credits
Project 1 (Launch and follow-up) Development in	MODULE	1		4	
the workplace	MODULE				
UE503 Specialized Sciences	UE				18 credits
Project Management Digital Societies	MODULE	6 hours	6 hours	28	
Graphs and Recursion	MODULE	13.5	22.5	hours	
Assessment Skills in database information and	MODULE	hours	hours	4	
algorithms	MODULE	12h	12h	hours	
General Discrete Mathematics	MODULE		20h	16	
	MODULE	12h	40h	hours	
			40h		

Semester 6

	Type	Lectures	Tutorial	Practical	Credits
UE601 SHES - Languages	UE				4 credits
Introduction to Sustainable Development and CSR	MODULE	6 hour	4 hour		
Sustainable development - Site approach (Environmental management) Support (every Thursday afternoon when FISA staff are present) English (TOEIC level not achieved)	MODULE	s 4 hour	s 6 hour		
English (TOEIC level achieved)	MODULE	s	s		
	MODULE				
	MODULE		30		
UE602 Work experience	UE				10 credits
Project 1 (Monitoring and reporting) Development in	MODULE			4	
the workplace (4 areas)	MODULE				
UE603 Specialized Sciences	UE				16 credits
Issues in Artificial Intelligence Logic and Programming	MODULE	6 hours			
	MODULE	10.5 hours	10.5	20	
Operating Systems and Virtualization Collaborative Platforms	MODULE	10.5 hours	13.5	16 hours	
Data Acquisition and Statistical Processing Behavior and Dynamic Modeling	MODULE	13.5	15 hours	12 hours	
	MODULE	13.5	13.5 hours	20 hours	
	MODULE	9	9	28 hours	

IGE4 - IT, Data, Applications - Work-study program

Semester 7

	Nature	Lecture	Tutorial	Practical	Credits
UE701 SHES - Languages	UE				8 credits
Support (half of Thursday afternoons when FISA staff are present) Management	MODULE				
	MODULE		32		

Business structure and entrepreneurship 2 Sustainable development - Product approach English (TOEIC level not achieved) English (TOEIC level achieved)	MODULE MODULE MODULE MODULE	12 hours 4 hours	12 hours 2 hours 34 hours 34	8	
UE702 Work experience	UE				10 credits
Project 2 (launch and follow-up) Development in the workplace (progress)	MODULE MODULE	1		8	
UE703 Specialized sciences	UE				12 credits
Stochastic Modeling Data Analysis and Visualization	MODULE MODULE	12 hours 12 hours	23.5	24	
Security and Cryptography Data Economics and Governance	MODULE MODULE	13.5 hours 15	22.5 21	4 hours 4 hours	

Semester 8

	Nature	Lectures	Tutorial	Practical	Credits
UE801 SHES - Languages	UE				5 credits
Support (half of Thursday afternoons when FISA staff are present) Management and technical communication	MODULE MODULE	6	4	12 p.m.	
English (TOEIC level not achieved)	MODULE		40 hours		
English (TOEIC level achieved)	MODULE		40		
UE802 Work experience	UE				7 credits
Project 2 (Monitoring and reporting) Development in the workplace (4 areas)	MODULE MODULE			8	
UE803 Specialized Sciences	UE				18 credits
Big Data Machine Learning	MODULE MODULE	7.5 hours 9	9	12 hours 12 hours	
Business intelligence	MODULE	9 hours	9 hours	12 hours	
Data and software quality Large-scale distributed systems	MODULE	12 hours	12 hours	4 hours	
Distributed databases	MODULE	12 hours	13.5 hours	15 hours	
APP and business openness	MODULE	6 hours 30 hours	6	28 hours	

IGE5 - IT, Data, Applications - Work-study program

Semester 9

	Nature	Lectures	Tutorial	Practical	Credits
UE901 SHES - Languages	UE				7 credits
Legislation, labor law, occupational health, sustainable engineering, decarbonization GEPC, Humanities, management, ergonomics	MODULE MODULE	18 hours 28	8	8	

English (TOEIC level not achieved) MODULE 26

English (TOEIC level achieved)	MODULE		26 hours		
UE902 Work experience	UE				10 credits
Project 3 (Launch and follow-up) Development within the	MODULE	1 hour		8	
company (progress)	MODULE				
UE903 Specialized Sciences	UE				13 credits
Machine Learning	MODULE	12 hours	12 hours	16 hours	
Optimization and Multi-Criteria Decision Support	MODULE	12 hours	12 hours	16 hours	
High-Performance Computing and Cloud Computing	MODULE	7.5 hours	7.5 hours	24 hours	
Innovation, Research, and Technology Watch	MODULE	6	44		

Semester 10

	Type	Lectures	Tutorial	Practical	Credits
UE001 Work experience	UE				22 credits
Project 3 (Monitoring and reporting) Development in the	MODULE			12	
workplace (4 areas)	MODULE				
UE002 Specialized Sciences	UE				8 credits
SHES Opening	MODULE	40			
Deployment and Security of IT Systems	MODULE		33		
Advanced AI	MODULE		33		

Presentation Practical information

Campus

Annecy / Annecy-le-Vieux campus

Program

IGE3 - Computer Science, Data, Applications

Semester

	Nature	Lecture	Tutorial	Practical	Credits
UE501 Gateway to the professional career path	UE				8 credits
English S5 Sports	MODULE		40.5		
Business management simulation	MODULE		21		
Skills development support Optional internship S5	MODULE		12		
Support (every Thursday afternoon)	MODULE				
	MODULE	3 hours			
	MODULE				
	MODULE				
UE502 Engineering Sciences and Tools	UE				9 credits
Sustainable Development	MODULE	15 hours	12 hours	12	
Algorithms and Python Programming	MODULE	3 hours	6 hours		
Databases (basics of business information management) MAraTHon: Support/Refresher course	MODULE	6	4.5	12	
Mathematics Core Curriculum	MODULE				
	MODULE	16.5	37.5		
UE503 Engineering Sciences IDU1	UE				13 credits
Project Management Digital Societies	MODULE	6 hours	6h	28h	
Graphs and Recursion C Programming	MODULE	13.5 hours	22.5h	4h	
Languages and Paradigms	MODULE	12h	12h	16h	
	MODULE	12h 6h	6h 9h	12h	
	MODULE	10.5h		16h	

Semester 6

	Type	Lectures	Tutorial	Practical	Credits
UE601 Gateway to the professional career path	UE				8 credits
Professional experience Financial management	MODULE	10.5 hours	9		
	MODULE				
Introduction to law	MODULE	15 hours	4.5		
Issues in artificial intelligence	MODULE				
Project management techniques, business-oriented	MODULE	6 hours	9		
English (TOEIC level not achieved) S6 Modern Languages (TOEIC level achieved)	MODULE		40.5 hours		
	MODULE				
English S6 Modern	SUBJECT				
Language 2	CHOICE		15 hours		
German TD	SUBJECT				
			15 hours		

Spanish TD	SUBJECT	3:00
Italian TD	SUBJECT	3 p.m.

Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S6 Optional internship	SUBJECT		9 p.m.		
S6	MODULE				
Support (every Thursday afternoon when FISA staff are present)	MODULE				
UE602 Mathematics and Algorithms	UE				11 credits
Logic and Programming Algorithmic Project	MODULE	10.5 hours	10.5	20	
Probability and Statistics	MODULE	18	42 hours		
	MODULE		18 hours		
Object-oriented design and programming	MODULE	9	9 p.m.	8	2.5 credits
UE603 Environment and Applications	UE				11 credits
Database Programming and Website Design Operating Systems and Virtualization	MODULE	10.5 hours	13.5 13.5	16	
	MODULE				
Collaborative platforms APP Data Science	MODULE	13.5 hours	15 hours	12	
Project	MODULE		30 hours		

IGE4 - IT, Data, Uses

Semester 7

	Nature	Lecture	Tutorial	Practical	Credits
UE701 Gateway to a career path	UE				6 credits
Resources and professional dynamics Creativity and innovation	MODULE		13.5 hours	3.5	
management English (TOEIC level not achieved) S7 Modern languages	MODULE		25.5		
(TOEIC level achieved)	MODULE		40.5		
English S7 Modern	MODULE				
Language 2	MODULE		15		
German TD Spanish	SUBJECT				
TD Italian TD	CHOICE		15 15		
Chinese TD	SUBJECT		15 15		
Japanese TD	SUBJECT		15 15		
Russian TD					
Advanced English S7 Optional internship					
S7			21		
Support (half of Thursday afternoons when FISA staff are present)					
UE702 Mathematics and Data	UE				8 credits
Stochastic Modeling Security and	MODULE	12		24	
Cryptography	MODULE	hours	22.5		
		13.5			
		hours			
Statistical Tests	MODULE	18	18		
UE703 Computer Science and Design	UE				7 credits
Behavior and Dynamic Modeling	MODULE	7.5 hours	6	24	2.5 credits

APP Data analysis and visualization	MODULE			8 p.m.	
Networks and Distributed Systems	MODULE	18 hours	4 p.m.	4 p.m.	
UE704 Visualization and Governance	UE				9 credits
Data Analysis and Visualization Full Stack Development	MODULE	12 hours	23.5		
Data Economics and Governance	MODULE	12 hours	24 hours		
	MODULE	15 hours	21 hours	4	

Semester 8

	Nature	Lectures	Tutorial	Practical	Credits
UE801 Gateway to the professional career path	UE				6 credits
Integrated QSE (Quality, Safety, Environment) Management System Management Techniques	MODULE	9am	10.5		
English (TOEIC level not achieved) S8 Modern Languages (TOEIC level achieved)	MODULE	6pm	7.5		
English S8 Modern Language 2	MODULE		40.5		
German TD Spanish	MODULE		3 p.m.		
TD Italian TD					
Chinese TD	SUBJECT CHOICE				
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S8 Optional internship	SUBJECT		3 p.m.		
S8	SUBJECT		3 p.m.		
Support (half of Thursday afternoons when FISA students are present)	SUBJECT		3 p.m.		
	SUBJECT		3 p.m.		
	SUBJECT		9 p.m.		
	SUBJECT				
	SUBJECT				
	SUBJECT				
	MODULE				
	MODULE				
UE802 Internship	UE				6 credits
Assistant Engineer Internship S8	MODULE				
UE803 Data and Decision Support	EU				9 credits
Big Data	MODULE	7.5 hours		12	
Machine Learning	MODULE	9	9	p.m.	
				12	
				p.m.	
Business intelligence	MODULE	9 a.m.	9	12 p.m.	
APP IT Project Data and Uses Data Flow and Concurrent Access	MODULE		a.m. 8		
	MODULE	4	p.m.		
			4 p.m.		
UE804 Computer Science and ECO-Design	UE				9 credits
Data and software quality Large-scale distributed systems	MODULE	12	12h	4	
Distributed databases Business dimensions	MODULE	hours	13.5h	hours	
	MODULE	12	6	15	
	MODULE	hours		hours	
		6		28	
		hours		hours	
		30			
		hours			

IGE5 - IT, Data, Uses

Semester 9

	Nature	Lecture	Tutorial	Practical	Credits
UE901 Gateway to the professional career path	UE				10 credits
Research and Development Project English (TOEIC level not achieved) S9 Modern Languages (TOEIC level achieved)	MODULE				
English S9 Modern Language 2	MODULE		40.5		
German TD	MODULE				
	SUBJECT		15		
	CHOICE				
	SUBJECT				
Spanish TD Italian	SUBJECT		15		
TD Chinese TD	SUBJECT		hours		
Japanese TD	SUBJECT		15		
Russian TD	SUBJECT		hours		
Advanced English S9	SUBJECT		15		
Optional internship S9	SUBJECT		hours		
	MODULE		15		
			hours		
			15		
			hours		
			21		
			hours		
UE902 Optimization and HPC	UE				10 credits
Optimization and multi-criteria decision support High-performance computing and	MODULE	12 hours	12 hours	16	
cloud computing Usage project	MODULE	7.5 hours	7.5 hours	hours	
	MODULE			24	
				hours	
				40	
				hours	
UE903 Data and Decision Support	UE				10 credits
Machine Learning Innovation and Research	MODULE	12	12	16	
APP Data Science Project	MODULE	hours		hours	
	MODULE	6		20	
		hours		hours	
				40	
				hours	

Semester 10

	Nature	Lectures	Tutorial	Practical	Credits
UE001 Engineering Internship	UE				30 credits
Engineering Internship S10	MODULE				

Computer Science, Data, Applications - Work-study program

Computer Science, Data, Applications Engineering Degree

Presentation Practical information

Campus

Annecy / Annecy-le-Vieux campus

Program

IGE3 - Computer Science, Data, Applications - Work-study program

Semester

	Type	Lecture	Tutorial	Practical	Credits
UE501 SHES - Languages	UE				8 credits
Support (every Thursday afternoon) Labor law and corporate structure 1	MODULE				
	MODULE	20 hours	12		
Introduction to sustainable development and CSR - Cognitive development	MODULE	4 p.m.	12 hours	4	
English	MODULE		37 hours		
UE502 Work experience	EU				4 credits
Project 1 (Launch and follow-up) Evolution in	MODULE	1		4	
business	MODULE				
UE503 Specialized Sciences	UE				18 credits
Project Management Digital Societies	MODULE	6 hours	6 hours	28	
Graphs and Recursion	MODULE	13.5	22.5	hours	
Assessment Skills in database information and	MODULE	hours	hours	4	
algorithms	MODULE	12h	12h	hours	
General Discrete Mathematics	MODULE		20h	16	
	MODULE	12h	40h	hours	
			40h		

Semester 6

	Type	Lectures	Tutorial	Practical	Credits
UE601 SHES - Languages	UE				4 credits
Introduction to sustainable development and CSR	MODULE	6 hours	4 hours		
Sustainable Development - Site Approach (Environmental Management) Support (every Thursday afternoon when FISA staff are present) English (TOEIC level not achieved)	MODULE	4 hours	6 hours		
English (TOEIC level achieved)	MODULE				
	MODULE				
	MODULE		30		
UE602 Work experience	UE				10 credits
Project 1 (Monitoring and reporting) Development in	MODULE			4	
the workplace (4 areas)	MODULE				
UE603 Specialized Sciences	EU				16 credits
Issues in Artificial Intelligence Logic and Programming	MODULE	6 hours			
	MODULE	10.5 hours	10.5	20	
Operating Systems and Virtualization Collaborative Platforms	MODULE	10.5 hours	13.5	16	
Data Acquisition and Statistical Processing	MODULE	13.5	15 hours	hours	
Behavior and Dynamic Modeling	MODULE	13.5	13.5 hours	12	
	MODULE	9	9	hours	
				20 hours	
				28	

IGE4 - IT, Data, Applications - Work-study program

Semester 7

	Nature	Lectures	Tutorial	Practical	Credits
UE701 SHES - Languages	UE				8 credits
Support (half of Thursday afternoons when FISA staff are present) Management	MODULE				
	MODULE		32		
Business structure and entrepreneurship 2 Sustainable development - Product	MODULE	12	12		
approach English (TOEIC level not achieved)	MODULE	hours	hours	8	
English (TOEIC level achieved)	MODULE	4	2		
	MODULE	hours	hours		
			34		
			hours		
			34		
UE702 Work experience	UE				10 credits
Project 2 (launch and follow-up) Development in the	MODULE	1		8	
workplace (progress)	MODULE				
UE703 Specialized sciences	UE				12 credits
Stochastic modeling	MODULE	12		24	
Data analysis and visualization	MODULE	hours	23.5		
		12			
		hours			
Security and Cryptography	MODULE	13.5 hours	22.5	4	
Data Economics and Governance	MODULE	15	21	hours 4 hours	

Semester 8

	Nature	Lectures	Tutorial	Practical	Credits
UE801 SHES - Languages	UE				5 credits
Support (half of Thursday afternoons when FISA staff are present) Management and technical communication	MODULE				
	MODULE	6	4	12	
English (TOEIC level not achieved)	MODULE		40 hours		
English (TOEIC level achieved)	MODULE		40		
UE802 Work experience	UE				7 credits
Project 2 (Monitoring and reporting) Development in	MODULE			8	
the workplace (4 areas)	MODULE				
UE803 Specialized Sciences	UE				18 credits
Big Data	MODULE	7.5 hours		12	
Machine Learning	MODULE	9	9	hours	
				12	
				hours	
Business intelligence	MODULE	9am	9 hours	12	
Data and software quality Large-scale distributed systems	MODULE	12pm	12 hours	hours	
Distributed databases	MODULE	12pm	13.5	4	
APP and business openness	MODULE	6pm	hours	hours	
	MODULE	30 hours	6	15 hours 28 hours	

IGE5 - IT, Data, Applications - Work-study program

Semester 9

	Nature	Lecture	Tutorial	Practical	Credits
UE901 SHES - Languages	UE				7 credits
Legislation, labor law, occupational health, sustainable engineering, decarbonization GEPC, Humanities, management, ergonomics	MODULE	18 hours	8	8	
	MODULE	28			
English (TOEIC level not achieved)	MODULE		26 hours		
English (TOEIC level achieved)	MODULE		26		
UE902 Work experience	UE				10 credits
Project 3 (Launch and follow-up) Development in the	MODULE	1		8	
workplace (progress)	MODULE				
UE903 Specialized Sciences	UE				13 credits
Machine Learning	MODULE	12 hours	12 hours	16 hours	
Optimization and Multi-Criteria Decision Support High-Performance Computing and	MODULE				
Cloud Computing Innovation, Research, and Technology Watch	MODULE	12 hours	12 hours	16 hours	
	MODULE	7.5 hours	7.5 hours	24 hours	
		6	44		

Semester 10

	Type	Lectures	Tutorial	Practical	Credits
UE001 Work experience	UE				22 credits
Project 3 (Monitoring and reporting) Development within the	MODULE			12 hours	
company (4 areas)	MODULE				
UE002 Specialized Sciences	UE				8 credits
SHES Opening	MODULE	40			
Deployment and Security of IT Systems	MODULE		33		
Advanced AI	MODULE		33		

UE501 Bridge to the professional pathway

ECTS
8 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
English S5 Sports	MODULE		40.5 hours		
Business management simulation	MODULE		21 hours		
Skills development support	MODULE		1.5 hours		
	MODULE	3 hours	12		

	Nature	CM	Tutorial	Practical	Credits
Optional internship S5	MODULE				
Support (every Thursday afternoon)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

English S5 (LANG501_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English

Teaching methods: Hybrid **Teaching format:** Tutorials **Open to exchange students:** Yes **ERASMUS reference:** Languages

Presentation

Description

This course prepares students for the TOEIC ("Test of English for International Communication") exam, specifically to obtain a minimum score of 785 points (out of 990).

With the aim of developing all four skills, this course also serves as an introduction to public speaking through presentations given by students in groups or individually on topics illustrated by press articles or video materials (VTD: Video, Talk and Debate, as well as written work). Depending on the location (Annecy or Chambéry), some will be seen at different times during the semester, the year, or even the three years of training.

Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam, depending on the semester, and counts for 20% of the total continuous assessment.

Objectives

Specific objectives: at the end of this course, students will be able to:

revise grammar on: the correct reflexes of common structures; the verb group and tenses (except the conditional tense); the noun group and all its constituent elements; logical links (connecting words)

improve their grammatical and lexical knowledge (general English and TOEIC-specific vocabulary) in class and independently, validating their progress through regular assessment tests.

Teaching hours

Tutorials	Tutorials	40.5

Mandatory prerequisites

CEFR level B1

Course outline

1. **Oral**
   1. Elements of phonology
   2. Grammar (tenses, questions, adjectives.....)
   3. Reinforcement of structures and vocabulary
   4. Interactive oral communication
   5. Introduction to and practice for the TOEIC (listening section)
2. **Writing**
   1. Review of grammatical elements (tenses, questions, adjectives. .....)
   2. Translation (theme/version)
   3. Reading comprehension in authentic language
   4. Curriculum vitae (in S5, S6, or S7 at the latest)
   5. Cover letter/letter of motivation (in S5, S6, or S7 at the latest)
   6. Introduction and training for the TOEIC (reading section)

Bibliography

- Documents distributed by lecturers
- Various websites, a list of which is provided at the beginning of the year
- Global Exam

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Sport (SHES501_PACY)

Polytech Annecy-Chambéry
component

In brief

Course start date: Sept. 8, 2025 **Languages of instruction:** French
Teaching methods: In person **Teaching format:** Tutorials **Open to exchange students:** Yes
ERASMUS reference: Services to individuals

Presentation

Description

This course focuses on physical and sports activities and is structured around two main areas.

On the other hand, the aim is to enable engineering students to acquire collective skills in project implementation and group management, but also to develop their individual abilities to adapt and regulate themselves. This focus will be reflected in the collective organization and implementation of a sporting event over the course of one session.

It also aims to enable students to acquire skills related to sporting activities and to highlight their interpersonal skills, which are essential for their integration and professional success. This focus will be based on the work carried out around the values conveyed by the various sporting activities and their diverse modes of practice.

Objectives

Objective 1: Work as a team to prepare, organize, and manage a sporting event within a constrained framework.

Objective 2: Engage in a new physical activity in an intense, lucid, reasoned, and critical manner

Teaching hours

Tutorials	Tutorials	21

Mandatory prerequisites

No mandatory prerequisites

Course outline

7 three-hour practical sessions.

Additional information

Classes are held at the Dassault gymnasium, avenue des îles in Metz-Tessy. Bus transportation (round trip) is provided from the Annecy campus.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Jean-Baptiste Evrot
+33 4 50 09 24 35
Jean-Baptiste.Evrot@univ-savoie.fr

Course coordinator Vincent Daniere
+33 4 50 09 24 35
Vincent.Daniere@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Business Management Simulation (SHES505_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** Hybrid
Teaching format: Tutorials **Open to exchange students:** Yes

Presentation

Description

Business games, also known as serious games or business management simulations, are educational tools that offer a different way of learning. They are simulations that aim to demonstrate the complexity of businesses while relying on a simplified model. In a business game, time is accelerated and participants play out several years in the life of a company over a condensed period (two days in this case). This business simulation is carried out using a computer program. The program incorporates an algorithm to calculate the performance of each competing team (each team representing a company in the market) at the end of each decision.

Objectives

1. Analyze the general context to communicate more effectively.
2. Learn about the main communication tools, media/non-media,
3. Understand the process of developing a communication strategy,
4. Provide comprehensive, practical, and effective training in business management,
5. Raise awareness of the interdependence of business functions through decision-making and results analysis.

Teaching hours

Tutorials	Tutorials	1.5
Distance	Distance learning	18

Mandatory prerequisites

None

Course outline

Focused on a cross-functional approach to business management issues, this game combines various constraints specific to different business functions (marketing, production, finance, and financial resources) and allows students to learn the basics of both oral and written communication. Through simulation, students will address person-to-person, face-to-face communication. External communication mainly involves communication for the purposes of corporate marketing: strategy development, overview of tools, etc.

Targeted skills

- Be able to design the basics of a business strategy.
- Know how to support the development and implementation of a communication plan,
- Be able to work in a team,
- Know how to communicate and make decisions as part of a team

Bibliography

- Sophie Delerm, Jean-Pierre Helfer, and Jacques Orsoni. Les bases du marketing (The Basics of Marketing), Vuibert, 2006 (Part 2, Chapters 1 and 2, and Part 3, Chapter 2).
- Jacques Lendrevie, Julien Levy, "Mercator, Theory and New Practices in Marketing (9th Edition)," Dunod, Paris, 2009 (Chapter 15)
- Jean Barreau, Jacqueline Delahaye, "Financial Management DECF Test 4," Dunod, 2006 (Chapters 7 and 8)
- Christian Goujet, Christian Raulet & Christiane Raulet, "Management Accounting," Dunod, Paris, 2007. (Chapters 1, 17, and 18)
- Maurice Pillet, Chantal Martin-Bonnefous, Pascal Bonnefous, Alain Courtois, "Production Management: Fundamentals and Best Practices," Eyrolles, 2011. (Read: Chapters 4, 6, and 8)

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Elodie Gardet
+33 4 50 09 24 51
Elodie.Gardet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Skills development support (ADCO501_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

As the school is committed to a skills-based approach, this course aims to introduce students to this approach, familiarize them with the skills framework for their training, and present them with the various documents and tools they will need to use throughout their training.

Teaching hours

CM	Lecture	3
Tutorial	Tutorials	12

Course outline

Content elements for all specializations

- Understanding the APC approach and its relevance to engineering education (link to professions, RNCP)
- Understanding the main concepts and learning the terminology used by the school
- Find resources related to APC (reference documents, RNCP files, cross-referenced matrices, AMS mapping, portfolio, etc.)

- Reading a training reference document (templates and examples)
- Understanding what a portfolio is
- Write a skills assessment (KAPC+ example)

Specific content elements for each specialty

- Get to grips with the reference framework for your specialty
- Link the reference guide to job characteristics
- Assessing your position in your training program
- Identify the contribution of resources to the skills in the reference framework (cross-referenced matrices)
- Identify the situational activities (AMS) in your training and the skills they involve
- Use the portfolio to self-assess the skills in your training program

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Ilham Alloui

+33 4 50 09 65 87

Ilham.Alloui@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Optional internship S5 (PROJ500_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The optional internship aims to enrich students' academic and professional experience by offering them a practical opportunity to apply their knowledge and acquire new skills. An optional internship can be carried out **in France or abroad**. It must comply with the same general conditions as compulsory internships.

Objectives

- **Acquisition of** specific skills related to the specialization;
- **Refining career goals and/or** gaining confidence and independence through the completion of a project or specific tasks;
- Establish valuable professional contacts that can help in future job searches.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Head of the Polytech Business Relations course

Relations-Entreprises.Polytech@univ-savoie.fr

Support (every Thursday afternoon) (ACCO501_PACY)

Polytech Annecy-Chambéry component

In brief

Teaching methods: In person **Teaching format:** Tutored project **Open to exchange students:** Yes

Presentation

Description

This support is open to all students at the school: students, apprentices, and Continuing Education employees. It is not mandatory, as it is primarily intended for students who need it to succeed in their training. This semester, it is scheduled into the timetable for each course, with a total of 64 hours.

Support may take the form of refresher courses, upgrading courses, or support in the main areas of the training programs.

Peer tutoring is encouraged and the educational resources of the Polytech Network are used (https://eplanet.polytech-reseau.org/).

Objectives

To promote the success of all students in their educational journey.

Teaching hours

PTUT	Tutored project	64

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Director of Training, Polytech

Locations

Annecy-le-Vieux (74)

UE502 Engineering Sciences and Tools

ECTS
9 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Sustainable Development	MODULE	3 p.m.	12 hours		
Algorithms and Python Programming	MODULE	3 hours	6 hours	12 hours	
Databases (business management information database) MAraTHon: Support/Refresher courses	MODULE	6	4.5	12	
Mathematics Core Curriculum	MODULE				
	MODULE				
		16.5	37.5		

Practical information

Locations

Annecy-le-Vieux (74)

Sustainable Development (DDRS501_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Engineering and related techniques

Overview

Description

This course trains engineering students in the issues surrounding sustainable development and its integration into businesses. The aim is to enable them to consider and integrate the challenges of ecological and energy transition into their professional work.

Objectives

Students will learn to define the various challenges of ecological and societal transition, as well as energy issues. They will be introduced to the tools available to engineers to limit the ecological impact of a product or service.

Teaching hours

Lectures	Lecture	15
Tutorial	Tutorials	12

Course outline

1. Introduction to sustainable development (3 hours of lectures)

1. 1. Planetary boundaries
    2. Concept of sustainable development and ecological and societal transition
2. Carbon footprint (3 hours of lectures)
    1. The concept of climate
    2. Climate change - Greenhouse gases
    3. Carbon footprint method (6 hours of tutorials)
3. Energy (3 hours of lectures)
    1. Concepts of power and energy
    2. Global energy situation
    3. Practical exercises and case studies (3 hours of tutorials)
4. The ecological transition in business (1.5 hours lecture)
5. Product life cycle analysis, eco-design (3 hours lecture, 3 hours tutorial)

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator David Gibus
+33 4 50 09 65 77
David.Gibus@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Algorithms and Python Programming (INFO501_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This is an introductory course on the use of programming to solve problems related to engineering. It will introduce concepts of algorithms and data representation in a computer. In practice, students will also learn to program in Python for the MM track and C for the IDU/SNI tracks.

Objectives

This course aims to provide students with basic knowledge of how information is represented in computers, while also introducing them to traditional data structures. The module also aims to teach students the basics of algorithms and programming. The goal is to enable students to use IT tools to solve problems encountered in engineering.

Teaching hours

Lectures	Lecture	3
Tutorial	Tutorials	6
Lab	Practical work	12

Mandatory prerequisites

None

Course outline

The course is divided into:

- Lectures (CMs), where concepts related to algorithms and data structures will be introduced
- Tutorials (TDs), where concrete examples will be put into practice in a programming language
- Practical work (PW) where we will explore concepts and skills in depth to solve concrete problems. The program is as follows:

1. Machine architecture and basic data representations
2. Algorithmic concepts and introduction to C programming
    1. Language basics
    2. Control structures
    3. Loops
    4. Functions and procedures
    5. Compilation
3. Data structures and implementation in C language
    1. Structs
    2. Linked lists
    3. Graphs and trees
4. Complex algorithms
    1. Sorting and selection
    2. Graph traversal
    3. Hashing
5. Concept of algorithmic complexity
6. Use of a high-level language: the case of Python

In MM courses:

1. Machine architecture, data representation
2. Introduction to Python programming
    1. The basics of the language
    2. Basics of the language
    3. Control structures

4. Loops
5. Functions and procedures
6. Classic data structures

3. Algorithmic concepts and implementation in Python
   1. Calculation of mathematical functions
   2. Sorting and selection
4. Object-oriented programming
5. Problem solving using libraries

Targeted skills

At the end of this module, students should be able to:

- model a concrete problem using an appropriate data structure
- solve the problem by implementing an algorithmic approach
- program the solution on a computer

Bibliography

- Learning to Program with Python 3, Gérard Swinnen
- C Programming Language Kernighan Brian, Ritchie Dennis

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course Director Ammar Mian
+33 4 79 75 85 85
Ammar.Mian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Databases (business management information database) (INFO502_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course aims to provide students with the basic skills needed to model, implement, and manipulate a relational database. The course focuses on general and business-related problems.

Objectives

1. Designing a simple relational database (< 10 entities, linked only by 1-n or n-m relationships)
2. Implementation of a simple DB in a relational DBMS
3. Use of a relational DB through simple queries

Teaching hours

Lectures	Lecture	6
Tutorial	Tutorials	4.5
Lab	Practical work	12

Mandatory prerequisites

None

Course outline

1. Introduction to Databases (30 min CM 1)
2. Entity/Association (EA) modeling in UML standard (1 hour CM 1)
3. Relational modeling & transition from EA to relational modeling (1.5 hours, lecture 2)
    1. Tutorial 1: EA and relational models
4. Relational Algebra (1.5 hours, Lecture 2)
    1. Tutorial 2: Relational algebra
    2. Tutorial 3: Extended relational algebra
    3. Lab 1: Manipulating a database in SQL
    4. Lab 2: Modifying a database in SQL
    5. Lab 3: Database lab exam in SQL

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier

+33 4 50 09 65 90

Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

MAraTHon: Support/Refresher Course (MATH500_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Mathematics and statistics

Presentation

Description

This course aims to strengthen students' foundations in mathematics.

Teaching hours

PTUT	Tutored project	15

Course outline

1. Plane geometry and geometry in space
2. Complex numbers, polynomials, rational fractions: decomposition into simple elements on R
3. Linear systems, matrices, determinants
4. Differential calculus of functions of a real variable, applications: Taylor's formula, limited developments, equivalents
5. Basic integral calculus (including change of variable), definition and examples of generalized integrals
6. Basic differential equations: first-order linear cases, variation of the constant, second-order linear equations with constant coefficients.

Bibliography

- J-P. Truc, Précis de Mathématiques, Nathan, 1997
- G Chauvat, A. Chollet, Y.Bouteiller, Mathématiques, Ediscience, 2005
- S Ferrigno, D Marx, A Muller-Gueudin, Mathématiques pour les sciences de l'ingénieur, Dunod, 2013

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Catherine Adloff

+33 4 50 09 66 43

Catherine.Adloff@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Mathematics Core Curriculum (MATH501_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

ERASMUS reference: Mathematics and statistics

Presentation

Description

This course aims to provide the fundamentals of analysis necessary for engineering sciences.

Teaching hours

Lectures		Lecture	16.5
Tutorial		Tutorials	37.5

Mandatory prerequisites

MATH500: Mathematics refresher course or otherwise solid foundation in mathematics equivalent to two years of post-secondary education

Course outline

1. Differential calculus: functions of several variables, differentiation, examples of partial differential equations
2. Vector analysis (Part 1): differential operators, scalar potentials, vector potentials,
3. Curves and surfaces, point motions

4. Multiple integrals

5. Vector analysis (Part 2): line integrals, surface integrals

Bibliography

Books:

- J-P. Truc, Précis de Mathématiques, Nathan, 1997 (for MATH500)
- J. Stewart, Analysis, Concepts and Contexts, vol. 2, De Boeck, 2001
- B. Dacorogna, Advanced Analysis for Engineers, Presses polytechniques et universitaires romandes, 2002
- E. Azoulay, J. Avignant, G. Auliac. Mathematics in the Bachelor's Degree (2nd year, volume 1), Ediscience, 2003
- F. Cottet-Emard, Analysis 2, De Boeck, 2006
- P. Pilibossian, J-P. Lecoutre, Analysis, 1998
- P. Pilibossian, J-P. Lecoutre, Algebra, 1998
- P. Thuillier, J.C. Belloc, Mathematics (2 volumes), 2004 Websites:
- https://fr.wikiversity.org/wiki/Facult%C3%A9:Math%C3%A9matiques
- https://uel.unisciel.fr/uel/co/Uel.html

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Catherine Adloff

+33 4 50 09 66 43

Catherine.Adloff@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE503 Engineering Sciences IDU1

ECTS
13 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Project management	MODULE	6	6	28	
Digital companies	MODULE	13.5 hours	22.5 hours	4	
Graphs and Recursion	MODULE	12h	12	16	
C Programming	MODULE	6 hours	6 hours	12	
Languages and Paradigms	MODULE	10.5 hours	9	4 p.m.	

Practical information

Location

Annecy-le-Vieux (74)

Project Management (PROJ531_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Presentation

Description

This module is an introduction to project management in general and IT project management in particular. Students will become familiar with the various factors to be taken into account, the different stages (scoping, planning, monitoring, software life cycle), and the practices and tools used to develop small software systems.

Objectives

The objective of the course is to enable students to implement a small-scale IT project management method using various tools: planning, collaboration, version management, etc.

Students will be required to use these methods and tools in various projects throughout their training.

Teaching hours

Lectures	Lectures	6
TD	Tutorials	6
Lab	Practical work	28

Mandatory prerequisites

INFO501_PACY INFO502_PACY

Course outline

Lecture 1: What is software and how is it developed?

- What is software?
- Software life cycle
- The software development crisis
- Waterfall approach
- Limitations of the waterfall approach

Lesson 2: Other approaches to development

- Spiral
- Iterative
- Agile

Lesson 3: Project planning

- PERT/GANTT
- SWOT
- Risk Management

Lesson 4: Software Development Tools

- Open Source Approach
- Collaborative tools (communication, version management, etc.)
- Continuous Integration
- Error and Requirements Management

All tutorials will focus on the concepts covered in lectures, namely defining the project in terms of duration and resources, planning, and SWOT analysis.

The first two practical sessions will focus on implementing the various methods and tools. The other practical sessions will be dedicated to a team IT development project. Students will be required to manage the project (using PERT and GANTT), define the necessary resources, and then carry out the development work, taking into account any errors and the client's requirements.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Ilham Alloui
+33 4 50 09 65 87
Ilham.Alloui@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Digital societies (ISOC531_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Engineering and related techniques

Overview

Description

This course aims to enable engineering students to think about and study digital transformation in a sociological context. We will approach "digital" both as a subject of study and as an instrument of sociological change. First, we will provide an introduction to sociology. Next, we will analyze the anthropological and sociological foundations of digital technology. Next, we will analyze how digital technology has transformed ways of being and social practices (interacting, mobilizing, informing oneself, working, engaging in cultural practices, etc.).

The course will continue with case studies of technical and social issues.

Objectives

The aim of the course is to raise awareness among future engineers of the social dimensions of the digital revolution. This course will also lay the foundations for digital ethics, which is a fundamental skill to be acquired by the end of the program.

Teaching hours

Lectures	Lecture	13.5
Tutorial	Tutorials	22.5
Lab	Practical work	4

Mandatory prerequisites

None

Course outline

- Introduction to sociology

- Conceptual foundations of digital technology

- History of the evolution of information technology

- Connected societies

- Introduction to social networks

- Digital technology and politics

- Identity issues

- Case studies

Targeted skills

Extracting the social dimensions of a digital product

- Repositioning digital technology in the context of human evolution

- Develop digital products that take social dimensions into account

- Extract the ethical and human dimensions of IT projects

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Graphs and Recursion (INFO532_IDU)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In-person

Open to exchange students: Yes

ERASMUS reference: Mathematics and statistics

Presentation

Description

This course aims to provide students with knowledge of graph theory and its applications so that they can use this computational tool to model and manipulate data representation problems. Drawing on graph theory, this course also aims to provide students with knowledge of language theory so that they can design a language for a target application.

Objectives

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

- choose a generic, N-ary tree structure suited to a given problem,
- design and implement iterative and recursive algorithms dedicated to N-ary trees,
- design and implement iterative and recursive algorithms dedicated to generic trees,
- choose a graph structure suited to a given problem,
- implement classic algorithms dedicated to graph traversal,
- design and implement a rational language,
- design and implement a language based on a lexicon and grammar.

Teaching hours

Lectures	Lecture	12
Tutorial	Tutorials	12
Lab	Practical Work	4 p.m.

Mandatory prerequisites

INFO501 (Basics of Python Programming)

Course outline

1. Trees and tree structures
    1. Data structures (sequential and recursive)
    2. Tree primitives
    3. Tree traversal algorithms (depth/width, prefix/infix/postfix, etc.)
    4. Binary trees (search trees, red/black trees, etc.)
2. Graphs
    1. Data structures (matrix and set-based)
    2. Primitives on graphs
    3. Graph traversal algorithms (shortest path, spanning tree, flows, etc.)
            3. Language theory
        1. Rational languages
    2. Finite state machines
    3. Lexicon and grammar

Lab 1 Data sorting: Binary search tree (BST)

TP2 Task scheduling: Directed acyclic graphs (DAG) TP3 Traveling salesman
TP4 Speaking Idul (IDU language): Language design

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

C Programming (INFO503_PACY)

Polytech Annecy-Chambéry
component

Overview

Description

This C programming course, designed as a follow-up to the Python course, aims to deepen understanding of low-level machine mechanisms (binary representation and memory management), master the syntax and semantics of the C language, manage dynamic allocation, implement fundamental data structures (linked lists), and develop efficient sorting and search algorithms. It consists of 6 hours of lectures, 6 hours of tutorials, and 12 hours of practical work.

Objectives

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

- **Understand** the binary representation of data and its organization in memory.
- **Master** the basic syntax of the C language: types, operators, control structures, and input/output management.
- **Use** pointers to manipulate addresses and perform pointer arithmetic.
- **Implement** dynamic memory allocation with malloc, calloc, realloc, and free, and detect memory leaks.
- **Implement** and manipulate fundamental data structures, in particular simple linked lists.
- **Design**, code, and analyze the complexity of sorting algorithms (e.g., bubble sort, insertion sort, quick sort) and search algorithms (linear and binary).

Teaching hours

Lectures	Lecture	6
Tutorial	Tutorials	6
Lab	Practical work	12

Mandatory prerequisites

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course leader Ammar Mian
+33 4 79 75 85 85
Ammar.Mian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Languages and Paradigms (INFO531_IDU)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

This course offers an introduction to language theory and explores the main paradigms that structure programming languages. Students will discover the fundamentals of syntax, semantics, and program execution mechanisms, while comparing imperative, functional, object-oriented, logical, and concurrent paradigms. The objective is to provide the keys to understanding necessary to analyze, compare, and choose the languages best suited to different development contexts. Practical applications will illustrate the concepts through concrete examples and programming exercises.

Objectives

Understand the theoretical foundations of programming languages.

Identify the essential characteristics of a language: syntax, semantics, and execution models.

Discover and compare the main programming paradigms (imperative, functional, object-oriented, logical, concurrent, etc.). Analyze the advantages and limitations of different paradigms depending on the context of use.

Develop the ability to choose a paradigm and language suited to a given problem. Put the concepts studied into practice through programming exercises.

Teaching hours

Lectures	Lecture	10.5
Tutorial	Tutorials	9
Lab	Practical work	4 p.m.

Mandatory prerequisites

None

Course outline

1. **General introduction**
    1. Why study languages and paradigms
    2. History of programming languages
2. **Language theory**
    1. Syntax and formal grammars
    2. Semantics: static and dynamic
    3. Compilation vs. interpretation
3. **Imperative paradigm**
    1. Fundamental concepts: states, instructions, flow control
    2. Examples: C, Python (imperative mode)
4. **Functional paradigm**
    1. Pure functions, immutability, recursion
    2. Examples: Haskell, Scala, OCaml
5. **Object-oriented paradigm**
    1. Encapsulation, inheritance, polymorphism
    2. Examples: Java, Python (OO mode)
6. **Logical paradigm**
    1. Declarative programming, resolution by inference
    2. Example: Prolog
7. **Concurrent and parallel paradigm**
    1. Threads, processes, synchronization
    2. Examples: Java Concurrency, Erlang
8. **Comparison and selection of paradigms**
    1. Criteria for choosing a paradigm according to the problem
    2. Hybridization of paradigms in modern languages
9. **Practical applications**
    1. Case studies
    2. Exercises in implementation in several paradigms

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE601 Bridge to the professional pathway

ECTS
8 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Professional experience	MODULE				
Financial management	MODULE	10.5 hours	9		
Introduction to law	MODULE	15 hours	4.5		
Issues in artificial intelligence	MODULE	6			
Business-oriented project management techniques	MODULE		9		

	Nature	Lecture	Tutorial	Practical	Credits
English (TOEIC level not achieved) S6	MODULE		40.5		
Modern languages (TOEIC level achieved)	MODULE				
English S6 Modern Language 2	SUBJECT		3 p.m.		
German TD	SUBJECT		3 p.m.		
	CHOICE				
Spanish TD Italian	SUBJECT		3 p.m.		
TD Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S6	SUBJECT		3 p.m.		
	SUBJECT		9 p.m.		

	Nature	CM	Tutorial	Practical	Credits
Optional internship S6	MODULE				
Support (every Thursday afternoon when FISA staff are present)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Professional experience (PROJ601_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The "worker" professional experience allows students to discover the practical aspects of blue-collar work and to understand the hierarchies, methods, and techniques used in companies. This experience should preferably take place in an industrial or construction company related to the student's area of expertise and likely to hire engineers. Teleworking is not permitted.

Objectives

- Gain experience in a professional environment as an operator (worker, unskilled person, etc.);
- Integrate into and participate in a professional organization;
- Observe how the company operates;
- Identify the roles of employees (engineers, technicians, workers, etc.);
- Analyze working conditions, risks, and work organization;
- Reflect on sustainable development and social/environmental responsibility;
- Draw conclusions from the internship for your own training, career plans, and management methods.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course Director, Polytech Business Relations
Relations-Entreprises.Polytech@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Financial Management (SHES601_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Business and administration

Overview

Description

This course aims to familiarize students with the fundamental principles of financial management and corporate finance. It is structured in such a way as to facilitate understanding of the interactions between key concepts, practical tools, and key players, with a view to rapid and effective application in a professional context.

Objectives

- Understand the key concepts of entrepreneurship and business start-up/takeover.
- Acquire the skills necessary to develop a business strategy.
- Explore financing and growth strategies for businesses.
- Develop an understanding of the challenges and opportunities faced by entrepreneurs.

Teaching hours

Lectures		Lecture	10.5
Tutorial		Tutorials	9

Mandatory prerequisites

None

Course outline

The main topics covered are:

- The fundamentals of financial accounting
- Interpretation of financial statements (income statement, statement of changes in equity, balance sheet, cash flow statement, etc.)
- Sources of short- and long-term financing, both on and off balance sheet, as well as stakeholders, financial structures, etc.
- Key players in the financing process (banks, venture capital/private equity, etc.)
- Aspects related to valuation and exit scenarios
- The correlation between strategy and financial control, as well as the role of the business plan
- Cost and revenue analysis techniques
- Designing a performance management system (indicators, dashboard, financial and non-financial criteria, etc.)

Targeted skills

- Understanding key points in a company's financial statements, knowing how to look at a balance sheet from a financing perspective, analyzing a company's situation
- Knowing how to build an economic performance management system.
- Understanding the different sources of financing and their impact on capital structure.
- Ability to identify and manage financial risks in a technological context.

Bibliography

Brealey, Richard A., and Stewart C. Myers. *Principles of Corporate Finance*. New York, McGraw-Hill Education, 2017.

Ross, Stephen A., Randolph W. Westerfield, and Bradford D. Jordan. *Corporate Finance*. New York, McGraw-Hill Education, 2018. Brigham, Eugene F., and Michael C. Ehrhardt. *Financial Management: Theory & Practice*. Mason, Cengage Learning, 2017.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Elodie Gardet
+33 4 50 09 24 51
Elodie.Gardet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Introduction to Law (SHES602_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes **ERASMUS reference:** Law

Presentation

Description

This introductory course in law aims to familiarize students with fundamental legal concepts. It explores the basic principles of law, with an emphasis on legal aspects related to the practice of engineering, such as contracts, civil liability, intellectual property, and industrial regulations.

Objectives

- Understand the general principles of law
- Acquire the knowledge necessary to interpret and draft contracts related to engineering projects.
- Explore the concepts of civil liability and intellectual property protection in the context of technology projects.
- Develop legal and ethical awareness in engineering practice.

Teaching hours

Lectures		Lecture	15
Tutorial		Tutorials	4.5

Mandatory prerequisites

none

Course outline

1. Judicial Institutions, Fundamental Principles, and Key Players in the Justice System
2. Criminal Procedure and Criminal Law
3. Contracts, Contractual Liability, and Intellectual Property Rights
4. Labor Law

Targeted skills

- Ability to understand and apply fundamental legal principles
- Ability to analyze the legal implications of decisions and actions in a professional context.
- Skills in interpreting engineering contracts.
- Knowledge of civil liability and intellectual property concepts related to engineering.

Bibliography

J.-B. Blaise and R. Desgorces, Business Law, 8th ed., LGDJ, 2015.

F. Dekeuwer-Défossez and E. Blary-Clément, Commercial Law, 11th ed., Montchrestien, 2015.

P. and Ph. Didier, Commercial Law, vol. I, Economica, coll. "Corpus droit privé," 2005.

D. Houtcieff, Commercial Law, 4th ed., Sirey, 2016.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Elodie Gardet
+33 4 50 09 24 51
Elodie.Gardet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Issues in Artificial Intelligence (DATA601_PACY)

Polytech Annecy-Chambéry
component

Presentation

Description

In the era of large language models, it is no longer enough to know how to use a chatbot: it is crucial to understand the underlying mechanisms in order to discern where AI brings real value and where it reaches its limits. As future engineers and citizens, engineering students will be called upon to observe the profound impact of these technologies on society—transforming professions, redefining social interactions, and disrupting decision-making processes. At the same time, the massive emergence of AI-dedicated computing centers raises major environmental issues: the energy consumption and carbon footprint of model training continue to grow and call for responsible technical and organizational choices. Finally, behind every AI application lie ethical challenges: copyright protection, privacy, and prevention of malicious use are all issues that require critical and informed consideration.

Objectives

By the end of the module, students will be able to:

- Describe the basic functioning of a neural network (perceptron, backpropagation) and explain the role of attention in a transformer.
- Explain what a language model is and give concrete examples of applications.
- Identify at least three types of bias in LLMs and propose a simple method for detecting them.
- Estimate the energy impact of an LLM model and list two best practices for reducing it (choice of infrastructure, work splitting).
- Write and test a clear prompt to generate useful text (summary, code, explanations).
- Recognize copyright and privacy issues related to the use of an LLM.

Teaching hours

Lectures	Lecture	6
AUTO	Independent study	4
PROJ	Project	10

Mandatory prerequisites

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course leader Ammar Mian

+33 4 79 75 85 85
Ammar.Mian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Business-oriented project management techniques (PROJ602_PACY)

Polytech Annecy-Chambéry
component

Presentation

Description

Project management requires methods and techniques that all engineers must know. However, depending on the profession, the stages and tools used to manage a project may differ. This course is differentiated according to the program.
With the help of the Corporate Relations Department and the Business Club, stakeholders from the socio-economic world come to present their daily experiences and how they evolve in project mode to control objectives, deadlines, costs, and associated resources.

Objectives

Acquire a project management methodology

Understand the necessary relationships between all project stakeholders Master the stages and tools of project management

Teaching hours

Tutorials	Tutorials	9

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Director of Training, Polytech

Locations

Annecy-le-Vieux (74)

Le Bourget-du-Lac (73)

English (TOEIC level not achieved) S6 (LANG601_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Mathematics and statistics

Presentation

Description

This course prepares students for the TOEIC test ("Test of English for International Communication") and, more specifically, for obtaining a minimum score of 785 points (out of 990).

Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam, depending on the semester, and counts for 20% of the total continuous assessment.

Objectives

Specific objectives: by the end of this course, students will be able to:

review grammar on: correct reflexes for common structures; verb groups and tenses (except for the conditional tense); noun groups and all their constituent elements; logical links (connecting words)

improve their grammatical and lexical knowledge (general English and TOEIC-specific vocabulary) in class and independently, validating their progress through regular assessment tests

Teaching hours

Tutorials	Tutorials	40.5

Mandatory prerequisites

S5 program (LANG501)

Course outline

Course outline

1. **Review of important grammar points for the TOEIC**
   1. Nouns
   2. Pronouns
   3. Linking words...
2. **Listening comprehension**
   1. Recorded dialogues in American, British, and New Zealand English...
   2. Videos in American, British, and Australian English...
3. **Reading comprehension**
   1. Press excerpts
   2. Various texts

Bibliography

Documents provided by lecturers Global Exam

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern Languages (TOEIC Level Achieved) (LANG602_PACY)

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	TD	Practical work	Credits
English S6	SUBJECT		15		
Modern Language 2	CHOICE				
German TD Spanish	SUBJECT		3:00		
TD Italian TD	SUBJECT		p.m.		
Chinese TD	SUBJECT		3:00		
Japanese TD	SUBJECT		p.m.		
Russian TD	SUBJECT		3:00		
Advanced English S6	SUBJECT		p.m.		
	SUBJECT		3:00		
	SUBJECT		p.m.		
	SUBJECT		3:00		
			p.m.		
			3:00		
			p.m.		
			9:00		
			p.m.		

Practical information

Locations

Annecy-le-Vieux (74)

English S6 (LANG602_PACYM1)

Polytech Annecy-Chambéry

Time of year
Spring

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Capacity: 25 per group

Presentation

Description

This course is an introduction to professional English.

Students will work on their fluency in the five skills (group project).

Students will develop their skills through the study of specific topics and/or develop their intercultural knowledge.

Students will be assessed throughout the semester.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace by developing their reading and listening comprehension as well as their speaking and writing skills.

Teaching hours

Tutorials	Tutorials	15

Mandatory prerequisites

Minimum TOEIC score of 785 obtained at the end of semester 5 (Lang 501)

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers

Targeted skills

Communicate independently, both orally and in writing, in all situations in an international professional setting.

Bibliography

A variety of authentic materials provided by the speakers and/or the students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern Language 2

Polytech Annecy-Chambéry

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
German TD Spanish	SUBJECT		3 p.m.		
TD Italian TD	SUBJECT		3 p.m.		
Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S6	SUBJECT		3 p.m.		
	SUBJECT		9:00 p.m.		

Practical information

Locations

Annecy-le-Vieux (74)

German TD (ALLE201D1_IUTA)

Annecy University Institute of Technology

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Spanish TD (ESPA201D1_IUTA)

Annecy IUT

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Overview

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Italian TD (ITAL201D1_IUTA)

Annecy IUT

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Chinese TD (CHIN201D1_IUTA)

Annecy University Institute of Technology

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Japanese TD (JAPO201D1_IUTA)

Annecy IUT

In

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Russian TD (RUSS201D1_IUTA)

Annecy IUT component

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Advanced English S6 (ENGL602_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This course is an introduction to professional English. Students will work on their fluency in the five language skills by enriching their technical and professional vocabulary, participating in role-plays and simulations, learning about cultural aspects, and completing written exercises.

Activities will be carried out individually, in pairs, and/or in groups. Students will be assessed throughout the semester.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace in an international context.

Teaching hours

Tutorials	Tutorials	21

Mandatory prerequisites

Minimum TOEIC score of 785 and semester 501 completed

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers

Targeted skills

Communicate independently, both orally and in writing, in all situations in a professional setting.

Bibliography

A variety of authentic materials provided by the speakers and/or students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Optional internship S6 (PROJ600_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The optional internship aims to enrich students' academic and professional experience by offering them a practical opportunity to apply their knowledge and acquire new skills. An optional internship can be carried out **in France or abroad**. It must comply with the same general conditions as compulsory internships.

Objectives

- **Acquisition of** specific skills related to the specialization;
- **Refining career goals and/or** gaining confidence and independence through the completion of a project or specific tasks;
- Establish valuable professional contacts that can help in future job searches.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course Director, Polytech Business Relations
Relations-Entreprises.Polytech@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Support (every Thursday afternoon when FISA representatives are present) (ACCO601_PACY)

Polytech Annecy-Chambéry
component

In brief

Teaching methods: In person **Teaching format:** Tutored project **Open to exchange students:** Yes

Presentation

Description

This support is open to all students at the school: students, apprentices, and Continuing Education employees. It is not mandatory, as it is primarily intended for students who need it to succeed in their training. This semester, it is scheduled into the timetable for each course, with a total of 32 hours.

Support may take the form of refresher courses, upgrading courses, or support in the main areas of the training programs.

Peer tutoring is encouraged and the educational resources of the Polytech Network are used (https://eplanet.polytech-reseau.org/).

Objectives

To promote the success of all students in their educational journey.

Teaching hours

PTUT	Tutored project	32

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Director of Polytech Training

Locations

Annecy-le-Vieux (74)

UE602 Mathematics and Algorithms

ECTS
11 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Logic and Programming Algorithmic Project	MODULE	10.5 hours	10.5	20	
Probability and Statistics	MODULE MODULE	18 hours	42 18 hours		
Object-oriented design and programming	MODULE	9	9 p.m.	8 hours	2.5 credits

Practical information

Locations

Annecy-le-Vieux (74)

Logic and Programming (INFO631_IDU)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course aims to provide students with the skills to model a problem according to a logical description and implement it in a logical language such as Prolog.

Objectives

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

- describe a problem in the form of first-order propositional and predicate logic
- implement a problem described in first-order predicate logic in a programming language
- infer knowledge from logical programming.

Teaching hours

Lectures	Lecture	10.5
Tutorial	Tutorials	10.5
Lab	Practical work	20

Mandatory prerequisites

MATH 531 (section: Graphs)

Course outline

1. Propositional logic
   1. Language and semantics
   2. Deductive aspects
   3. Normal forms
2. First-order predicate logic
   1. Quantifiers and Variables
   2. Models and Proofs
   3. Normalization, Unification, and Resolution
3. Logic Programming
   1. ProLog
   2. From Logic to Prolog

- TP1 Family Trees
- TP2 Finite State Machines
- TP3 Puzzle - Logigram
- TP4 Rule-based systems
- TP5 TP exam

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Algorithmic Project (PROJ631_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Type of instruction: Tutored project **Open to exchange students:** Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Presentation

Description

This module applies the data structures and algorithms presented in the "Graphs and Languages" module. It takes the form of software development in accordance with the IT project management methods covered in the "Project Management" module. In particular, tools appropriate for modular program development and code evolution management will be used.

Objectives

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

- identify existing algorithms that can address a given problem or contribute to its resolution,
- explain precisely the chosen algorithms, how they work, and how they are orchestrated,
- implement the chosen algorithmic solution,
- define and apply a testing procedure for the program created,
- measure the performance of the program developed.

Teaching hours

Tutorials	Tutorials	42

Mandatory prerequisites

- INFO501 (Algorithms and Python Programming)
- MATH531 (Graphs and Language)
- PROJ531 (IT Project Management)

Course outline

1. Mini-project 1: Three 4-hour sessions
2. Mini-project 2: Three 4-hour sessions
3. Mini-project 3: Three 4-hour sessions
4. Three 2-hour assessment sessions: individual assessment of each student
    1. Presentation and demonstration
    2. Questions
    3. Review

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier

+33 4 50 09 65 90

Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Probability and Statistics (MATH631_IDU)

Polytech Annecy-Chambéry
Component

Presentation

Description

This course covers the main concepts of probability and statistics useful in engineering sciences in order to know how to use them to model concrete situations.

Objectives

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

manipulate discrete or continuous variables, understand and use classical laws, find the law of a random variable and a sum of random variables.

Teaching hours

Lectures	Lecture	18
Tutorial	Tutorials	6 p.m.

Mandatory prerequisites

Numerical series, generalized integrals.

Course outline

1. Probability
   1. Definitions, enumeration, probability laws, conditional probability, and independence.

2. Discrete random variables and common discrete probability distributions
3. Continuous random variables and main continuous laws
4. Pairs of random variables
5. Joint and marginal laws
6. Convergence of sequences of random variables
7. Approximations by classical distributions

2. Statistics
   1. Descriptive statistics
   2. Double statistical series, different types of regression.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Alexandre Bascop
+33 4 50 09 66 18
Alexandre.Bascop@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Object-Oriented Design and Programming (INFO634_IDU)

ECTS
2.5 credits

Polytech Annecy-Chambéry
component

Time of year Spring

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This module is an introduction to the object-oriented approach. It covers aspects related to design and programming. For the programming part, Java is used as the support language.

Objectives

By the end of this module, students will be able to explain the characteristics of the object-oriented approach. In particular, they will be able to explain the structure of an object-oriented application, how objects communicate, what encapsulation is and its benefits, what inheritance is and its link to code reuse, as well as explain polymorphism, its link to inheritance, abstract classes, and interfaces.

Students will be able to design and implement a relatively small object-oriented application (10 classes) based on a problem description. In particular, they will be able to define a class diagram based on a problem description, create class instances and make them communicate, and build an application involving inheritance, abstract classes, and interfaces, set up an event-based communication mechanism, and build a graphical interface containing several windows that exchange events.

Students will also be able to explain the role of design and programming in the software life cycle.

Teaching hours

Lectures		Lecture	9
TD		Tutorials	9 p.m.
Lab		Practical Work	8

Mandatory prerequisites

Basic computer skills. Understanding of algorithms.

Course outline

1. Object-oriented approach and software life cycle
2. Classes and objects. Communication between objects. Encapsulation.
3. Relationships between classes. Inheritance and polymorphism
4. Abstract classes and interfaces
5. Event models and graphical interfaces

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Sorana Cimpan
+33 4 50 09 65 86
Sorana.Cimpan@univ-savoie.fr

Course Director Sorana Cimpan
+33 4 50 09 65 86
Sorana.Cimpan@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE603 Environment and Applications

ECTS
11 credits

Polytech Annecy-Chambéry component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Database programming and website design	MODULE		13.5 hours		
Operating systems and virtualization	MODULE	10.5 hours	13.5	16	
Collaborative platforms	MODULE	1:30 p.m.	15	12 hours	
Data Science Project APP	MODULE		30		

Practical information

Locations

Annecy-le-Vieux (74)

Database programming and website design (INFO633_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course focuses on learning how to develop web applications as an interface for data manipulation. This type of application, built on a three-tier architecture, includes a relational database, a web server for the backend that also provides the link to the database, and a user interface (web pages) for the frontend. The course covers these three dimensions. For the database part, it will involve implementing functions, procedures, and triggers in SQL programming language in order to perform initial processing on the database data. The web server is responsible for producing the web pages requested by the client and managing the transfer of data between the client and the database. Finally, the client part is an ergonomic, responsive design web interface, created in HTML/CSS/JavaScript with the support of a simple framework.

Objectives

The objective of this course is to teach web technologies in the context of data manipulation between a relational database and a web client (web browser). Learners will work on implementing features in the three dimensions of this type of application: on the database server, the web server, and the client. Some concepts related to the encryption of sensitive data and environmental efficiency will also be covered.

Teaching hours

Tutorials	Tutorials	13.5
AUTO	Independent study	6
PROJ	Project	12
PTUT	Supervised project	4

Mandatory prerequisites

A good knowledge of the basics of programming (including object-oriented programming). Relational databases.

The principles of computer networks (such as the internet) and the client-server approach. Knowledge of how to build a web page using HTML and

CSS.

Course outline

Part 1: Review of data modeling for manipulation in a database (entity-association model, relational model), followed by an introduction to SQL functions, procedures, and cursors.

Part 2: Manipulating data from a simple web page (HTML, CSS) using a web server. The focus is on the backend of the application, establishing the link between the client application and the database. At the database level, use of triggers.

Part 3: Building a client-side frontend based on a simple JavaScript framework (interaction with the DOM, WebSocket, various APIs).

Part 4: Integration of knowledge through a mini website development project involving data manipulation. This part is carried out in project mode and involves teamwork and the use of collaborative development tools (project management, code versioning).

Targeted skills

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

- design and implement a medium-sized three-tier application,
- develop advanced features for data manipulation on a database server,
- develop a web application consisting of a server part (backend) and a client part (frontend), allowing data manipulation (database storage, display, simple processing, etc.),

- Master the main languages used in web development (SQL, HTML, CSS, JavaScript) and base development on existing frameworks or APIs.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Lionel Valet
+33 4 50 09 65 25
Lionel.Valet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Operating Systems and Virtualization (INFO632_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course aims to provide an understanding of operating systems and virtualization from a user perspective. The course covers the main principles, and tutorials and practical work allow students to observe the system's responses and gain a better understanding of how it works.

Objectives

- Understand the basic functioning of operating systems and virtualization;
- Understand resource sharing (processor, memory, files) by processes;
- Identify consistency issues and understand and implement synchronization mechanisms;
- Know how to use virtualization systems.

Teaching hours

Lectures	Lecture	10.5
Tutorial	Tutorials	13.5
Lab	Practical work	16

Mandatory prerequisites

None. Basic knowledge of C and Shell is a plus.

Course outline

1. Introduction
    1. Role of systems, benefits of virtualization
    2. History
    3. Architecture
    4. Basic concepts
2. File management
    1. Tree structure
    2. File structures
    3. Manipulation
3. Process
    1. Concept of processes
    2. Processor sharing
    3. Communications
4. Synchronization
    1. Introduction to multitasking programming
    2. Consistency and synchronization
5. Virtualization
    1. Benefits of Virtualization
    2. Different types of virtualization and how they work

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Collaborative platforms (ISOC631_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

Digital platforms now play a central role in the global economy, profoundly transforming business models, modes of communication, and consumer behavior. Their importance lies in their ability to connect millions of users, facilitate the exchange of goods, services, and information, and generate vast volumes of usable data. These platforms rely on the effect of software APIs that enable access to their services. They rely on agile business models, often based on network effects, where value increases with the number of users. Thus, digital platforms are not only technological tools, but major strategic levers in the digital transformation of businesses and societies.

Objectives

The aim of this course is to introduce the principles and use of digital platforms and their strategy. In particular, the concepts of APIs will be introduced. We will focus on social networks (Facebook and Twitter), collaborative development platforms such as GitHub and Freshmat, and crowdfunding. Finally, an introduction to free software and participatory development will be given. This course will provide students with the opportunity to carry out a project based on these platforms.

Teaching hours

Lectures	Lecture	13.5
TD	Tutorials	15
Lab	Practical work	12

Mandatory prerequisites

ISOC531

Course outline

Introduction to the concept of platforms and APIs (REST APIs, middleware) Introduction to mapping APIs
Blockchain: an API for distributed consensus History of open source projects (GNU, LINUX)
Platform strategy
Introduction to digital entrepreneurship

Targeted skills

- Build APIs that guarantee data control and security
- Develop a platform strategy that incorporates network effects

-Build REST APIs

- Use mapping APIs

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

APP Data Science Project (PROJ632_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Type of instruction: Tutored project **Open to exchange students:** Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Presentation

Description

This first project in the field of data science aims to analyze what data is needed to address a given problem, acquire it, ensure its consistency, and fill in any missing information. The data may be either structured data, as found in Open Data approaches, or unstructured data such as text (social media reviews: recipes, restaurants, etc.). The project will result in the creation of a document that will provide the models for the application, as well as the database schemas and data needed to address the problem.

Objectives

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

- acquire more or less well-structured data,
- clean data,
- compensate for missing information in the data.

Teaching hours

Tutorials	Tutorials	30

Mandatory prerequisites

Numeration and Algorithms (INFO 501) Databases (INFO 502, INFO 642a) Object-Oriented Design and Programming (INFO 641a) Project Management (PROJ 531)

Course outline

1. Introduction to scraping
2. Data acquisition project using scraping and APIs

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE701 Bridge to the professional pathway

ECTS
6 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	CM	Tutorial	Practical work	Credits
Resources and professional dynamics	MODULE		13.5 hours	3.5	
Creativity and innovation management	MODULE		25.5		

	Nature	Lecture	Tutorial	Practical	Credits
English (TOEIC level not achieved) S7	MODULE		40.5		
Modern languages (TOEIC level achieved)	MODULE				
English S7 Modern language 2	SUBJECT CHOICE		3 p.m.		
German TD	SUBJECT		3 p.m.		
Spanish TD Italian	SUBJECT		3 p.m.		
TD Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S7	SUBJECT		3 p.m.		
	SUBJECT		9 p.m.		

	Nature	CM	Tutorial	Practical	Credits
Optional internship S7	MODULE				
Support (half of the Thursday afternoons when FISA staff are present)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Resources and professional dynamics (SHES703_PACY)

Polytech Annecy-Chambéry component

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

Professional integration module designed and implemented in collaboration with the Business Club and the Professional Integration Assistance Office of the University of Savoie Mont Blanc, involving a network of qualified professionals.

Objectives

The aim of the module is to help students gain a better understanding of themselves in order to define a career plan in line with their motivation and skills, develop a targeted internship and/or job search strategy, present themselves effectively in an interview, and promote their career path.

Teaching hours

Tutorials	Tutorials	13.5
TP	Practical work	0.5
TP	Practical work	3

Mandatory prerequisites

No mandatory prerequisites

Course outline

- Introduction: preparing for my future today
- Identify my professional environment, map out the possibilities
- Defining my career plan
- Boost my internship search efforts
- Create and optimize my LinkedIn profile
- Adapt my application tools, respond to a job posting
- Prepare for the interview
- Highlighting my work experience - Evaluation
- Mock interview with professionals - Evaluation

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Carole Mislin
+33 4 50 09 66 46
Carole.Mislin@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Creativity and Innovation Management (SHES704_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Teaching format: Tutorials **Open to exchange students:** Yes
ERASMUS reference: Business and administration

Presentation

Description

How can creativity and innovation be leveraged to enhance an organization? How can radical innovation be initiated based on the latest technological advances? This requires a thorough understanding of the innovation process and the ability to manage an innovative project in a complex and uncertain environment. It also involves adopting an entrepreneurial or intrapreneurial approach to mobilize and motivate interdisciplinary teams to achieve innovation. This training module offers the opportunity to acquire the methodologies and attitudes necessary to achieve these objectives.

Objectives

- Structure, organize, and manage a highly exploratory process with a consistent approach
- Find resources or make do with available resources
- Adapting in real time to changes in context and constraints
- Manage the challenges of each phase of the project
- Act as a leader in uncertain environments
- Mobilize stakeholders

- Master new technologies

Teaching hours

Tutorials	Tutorials	25.5

Mandatory prerequisites

None

Course outline

Part 1: Innovation management: theoretical foundations

Part 2: Creativity - Design thinking approach (different creativity tools depending on the stages of the process). Part 3: Role-playing

Targeted skills

- Recognize and seize internal and external development opportunities
- Develop and formalize opportunities to transform them into innovative projects
- Know how to lead a design thinking-type creativity process
- Develop management and leadership skills for innovative projects: challenge preconceived ideas, mobilize stakeholders, lead with flexibility, and seize opportunities with agility

Bibliography

Tidd, Joe, and John Bessant. *Managing Innovation: Integrating Technological, Commercial, and Organizational Change*. Paris, Pearson, 2018.

Kim, W. Chan, and Renée Mauborgne. *Blue Ocean Strategy: How to Create New Strategic Spaces*. Paris, Pearson, 2006.

Christensen, Clayton M. *The Innovator's Dilemma: How Technology Leaders Fail When They Don't Think Like Innovators*. Paris, Village Mondial, 2003.

Lockwood, Thomas, and Thomas Walton. *Design Thinking: Integrating Innovation, User Experience, and Brand Value*.
Paris, Dunod, 2013.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Elodie Gardet
+33 4 50 09 24 51
Elodie.Gardet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

English (TOEIC level not achieved) S7 (LANG701_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Description

This course prepares students for the TOEIC (Test of English for International Communication) exam, specifically to obtain a minimum score of 785 points (out of 990).

With the aim of developing all four skills, this course also serves as an introduction to public speaking through presentations given by students in groups or individually on topics illustrated by press articles or video materials (VTD: Video, Talk and Debate, as well as written work). Depending on the location (Annecy or Chambéry), some will be seen at different times during the semester, the year, or even the three years of training.

Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam.

Objectives

Specific objectives: at the end of this course, students will be able to:

work on telephone conversations (comprehension/production)

listen regularly to news on English-language news sites (CNN, BBC, Sky News, etc.) and be able to succinctly summarize the main points orally, interacting with the class

work on a variety of audio and video materials and speak spontaneously in an interactive manner with the class

speak in a prepared manner and spontaneously interact through individual presentations (self-presentation and/or article reports, such as "quizzes") and presentations in pairs (various topics)

practice TOEIC exercises (4 parts of listening comprehension) + entire tests

Teaching hours

Tutorials	Tutorials	40.5

Mandatory prerequisites

S5 and S6 program.

Course outline

Course outline

1. **Review of important grammar points for the TOEIC:**
    1. Review of tenses.
    2. The conditional and "should" structures (suggestion/subjunctive).
    3. Modal auxiliaries and periphrases with similar meanings.
    4. Linking words (review).
2. **Listening comprehension:**
    1. Recorded dialogues in American, British, and New Zealand English.
    2. Videos in American, British, and Australian English.
3. **Reading comprehension:**
    1. Press excerpts
    2. Various texts

Bibliography

- Documents distributed by speakers
- Various websites listed at the beginning of S5

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern Languages (TOEIC Level Achieved) (LANG702_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
English S7	SUBJECT		15		
Modern Language 2	CHOICE				
German TD Spanish	SUBJECT		3:00		
TD Italian TD	SUBJECT		p.m.		
Chinese TD	SUBJECT		3:00		
Japanese TD	SUBJECT		p.m.		
Russian TD	SUBJECT		3:00		
Advanced English S7	SUBJECT		p.m.		
	SUBJECT		3:00		
	SUBJECT		p.m.		
	SUBJECT		3:00		
			p.m.		
			3:00		
			p.m.		
			9:00		
			p.m.		

Practical information

Contact

Course coordinator Muriel Yvenat

+33 4 50 09 66 17

Muriel.Yvenat@univ-savoie.fr

Location

Annecy-le-Vieux (74)

English S7 (LANG702_PACYM1)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course focuses on acquiring professional English skills. Students will work on developing their fluency in the five skills (group project). Students will develop their skills through the study of specific topics and/or develop their intercultural knowledge.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace in an international context.

Teaching hours

Tutorial	Tutorials	15

Mandatory prerequisites

TOEIC score of 785 or higher and completion of semester 601 or 602

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers

Targeted skills

Communicate independently, both orally and in writing, in all situations in a professional setting.

Bibliography

A variety of authentic materials provided by instructors and/or students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern language 2

Polytech Annecy-Chambéry

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
German TD Spanish	SUBJECT		3 p.m.		
TD Italian TD	SUBJECT		3 p.m.		
Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S7	SUBJECT		3 p.m.		
	SUBJECT		9:00 p.m.		

Practical information

Locations

Annecy-le-Vieux (74)

German TD (ALLE101D1_IUTA)

Annecy University Institute of Technology

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Spanish TD (ESPA101D1_IUTA)

Annecy IUT

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Italian TD (ITAL101D1_IUTA)

Annecy IUT

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Overview

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Chinese TD (CHIN101D1_IUTA)

Annecy IUT

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Japanese TD (JAPO101D1_IUTA)

Annecy University Institute of Technology

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Russian TD (RUSS101D1_IUTA)

Annecy IUT

In brief

Languages of instruction: French **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Teaching hours

Tutorial	Tutorials	15

Skills acquired

Macro-skills	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Advanced English S7 (ENGL702_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This course is a training course in professional English. Students will work on their fluency in the five language skills by enriching their technical and professional vocabulary, through role-playing, cultural contributions, and written exercises (different topics from 602).

Activities will be carried out individually, in pairs, and/or in groups. Students will be assessed throughout the semester.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace in an international context.

Teaching hours

Tutorials	Tutorials	21

Mandatory prerequisites

Minimum TOEIC score of 785 – Semester 601 and/or 602 completed

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers.

Targeted skills

Communicate independently, both orally and in writing, in all situations in a professional setting.

Bibliography

A variety of authentic materials provided by the speakers and/or students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Places

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Optional internship S7 (PROJ700_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The optional internship aims to enrich students' academic and professional experience by offering them a practical opportunity to apply their knowledge and acquire new skills. An optional internship can be carried out **in France or abroad**. It must comply with the same general conditions as compulsory internships.

Objectives

- **Acquisition of** specific skills related to the specialization;
- **Refining career goals and/or** gaining confidence and independence through the completion of a project or specific tasks;
- Establish valuable professional contacts that can help in future job searches.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contacts

Head of the Polytech Business Relations Course

Relations-Entreprises.Polytech@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Support (half of Thursday afternoons when FISA representatives are present) (ACCO701_PACY)

Polytech Annecy-Chambéry
component

In brief

Teaching methods: In person **Teaching format:** Tutored project **Open to exchange students:** Yes

Presentation

Description

This support is open to all students at the school: students, apprentices, and Continuing Education employees. It is not mandatory, as it is primarily intended for students who need it to succeed in their training. This semester, it is scheduled into the timetable for each course, with a total of 16 hours.

Support may take the form of refresher courses, upgrading courses, or support in the main areas of the training programs.

Peer tutoring is encouraged and the educational resources of the Polytech Network are used (https://eplanet.polytech-reseau.org/).

Objectives

To promote the success of all students in their educational journey.

Teaching hours

PTUT	Tutored project	16

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Director of Training, Polytech

Locations

Annecy-le-Vieux (74)

Le Bourget-du-Lac (73)

UE702 Mathematics and Data

ECTS
8 credits

Polytech Annecy-Chambéry component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Stochastic modeling	MODULE	12 hours		24	
Security and Cryptography	MODULE	13.5 hours	22.5 hours	4	
Statistical tests	MODULE	18h	18 hours		

Practical information

Locations

Annecy-le-Vieux (74)

Stochastic Modeling (DATA731_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

The objective of the module is an in-depth study of stochastic modeling in the context of describing, analyzing, and searching for information in data. The main models studied are associated with probabilistic and statistical approaches. The module includes the study of single and multivariate probability families equipped with entropy functions, autoregressive and moving average families (as well as their neural generalizations), differential and stochastic integral families (of integer and fractional orders), Poisson processes and the Markovian properties of certain processes, as well as process interactions and mixtures of simple models.

Objectives

Learning outcome 1: describe an imprecise observation using a stochastic model / Objective 1: select and validate the relevance of a stochastic model for describing a given observation or information hidden in a data stream.

Acquired knowledge 2: associate imprecise information with a parameter of the stochastic model / Objective 2: estimate the model parameters and highlight trends, changes, or deviations in process observations, compared with expected specifications

Acquired knowledge 3: tracking/predicting the evolution of a physical phenomenon or information / Objective 3: predicting the nature of future observations, taking into account the validated model and past observations

Teaching hours

Lectures	Lecture	12
Lab	Practical work	24

Mandatory prerequisites

Probability and Statistics

Course outline

1. Mono- and multivariate probabilistic models
2. Cross-parametric and relative entropies
3. Maximum likelihood principle
4. Autoregressive statistical models and their neural generalizations
5. Stochastic integral equations / integer difference equations
6. Stochastic integral equations / fractional difference equations
7. Interacting processes and mixture models
8. Poisson processes - Markov chains and fields
9. Stochastic simulation and parameter estimation (random number generators, Monte Carlo methods, regressions, Bayesian approaches, etc.)

Bibliography

Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers, by Roy D. Yates and David J. Goodman.

Brockwell, P. J.; Davis, R. A. (2009). *Time Series: Theory and Methods* (2nd ed.). New York: Springer. p. 273. ISBN 9781441903198.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Abdourrahmane Atto
+33 4 50 09 65 27
Abdourrahmane.Atto@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Security and Cryptography (INFO731_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course provides an introduction to the principles and practice of computer network and system security. Topics covered will include cryptography, network and operating system security, worm and virus propagation mechanisms, and security incident management. We will also cover topics related to mobile application security, payment systems, and data security.

Objectives

This course aims to provide students with the theoretical and practical knowledge necessary to protect information systems against digital threats. The main objectives are as follows:

1. **Understand the fundamentals of cybersecurity**: concepts of confidentiality, integrity, availability, authentication, and non-repudiation.
2. **Identify types of threats and attacks**: viruses, ransomware, phishing, denial-of-service (DDoS) attacks, social engineering, etc.
3. **Master protection tools and techniques**: firewalls, antivirus software, intrusion detection systems (IDS), encryption, identity and access management (IAM).
4. **Learn how to design secure architectures**: apply best practices to strengthen the security of networks, applications, and databases.

5. **Understanding legal and ethical issues**: regulatory compliance (GDPR, NIS2, etc.), digital responsibility, privacy.
6. **Developing analytical and response capabilities**: analyzing a security incident, creating an incident response plan, implementing a business continuity plan.
7. **Raise awareness of security in the software development cycle** (DevSecOps): integrate security from the design phase onwards.

Teaching hours

Lectures	Lecture	13.5
Tutorial	Tutorials	22.5
Lab	Practical work	4

Course outline

Introduction to security cryptography
Symmetric cryptography Asymmetric cryptography Hash functions Key management and PKI
Network security - Attacks Web security
IPSec VPN and firewalls Intrusion detection User
authentication Program security Malicious software

Targeted skills

-Master the fundamentals of IT security: cryptography, secure protocols, authentication, access control.

-Configure and secure network infrastructures: firewalls, VPNs, intrusion detection/prevention systems (IDS/IPS).

-Analyze and detect vulnerabilities: perform security audits, penetration tests (pentests), and vulnerability analysis.

-Develop and integrate secure applications: apply secure development principles (DevSecOps).

-Implement security policies: identity and access management (IAM), network segmentation, data encryption.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Statistical Tests (MATH741_IDU)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

Presentation

Description

This course covers the main concepts of probability and statistics useful in engineering sciences in order to know how to use them to model concrete situations.

Objectives

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

manipulate discrete or continuous variables, understand and use classical laws, and find the law of a random variable and a sum of random variables.

Teaching hours

Lectures	Lecture	18
Tutorial	Tutorials	6 p.m.

Mandatory prerequisites

Numerical series, generalized integrals.

Course outline

1. Probability
   1. Definitions, enumeration, probability laws, conditional probability, and independence.
   2. Discrete random variables and common discrete probability distributions
   3. Continuous random variables and main continuous distributions
   4. Random vectors and sequences of random variables
   5. Joint and marginal laws
   6. Convergence of sequences of random variables
   7. Approximations by classical distributions
2. Statistics
   1. Descriptive statistics
   2. Double statistical series, different types of regression
   3. Estimates: definitions, estimation by confidence intervals, etc.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Alexandre Bascop
+33 4 50 09 66 18
Alexandre.Bascop@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE703 Computer Science and Design

ECTS
7 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Behavior and Dynamic Modeling APP Data Analysis and Visualization	MODULE	7.5 hours	6	24	2.5 credits 20
Networks and Distributed Systems	MODULE			hours	
	MODULE			4 hours	
		18	16		

Practical information

Locations

Annecy-le-Vieux (74)

Behavior and Dynamic Modeling (INFO732_IDU)

ECTS
2.5 credits

Polytech Annecy-Chambéry

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

The objective of this course is to learn how to design and implement a software system taking into account non-functional properties such as maintainability and scalability. Since static aspects were covered in the INFO641 module using an object-oriented approach, the focus here is on the dynamic aspects of the system, i.e., its behavior.

Objectives

This course aims to enable students to analyze and design the behavior of a software system using UML notation, in particular by using use case, sequence, and state diagrams.

This course aims to raise students' awareness of the concepts of non-functional software properties, with an emphasis on maintainability.

This course also aims to enable students to design and implement software systems using best practices in software engineering (design patterns). Students will thus be able to make informed design choices based on the desired characteristics of the software, and to put into practice software patterns such as strategy, factory, adapter, singleton, and decorator.

Teaching hours

Lectures	Lecture	7.5
TD	Tutorials	6
Lab	Practical work	24

Mandatory prerequisites

Basic concepts in object-oriented programming: classes, inheritance, polymorphism, abstract classes, interfaces, event-driven models, graphical user interfaces

OR

Completion of the INFO634_IDU module

Course outline

1. Analysis and design of dynamic aspects with UML (sequence diagrams, collaboration diagrams, and state transition diagrams)
2. Design patterns for scalable software products

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sorana Cimpan
+33 4 50 09 65 86
Sorana.Cimpan@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

APP Data Analysis and Visualization (PROJ731_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Engineering and related techniques

Overview

Description

This project is a continuation of the Data Science Project (PROJ632_IDU) from semester 6. Following the data acquisition carried out in semester 6, you will develop your project by integrating different data processing and visualization techniques.

Objectives

Acquisition of skills in data analysis and visualization.

Teaching hours

Practical	Practical work	20

Mandatory prerequisites

Data Analysis and Visualization (DATA732_IDU)

Course outline

Application of knowledge acquired in Data Analysis and Visualization (DATA732_IDU)

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sorana Cimpan
+33 4 50 09 65 86
Sorana.Cimpan@univ-savoie.fr

Course manager Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Distributed Networks and Systems (INFO733_IDU)

Polytech Annecy-Chambéry component

Presentation

Description

A course on networks and the Internet is fundamental to the training of engineers and IT professionals, as it provides the basis for understanding modern communication systems. In the era of global connectivity, where data exchange is constant and essential to all sectors (health, finance, industry, education, etc.), mastering the principles of networks allows us to understand how information flows, how infrastructures are organized, and how to secure communications. This course develops key skills such as network configuration, traffic analysis, management of protocols such as TCP/IP, and the adoption of advanced concepts such as routing, virtualization, and decentralized architectures. It also prepares students for current issues related to cybersecurity, 5G, and the Internet of Things (IoT). In short, it is an essential foundation for designing, maintaining, and upgrading the digital systems of today and tomorrow.

Objectives

This course provides the fundamental concepts necessary for understanding computer networks and deploying distributed applications and systems. The course will begin with an introduction to Internet architecture and application protocols. It will then present transport protocols and the structure of IP addressing. The socket interface will be presented, as well as the concept of middleware. Distributed algorithms will be introduced through concrete examples of applications. This will provide the essential foundations for deploying networked and distributed applications.

Teaching hours

Lectures	Lecture	6 p.m.
Tutorial	Tutorials	4 p.m.
Lab	Practical Work	4

Mandatory prerequisites

Knowledge of a programming language

Course outline

1. Introduction to Internet architecture
2. Application protocols
3. Transport protocols: TCP, UDP
4. IP addressing
5. Socket Programming
6. Middleware and Distributed Algorithms
7. Case studies

Practical assignment titles

- Setting up an IP network
- IP routing
- Frame capture and in vivo observation (4 hours of practical work)
- Development of network applications (chat server)
- Distributed algorithms

Bibliography

- James Kurose, Keith W. Ross, Structured Network Analysis: From Internet Applications to Telecommunications Infrastructure (2nd ed.), Pearson Education, 2003
- A. S. Tanenbaum, M. Van Steen, Distributed Systems: Principles and Paradigms (2nd ed.), 2007, Prentice Hall

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE704 Visualization and Governance

ECTS
9 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Data analysis and visualization Full stack development	MODULE	12 hours	23.5		
Data economics and governance	MODULE		24h		
	MODULE	12 hours 3 p.m.	21h	4	

Practical information

Locations

Annecy-le-Vieux (74)

Data Analysis and Visualization (DATA732_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

The Data Analysis and Visualization module will provide students with a set of techniques for analyzing and visualizing different types of data: structured, unstructured, and graphs. The module will highlight a number of tools to help students with this task.

Objectives

The aim of this module is to introduce students to data visualization and enable them to understand how, when used correctly, visualization is a useful analysis tool.
The module addresses how we can exploit the functioning of the brain to facilitate understanding through good visualization, addressing concepts such as perception, color theory, and the principles of dashboard construction.
This will enable students to analyze a visualization and understand why it works or doesn't work, as well as to produce effective visualizations that facilitate decision-making.

Teaching hours

Lectures		Lecture	12
Tutorial		Tutorials	23.5

Mandatory prerequisites

Basic computer skills

Course outline

1. The course is divided into two parts: theory and practice.

In the theoretical part

1. Introduction to visualization: why, history, etc.
2. Do's and don'ts – an overview of different types of diagrams
3. Color theory
4. Perception
5. Principles for building dashboards In the practical section, two approaches

1. Tableau – PowerBI-type tool, Excel ++
2. Python and JavaScript

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sorana Cimpan
+33 4 50 09 65 86
Sorana.Cimpan@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Full Stack Development (INFO734_IDU)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: French **Teaching methods:** In-person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

The course presents the concepts and technologies used in the development of modern web applications based on the JavaScript language.

Objectives

The objective of this course is to provide an overview of modern web technologies in JavaScript and NoSQL databases.

Teaching hours

Lectures	Lecture	12
Tutorial	Tutorials	24

Mandatory prerequisites

- Development of static pages with HTML, CSS
- CSS frameworks

- Algorithms and data structures

Course outline

The course first introduces JavaScript programming concepts for both frontend and backend development, then provides knowledge on the elements to implement in a web application developed with JavaScript technologies. We will then study the use of frontend and backend frameworks to implement the application's interface and internal logic. Finally, we will show how to deploy such an application so that it can be scaled.

A concrete project will then be carried out in groups to implement these elements.

Targeted skills

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

- be familiar with the different elements that make up the layers of a full-stack application and how they interact
- know how to set up a back-end such as an API using NodeJS
- be able to use a NoSQL database and communicate with the backend
- be able to develop an interface using front-end frameworks
- know how to program in JavaScript and TypeScript

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course leader Ammar Mian
+33 4 79 75 85 85
Ammar.Mian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Data Economics and Governance (ISOC731_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Engineering and related techniques

Overview

Description

This course aims to explore the economic transformations brought about by digital technologies and analyze their implications for markets, businesses, and public policy. It addresses key topics such as digital platforms, the data economy, disruptive business models, the regulation of digital giants, and the impact of artificial intelligence on productivity. Through an approach combining economic theory, case studies, and quantitative analysis tools, students develop a deep understanding of the dynamics of the contemporary digital economy.

Objectives

The objective of this course is to acquire the analytical and methodological tools needed to understand the economic, legal, ethical, and political aspects of data governance and its uses. We will present the wide variety of private and public, national, European, and international actors involved in order to understand who defines the standards, rules, and protocols for data processing, and for what reasons. This will enable us to understand how these standards are applied at the technical, political, and social levels. We will focus in particular on issues relating to privacy, trust, and the data economy.

Teaching hours

Lectures	Lecture	3 p.m.
Tutorial	Tutorials	9 p.m.
Lab	Practical Work	4

Mandatory prerequisites

ISOC531, ISOC631

Course outline

1. Introduction to economics (supply/demand, market equilibrium)
2. Game theory (Nash equilibrium)
3. Mechanism design
4. Network effects
5. Data strategy (intermediation)

Targeted skills

- Calculate economic equilibria in relation to data
- Integrate behavioral strategy models into economic analysis
- Implement the principles of intermediation
- Integrate network effects into the design of digital applications and platforms

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE801 Bridge to the professional pathway

ECTS
6 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Integrated QSE (Quality, Safety, Environment) Management System	MODULE	9 hours	10.5		
Management techniques	MODULE	18	7.5		

	Nature	Lecture	Tutorial	Practical	Credits
English (TOEIC level not achieved) S8	MODULE		40.5 hours		
Modern languages (TOEIC level achieved)	MODULE				
English S8 Modern language 2	SUBJECT CHOICE		3 p.m.		
German TD	SUBJECT		3 p.m.		
Spanish TD Italian	SUBJECT		3 p.m.		
TD Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S8	SUBJECT		3 p.m.		
	SUBJECT		9 p.m.		

	Nature	CM	Tutorial	Practical	Credits
Optional internship S8	MODULE				
Support (half of the Thursday afternoons when FISA staff are present)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Integrated QSE (Quality, Safety, Environment) Management System (SHES802_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Engineering and related techniques

Overview

Description

Students must be aware that quality, environmental, and occupational health and safety management systems are now essential in business. They must therefore have sufficient knowledge of these systems in order to take them into account and integrate them into their engineering work.

Objectives

- Understand the concepts and requirements of quality management (ISO 9001), safety (ISO 45001), and environmental (ISO 14001) standards.
- Learn how to implement an integrated QSE management system tailored to the specific structure and needs of an organization.
- Acquire the skills necessary to identify, assess, and manage risks related to quality, safety, and the environment.
- Explore auditing and monitoring techniques to ensure compliance and continuously improve the integrated management system.

Teaching hours

Lectures		Lecture	9
Tutorial		Tutorials	10.5

Mandatory prerequisites

None

Course outline

Topic 1: Quality Management

1. Introduction to quality management;
2. Standards: definition and history of quality, principles of certification;
3. Continuous Improvement: Kaizen, 5S, Lean, Six Sigma;
4. Process Approach;
5. TD: Computer modeling of a process, BPM, web publishing. Theme 2: Environmental Management

1. The environment, sustainable development, carbon footprint;
2. What is an EMS?
3. Standards, challenges;
4. The ISO 14001 standard;
5. The EMAS standard;
6. Implementing an EMS;
7. Practical work: Auditing a company's EMS, proposing eco-cards. Theme 3: Health and Safety at Work:

1. General information and challenges;
2. Stakeholders;
3. Legislation and OHS management system standards;
4. OHS and CSR

Targeted skills

- Ability to interpret and apply quality, safety, and environmental management standards.
- Ability to design and implement an integrated QSE management system within an organization.
- Skills in risk management and QSE performance evaluation.
- Mastery of audit and monitoring techniques to ensure compliance and continuous improvement.

Bibliography

Charvet, Denis. *Integration of management systems: Quality, Safety, Environment.* Paris, AFNOR, 2019. Pignal, François, and Pierre-Emmanuel Bardin. *The QSE manual: Quality, Safety, Environment.* Paris, Dunod, 2020. Bourgoin, Alain. *The ISO 9001 standard version 2015 in 50 questions.* Paris, AFNOR, 2018.

Baril, Pierre. *ISO 14001:2015 - Understanding and implementing an environmental management system.* Paris, AFNOR, 2017.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Elodie Gardet

+33 4 50 09 24 51

Elodie.Gardet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Management Techniques (SHES803_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This component of SHES is divided into two separate courses: Management and Ethics. The aim of this module is to understand the human and communication aspects of management and to develop students' managerial assertiveness.

Objectives

- Develop managerial assertiveness
- Manage a team responsible for implementing a project
- Understand the tasks and professional skills involved in implementing the project
- Know how to take a step back from complex situations and arbitrate conflicting needs related to project design
- Adopt an ethical and responsible management style

Teaching hours

Lectures		Lecture	18
Tutorial		Tutorials	7.5

Mandatory prerequisites

None

Course outline

Topic 1: Team management

- Understanding - The human dimension of management
- Communicate - The relational dimension of management

Topic 2: Ethics and psychosocial risks (PSRs)

- Mental load and information overload
- Stress at work and burnout
- Harassment (moral and sexual)

To supplement this topic on PSRs, students also have access to an e-learning training platform provided by INRS. This leads to the award of a certificate of achievement if 66% of the students' answers are correct.

Targeted skills

- Be able to express expectations and needs. Know how to communicate ideas clearly.
- Adopt active listening and establish positive professional relationships.
- Ability to analyze complex situations, evaluate available options, and make informed decisions based on organizational objectives.
- Know how to recruit, train, and develop team members, rally them around common goals, and foster a collaborative and productive work environment.
- Ability to identify, analyze, and solve problems encountered in the workplace using appropriate methods and tools.

Bibliography

Peretti, Jean-Marie, and Patrick Gilbert. *Management Styles: Choosing, Developing, and Implementing.* Paris, Dunod, 2014. Blanchard, Kenneth H., and Spencer Johnson. *The Management of Happiness.* Paris,

Éditions d'Organisation, 2019.

Goleman, Daniel. *Leadership: The Power of Emotional Intelligence.* Paris, Harvard Business Review Press, 2017.

Lecomte, Jacques. *Benevolent Management: What We Gain by Recognizing the Value of Others.* Paris, Odile Jacob, 2017.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Elodie Gardet
+33 4 50 09 24 51
Elodie.Gardet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

English (TOEIC level not achieved) S8 (LANG801_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Description

This course prepares students for the TOEIC ("Test of English for International Communication") exam, specifically to obtain a minimum score of 785 points (out of 990).

The TOEIC test will take place at the end of this semester at each of the sites on very similar dates. (Make-up sessions will take place in week 9).

Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam, depending on the semester.

Objectives

Specific objectives: at the end of this course, students will be able to:

continue practicing TOEIC exercises (4 parts of listening comprehension) + entire tests

work on a variety of audio and video materials (general English, business English, and specialized English) and speak spontaneously, interacting with the class

speak in a prepared manner and interact spontaneously through scientific presentations and on topics or issues related to the business world (job interviews, negotiations, discussions on technical/professional projects, wage inequality, international mobility, etc.)

Specific objectives: at the end of this course, students will be able to:

continue grammatical revision on: the conditional tense; all other tenses; expressing suggestions and modality/the passive voice; verbal structures (infinitive/ing)

improve their grammatical and lexical knowledge (general English, business English, and English specific to their scientific field), both in class and independently, validating their progress through regular tests.

Teaching hours

Tutorials	Tutorials	40.5

Mandatory prerequisites

LANG 701

Course outline

Course outline

1. **Review of important grammar points for the TOEIC**
    1. Review of all tenses covered or reviewed in S5, S6, and S7.
    2. The passive voice.
    3. Causative structures.
    4. BV / BVing or to BV.
    5. Linking words.
2. **Listening comprehension**
    1. Recorded dialogues in American, British, and New Zealand English.
    2. Videos in American, British, Australian English, etc.
3. **Reading comprehension**
    1. Press excerpts
    2. Various texts

Bibliography

Documents provided by Global Exam speakers

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern Languages (TOEIC Level Achieved) (LANG802_PACY)

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
English S8	SUBJECT		3 p.m.		
Modern Language 2	CHOICE				
German TD Spanish	SUBJECT		3:00		
TD Italian TD	SUBJECT		p.m.		
Chinese TD	SUBJECT		3:00		
Japanese TD	SUBJECT		p.m.		
Russian TD	SUBJECT		3:00		
Advanced English S8	SUBJECT		p.m.		
	SUBJECT		3:00		
	SUBJECT		p.m.		
	SUBJECT		3:00		
			p.m.		
			3:00		
			p.m.		
			9:00		
			p.m.		

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

English S8 (LANG802_PACYM1)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course focuses on acquiring professional English skills. Students will work on developing their fluency in the five skills (group project). Students will develop their skills through the study of specific topics and/or develop their intercultural knowledge.

Students will be assessed throughout the semester.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace in an international context.

Teaching hours

Tutorials	Tutorials	15

Mandatory prerequisites

TOEIC score of at least 785 and Lang701 or 702

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers

Targeted skills

Communicate independently, both orally and in writing, in all situations in a professional setting.

Bibliography

A variety of authentic materials provided by the speakers and/or students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern language 2

Polytech Annecy-Chambéry

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
German TD Spanish	SUBJECT		3 p.m.		
TD Italian TD	SUBJECT		3 p.m.		
Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S8	SUBJECT		3 p.m.		
	SUBJECT		9:00 p.m.		

Practical information

Locations

Annecy-le-Vieux (74)

Advanced English S8 (ENGL802_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This course is a training course in professional English. Students will work on their fluency in the five language skills by enriching their technical and professional vocabulary, through role-playing, cultural contributions, and written exercises (different topics from 602 and 702).

Activities will be carried out individually, in pairs, and/or in groups. Students will be assessed throughout the semester.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace in an international context.

Teaching hours

Tutorials	Tutorials	21

Mandatory prerequisites

Minimum TOEIC score of 785 – Semester 701 and/or 702 completed

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers.

Targeted skills

Communicate independently, both orally and in writing, in all situations in a professional setting.

Bibliography

A variety of authentic materials provided by the speakers and/or students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Optional internship S8 (PROJ800_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The optional internship aims to enrich students' academic and professional experience by offering them a practical opportunity to apply their knowledge and acquire new skills. An optional internship can be carried out **in France or abroad**. It must comply with the same general conditions as compulsory internships.

Objectives

- **Acquisition of** specific skills related to the specialization;
- **Refining career goals and/or** gaining confidence and independence through the completion of a project or specific tasks;
- Establish valuable professional contacts that can help in future job searches.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course Director, Polytech Business Relations

Relations-Entreprises.Polytech@univ-savoie.fr

Places

Annecy-le-Vieux (74)

Support (half of Thursday afternoons when FISA volunteers are present (ACCO801_PACY)

Polytech Annecy-Chambéry
component

In brief

Teaching methods: In person **Teaching format:** Tutored project **Open to exchange students:** Yes

Presentation

Description

This support is open to all students at the school: students, apprentices, and Continuing Education employees. It is not mandatory, as it is primarily intended for students who need it to succeed in their training. This semester, it is scheduled into the timetable for each course, with a total of 16 hours.

Support may take the form of refresher courses, upgrading courses, or support in the main areas of the training programs.

Peer tutoring is encouraged and the educational resources of the Polytech Network are used (https://eplanet.polytech-reseau.org/).

Objectives

To promote the success of all students in their educational journey.

Teaching hours

PTUT	Tutored project	16

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Director of Polytech Training

Locations

Annecy-le-Vieux (74)

Le Bourget-du-Lac (73)

UE802 Internship

ECTS
6 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Assistant Engineer Internship S8	MODULE				

Practical

Location

Annecy-le-Vieux (74)

S8 Assistant Engineer Internship (PROJ801_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

This is a professional internship as a technician or assistant engineer. The internship is to be carried out in a company or research organization on a topic closely related to the student's area of expertise, on a full-time basis and with a **maximum of 50% teleworking**.

Objectives

This internship, carried out within a company or organization whose activity is representative of the specialty chosen at the school, should enable students to:

- Integrate and participate in a professional organization;
- Discover professional methods and practices;
- Apply the student's theoretical and practical knowledge;
- Carry out tasks similar to those of technicians or assistant engineers.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course Director, Polytech Business Relations
Relations-Entreprises.Polytech@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE803 Data and Decision Support

ECTS
9 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Big Data	MODULE	7.5 hours		12 hours	
Machine Learning	MODULE	9 hours	9	12	
Business intelligence	MODULE	9	9	12 p.m.	
APP Data and Usage IT Project Data Flow and Concurrent Access	MODULE MODULE	4	a.m. 8 p.m.	4 p.m.	

Practical information

Locations

Annecy-le-Vieux (74)

Big Data (DATA831_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

With the advent of digital technology, data is becoming increasingly ubiquitous and so abundant that it is no longer possible to analyze it on a personal computer. Big Data was born among the Internet giants (Google, Amazon, Facebook, Yahoo) and has given rise to numerous tools that have become open source, such as Big Table, Hadoop, and MongoDB, to name but a few. The Big Data module presents the different approaches that exist for handling massive amounts of data, namely batch processing (with Hadoop and Map Reduce), live processing (with Apache Spark), and finally the lambda architecture, which combines the two approaches.

Objectives

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

- understand the three architectures and their use
- implement the three architectures

Teaching hours

Lectures	Lecture	7.5
Practical	Practical Work	12 hours

Mandatory prerequisites

- Large-Scale Distributed Systems (INFO 833)
- Distributed Databases (INFO 834)

Course outline

1. What is Big Data?
2. What are the characteristics of Big Data?
    1. Volume
    2. Speed
    3. Variety
3. From 3Vs to 5Vs
    1. Value
    2. Accuracy
4. Calculation process
    1. Map Reduce approach
    2. Streaming approach
    3. Lamba approach
1. Map Reduce approach for text data processing
2. Streaming approach for data flow analysis
3. Lambda architecture for analysis in the field of social networks

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Machine Learning (DATA832_IDU)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course provides an overview of machine learning, from its main principles to its implementation using specialized algorithms. The principles of learning are presented through a typology of the problems addressed and categories of learning. In concrete terms, formulating a learning problem involves specifying objectives, data, and models together. The formulated problem is then solved using an appropriate algorithm. While the main principles of learning apply to the various problems addressed, their resolution requires different algorithms. This course focuses on supervised and unsupervised classification problems. In this context, the main families of models (trees, neural networks, rules, etc.) and associated algorithms will be approached through practice and then revisited afterwards in order to extract the principles and concepts specific to the different methods.

Objectives

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

- formulate a learning problem using a triplet (data, objectives, models)
- to position a particular problem within the typology of problems addressed in machine learning
- formulate a procedure for evaluating a learned system

Teaching hours

Lectures	Lecture	9
Tutorial	Tutorials	9
Practical	Practical Work	12 hours

Mandatory prerequisites

- MATH741a,
- DATA732,
- INFO501,
- INFO641a

Course outline

1. Types of problems in machine learning
    1. Classification
    2. anomaly detection
    3. regression
    4. clustering
    5. reinforcement
2. Problem formulation and solution evaluation
    1. objectives
    2. data
    3. models and algorithms
    4. Supervised/unsupervised approaches
3. Supervised classification
    1. decision trees
    2. neural networks
    3. classifiers and Bayesian networks
    4. case-based reasoning
4. Unsupervised classification
    1. dimension reduction
    2. partitioning methods
    3. hierarchical methods
    4. Association rules

Bibliography

- Trevor Hastie Robert Tibshirani Jerome Friedman: The Elements of Statistical Learning, Springer
- E. Biernat, M. Lutz, Data Science: Fundamentals and Case Studies - Machine Learning with Python and R, Eyrolles 2015
- T.M Mitchell, Machine Learning, McGraw-Hill Series, 1997
- I.A Witten, E. Franck, Data mining - Practical machine learning tools and techniques with Java implementations, Morgan Kaufman Publishers, 1999

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Alexandre Benoit

+33 4 50 09 65 22

Alexandre.Benoit@univ-savoie.fr

Places

Annecy-le-Vieux (74)

Business Intelligence (INFO831_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course presents the statistical methods used in data analysis (factorial analysis) or in modeling the explanatory relationship of a variable (regression) and positions their use in the pyramid of modern business intelligence.

The first part of the course is devoted to factor analysis, which, by comparing the spaces of individuals and variables, enriches interpretation and reveals the internal structure of the data. The nature and coding of data lead to two essential variants of factorial methods, namely principal component analysis (PCA) and multiple correspondence analysis (MCA), combined in multiple factorial analysis (MFA).

The second part presents different regression models and methods for estimating their parameters, from linear models to more complex models, with potentially unknown structures, adapted to different assumptions about data distribution.

Objectives

Define a model suited to a data set based on one or more data analysis tools Estimate a multilinear statistical model and interpret the results obtained

Use a model for explanatory or predictive purposes

Teaching hours

Lectures	Lecture	9
Tutorial	Tutorials	9
Lab	Practical Work	12

Mandatory prerequisites

MATH741a, DATA732, ISOC631

Course outline

1. Decision-making and data analysis
2. Methods for Exploratory Analysis of Multidimensional Data
    1. PCA: Principal Component Analysis (quantitative variables)
    2. MCA: Multiple Correspondence Analysis (qualitative variables)
    3. MFA: Multiple Factor Analysis (groups of quantitative and/or qualitative variables)
3. Regressions
    1. Linear regression (simple, multiple)
    2. Polynomial regression
    3. Quantile regression
    4. Logistic regression
    5. Generalized linear model
    6. Nonparametric regression
    7. High-dimensional regression (ridge, lasso)

Bibliography

P.A. Cornillon, E. Matzner-Lober, Regression with R, Practical R Collection, Springer, 2011

T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning - Data Mining, Inference, and Prediction, Second Edition, Springer, 2013

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Abdourrahmane Atto
+33 4 50 09 65 27
Abdourrahmane.Atto@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

APP Data and Usage IT Project (PROJ831_IDU)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

The first project in semester 6 analyzed what data was needed to solve a problem, how to obtain it, and how to consolidate it so that it could be used. This second project aims to consider the next step in a Data Science project, namely data analysis and visualization: selecting the data characteristics to be used for analysis and considering the best ways to visualize this data to highlight it. This project will again start with a problem and, as in PROJ 631, seek to find the necessary data, format it, and then perform analysis and visualization. This module could be the subject of a challenge between a partner company and the students in the program. The company would provide the data, and a joint effort between the company and the students could lead to a solution to the problem at hand.

Objectives

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

- understand a problem statement related to the use of Big Data
- propose a comprehensive approach to solving the problem as a team
- design tools for collecting and formatting data
- visualize and highlight data

- perform qualitative and quantitative data analysis

Teaching hours

Tutorials	Tutorials	20

Mandatory prerequisites

- Data Analysis and Visualization (DATA 732)
- APP Data Analysis and Visualization (PROJ 731)
- Software Quality and Testing (INFO 832)

Course outline

Following on from the Data Analysis and Visualization APP (PROJ731_IDU), you will develop your project into an integrated system covering everything from acquisition to processing and visualization.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Data Flows and Competitive Access (PROJ832_IDU)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: English, French **Teaching methods:** In person **Open to exchange students:** Yes

Presentation

Description

This course aims to teach data flow management through hands-on experience. Handling large data flows requires mastery of input/output, network programming, and concurrent programming.

Objectives

- Advanced input/output manipulation;

- Program distributed solutions based on network sockets;

- Design and implement multi-threaded programs.

Teaching hours

Lectures		Lecture	4
Tutorial		Tutorials	16

Mandatory prerequisites

Object-oriented programming concepts (INFO641)

Course outline

1. Input/output in Java
   1. Streams
   2. Encapsulation
2. Network programming and sockets
   1. Network reminders
   2. TCP and UDP sockets
   3. Client/server model
3. Multi-threaded programming and synchronization
   1. Creating threads/thread pools
   2. Consistency and synchronization

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course manager Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE804 Computer Science and ECO-Design

ECTS
9 credits

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Data and software quality	MODULE	12 hours	12 hours	4	
Large-scale distributed systems	MODULE	12 hours	13.5 hours	15	
Distributed databases	MODULE	6 hours	6	28	
Business dimensions	MODULE	30			

Practical information

Locations

Annecy-le-Vieux (74)

Data and Software Quality (INFO832_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course aims to provide students with the skills necessary to evaluate data quality, initially, and software quality, subsequently.

Objectives

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

- evaluate data quality
- design a software quality assurance plan
- put a software quality assurance plan into practice
- define all test sets for a software product
- define test suite validation criteria
- implement a test suite

Teaching hours

CM	Lecture	12 p.m.
Tutorial	Tutorial	12
Lab	Practical Work	4
PTUT	Supervised project	12

Mandatory prerequisites

- INFO 501
- MATH 631
- INFO 641

Course outline

1. Data Quality
2. Software Quality Assurance (SQA)
    1. Issues
    2. The SQA plan
    3. ISO, CMM, CMMI-DEV standards, etc.
    4. Quality metrics
3. Software testing
    1. Who? What? Where? When? How? How much? Why? (5W1H)
    2. Test design methods (white box/black box, assertion/negation.....)
    3. From plan to test report
4. Software reengineering
    1. Reverse engineering
    2. Reengineering patterns

- TP1 Data quality
- TP2, 3, and 4 Project Quality Testing and Software Reengineering

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Large-scale distributed systems (INFO833_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course aims to teach students how to master large-scale distributed systems, particularly those that manage large amounts of data. We address both conceptual issues (the fundamentals of distributed algorithms) and technical issues (implementing scalable architectures). Particular attention will be paid to performance, robustness, and environmental aspects.

Objectives

- Understanding issues related to large scale, heterogeneity, asynchrony, fault detection, resource consumption;
- Implementing scalable architectures (data, services).

Teaching hours

Lectures	Lecture	12
Tutorial	Tutorials	13.5
Lab	Practical Work	15

Mandatory prerequisites

INFO632 (operating systems) and PROJ731 (concurrent programming, data flow).

Course outline

1. Distributed systems foundations
2. Architectures
   1. Client-server model
   2. Peer-to-peer model
   3. Complex architectures
3. Distributed algorithms
   1. Broadcast
   2. Failure detection
   3. Consensus
4. Large-scale data management
   1. Redundancy
   2. Distributed hash tables
   3. Large-scale distributed data management systems, NoSQL
5. Simulation of large-scale distributed systems
   1. Large-scale experiments
   2. Simulation approaches

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Distributed databases (INFO834_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course focuses on the design and implementation of distributed databases for Big Data. Two aspects are covered: data organization (representation, storage, distribution) and processing organization (definition, distribution, retrieval).

Objectives

The objective of this course is to provide students with the knowledge and skills they need to choose, design, and implement a data representation and processing system tailored to the needs of the application or computer system to be developed in a big data context.

Teaching hours

Lectures	Lecture	6
TD	Tutorials	6
Lab	Practical work	28

Mandatory prerequisites

INFO633_IDU

Course outline

1. Introduction to distributed databases for Big Data: requirements and characteristics
2. Fundamental concepts of NoSQL DBMS (vs. SQL): implicit schema, key-value pairs, document-oriented or column-oriented databases
3. CAP theorem and BASE properties of NoSQL DBMS
4. Development of NoSQL distributed databases (Redis, MongoDB, Neo4j, Parquet)

Tutorials and practical work will enable students to implement the various technologies. A mini integrative project carried out in teams will conclude the module.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Ilham Alloui

+33 4 50 09 65 87

Ilham.Alloui@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Business dimensions (ISOC831_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes
ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

The role of Data Scientist consists of three parts:

- Knowledge of statistics
- Knowledge of computer science
- Business dimension

The objective of this module is to focus on the third part, namely the business dimension, through meetings with professionals who are confronted with Data Science issues.

Objectives

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

- identify the tasks assigned to a data scientist in a company
- position themselves in the job market

Teaching hours

Lectures	Lectures	30

Mandatory prerequisites

None

Course outline

The course consists of several 4- to 8-hour lectures, each independent of the others. The content of the lectures depends on the professionals involved during the year.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE901 Bridge to the professional pathway

ECTS
10 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Research and Development Project	MODULE				

	Nature	CM	Tutorial	Practical	Credits
English (TOEIC level not achieved) S9	MODULE		40.5		
Modern languages (TOEIC level achieved)	MODULE				
English S9 Modern language 2	SUBJECT CHOICE		3 p.m.		
German TD	SUBJECT		3 p.m.		
Spanish TD Italian	SUBJECT		3 p.m.		
TD Chinese TD	SUBJECT		3 p.m.		
Japanese TD	SUBJECT		3 p.m.		
Russian TD	SUBJECT		3 p.m.		
Advanced English S9	SUBJECT		3 p.m.		
	SUBJECT		9 p.m.		

	Nature	CM	Tutorial	Practical	Credits
Optional internship S9	MODULE				

Practical

Places

Annecy-le-Vieux (74)

Research and Development Project (PROJ901_PACY)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The Research and Development Project (PRD) is an educational activity involving a partnership between the PAC School and a professional organization or research laboratory.
This activity allows students to acquire (or strengthen) their experience in research and development.

Objectives

The R&D Project aims to strengthen engineering students' R&D skills by enabling them to

- carry out and manage a research and development project in an industrial or research context,
- apply and expand the skills acquired during their training in their specializations
- solve problems while taking into account constraints such as cost, deadlines, quality, etc.
- interact within a team,
- organize themselves to achieve set objectives by planning the various stages,
- effectively monitor progress.

Teaching hours

PTUT	Tutored project	15
PROJ	Project	125 hours

Mandatory prerequisites

First year of the engineering program (FI3) for all specializations

Course outline

The first sessions are supervised by teaching and scientific tutors.

Students carry out bibliographic, analytical, and synthesis work, partly independently, during this period.

Supervisors agree on the frequency of meetings to review progress, in order to provide the best possible support for students in carrying out their projects.

Bibliography

Depends on the R&D topic

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Nirina Chhay

+33 4 79 75 88 93

Nirina.Chhay@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

English (TOEIC level not achieved) S9 (LANG901_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course prepares students for their entry into professional life. Conducting or participating in a meeting: vocabulary and structures related to this aspect while continuing to work on the four skills, but with an emphasis on realistic scenarios (role-playing, acquisition of technical vocabulary (depending on the site) and business vocabulary, etc.). But also public speaking through presentations given by students in groups and/or individually, on topics illustrated by press articles or video materials (VTD: Video, Talk and Debate). Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam.

Objectives

Specific objectives: at the end of this course, students will be able to:

Continue lexical and grammatical revisions focusing specifically on the areas tested in the TOEIC. Intensify training on TOEIC exercises (7 parts) / entire tests.

Specific objectives: at the end of this course, students will be able to:

listen regularly to news on English-language news sites (CNN, BBC, Sky News, etc.) and be able to succinctly summarize the main points orally, interacting with the class group

conduct research (in groups and individually) to develop an innovative (professional/cultural) project as a team, to be presented in class, after anticipating and simulating the steps involved with economic actors capable of helping the team to develop it, according to the stages of a credible business plan: writing emails, telephone interviews, recruitment, fundraising, etc.

present the collective project.

Teaching hours

Tutorials	Tutorials	40.5

Mandatory prerequisites

LV 801

Course outline

1. **Use of structures, vocabulary, concepts, and functions necessary for effective oral and written expression:**
   1. Tenses
   2. Questioning (in a professional context)
   3. Connecting words
2. **Listening comprehension:**
   1. Recorded dialogues in American, British, and New Zealand English...
   2. Videos in American, British, Australian English, etc.
3. **Reading comprehension:**
   1. Press excerpts
   2. Various texts

Bibliography

- Documents distributed by speakers
- Various websites, a list of which is provided at the beginning of S5
- Global Exam

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern Languages (TOEIC Level Achieved) (LANG902_PACY)

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
English S9	SUBJECT		15		
Modern Language 2	CHOICE				
German TD Spanish	SUBJECT		3:00		
TD Italian TD	SUBJECT		p.m.		
Chinese TD	SUBJECT		3:00		
Japanese TD	SUBJECT		p.m.		
Russian TD	SUBJECT		3:00		
Advanced English S9	SUBJECT		p.m.		
	SUBJECT		3:00		
	SUBJECT		p.m.		
	SUBJECT		3:00		
			p.m.		
			3:00		
			p.m.		
			9:00		
			p.m.		

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

English S9 (LANG902_PACYM1)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

Simulated job application followed by a job interview in English

Objectives

Become confident in face-to-face or telephone job interviews

Teaching hours

Tutorial	Tutorials	15

Mandatory prerequisites

Validated TOEIC score of at least 785 and validated semester 802

Course outline

Writing resumes and cover letters, telephone interviews, and mock job interviews

Targeted skills

Communicate independently in job interviews

Bibliography

Various documents provided by instructors and students as needed

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Modern language 2

Polytech Annecy-Chambéry

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
German TD Spanish	SUBJECT		3:00		
TD Italian TD	SUBJECT		p.m.		
Chinese TD	SUBJECT		3:00		
Japanese TD	SUBJECT		p.m.		
Russian TD	SUBJECT		3:00		
Advanced English S9	SUBJECT		p.m.		
	SUBJECT		3:00		
			p.m.		
			3:00		
			p.m.		
			3:00		
			p.m.		
			9:00 p.m.		

Practical information

Locations

Annecy-le-Vieux (74)

Advanced English S9 (ENGL902_PACY)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This course is a training course in professional English. Students will work on their fluency in the five language skills by enriching their technical and professional vocabulary, through role-playing, cultural contributions, and written exercises (different topics from 602, 702, and 802).

Activities will be carried out individually, in pairs, and/or in groups. Students will be assessed throughout the semester.

Objectives

The objective is to improve students' autonomy in the English-speaking workplace in an international context.

Teaching hours

Tutorials	Tutorials	21

Mandatory prerequisites

Minimum TOEIC score of 785 – Semester 801 and/or 802 completed

Course outline

Various presentations by professionals, mainly English-speaking teachers or external speakers.

Targeted skills

Communicate independently, both orally and in writing, in all situations in a professional setting.

Bibliography

A variety of authentic materials provided by the speakers and/or the students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Optional internship S9 (PROJ900_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The optional internship aims to enrich students' academic and professional experience by offering them a practical opportunity to apply their knowledge and acquire new skills. An optional internship can be carried out **in France or abroad**. It must comply with the same general conditions as compulsory internships.

Objectives

- **Acquisition of** specific skills related to the specialty;
- **Refining career goals and/or** gaining confidence and independence through the completion of a project or specific tasks;
- Establishing valuable professional contacts that can help in future job searches.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contacts

Polytech Business Relations

Relations-Entreprises.Polytech@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE902 Optimization and HPC

ECTS
10 credits

Polytech Annecy-Chambéry component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Optimization and multi-criteria decision support	MODULE	12	12	16	
High-performance computing and cloud computing	MODULE	7.5 hours	7.5	24	
Project Uses	MODULE			40	

Practical information

Locations

Annecy-le-Vieux (74)

Optimization and multi-criteria decision support (INFO931_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Engineering and related techniques

Overview

Description

This course aims to address multi-criteria problems from two different angles: optimization and decision support. In both cases, the general problem is presented before detailing the different approaches. Multi-criteria optimization is addressed using evolutionary algorithms (genetic algorithms, genetic programming). The various elements of artificial evolution are presented before addressing multi-criteria optimization through dominance-based approaches and presenting the Non-dominated Sorting Genetic Algorithm (NSGA). Multi-criteria decision support is used in decision-making problems to find the best possible solution(s) and make the decision-making process more explicit, rational, and effective. The decision-maker is assisted by automatic tools to construct one or more preference models. The different types of problems addressed and models developed lead to various methods and implementation tools presented in this course.

Objectives

- Define the key steps in the modeling phase: set of alternatives, problem, criteria;

- Choose an appropriate method for finding optimal solutions or compromises;

- Implement a decision support method on a concrete case using appropriate computer tools.

Teaching hours

Lectures	Lecture	12
Tutorial	Tutorials	12 p.m.
TP	Practical Work	4 p.m.

Mandatory prerequisites

- DATA731
- PROJ731
- INFO831

Course outline

1. Introduction
2. Evolutionary optimization
    1. Artificial evolution and principles of evolutionary algorithms
    2. Multi-criteria problems
    3. Dominance and Pareto front
    4. Multi-criteria evolutionary optimization
    5. NSGA algorithm
3. Multi-criteria decision support
    1. Typology of problems addressed
    2. Different approaches: outranking, aggregation
    3. Overview of the main methods: Electre, UTA, AHP, MACBETH
    4. Tools

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

High-Performance Computing and Cloud Computing (INFO932_IDU)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Overview

Description

This course aims to provide an understanding of the specific features of cloud computing (on-demand resources, virtualization, deployment, ...) and high-performance computing.

Objectives

- Understand the principles of virtualization;

- Build, configure, and deploy virtual machines.

Teaching hours

Lectures	Lecture	7.5
Tutorial	Tutorials	7.5
Lab	Practical work	24

Mandatory prerequisites

Good knowledge of systems, distributed systems, networks.

Course outline

1. High-performance computing (HPC)
    1. HPC architectures
    2. Parallel programming (MPI / OpenMP)
2. Cloud computing
    1. Introduction, definitions
    2. Elasticity: isolation and consolidation
    3. Virtualization techniques
    4. Deployment
    5. Data storage in clouds
3. Virtualization overhead and HPC

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course manager Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Usages Project (PROJ931_IDU)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French, English

Type of teaching: Personal and professional project

Open to exchange students: Yes

Presentation

Description

Data has become crucial information for companies, which seek to leverage it. This leverage may be internal, for example to better understand their customers, but as is often the case with Internet companies, it involves reselling this data to third parties for targeted advertising, for example. It is becoming important to master data acquisition and exploitation.

This project deals with data in the broadest sense and should highlight issues such as data management policies, security, data confidentiality, and data exploitation.

The specific topic is to be defined in collaboration with the company.

Objectives

- Obtain data that may be confidential or private.

- Understand the concepts of data security;

- Know how to manage data;

- Apply a security policy to data.

Teaching hours

Practical work	Practical work	40

Mandatory prerequisites

Collaborative platforms (ISOC 631) Data economics and governance (ISOC 731) Security and cryptography (INFO 731)

Course outline

The topics covered and the project schedule vary depending on the project subject and the professionals involved.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Location

Annecy-le-Vieux (74)

UE903 Data and Decision Support

ECTS
10 credits

Polytech Annecy-Chambéry component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Machine Learning	MODULE	12 hours	12	4 p.m.	
Innovation and Research	MODULE	6 p.m.	12 hours	20	
APP Data Science Project	MODULE			40	

Practical information

Locations

Annecy-le-Vieux (74)

Machine Learning (DATA931_IDU)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French, English **Teaching methods:** In person **Open to exchange students:** Yes

ERASMUS reference: Information and Communication Technologies (ICT)

Presentation

Description

This module follows on from modules DATA832 and INFO831, in which the basics of data science were presented through the various paradigms of machine learning and exploratory statistics and tested using basic algorithmic machinery, highlighting the limitations of basic modeling tools. This module presents a set of advanced methods that extend the fundamentals of learning. Each approach improves the learning process by focusing on a particular aspect, such as reducing decision variance, handling nonlinear problems, or learning from a very large number of examples and automatically extracting features. A conceptual presentation of the different methods will be accompanied by a discussion of their implementation and experimentation based on concrete cases from research and development.

Objectives

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

- present applications that have contributed to the success of modern approaches in machine learning and analyze their characteristics
- formulate the basic principles and concepts of the main modern approaches

- install, configure, and use advanced learning libraries in Python
- experiment with advanced learning techniques for object classification using massive reference databases
- design and develop their own advanced learning application in the context of big data

Teaching hours

Lectures	Lecture	12
Tutorial	Tutorials	12
Lab	Practical Work	4 p.m.

Mandatory prerequisites

- DATA832
- INFO831

Course outline

Overview of advanced methods for big data

1. Ensemble methods (bagging, random forests, boosting)
2. Support vector machines and kernel methods
3. Deep learning
4. Fuzzy approaches

Bibliography

- T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning - Data Mining, Inference, and Prediction, Second Edition, Springer, 2013
- I. Goodfellow, Y. Bengio, A. Courville, Deep learning, MIT Press book, 2016

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Alexandre Benoit
+33 4 50 09 65 22
Alexandre.Benoit@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Innovation and Research (ISOC931_IDU)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** French, English
- **Teaching methods:** In person
- **Teaching format:** Lectures and seminars
- **Open to exchange students:** Yes
- **ERASMUS reference:** Engineering and related techniques

Presentation

Description

The objective of this module is to provide the methodological foundations

1. for documentary research
2. a bibliographic synthesis, i.e., the review and critical analysis of a set of documents on the same topic, based on explicit criteria
3. a detailed critical analysis of a specific scientific document

Objectives

The objective of this module is to provide the methodological foundations

1. for documentary research
2. a bibliographic review, i.e., a summary and critical analysis of a set of documents on the same topic, based on explicit criteria
3. a detailed critical analysis of a specific scientific document

Teaching hours

Lectures	Lecture	6
TD	Tutorials	12
Lab	Practical Work	20

Mandatory prerequisites

All modules of the course

Course outline

1. Documentary methodology
    1. Documentary research
    2. Information validation
    3. Documentary monitoring
    4. Writing a detailed critical analysis of a specific document
2. Bibliographic synthesis
    1. Identify elements of common interest in the documents
    2. Analyze and evaluate each document against criteria
    3. Compare the documents
    4. Establish a common thread and organize the summary
    5. Write, eliminate redundancies

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Alexandre Benoit
+33 4 50 09 65 22
Alexandre.Benoit@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Data Science Project APP (PROJ932_IDU)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: French, English **Teaching methods:** In person **Type of instruction:** Tutored project **Open to exchange students:** Yes

Presentation

Description

Description

Previous projects (PROJ 631, 831, 931) focused on development and operation on a personal computer. In this project, the aim is to go beyond the limitations of a single machine and consider a Big Data approach and its 3Vs: Volume, Velocity, and Variety. For this project, students will be required to provide a turnkey system (via a virtual machine or Docker container) that addresses the problem at hand. They will therefore need to identify the necessary architecture to implement, the tools to use or create, and the databases to define, all within a cloud environment.

Objectives

- Understand a Data Science problem in its entirety;

- Define the complete process from data acquisition to data visualization and results;

- Design a system that requires massive data and distributed computing;

- Provide a turnkey system to replicate the process.

Teaching hours

Practical work	Practical work	40

Mandatory prerequisites

- Large-scale distributed systems (INFO 833)
- Distributed Databases (INFO 834)

Course outline

The topics covered and the course schedule are variable and depend on the chosen subject.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Sebastien Monnet

+33 4 50 09 65 24

Sebastien.Monnet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE001 Engineering Internship

ECTS
30 credits

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
S10 engineering internship	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

S10 Engineering Internship (PROJ001_PACY)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The internship must be completed in a company or research organization related to the student's area of expertise, on a full-time basis and with a **maximum of 50% teleworking**.

Objectives

This is an internship carried out within a company or research laboratory, department, or organization whose activity is representative of the student's specialty. This internship should enable students to:

- apply the student's theoretical and practical knowledge;
- verify their aptitude for engineering roles.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course Director, Polytech Business Relations

Relations-Entreprises.Polytech@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE501 SHES - Languages

ECTS
8 credits

Polytech Annecy-Chambéry
component

List of courses

	Type	Lectures	Tutorial	Practical	Credits
Support (every Thursday afternoon)	MODULE				

	Nature	CM	Tutorial	Practical	Credits
Labor law and corporate structure 1	MODULE	8 p.m.	12		
Introduction to Sustainable Development and CSR - Cognitive Development English	MODULE MODULE	4 p.m.	p.m. 12 p.m. 37	4	

Practical information

Locations

Annecy-le-Vieux (74)

Labor Law and Corporate Structure 1 (SHES510_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

Presentation

Description

Common economic concepts used to characterize the economic situation of a company, their content and meaning, and understanding the distinction between economics and finance.

Concepts of labor law.

Objectives

This course aims to enable students to:	Level	At the end of this course, students will be able to:
understand the major changes in the economic world (production economy/market economy) and the elements of the business environment, their roles, and their expectations.	Master	understand the economic workings of their company and/or projects
understand the challenges facing the company and why a company must evolve,	Master	Participate in the necessary evolution of the company

both in terms of its services (adapting to demand, innovation) and its organization (cost reduction, continuous improvement)		
know the common economic terms used to describe the company's economic situation, their content, and their meaning, and know and understand the difference between economics and finance	Master	of reading an income statement and a balance sheet
		to draw up a simple provisional budget and an economic approach to an improvement measure
Have a basic understanding of labor law	Know	Knowing your rights within the company

Teaching hours

Lectures		Lecture	8 p.m
Tutorial		Tutorials	12

Mandatory prerequisites

- Have completed an internship in a company
- Knowledge of basic economic vocabulary
- Knowledge of the company, its structure, and its management

Course outline

1. Knowledge of the company
   - The economic environment (customers, suppliers, shareholders, banks, government, local authorities, social organizations, competitors, social partners, etc.)
   - Changes in the economic world and their impact on fundamental economic reasoning (market economy, globalization, etc.)
   - Customer needs, the need for innovation
   - Different possible scenarios for increasing profits
   - The concept of useful value for the customer and economic waste
2. The concept of economics
   - Definition of the main terms used in the income statement (influence of inventories, depreciation mechanism, payroll and its content, taxes, profits, availability of earnings)
   - Definition of key terms in the balance sheet (fixed assets, receivables/payables, concept of provisions and risk, financing: share capital and loans)

- The dynamics between the income statement and balance sheet (the main mechanisms, interests of the various stakeholders: shareholders, bankers, employees, etc.)
- The company's cash flow and its availability over time (VAT mechanism, depreciation, and borrowing)
- The implementation of economic indicators at the workshop level (types of indicators, limitations)
- Drawing up a simple provisional budget (principle)

3. Introduction to legislation
   - Different types of employment contracts
   - The powers of the employer
   - Working conditions
   - Remuneration for work
   - Events affecting the employment contract
   - Termination of the employment contract
   - Procedures and consequences of dismissal
   - Employee representation

Additional information

Bibliography

My small business day-to-day. From balance sheets to financial analysis: understanding, managing, analyzing Nadine BONHIVERS

BUSINESS solutions

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Véronique Saudrais

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Introduction to Sustainable Development and CSR - Cognitive Development (SHES511_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

The Cognitive Development course aims to open engineering students' minds to SHEJS and provide them with useful guidelines for advancing their projects, both personally and professionally.

The Sustainable Development section lays the foundations for ethics and CSR.

Objectives

Acquire benchmarks and tools to optimize learning

Learn the basics of corporate social responsibility and sustainable development

Teaching hours

Lectures	Lecture	16
Tutorial	Tutorials	12
Lab	Practical Work	4

Mandatory prerequisites

None

Course outline

1. Introduction to sustainable development

- Why companies take the environment into account in their strategy (environmental issues, industrial accident prevention, environmental regulations, etc.).
- Introduce the environmental management system (as defined by ISO 14001), its principles, organization, and benefits for businesses.
- Introduce other environmental approaches and how they fit together (energy management, carbon accounting, and eco-design). Normative aspects are also introduced.

2. Cognitive development.

- Understanding SHEJS and their usefulness in engineering training
- Learn how to manage a project in the broadest sense (neuroscience: plasticity and objectives, the importance of defining objectives, mental processes including memorization and the forgetting curve, etc.)
- Finding your bearings to optimize learning (neuroscience: 4 pillars of learning, role of attention, VAKOG model. .....)
- Finding your bearings to be effective (optimal conditions for brain use, identification of personality profiles—the "Brain Preferences" model—organization, identification of resources.)

Additional information

Bibliography

CSR and sustainable development: Labels, reporting, CSRD, ISO 26000, SDGs - Alain Jounot Journey Beyond My Brain - Dr. Jill Bolte Taylor

Inaugural lecture at the Collège de France "Towards a science of mental life" - Stanislas Dehaene Face to face with your brain - Stanislas Dehaene

A Day in Anna's Brain - Sylvie Chokron Cognition: Theories and Applications - Reed,

Stephen K.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (LANG510_PACYFISA)

Polytech Annecy-Chambéry
Component

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course prepares students for the TOEIC (Test of English for International Communication) exam, specifically to obtain a minimum score of 785 points (out of 990).

With the aim of developing all four skills, this course also serves as an introduction to public speaking through presentations given by students in groups or individually on topics illustrated by press articles or video materials (VTD: Video, Talk and Debate, as well as written work).

Students are assessed throughout each semester.

Objectives

Specific objectives: at the end of this course, students will be able to:

listen regularly to news on English-language news sites (CNN, BBC, Sky News, etc.) and be able to succinctly summarize the main points orally, interacting with the class group.

work with a variety of audio and video materials and speak spontaneously in an interactive manner with the class

to speak in a prepared manner and interact spontaneously through individual presentations (self-presentation and/or article reports, such as "quizzes") and presentations in pairs (various topics)

work on telephone conversations (comprehension/production)

practice TOEIC exercises (4 parts of listening comprehension) + entire tests

Teaching hours

Tutorials	Tutorials	37

Mandatory prerequisites

CEFR level B1

Course outline

Course outline

1. **Oral**
    1. Elements of phonology
    2. Grammar (tenses, questions, adjectives.....)
    3. Reinforcement of structures and vocabulary
    4. Interactive oral communication
    5. Introduction to and practice for the TOEIC (listening section)
2. **Writing**
    1. Review of grammatical elements (tenses, questioning, adjectives. .....)
    2. Translation (theme/version)
    3. Reading comprehension in authentic language
    4. Curriculum vitae (in S5, S6, or S7 at the latest)
    5. Cover letter/letter of motivation (in S5, S6, or S7 at the latest)
    6. Introduction and training for the TOEIC (reading section)

Additional information

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE502 Work experience

ECTS
4 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Project 1 (Launch and follow-up)	MODULE	1		4	
Evolution in business	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Project 1 (Launch and monitoring) (PROJ501_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** French
- **Teaching methods:** In person
- **Teaching format:** Learning and assessment situations
- **Open to exchange students:** Yes

Presentation

Description

Understanding the host company and the expectations of the engineering profession

Take a step back to look at the integration process and the effectiveness of the company's approach to monitoring apprentices

Objectives

Identify the essential workings of the company

understand your role within your company and take a step back to view it objectively understand what is expected of an

engineer

Teaching hours

Lectures		Lecture	1
Lab		Practical work	4
Other		Other	2

Mandatory prerequisites

None

Course outline

Launch

Support: developing an action plan to ensure project success

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Corporate Development (STAG501_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** French
- **Teaching methods:** In person
- **Teaching format:** Learning and assessment situations
- **Open to exchange students:** Yes

Presentation

Description

Analysis of the apprentice's progress during their integration into the company.

Objectives

The tasks assigned to the apprentice should enable them to discover the company.

Mandatory prerequisites

None

Course outline

An assessment carried out by the company in January.

Additional information

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE503 Specialized Sciences

ECTS
18 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Project management	MODULE	6	6	28	
Digital companies	MODULE	13.5 hours	22.5	4	
Graphs and Recursion Assessment Skills Info BD	MODULE	12	12	4 p.m.	
and Algorithms	MODULE		hours		
General discrete mathematics	MODULE		20		
	MODULE	12	hours		
			40		
			hours		
			40		

Practical information

Locations

Annecy-le-Vieux (74)

Assessment Info Skills (INFO530_IDUFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In-person
Teaching format: Tutorials **Open to exchange students:** Yes

Presentation

Description

The aim of this module is to assess the various IT skills of apprentices when they enter S5.
It provides an overview of their learning so that support sessions can be organized on Thursday afternoons for apprentices who do not have the prerequisites for the IT modules of the program.
This involves identifying the support needs of each apprentice.

Objectives

- Identify apprentices' IT support needs by assessing various aspects of IT (analysis, design, programming, etc.).

- Based on the skill levels validated, direct apprentices to the appropriate support sessions.

Teaching hours

Tutorials	Tutorials	20

Course outline

The sessions will focus on assessing basic skills in:

- algorithms
- programming
- analysis and design
- computer system modeling
- operating systems.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Ilham Alloui
+33 4 50 09 65 87
Ilham.Alloui@univ-savoie.fr

Location

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

BD and Algorithms (INFO533_IDUFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

Presentation

Description

This course covers the basic and advanced concepts of data representation, algorithms, and databases that are essential for solving computer science problems. The course is based on the Python and SQL languages.

Objectives

At the end of the course, students will be able to choose and justify their choice of data structures, algorithms, and relational data architectures for a given computer science problem.

Teaching hours

Lectures		Lecture	12
Tutorial		Tutorials	40

Mandatory prerequisites

Basics of programming and relational databases

Course outline

1. Data structures
2. Algorithms
3. Relational databases

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Olivier Arnaez
+33 4 79 75 85 85
Olivier.Arnaez@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

General Discrete Mathematics (MATH532_IDUFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In-person
Teaching format: Tutorials **Open to exchange students:** Yes

Presentation

Description

The General Discrete Mathematics course presents the fundamental concepts for the study of discrete structures. It develops essential methods and tools for modeling, analyzing, and solving mathematical and computer science problems.

Objectives

- Acquire the theoretical foundations necessary to understand the discrete structures used in mathematics and computer science.
- Manipulate sets, relations, and functions, and use these concepts in concrete problems.
- Understand and use formal languages to model problems and study simple automata.
- Master the fundamental concepts of number theory.
- Apply probability and discrete statistics methods to model and analyze discrete random phenomena.
- Prepare the groundwork for applications in algorithmics, cryptography, theoretical computer science, and data analysis.

Teaching hours

Tutorials	Tutorials	40

Mandatory prerequisites

None

Course outline

1. Set theory
2. Number theory
3. Language theory
4. Probability and discrete statistics

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE601 SHES - Languages

ECTS
4 credits

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Introduction to sustainable development and CSR	MODULE	6 hours	4		
Sustainable development - Site approach (Environmental management)	MODULE	4	6		

	Nature	CM	Tutorial	Practical	Credits
Support (every Thursday afternoon when FISA staff are present)	MODULE				

	Nature	CM	Tutorial	Practical	Credits
English (TOEIC level not achieved)	MODULE		30 hours		
English (TOEIC level achieved)	MODULE		30 hours		

Practical information

Locations

Annecy-le-Vieux (74)

Introduction to Sustainable Development and CSR (SHES611_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

Global warming and sustainable development Responses and strategy

GEDES

Objectives

Acquire a foundation of knowledge and skills in ecological transition for sustainable development (TEDS)

Teaching hours

Lectures		Lectures	6
Tutorial		Tutorials	4

Mandatory prerequisites

Basic knowledge of the environment

Course outline

Understanding global warming: causes, consequences, global challenges, and implications for the industrial sector;

- Understanding the evolution of the concept of sustainable development;
- Understanding responses to the climate crisis and identifying different approaches (international agreements, legislative framework, climate strategy);
- Developing a strategic vision to integrate climate issues and the need for ecological transition for an industrial company;
- Understanding what a Greenhouse Gas Emissions Assessment (GHG EA) is;
- Understand the GHG inventory methodology and know how to carry out a GHG inventory for an industrial company;
- Identify concrete actions to reduce GHG emissions and develop an action plan based on the project mode.

Additional information

Bibliography

Global Warming John Houghton

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Claire Roset

Course coordinator Laure Comble

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Sustainable Development - Site Approach (Environmental Management) (SHES612_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

Energy production and environmental issues

Objectives

Acquire a foundation of knowledge on energy issues, energy production systems, and the methodology for implementing an energy transition strategy.

Teaching hours

Lectures	Lecture	4
Tutorial	Tutorials	6

Mandatory prerequisites

Basic knowledge of the environment

Course outline

1. Understanding the main challenges of global energy production
2. Understand the current energy situation in France, energy transition scenarios, and public policies for achieving carbon neutrality;
3. Introduction to the building sector: present the different energy systems available for powering a building and understand the advantages and disadvantages of each;
4. Understanding the challenges of building regulations;
5. Understand the methodology and know the tools needed to implement an energy transition strategy for built heritage;
6. Have a basic understanding of energy transition financing.

Additional information

Bibliography

Energy Transition and Climate, 1st edition

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Claire Roset

Course coordinator Laure Comble

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level not achieved) (LANG610_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course prepares students for the TOEIC test ("Test of English for International Communication") and, more specifically, for obtaining a minimum score of 785 points (out of 990).

Students are assessed throughout each semester. The final assessment consists of a 1- or 2-hour exam.

Objectives

Specific objectives: at the end of this course, students will be able to:

work on telephone conversations (comprehension/production)

listen regularly to news on English-language news sites (CNN, BBC, Sky News, etc.) and be able to succinctly summarize the main points orally, interacting with the class

work on a variety of audio and video materials and speak spontaneously in an interactive manner with the class

speak in a prepared manner and interact spontaneously through individual presentations (self-presentation and/or article reports, such as "quizzes") and presentations in pairs (various topics)

practice TOEIC exercises (4 parts of listening comprehension) + entire tests

Teaching hours

Tutorials	Tutorials	30

Mandatory prerequisites

LANG510

Course outline

Course outline

1. **Review of important grammar points for the TOEIC**
   1. Nouns
   2. Pronouns
   3. Linking words...
2. **Listening comprehension**
   1. Dialogues recorded in American, British, and New Zealand English....
   2. Videos in American, British, and Australian English...
3. **Reading comprehension**
   1. Press excerpts
   2. Various texts

Additional information

Bibliography

Documents provided by Global Exam contributors

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level achieved) (LANG611_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This course prepares students for their entry into professional life. Conducting or participating in a meeting: vocabulary and structures related to this aspect while continuing to work on the four skills, but with an emphasis on realistic scenarios (role-playing, acquisition of technical vocabulary and business vocabulary, etc.). It also covers public speaking through presentations given by students in groups and/or individually. Students are assessed throughout the semester.

Objectives

To be and become as autonomous as possible in an industrial context in English.

Teaching hours

Tutorials	Tutorials	30

Mandatory prerequisites

TOEIC validated with a minimum score of 785 for apprenticeship students or 600 for continuing education students and Lang510_GICM

Course outline

Various presentations by specialists in industrial and business-related fields, mainly English speakers

Additional

Targeted skills

Greater autonomy in order to communicate in all circumstances in an international setting

Bibliography

Various documents provided by the speakers and/or the students themselves.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE602 Work experience

ECTS
10 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Project 1 (Monitoring and reporting)	MODULE			4 hours	
Career development (4 areas)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Project 1 (Monitoring and reporting) (PROJ601_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** English
- **Teaching methods:** In person
- **Teaching format:** Learning and assessment situations
- **Open to exchange students:** Yes

Overview

Description

Prepare for active participation in business projects.

Objectives

Establish the methodological foundations for problem solving and project management:

- Identify practices related to projects within the company
- know how to define a project
- draw up initial specifications

Teaching hours

Practical work	Practical work	4
Other	Other	1

Mandatory prerequisites

First part in semester 5

Course outline

Workshop: managing an action plan (creation, modification, and monitoring) & Tools/Methods for project management/problem solving Defense

Additional

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Corporate Development (4 areas) (STAG601_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This monitoring allows us to see the progress of engineering students during the various assignments and projects carried out within the company. The semester 6 assessment relates to the first year of the work-study program.

Objectives

To learn about the company's departments in order to:

- be effective,

- communicate effectively,

- demonstrate pragmatism and adaptability

Mandatory prerequisites

None

Course outline

Assessments carried out by the company

Additional information

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy (74)

Campus

Annecy / Annecy-le-Vieux campus

UE603 Specialized Sciences

ECTS
16 credits

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Issues in artificial intelligence	MODULE	6			
Logic and Programming	MODULE	10.5 hours	10.5	20	
Operating Systems and Virtualization	MODULE	10.5 hours	13.5 hours	16	
Collaborative Platforms	MODULE	13.5 hours	15	12	
Data acquisition and statistical processing	MODULE	13.5 hours	13.5 hours	20	
Behavior and Dynamic Modeling	MODULE	9 hours	9	28	

Practical information

Locations

Annecy-le-Vieux (74)

Data acquisition and statistical processing (INFO635_IDUFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This course aims to analyze what data is needed to address a given problem, acquire it, and then ensure its consistency and completeness through statistical analysis. The data may be either structured data, as found in Open Data approaches, or unstructured data such as text (social media reviews: recipes, restaurants, etc.).

Objectives

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

- acquire more or less structured data,
- clean up data,
- compensate for missing information in the data.

Teaching hours

Lectures	Lecture	13.5
Tutorial	Tutorials	13.5
Lab	Practical work	20

Mandatory prerequisites

Basics of statistics, Python programming, and web programming

Course outline

1. Introduction to scraping
2. Data quality analysis and statistical indicators
3. Data acquisition project via scraping and API

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course manager Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Behavior and Dynamic Modeling (INFO636_IDUFISA)

Polytech Annecy-Chambéry
component

Presentation

Description

The objective of this course is to learn how to design and implement a software system taking into account non-functional properties such as maintainability and scalability. Since static aspects were covered in module INFO641 using an object-oriented approach, the focus here is on the dynamic aspects of the system, i.e., its behavior.

Objectives

This course aims to enable students to analyze and design the behavior of a software system using UML notation, in particular by using use case, sequence, and state diagrams.

This course aims to raise students' awareness of the concepts of non-functional software properties, with an emphasis on maintainability.

This course also aims to enable students to design and implement software systems using good software engineering practices (design patterns). Students will thus be able to make informed design choices based on the desired characteristics of the software and to put into practice software patterns such as strategy, factory, adapter, singleton, and decorator.

Teaching hours

Lectures	Lecture	9 a.m.
Tutorial	Tutorial	9 a.m.
TP	Practical Work	28

Mandatory prerequisites

Basic concepts in object-oriented programming: classes, inheritance, polymorphism, abstract classes, interfaces, event models, graphical user interfaces

Course outline

1. Analysis and design of dynamic aspects with UML (sequence diagrams, collaboration diagrams, and state transition diagrams)
2. Design patterns for scalable software products

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Sorana Cimpan
+33 4 50 09 65 86
Sorana.Cimpan@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE701 SHES - Languages

ECTS
8 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Support (half of Thursday afternoons when FISA staff are present)	MODULE				

	Nature	CM	Tutorial	Practical	Credits
Management	MODULE		32		
Business Structure and Entrepreneurship 2	MODULE	12 hours	12		
Sustainable development - Product approach	MODULE	4	2	8	

	Nature	CM	Tutorial	Practical work	Credits
English (TOEIC level not achieved)	MODULE		34 hours		
English (TOEIC level achieved)	MODULE		34 hours		

Practical information

Locations

Annecy-le-Vieux (74)

Management (SHES701_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This course will be divided into two parts:

- Business management
- Entrepreneurship

Objectives

This course aims to enable students to:	Level	By the end of this course, students will be able to:
initiate a business creation process	Application	learn the basics of business management
		list the questions that a future entrepreneur must ask themselves
		to adopt an approach that can lead to business creation
carry out an economic project within your company	Application	have a macroeconomic vision of the company

		be familiar with all the financial aspects of putting together a business plan
		use economic language

Teaching hours

Tutorials	Tutorials	32

Mandatory prerequisites

Basic understanding of how a business operates Basic understanding of

economics

Course outline

1. General accounting: the core of the accounting information system
   - Presentation of the accounting information system
   - Presentation and functioning of the balance sheet
   - Presentation and functioning of the income statement
   - Introduction to financial analysis
2. Budget management: forecasting, anticipating, and deciding
   - Initial budgets
   - Cash flow budget
   - Provisional balance sheet and income statement
3. Cost calculation methods: analyzing data provided by general accounting
   - Full cost calculation
   - Partial cost calculation
4. Investment project analysis
   - Analysis of investment profitability
   - Financing methods and their implications
5. Entrepreneurship
   - The various stages, approaches, and steps to be taken before deciding to start a business
   - The business plan (its structure and components)
   - Existing tools

Additional information

Bibliography

Management accounting

Large Format - 08/21/2018 - GUALINO

Grandguillot F., Grandguillot B.

Entrepreneurship

Léger-Jarniou Catherine Collection:

Openbook Format: Paperback

317 pages

Skills acquired

Macro-skill	Micro-skills

Practical information

Contacts

Course Director Pierre Thabuis

+33 4 79 75 85 85

Pierre.Thabuis@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Business Structure and Entrepreneurship 2 (SHES702_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

The entire course is structured around

- around a scenario involving an industrial company manufacturing coffee makers and coffee machines over a period of six years.
- with practical exercises focusing on:
- Provisional financial statements, dashboards, financial analysis, cost calculation, return on investment, and business strategy.
- Management projects initiated by engineering students in companies

Objectives

This course aims to enable students to:	Level	By the end of this course, students will be able to:
apply the concepts covered in the management module in a practical way	Master	use management concepts in the context of business projects

develop financial reflexes for managing the company in response to unforeseen events, opportunities, and market conditions	Master	Make decisions during projects based on available financial information

Teaching hours

Lectures	Lecture	12
Tutorial	Tutorials	12

Mandatory prerequisites

- Have completed the previous course
- Have completed a management project in your company

Course outline

Formation of company groups

Simulation of company life

Review and feedback

Additional information

Bibliography

Business Strategy - Concepts, Models, Tools, Examples (2nd edition)

Dominique Jolly (Author)

Skills acquired

Macro-skill	Micro-skills

Practical information

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Sustainable Development - Product Approach (SHES711_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This course is divided into several parts:

- an introduction to environmental issues in business,
- a focus on the eco-design approach (definition, tools, and methods),
- the methodology for analyzing the life cycle of products or services,
- an overview of regulatory constraints
- insight into how companies can benefit from this approach.

Objectives

This course aims to enable students to:	Level	By the end of this course, students will be able to:
understand the approach of eco-design and understand the	Application	to take into account the challenges and regulations

key challenges of its application in business		when designing a product or service

Teaching hours

Lectures	Lecture	4
Tutorial	Tutorials	2
Lab	Practical work	8

Mandatory prerequisites

Basic environmental concepts

Product design concepts

Course outline

The course is followed by two practical sessions:

- one session on learning how to assess the environmental impacts of a product
- one session on implementing an eco-design approach in a company

Additional information

Bibliography

Life Cycle Assessment: Understanding and Performing an Ecobalance, 4th revised and expanded edition

Myriam Saadé - Oliver Jolliet

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Timoteo Payre
Timoteo.Payre@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level not achieved) (LANG710_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course prepares students for the TOEIC (Test of English for International Communication) exam, specifically to obtain a minimum score of 785 points (out of 990).

With the aim of developing all four skills, this course also serves as an introduction to public speaking through presentations given by students in groups or individually on topics illustrated by press articles or video materials (VTD: Video, Talk and Debate, as well as written work). Depending on the location (Annecy or Chambéry), some will be seen at different times during the semester, the year, or even the three years of training.

Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam.

Objectives

Specific objectives: at the end of this course, students will be able to:

work on telephone conversations (comprehension/production)

listen regularly to news on English-language news sites (CNN, BBC, Sky News, etc.) and be able to succinctly summarize the main points orally, interacting with the class

work on a variety of audio and video materials and speak spontaneously in an interactive manner with the class

speak in a prepared manner and spontaneously interact through individual presentations (self-presentation and/or article reports, such as "quizzes") and presentations in pairs (various topics)

practice TOEIC exercises (4 parts of listening comprehension) + entire tests

Teaching hours

Tutorials	Tutorials	34

Mandatory prerequisites

S5 and S6 program.

Course outline

Course outline

1. **Review of important grammar points for the TOEIC:**
    1. Review of tenses.
    2. The conditional and "should" structures (suggestion/subjunctive).
    3. Modal auxiliaries and periphrases with similar meanings.
    4. Linking words (review).
2. **Listening comprehension:**
    1. Recorded dialogues in American, British, and New Zealand English.
    2. Videos in American, British, and Australian English.
3. **Reading comprehension:**
    1. Press excerpts
    2. Various texts

Additional information

Bibliography

- Documents distributed by speakers
- Various websites listed at the beginning of S5

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level achieved) (LANG711_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English **Teaching methods:** In person
Teaching format: Tutorials **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Description

English at work

Continuous speaking, discussion based on business topics, project presentations, acquisition of business vocabulary and linguistic enrichment, grammar and phonetic correction.

Objectives

To be and become as autonomous as possible in an industrial context in English

Teaching hours

Tutorial	Tutorials	34

Mandatory prerequisites

TOEIC score of 785 or higher, except for continuing education students, who must have obtained a score of 600 or higher.

Course outline

Various presentations by specialists in industrial and business-related fields, mainly English speakers

Additional information

Bibliography

Various documents provided by speakers and/or students themselves.

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE702 Work experience

ECTS
10 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Project 2 (launch and follow-up)	MODULE	1 hour		8	
Progress in the workplace (advancement)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Project 2 (launch and follow-up) (PROJ701_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** French
- **Teaching methods:** In person
- **Teaching format:** Learning and assessment situation
- **Open to exchange students:** Yes

Presentation

Description

In this module, engineering students will be required to carry out a mainly technical project within the company, implementing a structured and effective approach.

The technical component is considered in a broad sense (products, production processes, organization, etc.).

This project may be continued in semester 8, during which engineering students will develop its economic component. If company constraints do not allow this, it will be possible to choose a new project.

Objectives

Situate your project within the company's overall strategy and understand its challenges:

- assess the importance of your project in relation to other ongoing projects

- anticipate and take into account changes in the company to ensure the project's sustainability Broaden the range of possible solutions:

- justify choices

- systematically integrate relevant health, safety, and environmental aspects

Teaching hours

Lectures	Lecture	1
Lab	Practical work	8

Course outline

Launch

Support: framing of technical assignments/projects, implementation of project management/problem-solving tools/methods, taking a step back from the project—confidentiality, approach, choices, personal development, etc.

Interim oral presentation accompanied by a written report (project summary sheet)

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Career development (progression) (STAG701_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This assessment allows us to see the apprentice's progress throughout the various projects and tasks carried out within the company. The semester 7 assessment relates to the Extended Technical project.

Objectives

Be a good engineer and have good relationships with others:

- get involved
- be organized

- make decisions
- solve problems
- take responsibility

Mandatory prerequisites

None

Course outline

Writing the project orientation sheet. Evaluation by the company.

Additional

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy (74)

Campus

Annecy / Annecy-le-Vieux campus

UE703 Specialized Sciences

ECTS
12 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Stochastic modeling	MODULE	12 hours		24	
Data analysis and visualization	MODULE	12 hours	23.5 hours		
Security and Cryptography	MODULE	13.5 hours	22.5 hours	4	
Data Economics and Governance	MODULE	15	21	4	

Practical information

Locations

Annecy-le-Vieux (74)

UE801 SHES - Languages

ECTS
5 credits

Polytech Annecy-Chambéry
Component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Support (half of Thursday afternoons when FISA staff are present)	MODULE				

	Nature	CM	Tutorial	Practical	Credits
Management and technical communication	MODULE	6	4	12	

	Nature	CM	Tutorial	Practical	Credits
English (TOEIC level not achieved)	MODULE		40 hours		
English (TOEIC level achieved)	MODULE		40 hours		

Practical information

Locations

Annecy-le-Vieux (74)

Management and Technical Communication (SHES801_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

The objective of this module is:

- to provide future engineers with the key tools for self-awareness, enabling them to communicate more effectively and take on their future responsibilities in a positive manner, whether functional or hierarchical;
- to support future engineers, through progressive methodological steps, in the management and presentation of their various projects.

Objectives

This course aims to enable students to:	Level	By the end of this course, students will be able to:
define the main tools of self-awareness to enable them to communicate better and take responsibility positively assume its future responsibility, whether functional or hierarchical	Mastery	to communicate effectively
		to take responsibility for the future

lead and report on their various projects	Mastery	prepare reports and presentations of projects carried out in company

Teaching hours

Lectures	Lecture	6
Tutorial	Tutorials	4
Lab	Practical work	12

Mandatory prerequisites

- Herrmann's Brain Preferences Model
- The "organization" (time management, delegation) and "problem solving" approaches covered in Cognitive Development/Intro to Management (SHES591)

Preparation/presentation of the preparatory topic "Project Management and Extended Technical Project Specifications"

Course outline

1. Inventory of the main strategic, technological, and organizational changes at work in the company and in society, and their consequences on human resource management: historical and sociological retrospective
2. In-depth study of the concept of responsibility and accountability
3. Personal development:
   - basics of responsible and assertive communication
   - Transactional Analysis approach: self-diagnosis of "ego states," conditioning messages, life positions

Practical work titles

- Acquisition of project terminology (challenges, objectives, indicators, resources, constraints, PDCA, validation, sustainability)
- Development of a "context" grid and definition of the qualities and expectations of a project manager based on Herrmann
- End of "technical" project period, "management" project led: Monitoring and support work on projects; mutual field advice
- Methodological contributions: argumentation and demonstration
- Contributions to written/oral expression

Additional information

Bibliography

The Secrets of Communication John Grinder

The Essentials of Business Management Samuel Josien

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Delphine Lacquement +33 4 79 75 85 85
Delphine.Lacquement@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level not achieved) (LANG810_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

ERASMUS reference: Languages

Presentation

Description

This course prepares students for the TOEIC test ("Test of English for International Communication") and, more specifically, for obtaining a minimum score of 785 points (out of 990).

The TOEIC test will take place at the end of this semester at each of the sites on very similar dates. (Make-up sessions will take place in week 9).

Students are assessed throughout each semester. The final assessment consists of a 1-hour, 1.5-hour, or 2-hour exam, depending on the semester.

Objectives

Specific objectives: at the end of this course, students will be able to:

continue practicing TOEIC exercises (4 parts of listening comprehension) + entire tests

work on a variety of audio and video materials (general English, business English, and specialized English) and speak spontaneously in an interactive manner with the class

speak in a prepared manner and interact spontaneously through scientific presentations and on topics or issues related to the business world (job interviews, negotiations, discussions on technical/professional projects, wage inequality, international mobility, etc.)

Specific objectives: at the end of this course, students will be able to:

continue grammatical revision on: the conditional tense; all other tenses; expressing suggestions and modality/the passive voice; verbal structures (infinitive/ing)

improve their grammatical and lexical knowledge (general English, business English, and English specific to their scientific field), both in class and independently, validating their progress through regular tests

Teaching hours

Tutorials	Tutorials	40

Mandatory prerequisites

LANG710

Course outline

Course outline

1. **Review of important grammar points for the TOEIC**
    1. Review of all tenses covered or reviewed in S5, S6, and S7.
    2. The passive voice.
    3. Causative structures.
    4. BV / BVing or to BV.
    5. Linking words.
2. **Listening comprehension**
    1. Recorded dialogues in American, British, and New Zealand English.
    2. Videos in American, British, Australian English, etc.
3. **Reading comprehension**
    1. Press excerpts
    2. Various texts

Additional information

Bibliography

Documents provided by speakers Global Exam

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level achieved) (LANG811_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English **Teaching methods:** In person
Teaching format: Tutorials **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Description

English at work

Continuous speaking, discussion based on company topics, project presentations, acquisition of business vocabulary and linguistic enrichment, grammar and phonetic correction

Objectives

To be and become as autonomous as possible in an industrial context in English

Teaching hours

Tutorial	Tutorials	40

Mandatory prerequisites

TOEIC score of 785 or higher, except for continuing education students, who must have obtained a score of 600 or higher.

Course outline

Various presentations by specialists in industrial and business-related fields, mainly English speakers

Additional

Bibliography

Various documents provided by speakers and/or the students themselves.

Skills

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE802 Work experience

ECTS
7 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Project 2 (Monitoring and reporting)	MODULE			8 hours	
Corporate development (4 areas)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Project 2 (Monitoring and reporting) (PROJ801_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

In this module, engineering students will be required to carry out an economics-oriented project within their company (either a continuation of the project from semester 7 or a new project).

The aim of this project is for engineering students to realize the importance of economic factors in the smooth running of any industrial project and their impact on the company.

Objectives

Measure the importance of economic factors in the management of any project (decision to launch, investment strategies and decisions, management and performance indicators) and for the effective management of all or part of the company (a department, a workshop, a production line, etc.):

- Use management knowledge in the management of a company project Master the main economic and financial parameters of the

company:

- take economic and financial data into account when undertaking an industrial project

Make the numbers "speak," know how to interpret them clearly so they can be understood and used at the operational levels of the company:

- presenting and using economic and management data for an industrial project

Teaching hours

Practical work	Practical work	8
Other	Other	1

Course outline

Support: framing of economic missions/projects, implementation of project management/problem-solving tools/methods, identification and testing of economic tools/concepts useful to the project

Report & Defense of the P2 project - presentations covering the two components of Technical and Management/Economics and meeting the associated expectations -

Additional

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Career development (4 areas) (STAG801_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This monitoring allows us to see the apprentice's progress during the various projects and work carried out in the company. The semester 8 assessment relates to the Management project.

Objectives

Be a good engineer and have good relationships with others:

- get involved
- be organized
- make decisions
- solve problems
- take responsibility

Mandatory prerequisites

None

Course outline

Writing a project orientation sheet. Assessment carried out by the company.

Additional

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contacts

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE803 Specialized Sciences

ECTS
18 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Big Data	MODULE	7.5 hours		12 hours	
Machine Learning	MODULE	9 hours	9	12	
Business intelligence	MODULE	9 a.m.	9 a.m.	12	
Data and software quality	MODULE	12 p.m.	12	4	
Large-scale distributed systems	MODULE	12 hours	13.5 hours	15	
Distributed databases	MODULE	6 hours	6	28	
APP and business openness	MODULE	30			

Practical information

Locations

Annecy-le-Vieux (74)

APP and career opportunities (ISOC832_IDUFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French

Open to exchange students: Yes

Overview

Description

The role of Data Scientist consists of three parts:

- Knowledge of statistics
- Knowledge of computer science
- Business dimension

The objective of this module is to focus on the third part, namely the professional dimension, through meetings with professionals who are confronted with Data Science issues.

Objectives

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

- identify the tasks assigned to a data scientist in a company
- position themselves in the job market

Teaching hours

Lectures	Lectures	30

Mandatory prerequisites

None

Course outline

The course consists of several 4- to 8-hour sessions, each independent of the others. The content of the sessions depends on the professionals involved during the year. Assessment is carried out through a data hackathon.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Flavien Vernier
+33 4 50 09 65 90
Flavien.Vernier@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE901 SHES - Languages

ECTS
7 credits

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Legislation, labor law, occupational health, sustainable engineering, decarbonization	MODULE	18 hours	8	8	
GEPC, human sciences, management, ergonomics	MODULE	28			

	Nature	CM	Tutorial	Practical	Credits
English (TOEIC level not achieved)	MODULE		26 hours		
English (TOEIC level achieved)	MODULE		26 hours		

Practical information

Locations

Annecy-le-Vieux (74)

Legislation, labor law, occupational health, sustainable engineering, decarbonization (SHES901_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

Legislation and labor law Occupational health

Sustainable engineering and decarbonization

Objectives

This course aims to enable students to:	Level	Upon completion of this course, students will be able to:
define the scope of human resources and labor legislation	Application	use their knowledge of human resources and labor legislation in their company
analyze and deal with a situation	Application	apply legal concepts to a situation in the workplace

Know the main concepts of ergonomics	Application	apply the concepts of ergonomics in an industrial context
take into account the ergonomic dimension in their sectors of activity and responsibility	Application	apply knowledge of ergonomics to projects within the company

Teaching hours

Lectures	Lecture	18
Tutorial	Tutorials	8
Lab	Practical Work	8

Mandatory prerequisites

Legal concepts covered in semester 5

Sustainable development modules from semesters 5, 6, and 7

Course outline

1. Legislation

- Sources of labor law and judicial organization
- Key elements of the employment contract
- Working hours/salaries/paid leave
- Employee representation
- Elements of civil and criminal liability of managers and their employees

2. Ergonomics

- Ergonomics (origin, definition, scope)
- Workstation design
- Physical fatigue
- Mental fatigue
- Thermal comfort
- Visual comfort
- Auditory comfort
- Workstation analysis method and ergonomic approach
- Contribution of ergonomics to the prevention of hardship

3. Sustainable engineering

Additional information

Bibliography

Ergonomics at work, principles and practices Pascal Reytier

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Véronique Saudrais

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

GEPC, Humanities, Management, Ergonomics (SHES902_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: French **Teaching methods:** In person

Open to exchange students: Yes

Presentation

Description

Project management and leadership Skills management

Objectives

This course aims to enable students to:	Level	At the end of this course, students will be able to:
acquire an understanding of the collective dimension of day-to-day business management and change management	Master	define skills management
		understand the challenges of job and skills management
		understand the philosophy of GPEC (forward-looking management of jobs and skills) and its direct link to company strategy

		understand common HR vocabulary: skills, qualifications, performance, jobs, etc.
		identify and understand the role of the engineer in the GPEC process
identify and understand the use of the main job and skills management tools (job map, job descriptions, skills frameworks, appraisal interviews, etc.)	Mastery	understand the principles behind the creation of these tools
		be able to write a simple job description
		recruit
		understand the recruitment process and its main stages
		identify pitfalls to avoid
understand the contingency of the recruitment process (depending on the profile, time available, budget, etc.)	Master	understand the legal framework for recruitment (basic concepts)
		be familiar with the main stages of the recruitment interview
		understand judgment biases and be able to avoid them
		understand the basic principles of assessment tools (tests)

Teaching hours

Lectures	Lecture	28

Mandatory prerequisites

- The entire second-year module: personal development
- Definition of the "team management/leadership" project
- Knowledge of the company

Course outline

1. Leading and managing a project
   - Leading a team: taking on the role of leader or manager; status, roles, performance indicators, and team monitoring; adaptive management

- The group: its personality, its evolution, the role of the leader, group phenomena (application to meeting facilitation)
- Leading a "sensitive" project: lateralizing it, identifying and developing the roles of the various players, adapting to each type
- Leading change: crisis or change, individual and collective emotional cost, qualities of the leader, successive stages and support
- Managing conflict: preventive, curative, interindividual, and collective approaches, from conflict to negotiation: prerequisites for negotiation, range of tactics and strategies used

2. Skills management

- Theoretical aspects

2.1.1.The history of skills management (career management, job management, etc.) 2.1.2.The conventional and legal aspects of GPEC

2.1.3. Key definitions (distinction between job and position, competency and performance, etc.)

- The link between job and compensation (collective bargaining agreement, classification/rating, etc.)
- GPEC tools
- Creating a job map

2.2.2.Methodology for creating a job description

2.2.3.Skills frameworks

- Skills assessment
- GPEC as a strategic approach
- Developing a comprehensive action plan

2.3.2.Different ways of implementing GPEC

2.3.3.GPEC stakeholders

1. Recruitment

- The recruitment process

3.1.1. Recruitment: a strategic business tool

3.1.2. The stages of recruitment

- The cost of recruitment
- The recruitment interview
- Interview conditions

3.2.2.Interview support

3.2.3.Conducting a recruitment interview

- Judgment biases to avoid
- Tests
- Types of tests

3.3.2.Methods for the statistical construction of a test

3.3.3.Test validity

Practical work titles

- Simulations of difficult communication situations: listening, criticism, conflicts
- Formation of "project management" working groups
- Managerial insights in response to various "management/team leadership" projects
- Preparation for the presentation of projects in the workplace

Additional information

Bibliography

- CADIN Loïc, GUERIN Francis, and PIGEYRE Frédérique (Eds.). – Human resource management: practice and theory. – 2nd ed. – Paris: Dunod, 2004
- DEFELIX Christian, DUBOIS Michel, and RETOUR Didier. - GPEC: forward planning in crisis? – In: HRM in the face of crisis: HRM in crisis? – edited by Tremblay M. and Sire B. – Montreal: Presses des l'école des HEC, 1997
- DENIMAL Philippe. – Classification, qualification, skills: for action on organization and social dialogue. – 1st ed. – Paris: Editions Liaisons, 2004
- FLÜCK Claude. – Skills and Performance: a successful alliance. – 1st ed. – Paris: DEMOS, 2001
- LUSSATO Ariane – Recruitment tests – Que Sais-Je – Presses Universitaire de FranceMINTZBERG Henry. – Structure and dynamics of organizations. – 12th ed. – Paris: Editions d'Organisation, 1982
- PERETTI Jean-Marc (Dir.). – Tous DRH. – 2nd ed. – Paris: Editions d'Organisation, 2006
- PERMATIN Daniel. – Managing by Skills or How to Succeed Differently? – 1st ed. – Caen: Editions Management Société, 1999

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Delphine Lacquement +33 4 79 75 85 85
Delphine.Lacquement@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level not achieved) (LANG910_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: English, French **Teaching methods:** In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This course prepares students (who have not yet validated their score) for the TOEIC ("Test of English for International Communication") test and, more specifically, for obtaining a minimum score of 785 points (out of 990).

Objectives

To develop a number of reflexes and autonomy in relation to the TOEIC or Linguaskill test at the end of S8 in order to achieve the score required for the engineering degree.

Teaching hours

Tutorial	Tutorials	26 hours

Mandatory prerequisites

LANG 810

Course outline

1. **Review of important grammar points for the TOEIC**
    1. Review of all tenses covered or reviewed in S5, S6, S7, and S8
    2. The passive voice.
    3. Causative structures.
    4. BV / BVing or to BV.
    5. Linking words.
2. **Listening comprehension**
    1. Recorded dialogues in American, British, and New Zealand English.
    2. Videos in American, British, Australian English, etc.
3. **Reading comprehension**
    1. Press excerpts
    2. Various texts

Additional information

Bibliography

Various documents distributed by speakers Global Exam

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat
+33 4 50 09 66 17
Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

English (TOEIC level achieved) (LANG911_PACYFISA)

Polytech Annecy-Chambéry

In brief

Languages of instruction: English **Teaching methods:** In person
Teaching format: Tutorials **Open to exchange students:** Yes
ERASMUS reference: Languages

Presentation

Description

This course prepares students for their entry into professional life. Leading or participating in a meeting: vocabulary and structures related to this aspect while continuing to work on the four skills, but with an emphasis on realistic situations (role-playing, acquisition of technical vocabulary and business vocabulary, etc.). But also public speaking through presentations given by students in groups and/or individually. Students are assessed throughout the semester. Preparation of the engineering theme (English section compulsory) Simulation of an interview in front of two members of the jury and half the class.

Objectives

To become as independent as possible in their future profession

Teaching hours

Tutorials	Tutorials	26

Mandatory prerequisites

LANG811 and valid TOEIC score

Course outline

Labels (country culture for international exchange) Preparation of CVs and presentations of oneself and business

projects

Additional information

Bibliography

Various documents provided by speakers and students themselves

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Muriel Yvenat

+33 4 50 09 66 17

Muriel.Yvenat@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

UE902 Work experience

ECTS
10 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	Practical	Credits
Project 3 (Launch and follow-up)	MODULE	1 hour		8	
Progress in the workplace (advancement)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Project 3 (Launch and monitoring) (PROJ901_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** French
- **Teaching methods:** In person
- **Teaching format:** Learning and assessment situations
- **Open to exchange students:** Yes

Presentation

Description

In this module, engineering students will be required to carry out a management-oriented project within a company, implementing a structured and effective approach.

The managerial component is considered in a broad sense (hierarchical or cross-functional management, communication, team leadership, training, change management, conflict management, etc.).

The aim of this project is for engineering students to realize the importance and impact of the human factor on the smooth running of any industrial project.

This project may be continued in semester 10 and become the Engineering Project, expanding it to meet the end-of-program expectations.

Objectives

Develop an effective human approach to project management:

- anticipate the humanly sensitive stages of the project

- define the principles adopted for project management

- identify the obstacles encountered and the actions taken in response

- Monitor and define validation steps with a view to sustainability

Use human resources tools that are appropriate for the company, whether they are already in use or whether this project is an opportunity to propose new ones (skills, training, procedures, facilitation, etc.):

- Implement human resources tools in projects carried out within the company

- if necessary, select new dedicated tools

Teaching hours

Lectures	Lecture	1
Lab	Practical work	8

Mandatory prerequisites

Projects from semesters 5, 6, 7, and 8.

Modules from semesters 5, 6, 7, and 8: SHES511_PACYFISA, SHES801_PACFISA, and SHES902_PACFYSA

Course outline

Launch

Support: human-centered project framing, implementation of project management/problem-solving tools/methods, identification and testing of "Human Resources" tools/approaches useful to the project, critical analysis and areas for improvement

Interim defense in the company, with an active visit organized and led by the engineering student.

Additional information

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Career development (progression) (STAG901_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This follow-up allows us to see the apprentice's progress during the various projects and tasks carried out within the company. The mid-term review for semester 9 relates to the Management project.

Objectives

Be a good engineer and have good relationships with others:

- get involved
- be organized
- make decisions
- solve problems
- take responsibility

Mandatory prerequisites

None

Course outline

Writing the project orientation sheet. Assessment carried out by the

company.

Additional

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy (74)

Campus

Annecy / Annecy-le-Vieux campus

UE903 Specialized Sciences

ECTS
13 credits

Polytech Annecy-Chambéry

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
Machine Learning	MODULE	12 hours	12 p.m.	4 p.m.	
Optimization and multi-criteria decision support	MODULE	12 hours	12	4 p.m.	
High-performance computing and cloud computing	MODULE	7.5 hours	7.5	24	
Innovation, Research, and Technology Watch	MODULE	6 hours	44		

Practical information

Locations

Annecy-le-Vieux (74)

Innovation, Research, and Technology Watch (PROJ933_IDUFISA)

Polytech Annecy-Chambéry
component

In

Teaching methods: In person **Teaching format:** Tutorials **Open to exchange students:** Yes

Presentation

Description

This module aims to understand the scientific approach to a question or need. Two main areas are explored: the first focuses on reviewing scientific literature, and the second on innovation and proposing scientific contributions. The concepts will be put into practice using scientific questions proposed by the teaching team on very open and innovative topics.

* The first part focuses on scientific documentation, the different types and sources of documents, as well as modes of dissemination (media, scholarly publishers, open science), economic models, and associated quality metrics. The objective is to demonstrate methods for researching, collecting, and synthesizing scientific documents in order to answer a scientific question.

In order to better understand the process of scientific validation of documents, the module offers an introduction to writing scientific document reviews.

This first part then leads to the writing of a literature review (survey paper) on a scientific issue. Depending on its initial quality, the document may be submitted in an improved version, with the teaching team, to a scholarly publisher.

Assessment is based on the submission of two documents: a review (individual submission) and a survey paper (group work).

* The second part of the module aims to explore the scientific approach to proposing new contributions. Based on the scientific question and the literature review developed in the previous stage, the students, working in teams, will propose an innovative solution that will then be validated through experimentation, interpretation of results, and synthesis/conclusion.

This work will be carried out in supervised sessions and independently. The final deliverables to be assessed will be i) a summary report presenting the contribution, its evaluation, and analysis of the results, ii) an oral presentation, and iii) the documented codes of the contribution.

Objectives

understand innovation and the scientific approach to a question or need:

* learn about the types and sources of scientific documents, and know how to select, critique, and synthesize relevant documents related to a scientific question.

* Explore the scientific approach to proposing new contributions.

Teaching hours

CM	Lecture	6 hours
Tutorial	Tutorials	44

Course outline

* The first part focuses on scientific documentation, the different types and sources of documents, as well as modes of dissemination (media, scholarly publishers, open science), economic models, and associated quality metrics. The objective is to demonstrate methods for researching, collecting, and synthesizing scientific documents in order to answer a scientific question.

* The second part of the module aims to explore the scientific approach to proposing new contributions. Based on the scientific question and literature review developed in the previous stage, students will work in teams to propose an innovative solution, which will then be validated through experimentation, interpretation of results, and synthesis/conclusion.

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Course coordinator Alexandre Benoit
+33 4 50 09 65 22
Alexandre.Benoit@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

UE001 Work experience

ECTS
22 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lectures	Tutorial	TP	Credits
Project 3 (Monitoring and reporting)	MODULE			12 hours	
Development within the company (4 areas)	MODULE				

Practical information

Locations

Annecy-le-Vieux (74)

Project 3 (Monitoring and reporting) (PROJ001_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

- **Languages of instruction:** French
- **Teaching methods:** In person
- **Teaching format:** Learning and assessment situations
- **Open to exchange students:** Yes

Presentation

Description

In this module, engineering students will be required to carry out an engineering project within a company, involving technical, economic, and human aspects.

Objectives

Methodically manage an industrial project in a balanced and effective manner according to its three complementary components—technical, economic, and human—by:

- define and use project management tools for the technical, economic, and human aspects. Anticipate and promote the smooth running of the project:
- analyze and predict potential risks in order to anticipate how to control them
- define and monitor the defined action plan (associated countermeasures).

Use or implement relevant indicators and ensure the sustainability of the project:

- define and use project management indicators covering technical, economic, and human aspects (monitoring and performance indicators)

- identify the means and resources

- ensure the sustainability of results

- draw lessons that can be extrapolated for the future.

Teaching hours

Practical work	Practical work	12
Other	Other	2

Mandatory prerequisites

Projects and modules from semesters 5, 6, 7, 8, and 9 related to SHEJS and PROJ.

Course outline

Launch

Support: project scoping, advanced implementation of project management/problem-solving tools/methods, identification and management of the three essential components of the project (engineering, economic, and human resources), optimization of the approach and sustainability, taking a step back to consider the skills of an engineer, etc.

Thesis & Defense of the P3 project, including a section in English

Additional information

Bibliography

None

Skills acquired

Macro-skills	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Campus

Annecy / Annecy-le-Vieux campus

Corporate Development (4 areas) (STAG001_PACYFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: French **Teaching methods:** In person
Open to exchange students: Yes

Presentation

Description

This monitoring allows us to see the apprentice's progress throughout the various projects and tasks carried out within the company. The semester 10 assessment relates to the Engineering project.

Objectives

Be a good engineer and have good relationships with others:

- get involved
- be organized
- make decisions
- solve problems
- take responsibility

Mandatory prerequisites

None

Course outline

Writing the project orientation sheet. Assessment carried out by the

company.

Additional

Bibliography

None

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sandrine Vieules-Rosset +33 4 50 09 65 05
Sandrine.Vieules-Rosset@univ-savoie.fr

Locations

Annecy (74)

Campus

Annecy / Annecy-le-Vieux campus

UE002 Specialized Sciences

ECTS
8 credits

Polytech Annecy-Chambéry
component

List of courses

	Nature	Lecture	Tutorial	Practical	Credits
SHES opening	MODULE	40 hours			
Deployment and security of IT systems	MODULE		33		
Advanced AI	MODULE		33		

Practical information

Locations

Annecy-le-Vieux (74)

SHES opening (SHES031_IDUFISA)

Polytech Annecy-Chambéry
component

Presentation

Description

The technology that computer engineers design, develop, or deploy has a direct impact on individuals, organizations, and society as a whole. It is therefore necessary to understand human behavior, social dynamics, ethical issues, and psychological consequences in order to design more inclusive, accessible, and responsible systems. For example, in the fields of artificial intelligence, cybersecurity, and human-machine interfaces, a good understanding of social and cultural dimensions helps to anticipate uses, avoid biases, and strengthen user confidence. In short, combining technical skills with sensitivity to human realities promotes computer science that serves progress and the public interest.

Objectives

This course, which takes place in S10 at the end of the engineering program, is intended to provide an in-depth approach to the interaction between the humanities, social sciences, and computer science. The objectives of this course are to study in depth several themes at the interface between digital technology and the humanities, social sciences, and economics.

Teaching hours

Lectures	Lectures	40

Course outline

- Geopolitics of Cyberspace
- Digital Humanities
- Regional and Digital Planning
- AI strategy
- Law and AI

Targeted skills

- Apply multidisciplinary expertise in writing texts and projects
- Interact in a multidisciplinary environment with SHES experts

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Mohammad-Reza Salamatian
+33 4 50 09 65 37
Mohammad-Reza.Salamatian@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Deployment and security of IT systems (INFO031_IDUFISA)

Polytech Annecy-Chambéry
component

In brief

Languages of instruction: English, French **Teaching methods:** In person **Open to exchange students:** Yes

Presentation

Description

This module aims to provide students with the advanced skills needed to design, deploy, administer, and secure modern IT infrastructures. It covers best practices and tools used to ensure system reliability, scalability, and security.

Topics covered include:

- Deployment automation
- System configuration and lifecycle management
- Service monitoring and observability
- Cybersecurity fundamentals applied to systems
- Vulnerability management and incident response
- Resilience and traceability challenges

Objectives

- Design and deploy a reliable and scalable architecture, taking into account performance and environmental aspects.

- Identify, assess, and correct vulnerabilities in deployed systems, integrating security into all phases of a service's lifecycle.

Teaching hours

Tutorials	Tutorials	33

Mandatory prerequisites

Basic knowledge of systems, distributed systems, and networks.

Course outline

1. Introduction to modern system deployment

2. Containerization and orchestration

3. System security

4. Monitoring, observability, and incident response

5. Resilience, performance, and eco-design

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Sebastien Monnet
+33 4 50 09 65 24
Sebastien.Monnet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)

Advanced AI (DATA031_IDUFISA)

Polytech Annecy-Chambéry
Component

In brief

Teaching methods: In person

Open to exchange students: Yes

Presentation

Description

This module follows on from the modules on big data and machine learning, in which the fundamentals of data science were presented through the various paradigms of machine learning and exploratory statistics. Their experiments using basic algorithms highlighted the limitations of basic modeling tools.

In this module, a set of advanced methods extending the fundamentals of learning is presented. Each approach improves the learning process by focusing on a particular aspect, such as reducing decision variance, handling nonlinear problems, or learning from a very large number of examples and automatic feature extraction. A conceptual presentation of the different methods will be accompanied by a discussion of their implementation and experimentation based on concrete cases of research and development.

Practical work will enable students to familiarize themselves with advanced learning libraries in Python and then use certain libraries to solve complex learning problems, such as
Keras library for deep learning or the arulesSequences library for sequential pattern extraction. Reference data, such as the MNIST database (handwritten digits) or the CIFAR databases (objects and animals), will be used to train classification systems.

Objectives

The course aims to:
- identify the conceptual and technological advances associated with the development of modern learning methods

- implement modern learning methods using appropriate development tools

Teaching hours

Tutorials	Tutorials	33

Mandatory prerequisites

Fundamentals of data analysis. Basics of machine learning.

Course outline

Overview of advanced methods for big data

1. Support vector machines and kernel methods
2. Deep learning
3. Reinforcement learning methods
4. Time series and sequential patterns

Bibliography

- T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning - Data Mining, Inference, and Prediction, Second Edition, Springer, 2013
- I. Goodfellow, Y. Bengio, A. Courville, Deep learning, MIT Press book, 2016

Skills acquired

Macro-skill	Micro-skills

Practical information

Contact

Course coordinator Alexandre Benoit
+33 4 50 09 65 22
Alexandre.Benoit@univ-savoie.fr

Course coordinator Lionel Valet
+33 4 50 09 65 25
Lionel.Valet@univ-savoie.fr

Locations

Annecy-le-Vieux (74)