Table of Contents

Training

Prerequisites: No

Learning Objectives

Train'Ing week content is geared towards awareness, learning through action and positioning students to acquire and consolidate the skills expected of the Central Engineer:
- Understanding the fundamental principles of interpersonal communication - Understanding the diversity of different communication profiles and their characteristics
- Experiencing teamwork
- Awareness of socio-environmental and scientific issues

Programme Description

The Train'Ing is a place dedicated to the integration of the skills of the Central Engineer with 3 main axes: scientific openness, societal and cultural openness, business openness.
Concerning scientific openness, scientific activities, related to the components of the skills C1 (Scientific and Technical Innovation) and C2 (Control of Complexity and Systems) are proposed. These activities are organised over 3 days (24 h.student) around a theme by articulating different learning formats (practical work, experience, visit, project, workshops, etc.).
The business opening includes workshops for learning and practising soft skills (Agile Communication and Team Management) as well as weeks dedicated to specific activities of the innovation project (ideation week and model week) evaluated by a jury.
Finally, the cultural and societal opening allows students to open up to disciplines such as the humanities, the arts and various fields of the humanities and social sciences in order to develop their ability to take ownership of other languages, to promote their curiosity and creativity.
On the other hand, these training actions promote students' awareness of major social and environmental issues. In line with the institution's strategic directions, the proposed themes build on the SDGs.

Target generic centrale-specific field-related skills and knowledge

The Train'Ing is the privileged place to integrate the skills of the Central Engineer. As such, they are all 5 addressed in the three pillars of the Train'Ing weeks: scientific openness, cultural and societal openness and business openness.

Knowledge Control Procedures

The various training actions of the three above-mentioned components are evaluated in continuous monitoring. Each week is evaluated. The offer of cultural and societal openness is assessed both by the presence of a minimum number of actions defined at the beginning of the year and by the rendering of reports.

Bibliography
Coming

Teacher
Responsables : A. Soric et C. Enoch
Speakers : C. Delabroye, E. Sarrouy, P. Denis, J. Bittebierre, L. Gallais, F. Schwander, A. Martinez, C. Jazzar, B. Chatelet, N. Sandeau, P. Guichardon, F. Anselmet, O. Boiron, T. Durt, F. Lemarquis, I. de Riggi, D. Hérault, L. Schiltz, P. Massart.

Sustainable development objectives (SDO)
3-Access to Health

5-Gender equality

7-Use of renewable energy

12-Responsible consumption and production

13-Combating climate change

Distribution of hours
Total: 128

Directed work: 24

Practical work: 56

Applied Jobs: 24

Projects: 24

Language(s) used during the course: French

Physical, sports and artistic activities

Prerequisites: No

Learning Objectives
- Raising the level of competence in the physical, sports and artistic activity chosen (APSA)
- Ability to demonstrate a strong commitment to oneself and to one's "APSA group"
- Ability to contribute effectively to the proper functioning of one's group or team
- Ability to manage one's physical life and maintain one's "healthy capital"

Programme Description
Each student chooses an APSA that is eligible for the semester.
A weekly participation with the chosen APSA group is expected.
The teaching focuses on the acquisition of procedures that allow the "rise of the level of competence in sport or art" and on the effective and assiduous implementation of these procedures.

Target generic centrale-specific field-related skills and knowledge
Students develop resources during the APSA courses that contribute to the construction of the five competencies of the Central School's educational programme:
- Development of strategies based on precise analysis (issues, definition of objectives, context, risk management, evaluation of one's own strengths and weaknesses and those of partners and opponents)

- Decision-making in real or delayed time based on a refined perception of evolution Building a functioning group or team by considering and respecting each of its members

- Ability to act autonomously in order to develop its own level of competence

Knowledge Control Procedures
Continuous monitoring Students are assessed on their attendance, their level of commitment to progress and their investment in the optimal functioning of the group.

Teaching team
Practising teachers

Distribution of hours

Total: 15

Directed work: 15

Language(s) used during the course: French

IT

Prerequisites: No

Learning Objectives

This EU is an introduction to algorithms (trees, graphs, texts), complexity, indexing and databases, which are indispensable tools for a general engineer.
The aim is in particular to make students able to analyse/model a given problem, to imagine an algorithm to solve it, to question its effectiveness, and to implement it concretely by making relevant choices. programming and using appropriate data structures.

Programme Description

This unit covers:
- The notion of complexity (worst case, average, minimal)
- Graphic data and associated algorithms (path, shorter path, colouring...)
- Tree data and associated algorithms (search...)
- Text data and associated algorithms (search, comparison...)
- Dynamic programming
- Storage and I algorithms Data Indexing- Relational Algebra
-Databases of the SQL type

- Bases of Programming
- Introduction to Object-Orientated ProgrammingTeaching is shared between lecture courses, directed works focusing on algorithmic concepts and practical works for implementation with the Python language.

Target generic centrale-specific field-related skills and knowledge

- Know how to mobilise and use fundamental algorithmic approaches
- Master algorithms for classical problems and know how to programme them

- Know how to use adapted data structures

- Master the fundamental elements of Python programming language syntax

Knowledge Control Procedures

Mini-tests at the beginning of Directed Jobs: (50%)
Supervised: (50%)

Bibliography

Practical work: https: //wiki.centrale-marseille.fr/informatique/

Teacher

T. Artiere

F. Brucker

E. Daucé

C. Jazzar

P. Prea

R. Sicre

Distribution of hours

Total: 72

Magistrates: 14

Directed work: 20

Practical work: 20

Applied Jobs: 18

Language(s) used during the course: French

Waves and Signal

Prerequisites: No

Learning Objectives

WAVES:

- Have an intuition on the fundamental aspects of wave phenomena, such as the composition of wave packets by Fourier overlays, the relationship of uncertainty, and causality.
- Understand the physics behind the response of material media to electromagnetic waves and the resulting optical properties of these media.
- Be able to describe optical polarisation and the physical phenomena that modify it.
- Understand the The concept of a waveguide and its applications, as well as the dispersion effects caused by both their configuration and their material properties.
- To understand the phenomenon of diffraction in the paraxial regime through the use of the Fresnel propagation formula.
- To be able to model simple optical systems including imaging systems using both the ray and wave formalisms.

SIGNAL:

- Know the physical nature of the signals and the processes of their digitisation.
- Know and know how to implement the basic methods of signal processing.
- Approach the notion of optimal processing and master some techniques of optimal filtering in the presence of noise.

- Perform a work related to signal processing.- Use the lessons learned in the case of a multidisciplinary project or a work in autonomy linked to the signals.

Programme Description

WAVES:

This course begins with an introduction to Fourier's theory, which serves as the basis for much of what is presented later. The study of optical waves then follows from the equations of Maxwell, first in free space and then in linear medium. The main properties of the propagation of electromagnetic waves are described, including polarisation, dispersion, refraction and reflection, and diffraction. These concepts are then used to introduce applications such as waveguides (used for sensors or telecommunications) and imaging systems.

The course follows four main blocks:

- mathematical training: Fourier's theory and the equations of physics;
- free-space electromagnetic waves and polarisation;
- material response to electromagnetic waves: dispersion, refraction, reflection and guided waves;
- 3D spatial propagation: diffraction and optical systems.

SIGNAL:
This course allows the identification of problems that may be related to signal processing and provides the basic elements of this domain. This is one of the foundations of digital technologies. It presents the principles of a new and specific scientific and technical approach, whose industrial and societal applications are expanding rapidly. The main concepts discussed:
- representation of linear systems;
- temporal and spectral representation of deterministic and random signals;
- linear filtering;
- digitisation of signals and numerical methods of signal processing.

Knowledge Control Procedures

Continuous Control:
CC1 Waves: Writings + Practical work: (40 %) CC2 Signal: Writings + Practical work: (40 %) TA (20%)

Bibliography

Notes of the CourseBook "From Electromagnetic Optics to Interferometry

- Concepts and Illustrations", M. Lequime and C. Amra, EDP Sciences,
Book "Signal Theory", Ph. Réfréger, Masson (1993).

Teacher

WAVES :
- Miguel Alonso
- Laurent Gallais
- Nicolas Sandeau
- Frédéric Lemarquis
- Julien

SIGNAL :
- Salah Bourennane
- Antoine Roueff
- Caroline Fossati
- Thierry Gaidon

- Muriel Roche

- Lamine Diong

Sustainable development objectives (SDO)

3-Access to Health

4-Access to quality education

11-Sustainable cities and communities

13-Combating climate change

17-Partnerships for the achievement of objectives

Distribution of hours

Total: 96

Magistrates: 30

Directed work: 26

Practical work: 12

Applied Jobs: 24

Other: 4

Language(s) used during the course: French

Economy Management

Prerequisites: No

Learning Objectives

- Understanding what a business is: its environment, functions, structure and organisation
- Understanding the utility and general principles of economic
science- Mastering and understanding the limitations
of basic models in economics (microeconomics and macroeconomics)- Applying economic theory to contemporary issues
- Understanding how to extract information about the company and its operations through its accounting
data- Understanding the need for homogeneity of accounting rules for better comparability of companies over time and between them
- Understanding what constitutes corporate governance, strategic management and understanding the issues

Programme Description

The teaching unit is divided into three complementary blocks: an introduction to the economy, an introduction to accounting and an introduction to the organisation and management of the company. Each of the three parties will follow the following plan:
Introduction to the Economy

1. Economics as a Scientific
Discipline 2. Supply, Demand and Balance
3. the case of the environment
4. Innovation: network economics
5. Time and uncertainty: an aperitif in finance
6. Growth and demand factor: Introduction to
MacroeconomicsAccounting and Management
1. Introduction: General information on the various accounts
2. Accounting data and estimates: General accounts
3. Management decision support: Cost accounting
4. Investment choice and financial analysis: corporate
finance

5. Serious
application gameOrganisation and management of the company
1. Corporate culture, ethics and governance
2. The company: Environment, Structure, Functions and Organisation
3. Responsibilities: social, social and environmental security

Target generic centrale-specific field-related skills and knowledge

Knowledge Control Procedures DS1: Economy 42.5% DS2: Management 42.5% CC1: Serious game 15%

Bibliography

Course
copiesEbook The Economy of CORE Econ: Practical work: https: //www.core-econ.org/the-economy/fr/
Acemoglu, D., Laibson, D., and List, J. (2017), *Economics, Global Edition.* Pearson.
Marcus, J. and van Dam, N. (2019), *Handbook Organisation and Management: a practical approach. Noordhoff Uitgevers.*

Teacher

Renaud Bourlès (Economy)
Nicolas Clootens (Economy)
Cécile Loubet (Accounting)
Florian Magnani (Corporate Management)
Françoise Perrin (Accounting)
External stakeholders

Sustainable development objectives (SDO)

1-Eradication of poverty

7-Use of renewable energy

10-Reducing Inequality

13-Combating climate change

17-Partnerships for the achievement of objectives

Distribution of hours

Total: 60

Magistrates: 24

Directed work: 24

Applied Jobs: 12

Language(s) used during the course: French

Mathematics

Prerequisites: No

Learning Objectives
Introduction to the mathematical, numerical and probabilistic approaches required for a general engineer

Programme Description
The EU is divided into three distinct parts:
- A course of theoretical analysis where the bases of analysis are discussed: differential calculation, optimisation, integration of Lebesgue, Fourier transformations, Hilbert spaces

- A numerical analysis course where the bases of numerical approximation are introduced: polynomial approximation, ordinary differential equations and approximation of their solutions, finite differences approximation of solutions of partial differential equations

- A probability course and statistics as introduction to the study of random situations: probabilistic tools, modelling, sample applications in statistics. Includes: the foundations of probability calculation, the actual random variables, the transformations (characteristic function, generating function), the sequences of random variables and the modesty of convergence, the pairs of random variables, the point and interval estimates, the tests

Target generic centrale-specific field-related skills and knowledge
- Know how to mobilise and use basic mathematical approaches - Know how to implement numerical methods to simulate a problem
- Know how to recognise a random situation and be able to model it

- Be able to verify the suitability of a model Knowledge targeted:
Bases of numerical analysis and analysis, theory of probability, parametric statistical elements

Knowledge Control Procedures
Mini-tests at the beginning of Directed Jobs: QCours Magistrals: (30%), project (20%), monitored duty (50%)

Bibliography
Polycopied courses

Teacher

- G. Chiavassa
- T. Le-Gouic
- J. Liandrat
- C. Pouet
- J.M. Rossi
- F. Schwander
- M. Tournus

Distribution of hours

Total: 96

Magistrates: 36

Directed work: 36

Applied Jobs: 24

Language(s) used during the course: French

Mechanical

Prerequisites: No

Learning Objectives

Present the concepts and tools of the mechanics of continuous deformable environments (MMC)
This scientific discipline concerns the study of movement and deformation of systems under the action of forces. It allows modelling most of the mechanical problems encountered by engineers in applications. Examples include the analysis of the airflow around a wind turbine blade to optimise its performance, the study of the deformation and resistance of the same blades under extreme wind, and the impact of the acoustic nuisance generated by the wind turbine in a nearby environment.
This course of continuous media mechanics (MMC)) has been designed to consistently support all advanced second- and third-year engineering courses. The fundamental concepts of the discipline are presented at the highest level of current knowledge according to a unified presentation valid for all fluid and solid macroscopic environments. Because it limits the number of essential concepts, this vision is pedagogically effective, and it best prepares students for the modelling of complex multi-physical and multi-scale mechanical systems.

Programme Description

The first part of this course is devoted to the general concepts of the discipline.
- Algebra and tensory analysis - Fundamental concepts of the MMC
- Deformation of continuous environments: deformation tensioners - stresses in continuous media: stress tensors - General MMC Equations: mass conservation, fundamental principle of dynamics, first and second principles of thermodynamics

The following course covers three priority applications for an engineer: (1) Linear elasticity - Moving from general MMC equations to elasticity equations - Linear elastic solid behaviour relation - A few analytical resolutions of elasticity problems – Finite element numerical resolution (2) Fluid mechanics - Translation of general MMC equations MC for flow of incompressible fluids - Behaviour of Newtonian fluids- Resolution of classical problems of fluid mechanics- Hydrauliccircuits

3) Linear

acoustics- Passage of general equations of MMC to acoustic equations⇒- Propagation of acoustic waves, notion of acoustic modes

Target generic centrale-specific field-related skills and knowledge

- Mastery of a scientific discipline that creates value and innovation
- Ability to understand, formulate and solve a complex multi-physical problem
- Ability to expand knowledge to other disciplines

Knowledge Control Procedures

(1) Continuous monitoring: During each of the 14 sessions of Directed Work, a test without documents is conducted:
- a short test of 3 minutes at the beginning of Directed Work: (on 2 points)
- a 30-minute long test at the end of Directed Work: (on 20 points) as the closing of each block: MMC, Elasticity, Fluid, Acoustics.

2) Classic written evaluation (3 hours) "without documents" at the end of the module.

Bibliography

*Jean Coirier, Mechanics of Continuous Environments, 2*th edition, Dunod.
*Paul Germain, Patrick Muller, Introduction to Mechanics of Continuous Environments, 2*th edition, Masson.
Paul Germain, Mechanics, Volume I and II, École polytechnique, Ellipse.
Jean Salençon Continuous Environment Anique, Volume I and II, Polytechnic.

Teacher

- Michel Benoit
- Stéphane Bourgeois
- Bruno Cochelin
- Thierry Désoyer
- Marc Jaeger
- Olivier Kimmoun
- Cédric Maury
- Daniel Mazzoni
- Emmanuelle Sarrouy

Sustainable development objectives (SDO)

Distribution of hours

Total: 72

Courses: 26

Directed Jobs: 28

Applied Jobs: 18

Language(s) used during the course: French

Chemistry - Process Engineering

Prerequisites: No

Learning Objectives

In Chemistry:
- Know the general principles of kinetics and chemical thermodynamics and the structural relations - properties of molecules
- Know the reactive molecular entities - Know the general concepts of

organic reactivityIn Process Engineering:
- Know how to apply material and energy balances, with and without chemical reaction, in regimedia permanent on a system
- Know and know how to calculate the volume of the ideal reactors (closed reactor, perfectly agitated, piston) in simple cases - In the case of perfectly agitated reactors, know how to calculate the adiabatic temperature⇒- Abort the transient regime⇒- Apply this knowledge to the distillation of a binary mixture⇒- Know the thermodynamics of liquid/vapour equilibria- Know scale a tray grinding column in continuous modes and batch

Programme Description

In Chemistry: Molecular Structure:
1. Chemical Element and Atom - Electronic Configurations - Lewis Theory - Molecular Geometry - Quantum Model of the Atom - Molecular Orbals - Hückel Method2. Formal Chemical Theory - Reaction speed and order and speed constant - Complex reactions (parallel, consecutive reactions) - Mechanisms Chemical Thermodynamics - Thermodynamics of Activation - Kinetic/Thermodynamics
3. Chemical Thermodynamics - Standard State - Status Functions - Partial Molar Quantities - Reaction Quantities - First Principle and Applications - Chemical Potential - Second Principle and Evolution of Chemical Systems Organic Reactivity:

- Dynamic Stereochemistry (conformational analysis)⇒2. Reactivity of alkanes and halogeno-alkanes, reactive species - Nucleophilic substitution - Elimination⇒3. Kinetic control, thermodynamic control - orbital control, load control, quantitativelysteric controlIn Process Engineering:⇒1. Balance sheets and reactor:⇒- Discovery of Combined processes and operations.- Comprehensive analysis of a manufacturing process- Application of global and partial balances without chemical reaction- Application of global and partial balances with chemical reaction- Energy balance, with and without chemical reaction- Introduction on reactors (process and technology aspect)[1]- Special case of ideal reactors⇒2. binary mixture:- Introduction to separative methods⇒- Thermodynamics of liquid/vapour equilibria- Distillation flash⇒- Continuous correction: Mac Cabe and

Thiele
's method of sizing - Batch mode correction: Rayleigh equation and sizing

Target generic centrale-specific field-related skills and knowledge

Chemistry:
- Ability to understand the kinetics and thermodynamics of molecular transformations

- Ability to identify the reactive species of a chemical system, know how to formulate hypotheses of reactionary mechanisms

- Predict the selectivity and stereochemistry of a molecular transformation

Knowledge Control Proceduresc

DS Chemistry (2/3) - GP (1/3): 50%
CC (Directed + Practical + Applied) Chemistry (2/3) - (Directed + TA) GP (1/3): 50%

Bibliography

Online resources on the educational portal of the
Central SchoolWorks (documentation centre)

Teacher

Chemistry :
- Bastien Chatelet
- Laurent Giordano
- Alexandre Martinez
- Didier Nuel
- Innocenzo de Riggi
- Anne-Doriane Manick
- Cédric Colomban
- Louise Miton
- Émile Vandeputte

Genie des Procédés :

- Pierrette Guichardon

- Pascal Denis

-Nelson Ibaseta

- René Arnaud

Sustainable development objectives (SDO)

12-Responsible consumption and production

Distribution of hours

Total: 96

Magistrates: 36

Directed work: 32

Practical work: 4

Applied Jobs: 24

Language(s) used during the course: French

International languages and cultures

Prerequisites: No

Learning Objectives

LCI education is part of the training of · citizens · s and · engineers · international engineers · experts · and · .

The Engineer · Central · Marseille will have to be able to interact accurately and effectively with partners of different languages and/or cultures, especially in a professional environment. He/she will be able to mobilise linguistic, conceptual, cultural and communicational knowledge and skills. To do this he/she will acquire knowledge of historical, cultural, social, economic and political practices, events and/or phenomena. He/she will stimulate his/her imagination through cultural discovery and awareness of difference by varying his/her representations. He/she will develop his/her critical mind.

Programme Description

LCI education comprises two separate lessons per semester: English (LV1) 8 pm and another language (LV2) 8 pm.

Attention: students enrolled · e · s in Double Degree will follow 2 FLE lessons (LV1 and LV2) at S5 and S6.

These 40 hours of face-to-face courses are completed by 10 hours of personal work (autonomous work, research, exercises...) per language and per semester.

LCI is taught at a rate of 2 hours per language per week. Groups of levels are formed following evaluation tests in English, French, Foreign Language, German and Spanish.

For beginner LV2 levels, students will benefit from 10 hours (Italian, Spanish, Portuguese) or 15 hours (German, Chinese, Japanese, Russian) of additional support courses.

NB: Students will only be able to start a language in semester 5.

Target generic centrale-specific field-related skills and knowledge

Training in Languages and Cultures is essential to the identity of the · and Central · engineer who will be able to communicate and interact internationally. The skills of the Central Engineer repository specifically targeted by LCI's teachings will be related to:

- C1: the Central Engineer creates value through scientific and technical innovation.
- C2: ICR has mastered the complexity of the systems and the problems it faces.
- C3: ICR conducts programmes.
- C4: IC manages in an ethical and responsible manner.
- C5: ICR is part of a strategic vision and knows how to implement it.

Knowledge Control Procedures:

2 languages (50% each of the average). Minimum of 7/20 for each language.

The 5 skills of CECRL will be evaluated (modalities specified by the teacher · e).

Attention: required attendance: more than 2 absences will compromise the validation of the semester.

Sessions 2 will address the unvalidated skills in Sessions 1 and will be managed individually by teachers · · s.

Bibliography:

Bibliography according to the courses chosen.

Teacher

English : P. Atkinson, J. Airey, V. Durbec (responsable UE), G. Marquis, M. McKimmie
Spanish : C. Enoch (responsable LV2), S. Duran, S. Carmoni, E. Munoz, K. Pinchenet
German : D. Ortelli van Sloun
FLE : V. Hamel, Dominique Betton
Chinise : J. Dong
Japanise : K. Yoshida,
Italian: S. Canzonieri
Arab : B. Zoubir
Russian : Y. Yurchenko
Portuguese : S. Almeida

Sustainable development objectives (SDO)

5-Gender equality

7-Use of renewable energy

10-Reducing Inequality

12-Responsible consumption and production

16-Justice and peace

Distribution of hours

Total: 40

Directed work: 40

Applied Jobs: 20

Language(s) used during the course: English

Physical

Prerequisites: Preparatory Class End Level

Learning Objectives

- To allow students to assimilate the fundamental assumptions of quantum physics and to understand, in particular, microscopic physics in probabilistic terms

- To master the notions of statistical physics and the foundations of classical, quantum, thermodynamic and chemical potentials statistical distributions

- To understand the evolutions of scientific thought in a perspective of the history of ideas, midway between empiricism and speculation
- Being able to identify the implications in Engineering Sciences

Programme Description

QUANTUM PHYSICAL PART:
- Limits of the classical approach

- Wave

-corpuscular duality-

Probabilistic description, fundamental postulates and measurement
- Description of angular, orbital and spin moment

- Distinction of fermions/bosons
- Intrication and nonlocality.

These concepts will be illustrated with concrete examples, such as the hydrogen atom, The harmonic oscillator, the quantum tunnelling effect and the quantum boxes.STATISTICAL PHYSICAL

PART:
- Probability reminders for physics

- Random steps and diffusion - Construction of fundamental equations- Basic principles and distributions microcanonical and canonical- Examples of application- Elements on the grand-canonical and quantum distributions- First notions on the phase transitions

Target generic centrale-specific field-related skills and knowledge

- Familiarise the student with an unusual conceptual framework, as it is different from the intuitions that are formed at our macroscopic

scale- Learn to manage non-determinism in physics and engineering
sciences- Learn fundamental concepts of physics that are useful in many scientific and technical fieldsThis teaching also allows the student to train: -
-1 the crucial parameters that determine a problem.
-2 Invent original solutions.
-3 Demonstrate mathematical rigour when solving.
-4 Integrate a relatively complex mode of reasoning.

Knowledge Control Procedures

Continuous Control (CC):
CC1 (Quantum Physics): 2 writings that contribute 50% of the final score.
CC2 (Statistical Physics): 2 writings that contribute 50% of the final score.

Bibliography

Quantum Physical Part: course copies. Book of Griffith. Managed Work Solutions: and others available on Moodle.
Physical Statistical: books in the library. Some documents for the Managed Works.

Teacher

Thomas Durt, Philippe Réfréger, Georges Bérardi, Frédéric Galland, Olivier Kimmoun, Muriel Roche, Nicolas Sandeau, Jean Bittebierre, Marc Jaeger.

Distribution of hours

Total: 72

Magistrates: 34

Directed work: 20

Practical work:

Applied Jobs: 18

Language(s) used during the course: French

Stage

Prerequisites: No

Learning Objectives
Discover a company, its ecosystem, its constraints and its operation

Programme Description
The 1A course is a company discovery course. It must allow the student to contact the world of the company in execution tasks, without any authority. It is an opportunity for him to enrich his professional experience, to develop his thinking, to become aware of the socio-economic constraints to which the company is subject.

Knowledge Control Procedures
Assessment on the basis of an internship report corrected by a school teacher and a company assessment sheet

Bibliography
Internship site: https://stages-emplois.centrale-marseille.fr/content/informations-importantes-et-foire-aux-questions#FAQ-stage1A

Teacher
Internship Manager, Professional Training Office, Relations & Partnerships Business

Sustainable development objectives (SDO)
4-Access to quality education

Distribution of hours
Total: 100

Language(s) used during the course: French

Projects

Prerequisites: No

Learning Objectives

At the end of the learning unit, participants will have an understanding of the strategic and operational activities of managing innovative projects.
More specifically, participants will be able to:
- Explore, observe, investigate to select strategic ideas that will meet a need/use
- Develop a research strategy, use appropriate tools to find reliable and relevant information on a specific subject

- Conduct a literature review or a state of the art Art on a specific
subject- Reuse information in accordance with academic and ethical requirements (know how to quote and avoid plagiarism, use free licences)
- Participate in a phase of ideation and structuring ideas in order to arrive at the definition of an innovative and realistic idea

- Develop a project charter and the associated
project plan- Define activities, relationships and duration of activities to develop the project schedule

- Manage project resources (financial, material and human), anticipate and correct project risks - Prototype the chosen idea and confront it with a first user/user sample.

- Monitor the project

- Progress, results and corrective actions

- Conclude/complete a project and ensure the appropriate transfer

Programme Description

This EU includes 3 modules:

• MOOC: 4 weeks of 4 part distance training: Project management and organisation fundamentals, Essential to start a project, Advanced project management tools, Risk management + 2 specialisation modules to choose

• Search Information: Information search tools and methodology, source assessment, plagiarism, citation rules and bibliography writing. 4 hours of online self-training and 2 hours of Practical

Work • Project: The project starts in October and closes in June. During this project, students will learn to master the methods of exploration, ideation and creativity, the definition and framing of the project, the planning, the organisation of the project, the teamwork, the steering

of the project and its closure. To do this, many milestones will have to be passed and many deliverables will have to be completed and validated by the tutors

Target generic centrale-specific field-related skills and knowledge

- C1: Scientific and technical innovation: identification of unmet needs, exploration and state of the art of the existing, proposal of solutions to the problem
- C2: Control of complexity and systems: complexity resulting from technical solutions, complexity resulting from the constraints imposed by the stakeholders, identification of problems and commitment of their resolutions
- C3: Programme Direction: technical aspects (needs analysis, design, planning, and project monitoring) with organisational aspects
- C4: Management of men: all aspects of team management - C5: Strategic Vision: define a localised strategy and subordinate its operational decline

Knowledge Control Procedures

Project: Interactions with your tutors (10%), Mid-term support (10%), Intermediate deliverables (10%), Final deliverables (25%), Project completion report (20%), Final support (25%)
Search Information (1 QCours Magistraux + 1 Documentary file)
Mooc (4 QCours Magistraux + Review final

Bibliography

Project Management Institute (2009), Guide to the Body of Knowledge in Project Management, Project Management Institute, 4th edition.
Brun, J-P. (2013), *Team Management: 7 levers to improve well-being and efficiency at work, Eyrolles, 2nd edition.*

Teacher

- Florian Magnani
- Audrey Soric
- Françoise Perrin
- Fabrice Pincin
- Benoit Dubost
- Steve Manny

Sustainable development objectives (SDO)

4-Access to quality education

8-Access to decent jobs

9-Building Resilient Infrastructure

Distribution of hours

Total: 96

Projects: 96

Language(s) used during the course: French