
ENGINEERING PROGRAMME

2021-2022

Year 2 - Apprenticeship

PROGRAMME SUPERVISOR
Jean-Sebastien LE BRIZAUT



PROGRAMME ENGINEERING PROGRAMME - Year 2 - Apprenticeship

Autumn Semester

Course unit	ECTS Credits	Course type	Course code	Title
UE71	1			
		Core course	APP_EPS_S7	Sports and Physical Education
		Core course	APP_LVOS7	English
		Elective courses	LVC	Modern languages 2 (Chinese - German - Italian - Japanese - Russian - Spanish)
UE72	2			
		Core course	APP_FINAN	Finance
		Core course	APP_MANAG2	Management
		Core course	APP_STRMA	Marketing strategy
UE73	4			
		Core course	APP_APSYS	Systemic Approach
		Core course	APP_QUALI	Quality
UE74	9			
		Core course	APP_PLARU	Plasticity and rupture of structural materials
		Core course	APP_ROBOT	Robotics
		Core course	APP_STASC	Introduction to statistics and data science with Python
UE75	14			
		Core course	APP_ALTER2	Experience feedback in the company
		Core course	APP_ENTR1	Apprenticeship in the company

Spring Semester

Course unit	ECTS Credits	Course type	Course code	Title
UE81	1	Core course	APP_EPS_S8	Sports and Physical Education
		Core course	APP_LVOS8	English
		Elective courses	LVC	Modern languages 2 (Chinese - German - Italian - Japanese - Russian - Spanish)
UE82	2	Core course	APP_CREAN	Entrepreneurship
		Core course	APP_DROICO	Contract Law
		Core course	APP_SOCIO	Sociology
UE83	5	Core course	APP_GPROD	Production management
		Core course	APP_ORGSI	Industrial Systems Organization
		Core course	APP_RSE	Corporate social responsibility
UE84	9	Core course	APP_BDONN	DataBases
		Core course	APP_MEFIN	Finite Element Method
		Core course	APP_MEFLU	Fluid Mechanics
UE85	13	Core course	APP_ALTER3	Experience feedback in the company
		Core course	APP_ENTR2	Apprenticeship in the company

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

German [APP_ALLS7]

LEAD PROFESSOR(S): Arne HINTZ

Objectives

The students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level as well as on a professional level - corresponding to a B2 level according to the CEFRL standards) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing, text production.

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using different types of media and real-life situations.

Course material

Preparation manuals for the various foreign language certificates & specific preparation manuals for language use in job-related contexts. Written and televised press, various internet sources, general civilization documents, digital tools, excerpts of movies and television series, music and literature.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

Chinese [APP_CHIS7]

LEAD PROFESSOR(S): Silvia ERTL

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression. Possibility of B2 in German

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

Sports and Physical Education [APP_EPS_S7]

LEAD PROFESSOR(S): Loreta IVANAUSKAS

Objectives

Sports and physical education contribute significantly to an engineer's physical, psychological, social and intellectual development, as well as to his/her general well being. These activities:

- strengthen self-esteem,
- trigger a sense of competition and solidarity, team spirit and the desire to succeed,
- prepare for the demands of a career by fostering team and individual initiative,
- encourage a sense of responsibility related to positive characterisation and identity.

Course contents

Sports and physical education develop social communication through:

- various team activities (on small and large fields),
- autonomy projects (TA),
- physiological-directed activities (development of cardiopulmonary and muscular functions),
- organisation of sports events

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	16 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

Spanish [APP_ESPS7]

LEAD PROFESSOR(S): Josep PINYOL VIDAL / Marta HERRERA

Objectives

Acquisition and reinforcement of the 4 competencies in written and oral expression & comprehension.

Acquisition of vocabulary, syntax and pronunciation by both traditional means and through the use of digital resources.

Discovery of the Spanish-speaking worlds.

Course contents

Methods

individual and group production & presentations
 Written, digital and audiovisual tools

Contents

2 communicational approaches:

1- Monographical lectures on various engineering specialisations with active contribution from the students (debating, group and individual production and presentations).

2- Multi-week projects on corporate cultures, engineering and techniques in Spanish-speaking cultures. Virtual---but realistic---projects producing the theoretical implementation of a professional activity.
 Public presentations of the results.

Assessment:

Evaluation of in-class activities.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

Italian [APP_ITAS7]

LEAD PROFESSOR(S): Annunziata CALECA

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

Japanese [APP_JAPS7]

LEAD PROFESSOR(S): Silvia ERTL

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

English [APP_LVOS7]

LEAD PROFESSOR(S): Emily WILLIAMS / Matthew BEALL

Objectives

Course description :

In short, these classes' aim is to maintain English language knowledge while improving certain speaking skills that will render communication more fluid, both inside and outside the professional world.

The activities and projects at the heart of the program give a framework for communication and, often, a specific method to follow. In this way, transferable skills honed in the English language are the main takeaways of these classes.

Course contents

Course content changes each year based on the following table

Year A

1st Semester-Journalism Studies

2nd Semester-Conference Organization

Year B

1st Semester-Focus Groups-Qualitative research

2nd Semester-Team Building

Year C

1st Semester-Making a Pitch

2nd Semester-Intercultural Studies

Course material

Authentic written, televised, internet documents, as well as digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 0.5)
EVI 2 (coefficient 0.5)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE71

Russian [APP_RUSS7]

LEAD PROFESSOR(S): Silvia ERTL

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, Numerical tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE72

Finance [APP_FINAN]

LEAD PROFESSOR(S): Jean-Sebastien LE BRIZAUT

Objectives

Learn how to use accounting and/or financial documents as a privileged decision tool.
Understand the strategies developed by the specialists in order to present corporate financial information
Understand the contemporary techniques and tools to analyze the corporate financial statements.

Course contents

Basics of finance diagnosis

Analysis of:

- margins: structures
- margins: risks
- the working capital requirements and the investments,
- financing,
- accounting profitability,
- Conclusion of the financial diagnosis.

Case studies

Course material

- Bernet-Rollande, Luc. Principes de technique bancaire. 2008. Dunod.
- Boissonnade, Marie. Mathématiques financières. 2007. Dunod.
- Bossu, Sébastien. Finance des marchés : techniques quantitatives et applications pratiques. 2008. Dunod.
- Brealey, Richard A. Corporate finance. 2006. McGraw-Hill/Irwin.
- Charreaux, Gérard. Finance d'entreprise. 2000. EMS.
- Colinet, François. Pratique des comptes consolidés. 2008. Ordre des experts-comptables : Dunod.
- Cornuéjols, Gérard. Optimization methods in finance. 2006. Cambridge University Press.
- Hoarau, Christian. Maîtriser le diagnostic financier. 2008. Groupe Revue fiduciaire.
- Hull, John C. Options, futures, and other derivatives: Student solutions manual. 2006. Pearson, Prentice Hall.
- Hull, John C. Options, futures et autres actifs dérivés ; Multimédia multi-support. 2007. Pearson education.
- Knight, John. Forecasting volatility in the financial markets. 2007. Butterworth Heinemann.
- Neftci, Salih N. Principles of financial engineering. 2004. Elsevier Academic Press.
- Tirole, Jean. The theory of corporate finance. 2006. Princeton University Press.

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	10 hrs	7 hrs	0 hrs	0 hrs	1 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE72

Management [APP_MANAG2]

LEAD PROFESSOR(S): Thomas LECHEVALLIER

Objectives

The conference presents different theoretical and practical aspects of Management. The course will successively establish the theoretical framework with a practical application on projects and management contexts. The main objective of this course is to understand that management is a relationship of oneself towards others helped by techniques

Course contents

change management,
decision,
some management tools.

Course material

- Industrial and General Administration, Henry Fayol
- The management toolbox, 2020
- The 7 habits of highly efficient people, S. Covey
- Power and organization, Michel Crozier

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	11 hrs	11 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE72

Marketing strategy [APP_STRMA]

LEAD PROFESSOR(S): *Christophe DESRIAC / Jean-Sebastien LE BRIZAUT*

Objectives

Being able to have a global vision of the marketing and the corporate strategies in order to prepare the decision-making.

Course contents

Basics of marketing
 The consumer's behavior
 The market segmentation
 the demand analysis
 Market studies
 Business communication
 The choice of a communications strategy
 Competitive analysis and building competitive advantages
 The historical models of corporate development

Course material

- Beauvallet, Maya. Les stratégies absurdes : comment faire pire en croyant faire mieux. 2009. Éd. du Seuil.
- Jarvis, Jeff. La méthode Google : que ferait Google à votre place ?. 2009. Éd. SW-Télémaque.
- Joffr , Patrick. Gestion stratégique : l'entreprise, ses partenaires-adversaires et leur univers. 1992. Litec.
- Porter, Michael E.. Choix stratégiques et concurrence : techniques d'analyse des secteurs et de la concurrence dans l'industrie. 2001. Économica.
- Strategor. Strategor : politique générale de l'entreprise. 2005. Dunod.
- Anderson, Chris. The long tail : why the future of business is selling less of more. 2006. Hyperion.
- Anderson, Chris. La longue traîne : la nouvelle économie est là !. 2007. Village mondial.
- Best, Roger J. Market-based management : strategies for growing customer value and profitability. 2009. Prentice Hall/Pearson Education International.
- Bozzo, Cécile. Le marketing industriel. 2007. Dunod.
- Brasseur, Jean-Baptiste. Comment vendre sur Internet : guide juridique et pratique. 2008. Éd. du Puits fleuri.
- Bréchnignac-Roubaud, Béatrice. Le marketing des services : du projet au plan marketing. 1998. Éd. d'Organisation.
- Caumont, Daniel. Les études de marché. 2007. Dunod.
- Costa, Nathalie. Veille et benchmarking. 2008. Ellipses.
- Goudey, Alain. Marketing pour ingénieurs. 2010. Dunod.
- Guéguen, Nicolas. Psychologie du consommateur : pour mieux comprendre comment on vous influence. 2008. Dunod.
- Van Laethem, Nathalie. Le plan marketing : plan stratégique, plan opérationnel, plan de crise. 2004. Dunod.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	3 hrs	3 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE73

Systemic Approach [APP_APSYS]

LEAD PROFESSOR(S): Jean-Yves MARTIN

Objectives

Systemic Approach is one of the basics in modelling, analysis and integration in most of the companies. The main objectives of this courses are presenting the general concepts of the Systemic Approach, and illustrating its application in various branches of industry (information system, civil engineering, automatic engineering, computing science, industrial engineering, .)

Course contents

LECTURES

General concepts / The SAGACE method / Applications in Real-Time Systems, in Automatic Engineering, in Information Systems, in management of complex projects / Overview of the engineering system

TUTORIAL

Study Systemic analysis (functional, structural, behavioral, strategic) of some complex systems - level 0

HOMEWORK

Students, by group of 6 people, choose a complex system and make a systemic analysis of that system.

Course material

Assessment

Collective assessment: EVC 1 (coefficient 0.75)

Individual assessment: EVI 1 (coefficient 0.25)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	6 hrs	8 hrs	0 hrs	32 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE73

Quality [APP_QUALI]

LEAD PROFESSOR(S): Thomas LECHEVALLIER

Objectives

The objective of the course is to give the tools to general engineers to pilot the monitoring of the quality in the realization of the products and the services as well as in the implementation of the Quality in the projects.

Course contents

Definition of quality
The Why of quality
Quality audit management
The human organization of quality
Quality in projects

Course material

- ISO Organisation Internationale de Normalisation <http://www.iso.org>
- AFNOR Association Française de Normalisation <https://www.groupeafnor.org/>
- Jean-Marc DUTRENIT <http://www.iutenligne.net/ressources/le-management-de-la-qualite-totale.html>
- Besterfield & Besterfield Total Quality Management, Prentice Hall, 1999
- Frank W. Geels, Technological transitions and System Innovations, Edward Elgar Publishing, 2005
- La boîte à outils du responsable qualité, de Florence Gillet-Goinard et Bernard Seno, Dunod, 3ème édition 2019

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	6 hrs	6 hrs	0 hrs	4 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE74

Plasticity and rupture of structural materials [APP_PLARU]

LEAD PROFESSOR(S): Erwan VERRON

Objectives

This course introduces two ways of structures failures: plasticity and fracture. It is divided into two independent parts focusing on the two preceding problems. Each part includes 3 lectures, 2 set of exercises, and 1 practical work.

Course contents

1. Plasticity
 - 1.1. Phenomenological descriptio,
 - 1.2. 1D models for plasticity
 - 1.3. Extension to 3D case
2. Fracture mechanics
 - 2.1. Mechanical approach
 - 2.2. Thermodynamical approach

Course material

Assessment

Collective assessment: EVC 1 (coefficient 0.25)

Individual assessment: EVI 1 (coefficient 0.75)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	12 hrs	10 hrs	8 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE74

Robotics [APP_ROBOT]

LEAD PROFESSOR(S): Gaëtan GARCIA

Objectives

Initiation to mechanical modelling of robotic articulated systems for joint trajectories generation. Applications to geometry and kinematics.

Initiation to industrial robot manipulator programming.

Course contents

Modelling part

This lecture deals with two elements : on the one hand, understand the mechanics models that allow locating a rigid manipulator effector in space, with time, and therefore extract the joint trajectories needed to control it, and on the other hand, acquire the numerical tools that allow calculating a desired joint vector trajectory in an autonomous way. These two elements are applied to the rigid serial robots Staubli RX-90 (6R) and SCARA (3R-P).

Robot programming part

Statistics about robot manipulators in the industry and application examples. Programming by teaching. Robot programming languages. The Val II and V+ languages. Advanced features of robot programming languages.

Course material

«Modelling, Identification and Control of Robots». W. Khalil, E. Dombre. Elsevier 2004. ISBN 978-1-903996-66-9.

Assessment

Collective assessment: EVC 1 (coefficient 0.3)

Individual assessment: EVI 1 (coefficient 0.7)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	14 hrs	0 hrs	16 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE74

Introduction to statistics and data science with Python [APP_STASC]

LEAD PROFESSOR(S): Bertrand MICHEL

Objectives

This lecture is an introduction to statistical learning.

Main objectives:

- understanding the main concepts of statistical learning
- introduction to standard methods in statistical learning
- practice on real data using standard Python libraries

Course contents

- introduction to statistical learning
- standard methods for classification
- CART et random forests
- Introduction to Deep Learning

Course material

- The Elements of Statistical Learning, Data Mining, Inference, and Prediction. Trevor Hastie Robert Tibshirani Jerome Friedman, 2009 Springer.
- Hands-On Machine Learning with Scikit-Learn and TensorFlow by Aurélien Géron, O'Reilly 2017.

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	15 hrs	15 hrs	0 hrs	2 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE75

Experience feedback in the company [APP_ALTER2]

LEAD PROFESSOR(S): Jean-Sebastien LE BRIZAUT

Objectives

Allow apprentices, at the return of each period in the company, to present to the whole group, the work done during the period, acquired skills and their development in the company.

Present from their experience in business a particular theme : security, quality etc... in order to provoke an exchange on the practices specific to each company

Course contents

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	6 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Autumn Semester - UE75

Apprenticeship in the company [APP_ENTR1]

LEAD PROFESSOR(S): Jean-Sebastien LE BRIZAUT

Objectives

Validation of business activities, acquired skills, entrusted responsibilities and apprenticeship in the engineering profession

Course contents

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

German [APP_ALLS8]

LEAD PROFESSOR(S): Arne HINTZ

Objectives

The students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level as well as on a professional level - corresponding to a B2 level according to the CEFRL standards) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing, text production.

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using different types of media and real-life situations.

Course material

Preparation manuals for the various foreign language certificates & specific preparation manuals for language use in job-related contexts. Written and televised press, various internet sources, general civilization documents, digital tools, excerpts of movies and television series, music and literature.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

Chinese [APP_CHIS8]

LEAD PROFESSOR(S): Silvia ERTL

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

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The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

Sports and Physical Education [APP_EPS_S8]

LEAD PROFESSOR(S): Loreta IVANAUSKAS

Objectives

Sports and physical education contribute significantly to an engineer's physical, psychological, social and intellectual development, as well as to his/her general well being. These activities: - strengthen self-esteem, - trigger a sense of competition and solidarity, team spirit and the desire to succeed, - prepare for the demands of a career by fostering team and individual initiative, - encourage a sense of responsibility related to positive characterisation and identity.

Course contents

Sports and physical education develop social communication through: - various team activities (on small and large fields), - autonomy projects (TA), - physiological-directed activities (development of cardiopulmonary and muscular functions), - organisation of sports events

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	16 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

Spanish [APP_ESPS8]

LEAD PROFESSOR(S): Josep PINYOL VIDAL / Marta HERRERA

Objectives

Acquisition and reinforcement of the 4 competencies in written and oral expression & comprehension.

Acquisition of vocabulary, syntax and pronunciation by both traditional means and through the use of digital resources.

Discovery of the Spanish-speaking worlds.

Course contents

Methods

individual and group production & presentations

Written, digital and audiovisual tools

Contents

2 communicational approaches:

1- Monographical lectures on various engineering specialisations with active contribution from the students (debating, group and individual production and presentations).

2- Multi-week projects on corporate cultures, engineering and techniques in Spanish-speaking cultures. Virtual---but realistic---projects producing the theoretical implementation of a professional activity.
Public presentations of the results.

Assessment:

Evaluation of in-class activities.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

Italian [APP_ITAS8]

LEAD PROFESSOR(S): Annunziata CALECA

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

Japanese [APP_JAPS8]

LEAD PROFESSOR(S): *Silvia ERTL*

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

English [APP_LVOS8]

LEAD PROFESSOR(S): Emily WILLIAMS / Matthew BEALL

Objectives

Course description :

In short, these classes' aim is to maintain English language knowledge while improving certain speaking skills that will render communication more fluid, both inside and outside the professional world.

The activities and projects at the heart of the program give a framework for communication and, often, a specific method to follow. In this way, transferable skills honed in the English language are the main takeaways of these classes.

Course contents

Course content changes each year based on the following table

Year A

1st Semester-Journalism Studies

2nd Semester-Conference Organization

Year B

1st Semester-Focus Groups-Qualitative research

2nd Semester-Team Building

Year C

1st Semester-Making a Pitch

2nd Semester-Intercultural Studies

Course material

Authentic written, televised, internet documents, as well as digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 0.5)
EVI 2 (coefficient 0.5)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE81

Russian [APP_RUSS8]

LEAD PROFESSOR(S): *Silvia ERTL*

Objectives

As well as for preparing the certificates required in English (or French as a foreign language), the students will learn basic communication skills (enough to communicate on a daily basis at a non-specialist level) including the comprehension of the particular country's social, political and cultural context through written and televised press in their chosen language. The acquisition and reinforcement of basic vocabulary, syntax, and pronunciation by both traditional means and using multimedia resources. The teaching approach is 'communicative' meaning that the language is not only the subject matter of the course, it is also a means of communication.

Course contents

The course activities cover a whole range of practical language and communication exercises that span written and oral comprehension and expression.

Written: multiple choice, gap filling, rephrasing;

Oral: awareness of registers, intonation, syntax as it applies to different situations, debates, study of unique situations, linguistic consequences of cultural differences, using media, telephoning.

Course material

Preparation manuals for the various foreign language certificates. Written and televised press, internet, general civilization documents, digital tools.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	16 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE82

Entrepreneurship [APP_CREAN]

LEAD PROFESSOR(S): Valerie THEVENOT

Objectives

Creation of a business plan
Methodology

Course contents

Create a Complete Business plan for a project
Marketing strategy
Financial resources
Legal option
Team and human resources
etc

Course material

- Agence nationale pour la création et le développement des nouvelles entreprises. Créer ou reprendre une entreprise : méthodologie et guide pratique. 2008. Eyrolles-Éd. d'Organisation : Éd. APCE.
- Bozek, Jean-Philippe. Coacher les entrepreneurs : Transformer leurs rêves en réalité. 2010. Editions d'Organisation.
- Fayolle, Alain. L'ingénieur entrepreneur français : contribution à la compréhension des comportements de création et reprise d'entreprise des ingénieurs diplômés . 1999. l'Harmattan.
- Fayolle, Alain. Entrepreneuriat : apprendre à entreprendre. 2003. Dunod.
- Lambalais, Jacques. Créer son entreprise : les statuts, le capital, la gestion et la transmission des sociétés, les aides, le dossier financier... . 2007. De Vecchi.
- Percin, Laurence de. Créer sa boîte pour les nuls. 2007. First Editions.
- Pra, Jean-François. Création d'entreprise : les clés de la réussite. 2008. Alban éditions.

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	8 hrs	8 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE82

Contract Law [APP_DROICO]

LEAD PROFESSOR(S): Valerie THEVENOT

Objectives

To acquire a grounding in company law.

Course contents

Company law

- Understanding what a firm is and the different types of firm (sole concerns: freelance worker, artisan, trader, professional - and companies)
- Selection criteria (director's status, guarantees)
- Choice of company type (partnerships or joint-stock companies).

Course material

Le droit des affaires en France - Éditions Francis LEFEBVRE - B. MERCADAL et P. MACQUERON.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	6 hrs	6 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE82

Sociology [APP_SOCIO]

LEAD PROFESSOR(S): Valerie THEVENOT

Objectives

Understand the development of organizations in its historical context.
Understand the authors whose ideas had an impact on organizations: Taylor, Fayol, Weber, etc.
Discover the methods of sociological surveys.
Meet professionals and share their experience (experiments, values, corporate culture).

Course contents

Basics in sociology and in the sociology of organizations.
- Historical reminder: definitions, trends, methods and techniques. The development of organizations in its historical context; the authors with an impact on organizations: Taylor, Fayol, Weber.
- The Industrial Revolution.
- The evolution of organizations and of production from Taylor's times up to now.
- The evolution of the theories of the organization (from the scientific labour organization to the contingency theory).
- The current research trends.
Humanities: a scientific approach away from the numerous disciplines in interaction. The sociology of organizations and the emergence of a corporate sociology. The company as an organization: deciphering, functioning, organization chart, staff representativeness, trade unions, the rules and the labor code.

Course material

- Renaud SAINSAULIEU, L'Identité au Travail, les Presses de la fondation nationale des sciences politiques, Paris, 1988.
- Max WEBER, Economie et société, Presse Pocket, Agora, Paris, 1995.
- Les Organisations, Etat des Savoirs - Coordonné par Philippe CABIN - Editions Sciences Humaines, Paris, 1999.
- Hervé FENNETEAU, Enquête : Entretien et Questionnaire - Les Topos, Dunod 2002.
- François DE SINGLY, L'Enquête et ses Méthodes : Le Questionnaire, Colin, Paris, 2005.
- Joffre DUMAZEDIER, Construire ma recherche - éditions Chronique sociale, sous la direction de Georges LE MEUR.
- Michel CROZIER et Erhard FRIEDBERG, L'Acteur et le Système : les contraintes de l'action collective, Seuil, Points, Paris, 1977.
- Joffre DUMAZEDIER, Révolution Culturelle du Temps Libre : 1968-1988- Méridiens Klincksieck 1988
- Erhard FRIEDBERG, Le Pouvoir et la Règle : dynamiques de l'action organisée, Seuil, Paris, 1997.
- Violence et pouvoir, François STIRN, Hatier 1985 collection Profil Formation Philosophie.
- Philippe BERNOUX, La Sociologie des Organisations, Seuil, Paris, 1985.
- La culture d'entreprise, Maurice THEVENET - collection Que sais-je PUF - 2010.
- Méthodes pour une sociologie de l'entreprise, Françoise PIOTET, Renaud SAINSAULIEU - Presses de la Fondation Nationale des Sciences Politiques & ANACT Agence Nationale pour l'Amélioration des Conditions de Travail - décembre 1994.
- Philippe BERNOUX & G.HERREROS, Le Changement dans les Organisations : entre compromis et pouvoir - Gestion 2000, n° 6, 1993.
- Pierre BOURDIEU, Le Capital Social, Notes provisoires - Actes de la recherche en sciences sociales n° 31 - 1980.
- Sous la direction de Jean-Luc BERNARD et Claude LEMOINE, Traité de Psychologie du travail et des organisations, Dunod 2ème édition - Chapitre : L'autorité et le pouvoir - Pouvoir et performance dans l'entreprise.
- La Sociologie, Histoire et Idées - Coordonné par Philippe CABIN & Jean-François DORTIER - Editions Sciences Humaines, Paris, 2000.
- Claudine BLANCHARD-LAVILLE & Dominique FABLET, L'Analyse des Pratiques Professionnelles - Nouvelle édition revue et corrigée 2000, Savoir & Formation.
- Valérie GREMONT-MONNIER : Entre expertise Technique et Management, La Conversion des Agents de maîtrise en Organisation « équipes autonomes » aux Chantiers de l'Atlantique - Mémoire présenté pour l'obtention du DESS SIFA Promotion 2001-2003 / Université de Nantes Formation continue - Directeur de mémoire Charles Suaud Professeur des

Universités & Directeur du Centre Nantais de Sociologie.

- Bénédicte GENTIN, sous la direction de Monsieur André BRILLAUD, Maître de conférence - « Dirigeants de TPE (très petites entreprises) et Légitimité du Pouvoir - Mémoire de recherche DESS Stratégie et Ingénierie en Formation d'Adultes - Service de la Formation Continue - Université de Nantes - Juin 2004.

- Ouvrage collectif : Notre Vie de Métallos Batignollais - De 1918 à nos jours - évocation chronologique de la vie d'une usine et de ses travailleurs, éditions du Centre d'histoire du travail Nantes - 2007.

- Jean-Michel PLANE, Théorie des Organisations, 3ème édition, Dunod.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	6 hrs	6 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE83

Production management [APP_GPROD]

LEAD PROFESSOR(S): Jean-Sebastien LE BRIZAUT

Objectives

- Understand the flows in a production environment
- Forecast the demand and plan the related activities

Course contents

- Physical flows
 - Demand and forecasting
 - Inventory management
 - Data management (Bill of material, routings)
 - Planing
- Lab sessions will allow the students to apply the concepts on case study with a manufacturing software
 Keywords: Inventory management, forecasting, planing

Course material

"Toute la fonction Production" Florence Gillet-Goinard et Laurent Maimi (édition Dunod, l'Usine Nouvelle)

"Techniques d'amélioration continue en Production" Robert Chapeaucou (édition Dunod)

Assessment

Collective assessment: EVC 1 (coefficient 0.34)

Individual assessment: EVI 1 (coefficient 0.66)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	8 hrs	6 hrs	8 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE83

Industrial Systems Organization [APP_ORGSI]

LEAD PROFESSOR(S): *Chloé LOURDAIS*

Objectives

- Have an overview of the different production systems within industrial companies.
- Understand the organization of production, internally and within the supply chain.
- Understand the challenges of production management.
- Study production management activities: demand forecasting, inventory control, and facilities layout.

Course contents

- 1) Industrial companies and production activities: some definitions, functioning and organization of a company, flows in production, types and evolution of production systems.
- 2) Demand forecasting: objectives over different time horizons, typologies of demand, qualitative and quantitative methods.
- 3) Technical data: data used in production, information system, and software tools.
- 4) Facilities layout: types of layout in facilities, optimization methods.
- 5) Inventory control: challenges, an optimization model: the Economic Order Quantity Model.
- 6) Introduction to Lean Management: concept, origin, examples of tools.

Course material

Assessment

Collective assessment: EVC 1 (coefficient 0.34)

Individual assessment: EVI 1 (coefficient 0.66)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	10 hrs	8 hrs	4 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE83

Corporate social responsibility [APP_RSE]

LEAD PROFESSOR(S): Emmanuel ROZIERE

Objectives

Planetary boundaries, including climate change, and main mitigation levers

Understand the notion of collective responsibility: carbon footprint of an organization and corporate social responsibility

Course contents

Introduction to climate change and social responsibility

Environmental impacts: finite resources and planetary limits

Carbon accounting, case study.

Life cycle analysis, eco-design, circular economy and sobriety

Course material

Intergovernmental Panel on Climate Change (IPCC), 6th assessment report, 2022, sur ipcc.ch

ISO 14064-1:2018, Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals

Rockström, J. et al., Planetary boundaries:exploring the safe operating space for humanity. Ecology and Society 14(2): 32

Limits to growth : the 30-year update, D. Meadows, D. Meadows, J. Randers, 2004

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	10 hrs	2 hrs	0 hrs	2 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE84

DataBases [APP_BDONN]

LEAD PROFESSOR(S): Jean-Yves MARTIN

Objectives

The objective of this course is to understand the functioning of databases, from both theoretical and practical perspectives. Starting from relational algebra, we study the conceptual modeling of a more or less well defined problem and its transformation into a relational model and its operations through administrative tools or software. The focus lies particularly on the treatment of ill-posed problems, or the exploitation of poorly designed databases in order to prepare engineers for real situations.

Course contents

This course includes lectures, exercices and practical work.

Lectures will follow the following programme:

- Introduction to Databases
- Relational Databases
 - +Functional Modeling (CDM), Relational Modeling, Physical Data Modeling (PDM)
 - + Relational Algebra
 - + Introduction to Normal Forms
 - + Introduction to SQL
- Programming databases with Python and PL/SQL
 - + Notions of BI
 - + Introduction to noSQL and Big Data

Practical work includes:

- Database modelling with PostgreSQL
- SQL requests
- Python programming
- triggers implementation

Course material

Assessment

Collective assessment: EVC 1 (coefficient 0.5)

Individual assessment: EVI 1 (coefficient 0.5)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	12 hrs	4 hrs	14 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE84

Finite Element Method [APP_MEFIN]

LEAD PROFESSOR(S): Hervé OUDIN

Objectives

To present the fundamentals of the Finite Element Method and aspects of its implementation.

Course contents

Concepts covered: Rod and Truss Beams Each theme is presented through tutorials analytically and numerically. Projects are proposed for more complex examples, and the numerical results are compared with theoretical, numerical and experimental results.

Course material

<https://meefi.pedagogie.ec-nantes.fr/MEF/MEF.htm>

Assessment

Collective assessment: EVC 1 (coefficient 0.5)

Individual assessment: EVI 1 (coefficient 0.5)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	10 hrs	12 hrs	8 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE84

Fluid Mechanics [APP_MEFLU]

LEAD PROFESSOR(S): Sandrine AUBRUN

Objectives

The program contains essential skills needed by any engineer dealing with mechanics. The level achieved at the end of the program enables one to solve basic problems when fluids are present and to transfer them and interact with specialists, when relevant:

- Understand and interpret fluid flow phenomena
- Understand and interpret actions of fluids on objects
- Predesign a hydraulic installation

Course contents

1. Fluid properties and hydrostatic law
2. Static pressure loads
3. Perfect fluid dynamics. Bernoulli equation and applications
4. Closed-circuit flows. Generalized Bernoulli equation, Head loss. Circuits
5. Viscous fluid dynamics. Navier-Stokes equations. Similarities. Laminar and turbulent regime. Basics on boundary layer
6. Momentum equation and applications
7. Practical labs

Course material

Assessment

Collective assessment: EVC 1 (coefficient 0.4)

Individual assessment: EVI 1 (coefficient 0.6)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	12 hrs	12 hrs	6 hrs	0 hrs	2 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE85

Experience feedback in the company [APP_ALTER3]

LEAD PROFESSOR(S): Jean-Sebastien LE BRIZAUT

Objectives

Allow apprentices, at the return of each period in the company, to present to the whole group, the work done during the period, acquired skills and their development in the company.

Present from their experience in business a particular theme : security, quality etc... in order to provoke an exchange on the practices specific to each company

Course contents

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	6 hrs	0 hrs	0 hrs	0 hrs

ENGINEERING PROGRAMME - Apprenticeship

Year 2 - Spring Semester - UE85

Apprenticeship in the company [APP_ENTR2]

LEAD PROFESSOR(S): Jean-Sebastien LE BRIZAUT

Objectives

Validation of business activities, acquired skills, entrusted responsibilities and apprenticeship in the engineering profession

Course contents

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	-	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs