

ANNEE : 3ème année / 3rd year - ECTS

SEMESTRE : 1er semestre / 1st semester - 30 ECTS

PARCOURS : Parcours standard / Standard track - 30 ECTS

UE : Pilotage de la production / Production management - 7 ECTS

[EC : Gestion industrielle / Industrial Management - 4 ECTS](#)

[EC : Systèmes automatisés de production / Automated production systems - 3 ECTS](#)

UE : Conception de produits et systèmes industriels / Design of industrial products and systems - 7 ECTS

[EC : Penser système et cycle de vie / Lifecycle and system thinking - 2 ECTS](#)

[EC : Procédés de fabrication, industrialisation / Manufacturing processes, industrialization - 3 ECTS](#)

[EC : Résistance des matériaux / Strength of materials - 2 ECTS](#)

UE : Humanités et activités physiques et sportives / Humanities and sports activities - 6 ECTS

[EC : Théâtre Sciences humaines et Communication / Theater Social Sciences and Communication - 1 ECTS](#)

[EC : Projet personnel professionnel / Professional personal project - ECTS](#)

UE : Informatique et mathématiques décisionnelles / Computer Science and Decision Mathematics - 10 ECTS

[EC : Algorithmique, programmation et modélisation en UML / Algorithms, programming and modeling in UML - 4 ECTS](#)

[EC : Recherche Opérationnelle et optimisation / Operational research and optimization - 2 ECTS](#)

[EC : Probabilités, statistiques, plans d'expériences / Probability, statistics, design of experiments - 4 ECTS](#)

SEMESTRE : 2ème semestre / 2nd semester - 30 ECTS

PARCOURS : Parcours standard / Standard track - 30 ECTS

UE : Conception et gestion des systèmes d'informations / Design and management of information systems - 5 ECTS

[EC : Conception de bases de données et architecture des systèmes d'informations / Database design and information systems architecture - 3 ECTS](#)

[EC : Résolution informatique d'un problème / Computational problem solving - 2 ECTS](#)

UE : Humanités et activités physiques et sportives / Humanities and sports activities - 6 ECTS

[EC : Projet Personnel Professionnel / Personal professional project - ECTS](#)

[EC : Théâtre Sciences humaines et Communication / Theater Social Sciences and Communication - 1 ECTS](#)

UE : Pilotage des systèmes industriels / Control of industrial systems - 7 ECTS

[EC : Commande des systèmes dynamiques / Control of dynamic systems - 4 ECTS](#)

[EC : Conception, dimensionnement et analyse de performance d'un système de pilotage / Design, sizing and performance analysis of a control system - 3 ECTS](#)

UE : Conception de produits et systèmes industriels / Design of industrial products and systems - 7 ECTS

[EC : Matériaux pour l'ingénieur / Materials for the engineer - 2 ECTS](#)

[EC : Conception de système mécanique / Mechanical system design - 2 ECTS](#)

[EC : Gestion d'un projet de conception de machine / Management of a machine design project - 3 ECTS](#)

UE : Gestion de la chaîne logistique / Supply chain management - 5 ECTS

[EC : Gestion de flux / Flow management - 2 ECTS](#)

[EC : Introduction à la Supply Chain / Introduction to Supply Chain - 3 ECTS](#)

ANNEE : 4ème année / 4th year - ECTS

SEMESTRE : 1er semestre / 1st semester - 30 ECTS

PARCOURS : Parcours standard / Standard track - 30 ECTS

UE : Humanités et activités physiques et sportives / Humanities and sports - 7 ECTS

[EC : Projet personnel professionnel / Personal professional project - ECTS](#)

UE : Amélioration continue et innovation / Continuous improvement and innovation - 5 ECTS

[EC : Qualité / Quality - 1 ECTS](#)

[EC : Ecologie industrielle et économie circulaire / Industrial ecology and circular economy - 2 ECTS](#)

[EC : Design thinking / Design thinking - 2 ECTS](#)

UE : Pilotage des opérations industrielles / Management of industrial operations - 5 ECTS

[EC : Pilotage et conduite d'un système industriel / Piloting and management of an industrial system - 3 ECTS](#)

[EC : Ordonnancement / Scheduling - 2 ECTS](#)

UE : Options 4GI / 4th year options - 2 ECTS

[EC : Optimisation exacte et approchée / Exact and approached optimization - 2 ECTS](#)

[EC : Sûreté de fonctionnement / Dependability - 2 ECTS](#)

[EC : Initiation à la recherche / Introduction to scientific research - 2 ECTS](#)

[EC : Data-driven decision making / Data-driven decision making - 2 ECTS](#)

UE : Gestion et exploitation des données de l'entreprise / Management and exploitation of business data - 7 ECTS

[EC : Introduction à la science des données / Introduction to data science - 2 ECTS](#)

[EC : Business Intelligence / Business Intelligence - 2 ECTS](#)

[EC : Systèmes d'informations d'entreprise / Business Information Systems - 3 ECTS](#)

UE : Projets / Projects - 4 ECTS

[EC : Projet collectif S1 / Collective project S1 - 4 ECTS](#)

SEMESTRE : 2ème semestre / 2nd semester - 30 ECTS

PARCOURS : Parcours standard / Standard track - 30 ECTS

UE : Gestion et amélioration des performances de l'entreprise / Management and improvement of business performance - 5 ECTS

[EC : Lean / Lean - 3 ECTS](#)

[EC : Budget et contrôle de gestion / Budget and control management - 2 ECTS](#)

UE : Stage industriel / Industrial internship - 15 ECTS

[EC : Analyse sociologique des organisations / Sociological analysis of organizations - 1 ECTS](#)

[EC : Stage industriel / Industrial internship - undefined ECTS](#)

UE : Projets / Projects - 3 ECTS

[EC : Projet collectif S2 / Collective project S2 - 3 ECTS](#)

UE : Education physique et sportive / Physical Education - 1 ECTS

UE : Projets en systèmes d'information / Information systems projects - 6 ECTS

[EC : Projet SCADA-MES / SCADA-MES project - 3 ECTS](#)

[EC : Projet ERP / ERP Project - 3 ECTS](#)

UE : Stage industriel / Industrial internship - 15 ECTS

[EC : Analyse sociologique des organisations / Sociological analysis of organizations - 1 ECTS](#)

[EC : Stage industriel / Industrial internship - undefined ECTS](#)

PARCOURS : Parcours retour d'échange - 30 ECTS

UE : Stage industriel / Industrial internship - 15 ECTS

[EC : Stage industriel / Industrial internship - undefined ECTS](#)

[EC : Analyse sociologique des organisations / Sociological analysis of organizations - 1 ECTS](#)

UE : Education physique et sportive / Physical Education - 1 ECTS

UE : Remise à niveau / Refresher - 3 ECTS

[EC : Pilotage et conduite d'un système industriel / Piloting and management of an industrial system - 1 ECTS](#)

[EC : Systèmes d'informations d'entreprise / Business Information Systems - 1 ECTS](#)

[EC : Introduction à la science des données / Introduction to data science - 1 ECTS](#)

UE : Gestion et amélioration des performances de l'entreprise / Management and improvement of business performance - 5 ECTS

[EC : Lean / Lean - 3 ECTS](#)

[EC : Budget et contrôle de gestion / Budget and control management - 2 ECTS](#)

UE : Projets en systèmes d'information / Information systems projects - 6 ECTS

[EC : Projet ERP / ERP Project - 3 ECTS](#)

[EC : Projet SCADA-MES / SCADA-MES project - 3 ECTS](#)

ANNEE : 5ème année / 5th year - ECTS

SEMESTRE : 1er semestre / 1st semester - 30 ECTS

PARCOURS : Parcours R&D - 30 ECTS

UE : PRI2A - 4 ECTS

[EC : Projet Industriel - P1 / Industriel project - P1 - ECTS](#)

[EC : Projet Industriel - P2 / Industriel project - P2 - ECTS](#)

UE : GI-5-S1-UE-TAI2A - 9 ECTS

[EC : Planification des Ressources Humaines / Human resources requirement planning - ECTS](#)

[EC : Lean et ergonomie / Lean and ergonomics - ECTS](#)

[EC : Achats et Pilotage Fournisseurs / Sourcing process and supplier survey - ECTS](#)

[EC : Organisation et Gestion de la chaîne logistique et implantation de systèmes de production / Supply chain and implementation of production systems - ECTS](#)

[EC : Optimisation avancée / Advanced planning - ECTS](#)

UE : PRI2B - 2 ECTS

[EC : Projet Industriel - P1 / Industriel project - P1 - ECTS](#)

UE : TAI2B - 5 ECTS

[EC : Organisation et Gestion de la chaîne logistique et implantation de systèmes de production / Supply chain and implementation of production systems - ECTS](#)

[EC : Optimisation avancée / Advanced planning - ECTS](#)

[EC : Planification des Ressources Humaines / Human resources requirement planning - ECTS](#)

UE : Projet collectif 5GI / Collective projects 5GI - 6 ECTS

[EC : Projet collectif 5GI / Collective project S1 - 3 ECTS](#)

UE : Humanités et activités physiques et sportives / Humanities and sports - 4 ECTS

[EC : Projet Personnel Professionnel / Personal professional project - ECTS](#)

UE : Optimisation de la chaîne logistique dans l'industrie 4.0 / Supply chain optimization in industry 4.0 - 7 ECTS

[EC : Recherche en Génie Industriel / Research in Industrial Engineering - 3 ECTS](#)

[EC : Data science / Data science - 3 ECTS](#)

[EC : Industrie du futur - Projet / Industry of the future - Project - 2 ECTS](#)

[EC : Optimisation conjointe du Transport et de la Production / Joint optimization of transport and production - ECTS](#)

UE : Management de l'entreprise / Business management - 6 ECTS

[EC : Responsabilité Sociétale et Environnementale / Social and Environmental Responsibility - 2 ECTS](#)

[EC : Knowledge management / Knowledge management - 2 ECTS](#)

[EC : Management des Ressources Humaines / Human Resources management - ECTS](#)

PARCOURS : Parcours standard / Standard track - 30 ECTS

UE : Projets industriels / Industrial projects - 4 ECTS

[EC : Ethique de l'ingénieur / Engineering Ethics - 2 ECTS](#)

[EC : Projet Industriel - P1 / Industriel project - P1 - ECTS](#)

UE : Projet collectif 5GI / Collective projects 5GI - 6 ECTS

[EC : Projet collectif 5GI / Collective project S1 - 3 ECTS](#)

UE : TAI1B Techniques avancées de l'ingénieur / Advanced engineering techniques - 10 ECTS

[EC : Optimisation avancée / Advanced planning - ECTS](#)

[EC : Initiation à la Recherche / Introduction to Scientific Research - ECTS](#)

[EC : Projet en Communication pour Ingénieur / Communication for Engineer project - ECTS](#)

[EC : Gestion Maintenance Assistée par Ordinateur / Computer Aided Maintenance Management - ECTS](#)

[EC : Organisation et Gestion de la chaine logistique et implantation de systèmes de production / Supply chain and implementation of production systems - ECTS](#)

[EC : Planification des Ressources Humaines / Human resources requirement planning - ECTS](#)

UE : Projets industriels / Industrial projects - 6 ECTS

[EC : Ethique de l'ingénieur / Engineering Ethics - 2 ECTS](#)

[EC : Projet Industriel - P2 / Industriel project - P2 - ECTS](#)

[EC : Projet Industriel - P1 / Industriel project - P1 - ECTS](#)

UE : Techniques avancées de l'ingénieur / Advanced engineering techniques - 14 ECTS

[EC : Optimisation avancée / Advanced planning - ECTS](#)

[EC : Initiation à la Recherche / Introduction to Scientific Research - ECTS](#)

[EC : Projet en Communication pour Ingénieur / Communication for Engineer project - ECTS](#)

[EC : Gestion Maintenance Assistée par Ordinateur / Computer Aided Maintenance Management - ECTS](#)

[EC : Achats et Pilotage Fournisseurs / Sourcing process and supplier survey - ECTS](#)

[EC : Lean et ergonomie / Lean and ergonomics - ECTS](#)

[EC : Organisation et Gestion de la chaine logistique et implantation de systèmes de production / Supply chain and implementation of production systems - ECTS](#)

[EC : Planification des Ressources Humaines / Human resources requirement planning - ECTS](#)

UE : Humanités et activités physiques et sportives / Humanities and sports - 4 ECTS

[EC : Projet Personnel Professionnel / Personal professional project - ECTS](#)

UE : Management de l'entreprise / Business management - 6 ECTS

[EC : Responsabilité Sociétale et Environnementale / Social and Environmental Responsibility - 2 ECTS](#)

[EC : Knowledge management / Knowledge management - 2 ECTS](#)

[EC : Management des Ressources Humaines / Human Resources management - ECTS](#)

SEMESTRE : 2ème semestre / 2nd semester - 30 ECTS

PARCOURS : Parcours standard / Standard track - 30 ECTS

UE : Projet de fin d'études / Final project assignment - 30 ECTS

[EC : Projet de fin d'études / Final project assignment - 29 ECTS](#)

IDENTIFICATION

CODE : GI-3-S1-EC-GIN
ECTS : 4

HOURS

Cours : 0h
TD : 14h
TP : 34h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 50h
Travail personnel : 14h
Total : 64h

ASSESSMENT METHOD

Exercices (TD) + final exam
TP : MCQ

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. MONTEIRO Thibaud :
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AIMS

This course belongs to teaching unit Pilotage de la production (GI-3-S1-UE-PIPR) and contributes to the following skills :

C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)
C4 Sizing the hardware and / or software of a system (Level 3)
C5 Managing a production system and react to malfunctions (Level 2)
C6 Selecting appropriate production tools, integrating them into an environment and configuring them, and setting up a production system (Level 3)
C8 Managing supply in connection with the planning and inventory management policy (Level 3)

By allowing the engineering students to work and be evaluated on the following knowledge :

- (C8)

To be able to :

- (C2, C4, C6)

- (C8)

- (C5)

- Place the functions and objectives of production management for a company

- Manage supplies and inventory of a business

- Choose the method of management best suited to a given context

- Calculate the loads and manage production resources in the medium and long term

TP Prelude : This lab is designed to introduce students to the various functions and the basics of production management."

CONTENT

- Introduction to production management
- Master data for production management
- Modelling of production systems and manufacturing processes for production management
- Different levels of decision making in production management: SOP, MPS, MRP, ...
- Main approaches for production planning: Inventory management, MRP, Kanban, ...

TP Prelude: 10 sessions in a scenario based on an industrial case cover the various functions by using a tutorial MIS (Prelude):

- Master data (material, BOM, routing, work centers...)
- Demand management : Master planning and sales orders
- Material requirement planning
- Production Order management
- Purchase order management
- Scheduling and production order follow-up

Education provided in French

BIBLIOGRAPHY

"Vincent GIARD : Gestion de la production et des flux. Economica 2003
Jacques Erschler et Bernard Grabot : Organisation et Gestion de la Production. Traité IC2 Hermes 2001
Lionel Dupont : La Gestion Industrielle. Hermès 1998
Management industriel et logistique, Gérard Baglin"

PRE-REQUISITES

Probabilities and statistics, computer sciences

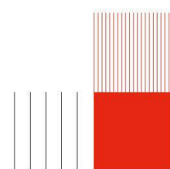
IDENTIFICATIONCODE : GI-3-S1-EC-APS
ECTS : 3**HOURS**Cours : 0h
TD : 42h
TP : 4h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 48h
Travail personnel : 0h
Total : 48h**ASSESSMENT METHOD**IE (interrogation écrite)
EE (évaluation écrite: poster,
rapports.)
EO (évaluation orale) Oral**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTMME SUBAI Corinne :
corinne.subai@insa-lyon.fr**AIMS**

This course belongs to teaching unit Production management GI-3-S1-UE-PIPR and contributes to the following skills :

- Security concepts
- Management of automated systems
- Choice of equipment and machines

CONTENTENVIRONMENT, COMMAND CHAINS AND REALIZATION -
Hydraulics, actuators, modulators
Measuring chains
Electric actuators
Real case study, choice of actuators and sensors (guiding principles)**BIBLIOGRAPHY**Catalogues et documents constructeur
Systèmes automatiques tome 1 et 2, J.-P. Hautier et J.-P. Caron Ellipses**PRE-REQUISITES**

IDENTIFICATION

CODE : GI-3-S1-EC-PSC
ECTS : 2

HOURS

Cours : 0h
TD : 12h
TP : 18h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 32h
Travail personnel : 0h
Total : 32h

ASSESSMENT METHOD

Exam
Written report

TEACHING AIDS

Scientific publications for group text survey.
Simplified "home-made" LCA tool using the ADEME's "Base IMPACTS" database.

TEACHING LANGUAGE

French

CONTACT

Mme PELISSARD Mélanie :
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AIMS

"This course belongs to teaching unit GI-3-S1-UE-CPSI Design of industrial products and systems and contributes to the following skills :

By allowing the student to work and be evaluated on the following knowledge:

- General culture on environmental issues;
- Notion of systemic, anthropocene ;
- Energy and distribution;
- State of the art of energy resources and associated issues;
- Environmental impacts of materials and their transformation processes;
- Impacts of different modes of transport;
- Notion of product life cycle taking into account the usage and the end of life.

By allowing the student to work on and be evaluated on the following abilities:

- Generate data for an LCA (Life Cycle Assessment);
- Produce an LCA based on the data generated;
- Use simple tools for LCA."

CONTENT

Global warming: understanding of the scientific concept, history on a planetary scale, presentation of the latest IPCC report (2 hours of tutorials).

Environmental impacts: impacts presentation, situation at the world level, orders of magnitude to better understand these notions, study on electric/thermal vehicles (6 hours of tutorials)

Life Cycle Assessment (LCA): methodology presentation and link with eco-design and environmental communication, increase in competence with the realization of simplified LCA (6 hours of tutorials), advanced implementation of the methodology through the manufacture of an object (16 hours of practical work).

BIBLIOGRAPHY

<https://www.ipcc.ch/languages-2/francais/>
<https://www.learnlifecycle.com/>
<https://www.lifecycleinitiative.org/>
<https://eplca.jrc.ec.europa.eu/ilcd.html>
<https://base-impacts.ademe.fr/>

PRE-REQUISITES

Ability to quickly read and synthesize scientific texts in French and English.
General scientific culture, have a good understanding of units of measurement.
Good knowledge of Excel.



IDENTIFICATION

CODE : GI-3-S1-EC-PFI
ECTS : 3

HOURS

Cours : 0h
TD : 32h
TP : 16h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 48h
Travail personnel : 0h
Total : 48h

ASSESSMENT METHOD

Written Assessment
Supervised Practical Work

TEACHING AIDS

Teaching Method
A project provides a common thread
- 1 lecture session followed by 2 tutorial sessions
- Work in groups of 2 people
The practical work is organized in groups of 3 students and takes place on a machine tool

TEACHING LANGUAGE

French

CONTACT

M. ARNAUD Frédéric :
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AIMS

This course belongs to teaching unit Conception de produits et systèmes industriels (GI-3-S1-UE-CPSI) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 1)
- A3 Implement an experimental approach (Level 3)
- A6 Report on an analysis or on a scientific approach (Level 3)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)
- C3 Evaluating, prototyping and simulating a system (Level 1)
- C6 Selecting appropriate production tools, integrating them into an environment and configuring them, and setting up a production system (Level 3)
- C13 Considering technological and methodological innovation (Level 2)
- B2 work, learn, progress autonomously (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Mold design;
- Precedence constraints in machining;
- Isostatism;
- Cutting parameters.

To be able to :

- (A1, A3, A6, C2, C3, C6, C13, B2)
- Design a mechanical manufacturing sequence by choosing a suitable material, designing a metal mold, respecting the geometric constraints, taking into account the economic constraints and machine capabilities

CONTENT

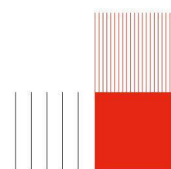
Mold design; precedence constraints in machining; Isostatism; cutting parameters

BIBLIOGRAPHY

Précis de construction mécanique. Projets-méthodes, Production, Normalisation ISBN : 2-09-194002-X
Fabrication par usinage. 2e édition ISBN : 978-2-10-051626-1
PRÉCIS DE FONDERIE MÉTHODOLOGIE, PRODUCTION ET NORMALISATION ISBN : 2-09-194019-4
Fonderie de précision à modèle perdu ISBN : 2-85330-100-1

PRE-REQUISITES

None



IDENTIFICATION

CODE : GI-3-S1-EC-RDM
ECTS : 2

HOURS

Cours : 0h
TD : 30h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 32h
Travail personnel : 0h
Total : 32h

ASSESSMENT METHOD

EE (évaluation écrite: poster, rapports) : mini-project coefficient 1
IE (interrogation écrite) : written test 1h50 coefficient 2

TEACHING AIDS

Duplicated course material

TEACHING LANGUAGE

French

CONTACT

Mme WALTER-LE BERRE Hélène
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helene.walter-le-berre@insa-lyon.fr

AIMS

This course belongs to teaching unit Conception de produits et systèmes industriels (GI-3-S1-UE-CPSI) and contributes to the following skills :

C2 Modeling and designing an information, decision and production system, of goods and services (Level 1)
C3 Evaluating, prototyping and simulating a system (Level 1)
C4 Sizing the hardware and / or software of a system (Level 1)

CONTENT

Classes and directed works : Strength Of Materials :

- * Stress modelling under simple load
- * Static balance and torque of mechanical actions
- * Stress tensor, strain tensor and strength criteria
- * Constitutive laws (Hooke's laws)
- * Bending deflection
- * Introduction to the Finite Element method
- * Application to a mini-project

- To Acquire the fundamental concepts of Strength Of Materials in order to analyze the behavior of mechanical components.

BIBLIOGRAPHY

S. TIMOSHENKO, Résistance Des Matériaux, Librairie Polytechnique Béranger, 1963.
P. AGATI, F. LEROUGE et M. ROSSETTO, Résistance des Matériaux, Dunod, 1999.
D. GAY et J. GAMBELIN, Dimensionnement des Structures, Hermes, 1999.

PRE-REQUISITES

- * Mechanic : static balance
- * Mathematics : integral and differential calculation bases and matrix algebra

IDENTIFICATION

CODE : GI-3-S1-EC-COM-HU

ECTS : 1

HOURS

Cours : 0h

TD : 16h

TP : 0h

Projet : 0h

Evaluation : 0h

Face à face pédagogique : 16h

Travail personnel : 0h

Total : 16h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**French
English**CONTACT**M. CHAUMARD Davyd :
davyd.chaumard@insa-lyon.fr**AIMS**

This course belongs to teaching unit Humanities and Sports Education (GI-3-S1-UE-HUEPS) and contributes to the following skills :

- to develop a practical awareness of the various channels of communication, through individual and group exercises focusing on drama
- to explore one's personal resources and limits (role games and improvisations)
- to analyse individual participation in a group situation
- to understand the methods of the social sciences, which provide a basis for the analysis of the activities
- cooperation and efficiency in a team job
- to know how preparing for 4GIs group project

CONTENT

Working with professional actors

practicing communication : from experience to concepts

BIBLIOGRAPHY

provided by the professor, according to the subject of research chosen by each team of students

PRE-REQUISITES

Ability to use oral, written and audio-visual modes of expression in French

IDENTIFICATIONCODE : GI-3-S1-EC-PPP-HU
ECTS :**HOURS**

Cours :	0h
TD :	6h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	6h
Travail personnel :	0h
Total :	6h

ASSESSMENT METHOD**TEACHING AIDS**

PPP handout (My PPP)

TEACHING LANGUAGE

French

CONTACTMme SANCHEZ FORSANS Sylvie
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lyon.fr**AIMS**

This course belongs to teaching unit Humanités et activités physiques et sportives (GI-3-S1-UE-HUEPS) and contributes to the following skills :

B1 know oneself; manage mental and physical fitness (Level 1)

B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Concept of personal professional project (B1, B6)

To be able to :

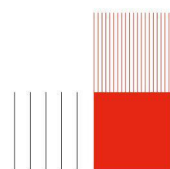
- Describe for whom and what they will become an engineer for (B1, B6)

CONTENT

PPP Presentation Time

Poster productions (with graphic facilitation) on the theme ""Engineer? For whom? For what?""

""My PPP?"" workshop to identify the expectations of the Personal Professional Project and to engage in a reflection on the future steps to carry it out; Individual reflection work in small groups and pairs"

BIBLIOGRAPHY**PRE-REQUISITES**



IDENTIFICATION

CODE : GI-3-S1-EC-APM
ECTS : 4

HOURS

Cours : 0h
TD : 30h
TP : 32h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 64h
Travail personnel : 0h
Total : 64h

ASSESSMENT METHOD

1 x 1h50 = written exam

TEACHING AIDS

Course material

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Informatique et mathématiques décisionnelles (GI-3-S1-UE-IMAD) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 2)
- A2 Operate a model of a real or virtual system (Level 2)
- A4 Design a system that meets a set of specifications (Level 2)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)
- C3 Evaluating, prototyping and simulating a system (Level 2)

- * Develop an experimental approach (Level 2)
- * Identify, formulate and solve a problem of complex engineering (Level 2)
- the following School skills : specific GI
- * evaluate, prototype and simulate a system (Level 2)
- * size the hardware and / or software of a system (Level 2)
- the following transversal School skills
- * Work, learn, evolve in an autonomous way (Level 2)
- * Interact with others, work in team (Level 3)

which decline the following professional skills :

- * Design and size systems required for a given activity of production, service, distribution ... (Level 2)
- * Identify and correct discrepancies in a continuous improvement process (material, human and information systems) by the implementation of analytical and simulation tools (Level 2)
- * Ensure quality reporting through the establishment of appropriate indicators, based on a systemic view of organizations (matrix, silo, project) for any scope and any type of activity (Level 2)"

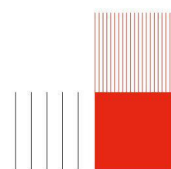
CONTENT

- Adopt a structured programming approach to solving a complex problem
- Choose the solution methods and data structures appropriate for the problem
- Build and analyze algorithms in a pseudo-language
- Translate a UML class diagram into Python
- Transcribe an algorithm written in a pseudo-language into a Python program

BIBLIOGRAPHY

V. FELEA, Introduction à l'informatique, Apprendre à concevoir des algorithmes, Ed. Vuibert, 2013
L. DEBRAUWER, Algorithmique, Ed. ENI, 2008
T.CORMEN, C. LEISERSON, R.RIVEST, C. STEIN, Introduction à l'algorithmie, Ed Dunod, 2002
DELANNOY C., Programmer en Java, Ed Eyrolles, 2001
OUSSALAH C., Ingénierie objet, Interéditions, 1997

PRE-REQUISITES



IDENTIFICATION

CODE : GI-3-S1-EC-ROO

ECTS : 2

HOURS

Cours : 0h

TD : 18h

TP : 12h

Projet : 0h

Evaluation : 2h

Face à face pédagogique : 32h

Travail personnel : 0h

Total : 32h

ASSESSMENT METHOD

IE (interrogation écrite)
EE (évaluation écrite: poster, rapports)

TEACHING AIDS

Available on caseine.org:
- lecture notes (in English and French)
- virtual programming labs to implement and test the programs as self-training (in English)
- quiz to check your understanding (in English)
- French / English glossary + crossword puzzles

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Informatique et mathématiques décisionnelles (GI-3-S1-UE-IMAD) and contributes to the following skills :

A1 Analyze a system (real or virtual) or a problem (Level 2)

A2 Operate a model of a real or virtual system (Level 2)

C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)

C3 Evaluating, prototyping and simulating a system (Level 1)

C4 Sizing the hardware and / or software of a system (Level 1)

C5 Managing a production system and react to malfunctions (Level 1)

C8 Managing supply in connection with the planning and inventory management policy (Level 1)

C9 Localizing and assigning the production, storage and transportation processes to different members of the supply chain (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Linear programming, simplex algorithm, duality (A1, A2, C2)

- Integer linear programming, branch&bound algorithm (A1, C2)

- Use of Excel Solver and OpenSolver for decision support (xA2, C2, C3)

To be able to :

- Specify a linear program in integer or real variables from the description of a problem expressed in natural language (C2, C3)

- Design a decision support tool for the management of a production or transport process

Design a decision support tool for the management of a production or transport process (A1, A2, C2, C4, C5, C8, C9)

- Identify the classic problem class to which a given real problem relates (A1, C2)

CONTENT

Introduction to operations research and its industrial applications

Modeling in linear programming, graphical solving

Simplex algorithm

Duality and sensitivity analysis

Branch & Bound

Modeling in integer linear programming; modeling tips; concepts of complexity and formulation quality

Backpack and bin-packing problem

Modeling in PL/PLNE with Excel: application to a lot-sizing problem with capacity constraints

Coverage and partition issues

Traveling Salesman (TSP) and Vehicle Routing (VRP) Issues

BIBLIOGRAPHY

- Dinkel J. J., G. A. Kochenberger and D. R. Plane, Management Science Text and Applications, Irwin Editor, 1978, ISBN 0-256-02037-X

- Taha H. A., Operations Research an introduction, Sixth edition, Prentice Hall, 1997, ISBN 0-13-272915-b

PRE-REQUISITES

- Linear algebra (matrix calculation),

- Production management (MRP, concept of independent / dependent need).

- Use of simple Excel functions

IDENTIFICATION

CODE : GI-3-S1-EC-PSX
ECTS : 4

HOURS

Cours : 2h
TD : 40h
TP : 14h
Projet : 0h
Evaluation : 4h
Face à face pédagogique : 60h
Travail personnel : 4h
Total : 64h

ASSESSMENT METHOD

IE (interrogation écrite)
IE (interrogation écrite)
IE (interrogation écrite)
EE+EO (évaluation écrite+orale)

TEACHING AIDS

Lecture handout and exercises
(part Probability & statistics and
part Design of experiments)
Use of spreadsheet files.
Course materials available
electronically.

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Informatique et mathématiques décisionnelles (GI-3-S1-UE-IMAD) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 3)
- A2 Operate a model of a real or virtual system (Level 3)
- A3 Implement an experimental approach (Level 3)
- A5 Process data (Level 3)
- A6 Report on an analysis or on a scientific approach (Level 3)
- C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 3)
- C3 Evaluating, prototyping and simulating a system (Level 2)
- C8 Managing supply in connection with the planning and inventory management policy (Level 2)
- C10 Developing and implementing an action plan as part of a quality and continuous improvement approach (Level 2)
- C15 Managing a project based on a master plan (planning, budgeting, definition of monitoring indicators) (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Notion of probability, Principles of combinatorial analysis, Probability calculus (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Notions of conditional probabilities and independent events (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Notion of random variable, Main indicators for random variables: expected value, variance... (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Main probability distributions (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Central limit theorem (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Notions of sample, population, statistical inference (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Client and supplier risks (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Ponctual estimation, Confidence intervals (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- One-tailed and two-tailed statistical tests, Comparison tests, goodness-of-fit tests, independence tests (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Implementation of a design of experiments (C10)

To be able to :

- Computing the probability of a complex event, based on simple events or by combinatorial analysis (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Modelling a random phenomenon choosing the appropriate probability distribution (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Computing and interpreting the main indicators related to a random variable (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Determining the average behaviour of a phenomenon considering a large number of random trials (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Carrying out a statistical test to validate a hypothesis related to a population (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Estimating the parameters of a statistical population based on a sample of values (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Carrying out a statistical test to validate a hypothesis related to a population (A1, A2, A3, A5, A6, C1, C3, C8, C10)
- Planning the tests to be conducted (A2, A3, C15)
- Carrying out the measurements (A1, C1)
- Developing a computing tool to process a design of experiments (A3)

Knowledge :

- Notion of probability, Principles of combinatorial analysis, Probability calculus
- Notions of conditional probabilities and independent events
- Notion of random variable, Main indicators for random variables: expected value, variance...
- Main probability distributions
- Central limit theorem
- Notions of sample, population, statistical inference
- Client and supplier risks
- Ponctual estimation, Confidence intervals
- One-tailed and two-tailed statistical tests, Comparison tests, goodness-of-fit tests, independence tests
- Optimal organization of experimentation
- Regression model and mathematical predictor
- Statistical model associated with the analysis of variance
- Implementation of a design of experiments

Capacities :

- Computing the probability of a complex event, based on simple events or by combinatorial analysis

- Modelling a random phenomenon choosing the appropriate probability distribution
- Computing and interpreting the main indicators related to a random variable
- Determining the average behaviour of a phenomenon considering a large number of random trials
- Computing the client / supplier risks according to a quality control procedure
- Estimating the parameters of a statistical population based on a sample of values
- Carrying out a statistical test to validate a hypothesis related to a population
- Planning the tests to be conducted
- Carrying out the measurements
- Developing a computing tool to process a design of experiments
- Analyzing the results obtained
- Finding an optimal setup condition

CONTENT

The aim of this course is to introduce the engineering tools and techniques needed to model and analyse phenomena and systems involving uncertainties, in particular through experimental approaches such as design of experiments. It is based on a description of standard mathematical concepts, coming from, among others, probability theory, descriptive statistics and analysis of variance. Numerous examples and application exercises are provided for each part of the course.

The knowledge and skills acquired are also put into practice through a case study based on a quality control problem, enabling the application of estimation methods and hypothesis testing, and through the implementation of an experiment for setting up a machine (a catapult), with a Taguchi's fractional design.

These different activities also lead the students to use and develop data processing tools on spreadsheets.

BIBLIOGRAPHY

D. Ghorbanzadeh : Probabilités - Exercices corrigés. Editions Technip. 1998.

Y. Dodge : Premiers pas en statistique. Springer. 2003.

S. Morgenthaler : Introduction à la statistique. Presses Polytechniques et Universitaires Romandes. 1997.

P. Bogaert : Probabilités pour scientifiques et ingénieurs: Introduction au calcul des probabilités, 2ème édition. De Boeck Supérieur. 2020.

G. Sado, M.C. Sado : Les plans d'expériences. De l'expérimentation à l'assurance qualité, Nlle édition. AFNOR. 2000.

M. Vigier : Pratique des plans d'expériences. Méthodologie Taguchi. Les Éditions d'Organisation. 1988.

J. Goupy : Introduction aux Plans d'expériences, 2ème édition. Dunod. 2001.

G. Lasnier : Plans d'expériences en gestion industrielle. Hermes science publ. - Lavoisier. 2003.

PRE-REQUISITES

None

INSA LYON

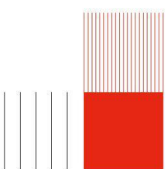
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membre de



IDENTIFICATION

CODE : GI-3-S2-EC-CBD
ECTS : 3

HOURS

Cours : 0h
TD : 22h
TP : 24h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 48h
Travail personnel : 0h
Total : 48h

ASSESSMENT METHOD

IE (interrogation écrite)
ES (évaluation en situation)

TEACHING AIDS

Slides

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Conception et gestion des systèmes d'informations (GI-3-S2-UE-CGSI) and contributes to the following skills :

A1 Analyze a system (real or virtual) or a problem (Level 2)

A2 Operate a model of a real or virtual system (Level 2)

A5 Process data (Level 2)

C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- (A1, C2)

To be able to :

- (A1, A5, C2, A2)

* Design and size systems required for a given activity of production, service, distribution

...

* Identify and correct discrepancies in a continuous improvement process (material, human and information systems) by the implementation of analytical and simulation tools

* Ensure quality reporting through the establishment of appropriate indicators, based on a systemic view of organizations (matrix, silo, project) for any scope and any type of activity"

CONTENT

Know :

- Architecture of a Data base system management

- Model entity - association

- Fonctionnal and multivaluate dependances

- Transitive closure notion, Minimal cover

- Normal forms

- Relationnal algebra, calculus

- SQL language

- Structure of a XML document, Wellformed XML document

- Document type definition, XSLT document

To be able to :

- Design an entity/association model

- Translate an entity/association model to relationnal model

- Write queries in relationnel algebra, in SQL

- Write a well formed XML document

- Validate a XML document from a DTD

- Transform a XML document with XSLT language

BIBLIOGRAPHY

C. Chrismet, "Mise en oeuvre des bases de données" ; Ed. Eyrolles 1990

H.F. Korth, A. Silbershats, "Systèmes de gestion de base de données", Mc Graw-Hill, 1988

C. Marée, G. Ledant, "SQL : Initiation, programmation et maîtrise" - Armand Colin, 1994

K. Williams, M. Brundage : XML et les bases de données - Ed. Eyrolles 2001

PRE-REQUISITES

IDENTIFICATIONCODE : GI-3-S2-EC-RIP
ECTS : 2**HOURS**Cours : 0h
TD : 8h
TP : 16h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 24h
Travail personnel : 8h
Total : 32h**ASSESSMENT METHOD**

ES (évaluation en situation)

TEACHING AIDS**TEACHING LANGUAGE**

French

CONTACTROBARDET Céline :
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M. MONCLA Ludovic :
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"This course belongs to teaching unit Conception et gestion des systèmes d'informations (GI-3-S2-UE-CGSI) and contributes to the following skills :

By allowing the engineering students to work and be evaluated on the following knowledge :

To be able to :

- * increase skills in object modeling (up to level 4)
- * be able to read/write in a file (parser, writing according to a specified formation)
- * be able to correct a program and validate it through unit tests.

From the point of view of learning around the management of the supply chain, this project will allow students to implement on a concrete instance an optimization strategy.

CONTENT

The student is placed in a situation of carrying out an IT project based on precise specifications. The project focuses on solving a constrained optimization problem. A validation program is provided to students in order to concretely assess the feasibility of their solution. Optimality is not guaranteed but a comparison of the results obtained by the different groups of students creates emulation. The objective is to allow students to acquire and deepen their programming skills. The language used is Python.

BIBLIOGRAPHY**PRE-REQUISITES**

IDENTIFICATIONCODE : GI-3-S2-EC-PPP-HU
ECTS :**HOURS**

Cours :	2h
TD :	2h
TP :	4h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	8h
Travail personnel :	4h
Total :	12h

ASSESSMENT METHOD**TEACHING AIDS**

PPP handout (My PPP)

TEACHING LANGUAGE

French

CONTACTMME SANCHEZ FORSANS :
sylvie.sanchez-forsans@insa-
lyon.fr**AIMS**

This course belongs to teaching unit Humanités et activités physiques et sportives (GI-3-S1-UE-HUEPS) and contributes to the following skills :

B1 know oneself; manage mental and physical fitness (Level 1)

B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Concept of personal professional project (B1, B6)

To be able to :

- Describe for whom and what they will become an engineer for (B1, B6)

CONTENT

PPP Presentation Time

Poster productions (with graphic facilitation) on the theme ""Engineer? For whom? For what?""

""My PPP?"" workshop to identify the expectations of the Personal Professional Project and to engage in a reflection on the future steps to carry it out; Individual reflection work in small groups and pairs"

BIBLIOGRAPHY**PRE-REQUISITES**

IDENTIFICATION

CODE : GI-3-S2-EC-COM-HU

ECTS : 1

HOURS

Cours : 0h

TD : 16h

TP : 0h

Projet : 0h

Evaluation : 0h

Face à face pédagogique : 16h

Travail personnel : 0h

Total : 16h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**French
English**CONTACT**M. CHAUMARD Davyd :
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This course belongs to teaching unit Humanities and Sports Education (GI-3-S2-UE-HUEPS) and contributes to the following skills :

- to develop a practical awareness of the various channels of communication, through individual and group exercises focusing on drama
- to explore one's personal resources and limits (role games and improvisations)
- to analyse individual participation in a group situation
- to understand the methods of the social sciences, which provide a basis for the analysis of the activities
- cooperation and efficiency in a team job
- to know how preparing for 4GIs group project

CONTENT

Working with professional actors

practicing communication : from experience to concepts

BIBLIOGRAPHY

provided by the professor, according to the subject of research chosen by each team of students

PRE-REQUISITES

Ability to use oral, written and audio-visual modes of expression in French

IDENTIFICATION

CODE : GI-3-S2-EC-CSD
ECTS : 4

HOURS

Cours : 0h
TD : 22h
TP : 40h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 64h
Travail personnel : 0h
Total : 64h

ASSESSMENT METHOD

IE (written examination)
Report and defense

TEACHING AIDS

Paper version of the slideshow
projected in class.

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Pilotage des systèmes industriels (GI-3-S2-UE-PLSI) and contributes to the following skills :

A3 Implement an experimental approach (Level 2)

C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 2)

C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)

C3 Evaluating, prototyping and simulating a system (Level 2)

C13 Considering technological and methodological innovation (Level 1)

B2 work, learn, progress autonomously (Level 2)

B3 interact with people and work in a team (Level 3)

- The notion of stability of a system
- Performance concepts
- Single-input, single-output correctors

To be able to:

- Study the stability of a system
- Determine the system performance parameters and compare them to the specifications
- Synthesize a controller
- Simulate a dynamic system and its controller
- Controlling a physical system experimentally

CONTENT

BIBLIOGRAPHY

P. Borne et al., Analyse et régulation des processus industriels, Technip

PRE-REQUISITES



IDENTIFICATION

CODE : GI-3-S2-EC-CDA
ECTS : 3

HOURS

Cours : 0h
TD : 26h
TP : 20h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 48h
Travail personnel : 0h
Total : 48h

ASSESSMENT METHOD

ES (évaluation en situation)
ES (évaluation en situation)
ES (évaluation en situation)
ES (évaluation en situation)

TEACHING AIDS

The pedagogic form will insist on the transcription of analytical expression to plant reality.
Support are handout and annales

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Pilotage des systèmes industriels (GI-3-S2-UE-PlSI) and contributes to the following skills :

- C2 Modeling and designing an information, decision and production system, of goods and services (Level 3)
- C3 Evaluating, prototyping and simulating a system (Level 3)
- C4 Sizing the hardware and / or software of a system (Level 3)
- C8 Managing supply in connection with the planning and inventory management policy (Level 3)
- C9 Localizing and assigning the production, storage and transportation processes to different members of the supply chain (Level 3)
- C17 Identifying, formalizing and contractualising the requirements of a client, following their evolution and validating their compliance (requirements traceability) (Level 3)
- B2 Work, learn, progress autonomously (Level 3)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Modeling and designing an information, decision and production system, of goods and services (C2)
- Evaluating, prototyping and simulating a system (C3)
- Managing supply in connection with the planning and inventory management policy (C8)

To be able to :

- Identifying, formalizing and contractualising the requirements of a client, following their evolution and validating their compliance (requirements traceability) (C17)
- Sizing the hardware and / or software of a system (C4)
- Localizing and assigning the production, storage and transportation processes to different members of the supply chain (C9)
- Work, learn, progress autonomously (B2)

CONTENT

Part 1 : Petri Nets (PN)

- 1.1 Introduction to the resource/flow paradigm
- 1.2 Autonomous PN (definition, properties)
- 1.3 Non-autonomous PN (synchronised, temporal)
- 1.4 Analysis (dimensionning and performance assessment)

Partie 2 : Queueing Nets (QN)

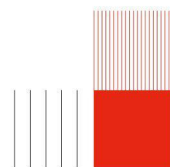
- 2.1 Introduction to the customer/server paradigm
- 2.1 Markov Chains and state equation
- 2.2 Performance indicators
- 2.3 Conventional Station
- 2.4 Markov Net limited to product form

BIBLIOGRAPHY

Du graficet aux réseaux de Petri, R. David, H. Alla HERMES 1989.
Modélisation des systèmes de production, J.M. Proth, X. Xie DUNOD 1992.
Introduction to DES, M. Cassandras, S. Lafortune, Wiley et sons 1999.
Modelling with generalized stochastic Petri Nets, A. Marsan, S. Donatelli Wiley et sons Ltd 1995.
Processus stochastiques, Alan Ruegg, méthodes mathématiques pour l'ingénieur, presses polytechniques romandes, Lausanne, 1989.
Network flow programming, by P. A. Jensen and J. W. Barnes, John Wiley and Sons, Inc., New York, 1980.

PRE-REQUISITES

Bachelor Eng.
Automatic Control
Discrete Mathematic
Graph Theory
Probability and Statistics



IDENTIFICATION

CODE : GI-3-S2-EC-MPI

ECTS : 2

HOURS

Cours : 0h

TD : 14h

TP : 16h

Projet : 0h

Evaluation : 2h

Face à face pédagogique : 32h

Travail personnel : 0h

Total : 32h

ASSESSMENT METHOD

IE (interrogation écrite)

IO (interrogation orale)

TPS (Travaux pratiques surveillés)

TEACHING AIDS

Duplicated course material

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Conception de produits et systèmes industriels (GI-3-S2-UE-CPSI) and contributes to the following skills :

C2 Modeling and designing an information, decision and production system, of goods and services (Level 1)

C3 Evaluating, prototyping and simulating a system (Level 1)

C4 Sizing the hardware and / or software of a system (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Families of materials and main mechanical characteristics of metals and composites;
- Concepts on ceramics and polymers;
- Breakage of materials;
- Help with the choice of materials: performance index method.

To be able to :

- Describe and explain the main mechanical properties of major classes of materials;
- Use a material selection method for specific applications considering expected performance.

CONTENT

- * Microscopic nature of materials
- * Plastic strain of crystalline materials
- * Fracture of materials (fast fracture and fatigue failure)
- * Mechanical properties of metals (steels, cast iron, aluminium alloys), of composites, of polymers (thermoplastics, thermosets, elastomers) and of ceramics
- * Materials selection: method of the performance indices
- * TP: Mechanical characterization of materials

BIBLIOGRAPHY

M.F. ASHBY, *Materials Selection in Mechanical Design*, Pergamon Press, 1992.

M.F. ASHBY et D.R.H. JONES, Matériaux, Vol. 1 et 2, Dunod, 1998.

J.P. BAILON et J.M. DORLOT, Des Matériaux, Presses internationales Polytechnique, 2000.

PRE-REQUISITES

- * Physic: basic knowledge
- * Mathematics : integral and differential calculation bases and matrix algebra



IDENTIFICATION

CODE : GI-3-S2-EC-CSM
ECTS : 2

HOURS

Cours : 0h
TD : 22h
TP : 8h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 32h
Travail personnel : 0h
Total : 32h

ASSESSMENT METHOD

IE (interrogation écrite)
IE (interrogation écrite)
ES (évaluation en situation)

TEACHING AIDS

Notes of lectures and lab works,
Files on line,
Software Solid Edge.

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Conception de produits et systèmes industriels (GI-3-S2-UE-CPSI) and contributes to the following skills :

- A3 Implement an experimental approach (Level 3)
- A4 Design a system that meets a set of specifications (Level 3)
- C3 Evaluating, prototyping and simulating a system (Level 3)
- C12 Changing organizations to meet new constraints or opportunities (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- (A4, C12)

To be able to :

- (A3, C3)
- (A4)

CONTENT

Mechanical System Design EC allows students to acquire the following knowledges:

- identification of loads and solicitations by isolating components,
- fatigue design and strength design (Wöhler curves, Miner theory),
- design of joints and connection with tolerances estimation,
- mechanical component design and choice (bearings, bolts).

This EC is also a mean for students to be able:

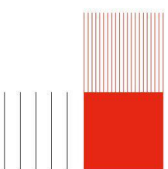
- to understand mechanical interaction phenomena between system components,
- to know classical and basic technologies for mechanical actuation (friction transmission, electro-magnetism, hydraulics),
- to know how some safety mechanical systems work (brake, clutch, spring, ...),
- to know or estimate some classical values of basic mechanical characteristics (stiffness, load, friction, ...).

BIBLIOGRAPHY

- MECHANICAL ENGINEERING DESIGN J. E. Shigley, R. G. Budinas, C.R. Mischke, Mc Graw-Hill Book Company, 7 th Ed., 2003.
- SYSTEMATIC MECHANICAL DESIGNING, A COST AND MANAGEMENT PERSPECTIVE M. S. Hundal, Ed. ASME 1997
- MECHANICAL POWER TRANSMISSION COMPONENTS » D. W. South, J. R. Mancuso, Ed. Marcel Decker Inc. NY, 1994
- METAL FATIGUE THEORY AND DESIGN Madayag, John Willey and Sons, 1969.
- THE MECHANICAL DESIGN PROCESS D.G. ULLMAN, McGraw-Hill Inc, 2nd Ed., 1997.
- PRODUCT DESIGN, practical methods for the systematic developments of new products » M. Baxter, Chapman et Hall, 1995
- MACHINE DESIGN, an integrated approach » R. Norton, Prentice-Hall Inc., 1996

PRE-REQUISITES

- First level of Drawings and mechanical data management,
- Introduction to Strength resistance of materials under static loadings,
- First level of knowledge on materials and processes.



IDENTIFICATION

CODE : GI-3-S2-EC-GPC
ECTS : 3

HOURS

Cours : 0h
TD : 46h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 48h
Travail personnel : 0h
Total : 48h

ASSESSMENT METHOD

EE+EO (évaluation écrite+orale)
IE (interrogation écrite)
IE (interrogation écrite)

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Conception de produits et systèmes industriels (GI-3-S2-UE-CPSI) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 1)
- A3 Implement an experimental approach (Level 2)
- A4 Design a system that meets a set of specifications (Level 3)
- A6 Report on an analysis or on a scientific approach (Level 2)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 3)
- C4 Sizing the hardware and / or software of a system (Level 3)
- C10 Developing and implementing an action plan as part of a quality and continuous improvement approach (Level 3)
- C12 Changing organizations to meet new constraints or opportunities (Level 3)
- C14 Collectively managing a project: organization, communication, group coordination (Level 3)
- C15 Managing a project based on a master plan (planning, budgeting, definition of monitoring indicators) (Level 3)
- C16 Identifying, analyzing and controlling the risks inherent to a project (Level 2)
- C17 Identifying, formalizing and contractualising the requirements of a client, following their evolution and validating their compliance (requirements traceability) (Level 2)
- B3 interact with people and work in a team (Level 2)
- B4 demonstrate creativity, innovation, entrepreneurship (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- General reliability of a mechanism
- Bearing calculations
- To be able to :
 - (C10, C12, C14, C15, C16, C17, B3, B4)
 - (A1, A3, A4, A6, C2, C4)
 - Manage a project
 - Design production equipment that meets productivity and safety expectations
 - Respect standards, costs and deadlines
 - Sizing a mechanically welded frame
 - Size bearings, belts
 - Sizing a tree statically and dynamically

CONTENT

BIBLIOGRAPHY

PRE-REQUISITES

IDENTIFICATION

CODE : GI-3-S2-EC-GFL
ECTS : 2

HOURS

Cours : 0h
TD : 4h
TP : 24h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 28h
Travail personnel : 4h
Total : 32h

ASSESSMENT METHOD

Report and simulation model

TEACHING AIDS

Moodle

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Gestion de la chaîne logistique (GI-3-S2-UE-GECL) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 3)
- A2 Operate a model of a real or virtual system (Level 3)
- A3 Implement an experimental approach (Level 3)
- A6 Report on an analysis or on a scientific approach (Level 1)
- C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 2)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 3)
- C3 Evaluating, prototyping and simulating a system (Level 3)
- C4 Sizing the hardware and / or software of a system (Level 2)
- C9 Localizing and assigning the production, storage and transportation processes to different members of the supply chain (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Physical behavior of a chain of Actuators and Sensors
- To be able to :
 - (A1, A2, A3, A6, C1, C2, C3, C4, C9)
 - Apply a "simulation project" approach
 - Trace flows
 - Analyze average flows
 - Find the bottleneck
 - Make stocks functional
 - Sizing a production line
 - Propose modifications to optimize flows
 - Implement an experimental approach to validate the proposed modifications

CONTENT

Apply a "simulation project" approach

1. Define Performance Indicators
2. Find the data required for the simulation
3. Model the problem by simplifying it
4. Validate the model

Finding a Bottleneck

Propose changes to optimize flows

Implementing tools and fundamentals of industrial engineering in a simulation project: Stock management, Experimental design, Stochastic processes, Queueing systems...

BIBLIOGRAPHY

PRE-REQUISITES

Production management,
Experimental design,
Stochastic processes,
Queueing systems

IDENTIFICATION

CODE : GI-3-S2-EC-ISC
ECTS : 3

HOURS

Cours : 6h
TD : 28h
TP : 12h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 48h
Travail personnel : 0h
Total : 48h

ASSESSMENT METHOD

IE (interrogation écrite) 80%
ES (évaluation en situation) 20%

TEACHING AIDS

Course and TD support
Exercices + Case studies

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Gestion de la chaîne logistique (GI-3-S2-UE-GECL) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 2)
- A2 Operate a model of a real or virtual system (Level 2)
- A5 Process data (Level 2)
- A6 Report on an analysis or on a scientific approach (Level 2)
- C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 2)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)
- C3 Evaluating, prototyping and simulating a system (Level 2)
- C8 Managing supply in connection with the planning and inventory management policy (Level 2)
- C9 Localizing and assigning the production, storage and transportation processes to different members of the supply chain (Level 2)
- C11 Understanding and evaluating a structure holistically, through socio-economic frames of reference (Level 1)
- B5 act responsibly in a complex world (Level 1)
- B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Forecasting methods, N&OP and their link with Demand management (A1, A2, C2, C8)
- Supply chain models (C2, C8, C9, B6)
- VBA syntax and event driven programming paradigm (C2)
- Bullwhip effect in the supply chain (C3)

To be able to :

- Identify the main functions of an industrial company, their operational logic, and their management methods. (C11, B6)
- Characterize the relationships of the company with its environment and within its supply chain, and the associated processes. (C2, C8, C9, B5, B6)
- Import and filter data using VBA syntax (A1, A2, A5, C1, C2)
- Manipulate event driven programming with VBA (user interaction and time trigger) (A2, A5, C2)
- Understand the problem of forecast management (A1, A2, C2, C8)
- Understand the stakes of the sales and operations planning (S&OP) and its link with (A1, A2, C2, C8)
- Select and apply a forecasting method adapted to a given context (A1, C1)
- To calculate the intermediate management balances, indicators, and ratios derived from the income statement and balance sheet. (A1, A6, C1, C11)

CONTENT

- Corporate structure
- Introduction to supply chain, SCOR Model
- Forecasting methods, S&OP, demand management
- case study: forecasting and statistical models & VBA programming for data import and filtering
- business finance (income statement, balance sheet), sustainable finance
- Beer game

BIBLIOGRAPHY

- IDRISSI N, P. KNOCKAERT et M. CATTAN, Maîtriser les processus de l'entreprise. Organisation, 2001
- MARION A. /Collectif, Le diagnostic d'entreprise. Méthode et processus. Economica, 1999
- BAGLIN G., BRUEL O., GARREAU A., GREIF M., Van DELF C., Management Industriel et Logistique, Economica, 1996.
- GIARD V. Gestion de la production et des flux, 3e édition, Economica, 2003.
- JAVEL G. Organisation et gestion de la production, Masson, 1997.
- BOURBONNAIS R. et USUNIER J.C., Prévision des ventes, Economica 3rd éd. 2001.
- GOODRICH R., Applied statistical forecasting, Business Forecast System, 1992
- LEMANCQVIAUX P., La gestion prévisionnelle à court terme, Dunod, 1995

IDENTIFICATIONCODE : GI-4-S1-EC-PPP-HU
ECTS :**HOURS**

Cours :	4h
TD :	4h
TP :	4h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	12h
Travail personnel :	4h
Total :	16h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTSANCHEZ FORSANS Sylvie :
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This course belongs to teaching unit Linguistic and sport activities (GI-4-S1-UE-HUEP) and contributes to the following skills :

B1 know oneself; manage mental and physical fitness (Level 2)

B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Key ideas on Self-Knowledge (B1)
- Ikigai or blason (B1)

To be able to :

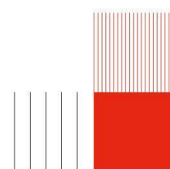
- Pursue their own goals by developing their own solutions to progress (B1, B6)
- Engage their network and actions to achieve their project (B6)

CONTENT

Pursue their own goals by developing their own solutions to progress
Engage their network and actions to achieve their project

BIBLIOGRAPHY**PRE-REQUISITES**

Bring an up-to-date CV (and any relevant preparation work) for the coaching interview



IDENTIFICATION

CODE : GI-4-S1-EC-QLT
ECTS : 1

HOURS

Cours : 0h
TD : 12h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 14h
Travail personnel : 0h
Total : 14h

ASSESSMENT METHOD

1 two-hour exam
Plus 1 ECTS for exchange students

TEACHING AIDS

Handout in English, exercises in English, Minitab software and an online tutorial in French

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

GI-4-S1-UE-AMCI
GI-4-S1-EC-QLT
Quality - Maintenance

Understand the issues and tools of quality (quality process vs. quality tools) and maintenance (impact of the organisation of quality on the other functions of companies).

Understand the usefulness and the operation of some tools (control charts, Gage R&R, reliability, etc.).

This EC contributes to:

- * School skills in Engineering Sciences / Level (1 for sensitization, 2 for pour sensibilisation, 2 for appropriation, 3 for mastery) :
 - . Solve questions asked by a scientific problem by being aware of limits / 3
 - . Develop an experimental approach / 3
 - . Implement a scientific approach / 2
- * School skills specific to GI:
 - . Observing, measuring, analyzing and interpreting an activity or a system from data / 3
 - . Managing a production system and react to malfunctions / 3
 - . Developing and implementing an action plan as part of a quality and continuous improvement approach / 3
 - . Collectively managing a project: organization, communication, group coordination / 1

CONTENT

FR or EN - possibility to integrate a group with lecture/practical work in english (but online tutorial in French only)

ONLINE TUTORIAL about Six Sigma to do without the assistance of the teacher
QUALITY

- * General introduction: relations of quality and maintenance
- * Introduction to quality: definitions, goals, voice of the client, overview of tools
- * Six sigma : Introduction, Etapes du DMAIC, Organisation.
- * Overview of ISO9001:2008
- * Control charts
- * Gage R&R

MAINTENANCE

- * Introduction: Definitions, Types of maintenance
- * TPM (Total Productive Maintenance), Overview, The 8 pillars with details on Autonomous maintenance in Pillar 2 and overview of RCM (Reliability-Centered Maintenance) in Pillar 3 (Planned maintenance), Lean Six Sigma
- * Types of maintenance, Impact of OEE (Overall Equipment Effectiveness), Frequency of change calculated from reliability function

BIBLIOGRAPHY

Bufferne J. (www.jean-bufferne.com), Le guide de la TPM, Éditions d'Organisation, Eyrolles, 2006.

Duret D., Pillet M., Qualité en production; De l'ISO 9000 à Six Sigma, 3e édition, Editions d'Organisation, 2005.

Pillet M., Six Sigma; Comment l'appliquer, Editions d'Organisation, 2004.

PRE-REQUISITES

GI-3-PRS-S1

IDENTIFICATION

CODE : GI-4-S1-EC-EIE
ECTS : 2

HOURS

Cours : 0h
TD : 26h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h

ASSESSMENT METHOD

Written examination
Report

TEACHING AIDS

Powerpoint slides
Sustainable development and
societal responsibility serious
game (CIPE)

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Continuous improvement and innovation(GI-4-S1-UE-AMCI) and contributes to the following skills :

A1 Analyze a system (real or virtual) or a problem (Level 2)

A2 Operate a model of a real or virtual system (Level 2)

C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 2)

C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)

C3 Evaluating, prototyping and simulating a system (Level 2)

C10 Developing and implementing an action plan as part of a quality and continuous improvement approach (Level 1)

C11 Understanding and evaluating a structure holistically, through socio-economic frames of reference (Level 2)

C12 Changing organizations to meet new constraints or opportunities (Level 2)

C20 Implementing Corporate Social Responsibility (CSR) (Level 1)

B5 act responsibly in a complex world (Level 2)

B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Definitions of industrial ecology, circular economy and associated terminology (B5, B6)

- Material Flow Analysis (A1, A2, C1, C2, C3)

- Integrated Assessment Model (A1, A2, C1, C2, C3)

- Waste definition, associated waste management rules, legal aspects (A1, C10)

- Challenges of circular economy and reverse logistics from the industrial engineering point of view (C20, B5)

- Eco-parks, industrial symbiosis, synergy and mutualization (C11, C12)

To be able to :

- Propose solutions limiting the consumption and waste of resources and the production of waste (C10, C20)

- Diagnose sustainable development issues within an industrial company (C10, C11)

CONTENT

- Definitions

- Sustainable development and societal responsibility serious game

- Material Flow Analysis

- Best Available Techniques

- Waste

- Reverse logistics

- Ecoparks

- Disassembly problems

BIBLIOGRAPHY

PRE-REQUISITES

Notions of life cycle analysis

IDENTIFICATION

CODE : GI-4-S1-EC-DTH
ECTS : 2

HOURS

Cours : 2h
TD : 24h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h

ASSESSMENT METHOD

project in group and evaluation
(2h)

TEACHING AIDS

Powerpoint slides

TEACHING LANGUAGE

French

CONTACT

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AIMS

Interactive systems design:
- Methods, tools and concepts for designing interactive systems
- User centered approach
- Ergonomic criterias

CONTENT

- HCI introduction and interaction paradigms
- Methods and models for designing UI (User Interfaces)
- Analysis of users requirements
- Sketching and prototyping
- Ergonomic criteria
- UI evaluation

BIBLIOGRAPHY

PRE-REQUISITES

IDENTIFICATION

CODE : GI-4-S1-EC-PCS
ECTS : 3

HOURS

Cours : 0h
TD : 16h
TP : 24h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 42h
Travail personnel : 0h
Total : 42h

ASSESSMENT METHOD

IE/COP ES (évaluation en situation)
P/COP ES (évaluation en situation)
IE/SCADA/MES ES (évaluation en situation)

TEACHING AIDS

- printed and online book
- complementary docs
- Moodle page
- oral testimony by an industrialist

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Management of industrial operations (GI-4-S1-UE-POPI) and contributes to the following skills :

- C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 2)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 2)
- C3 Evaluating, prototyping and simulating a system (Level 2)
- C4 Sizing the hardware and / or software of a system (Level 2)
- C5 Managing a production system and react to malfunctions (Level 2)
- C6 Selecting appropriate production tools, integrating them into an environment and configuring them, and setting up a production system (Level 2)
- C13 Considering technological and methodological innovation (Level 2)
- C15 Managing a project based on a master plan (planning, budgeting, definition of monitoring indicators) (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- (C4, C6, C13)
- (C15)
- (C1, C2, C3)

To be able to :

- (C1, C2, C3, C4, C5, C6? C13)

CONTENT

- Introduction to automation
- Automated systems of production (functions, uses)
- Conducting a project of automation (tools and methods for design and building)

BIBLIOGRAPHY

PRE-REQUISITES

- Industrial Machine environment: sensors, actuators
- basic PLC programming
- System Engineering basics

IDENTIFICATION

CODE : GI-4-S1-EC-ORD
ECTS : 2

HOURS

Cours : 0h
TD : 6h
TP : 16h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 24h
Travail personnel : 4h
Total : 28h

ASSESSMENT METHOD

IE (written test)
ES (situational assessment)

TEACHING AIDS

Handout for the lecture-tutorials part with exercises.
Project description.
Access to Opcenter APS software package.

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Pilotage des opérations industrielles (GI-4-S1-UE-POPI) and contributes to the following skills :

- A1 Analyze a system (real or virtual) or a problem (Level 3)
- A2 Operate a model of a real or virtual system (Level 3)
- A3 Implement an experimental approach (Level 2)
- C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 3)
- C2 Modeling and designing an information, decision and production system, of goods and services (Level 3)
- C3 Evaluating, prototyping and simulating a system (Level 3)
- C5 Managing a production system and react to malfunctions (Level 3)
- C6 Selecting appropriate production tools, integrating them into an environment and configuring them, and setting up a production system (Level 2)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Production scheduling techniques and methods: single machine, parallel machines, flowshop, jobshop, hybrid configurations. (A1, A2, A3, C1, C2, C3, C5, C6)

To be able to :

- Characterizing production master data; (A1, A2, C1, C2, C6)
- Specifying a scheduling problem; (A1, A2, C1, C2, C3)
- Choosing or proposing a method to solve a production scheduling problem that is best suited to a given context, and applying it; (A2, A3, C2, C3, C5, C6)
- Analyzing the impacts of scheduling methods. (A1, A2, A3, C1, C3, C5, C6)

CONTENT

1- Lecture-tutorials part :

Introduction: Positioning scheduling within the overall production management process, characteristics of scheduling problems, problem classification.

Single-machine problems.

Parallel machine problems.

Flowshop problems.

Jobshop problems.

Hybrid problems.

2- Project: using a scheduling software package (Opcenter APS) to solve a case study

Study of production master data.

Analysis of software functionalities.

Consideration of additional constraints.

Software evaluation and critical analysis.

BIBLIOGRAPHY

BAGLIN G., BRUEL O., GARREAU A., GREIF M., Van DELF C., Management Industriel et Logistique, Economica, 1996.

GIARD V. Gestion de la production et des flux, 3e édition, Economica, 2003.

JAVEL G. Organisation et gestion de la production, Masson, 1997.

PINEDO M., Scheduling: Theory, Algorithms, and Systems, Prentice Hall, 2001.

RINNOOY KAN A.H.G., Machine scheduling problems: Classification, complexity and computations, Nijhoff, The Hague (1976).Hall, 2001

PRE-REQUISITES

Basics of Production Management (production organization, master data, production planning)

Basic knowledge about algorithms.

IDENTIFICATION

CODE : GI-4-S1-EC-OEA

ECTS : 2

HOURS

Cours : 0h

TD : 0h

TP : 28h

Projet : 0h

Evaluation : 0h

Face à face pédagogique : 28h

Travail personnel : 0h

Total : 28h

ASSESSMENT METHOD

Lab: 100 %

TEACHING AIDS

Slides et Polycopié

TEACHING LANGUAGE

French

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This course belongs to teaching unit Option (GI-4-S1-UE-OPTN) and contributes to the following skills :

Provide the basis of operational research (concepts, methods, models) for industrial engineers.

Enable the students to master linear programming, integer linear programming, graph theory, to model and solve industrial and logistic problems, using optimization softwares.

CONTENT

The first half of the course alternates between 2-hour lectures and practical sessions, introducing the main concepts of exact optimization and key metaheuristics. It covers a review of linear programming and the simplex method, as well as complexity, integer linear programming, path-based heuristics, and population-based heuristics.

The second half of the course is dedicated to a project. In 2024-25, it focused on a two-tier urban logistics problem, where a truck tour supplies depots, and bicycles then collect goods from the depots to deliver them to customers' homes. A code implementing an algorithmic solution to the problem is provided. Students are then required to replace the solution components with more advanced exact or heuristic methods.

BIBLIOGRAPHY**PRE-REQUISITES**

Probability and statistics
Algorithmics
Programming
Integer Linear programming

IDENTIFICATION

CODE : GI-4-S1-EC-SDF
ECTS : 2

HOURS

Cours : 0h
TD : 16h
TP : 12h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

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AIMS

This course belongs to teaching unit Option (GI-4-S1-UE-OPTN) and contributes to the following skills :

Knowledge :

- Defining a rationale for dimensioning
- MTBF MTTF MTTR
- State graph, Markov chain
- Fault Tree, Reliability Diagram
- Decision support

Capacities :

- Apprehend the phenomena of malfunctioning
- Preliminary Risk Analysis
- Lifetime, Reliability, Availability, Maintainability of material and organisational structures
- Contract, commitment and penalties
- Negotiate solutions to increase fault tolerance
- Performance indicators
- Dimensioning

CONTENT

Dependability assesment methods

BIBLIOGRAPHY

Sûreté de Fonctionnement des systèmes matériels, A. Villemeur, Edt Eyrolles
Reliability Eng., Elsevier

PRE-REQUISITES

Stochastic process
Markov Chains
Probability

IDENTIFICATION

CODE : GI-4-S1-EC-INR
ECTS : 2

HOURS

Cours : 0h
TD : 2h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 4h
Travail personnel : 24h
Total : 28h

ASSESSMENT METHOD

written report and defense

TEACHING AIDS

Depending on the subject

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Option (GI-4-S1-UE-OPTN) and contributes to the following skills :

A6 Communicate a scientific analysis or approach with scenarios adapted to their speciality (level 1)

B4 Be creative, innovative, entrepreneurial (Level 1)

C13 Take into account technological and methodological innovation (level 1)

In addition, it requires the mobilization of the following skills:

B2 Working, learning, evolving autonomously

B3 Interact with others, work in teams

B7 Working in an International and Intercultural Context

C1 Observe, measure, analyze and interpret an activity or system from data

C14 Leading a project collectively: organization, communication, animation, group coordination

C16 Identify, analyze and control the risks inherent in a project

By allowing the student to work and be evaluated on the following knowledge:

- Devices and actors of research in France and the place of engineers PhD (A6, B4, C13)

By allowing the student to work and be evaluated on the following abilities :

- Developing a scientific approach of questioning on a research problem (A6, B4, C13)

CONTENT

Research project, in pairs, allowing the student to learn and experiment a research/innovation approach, on a subject proposed and supervised by a teacher-researcher, according to the following steps:

- appropriation of the subject
- formalization of the research problem and proposal of possible solutions
- development of solutions and experiments
- analysis of results, proposal of perspectives

BIBLIOGRAPHY

Depending on the subject

PRE-REQUISITES

Depending on the subject

IDENTIFICATIONCODE : GI-4-S1-EC-DDD
ECTS : 2**HOURS**Cours : 0h
TD : 0h
TP : 28h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h**ASSESSMENT METHOD**Continuous control
Lab report and oral presentation.**TEACHING AIDS**

PDF ressources on moodle

TEACHING LANGUAGE

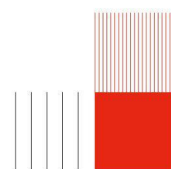
English

CONTACTMME ROBARDET Celine :
celine.robardet@insa-lyon.frM. DUMITRESCU Emil :
emil.dumitrescu@insa-lyon.fr**AIMS**

This course belongs to teaching unit Option (GI-4-S1-UE-OPTN) and contributes to the following skills :

CONTENT

- Building a Data Warehouse from raw data
- Introduction to data modeling for machine learning
- Methodology for the application of machine learning
- Application: predictive maintenance, building a model for failure prediction
- Application: Construction and operation of a model for failure prediction.

BIBLIOGRAPHY**PRE-REQUISITES**Notions of relational databases
PYTHON programming
Concepts of Statistics

IDENTIFICATION

CODE : GI-4-S1-EC-ISD
ECTS : 2

HOURS

Cours : 0h
TD : 10h
TP : 16h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h

ASSESSMENT METHOD

TEACHING AIDS

Course handouts

TEACHING LANGUAGE

English

CONTACT

MME ROBARDET Celine :
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AIMS

This course belongs to teaching unit Gestion et exploitation des données de l'entreprise (GI-4-S1-UE-GEDE) and contributes to the following skills :

A3 Implement an experimental approach (Level 2)
A5 Process data (Level 3)
A6 Report on an analysis or on a scientific approach (Level 3)
C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 3)
C4 Sizing the hardware and / or software of a system (Level 2)
C11 Understanding and evaluating a structure holistically, through socio-economic frames of reference (Level 1)
B2 work, learn, progress autonomously (Level 2)
B3 interact with people and work in a team (Level 3)

By allowing the engineering students to work and be evaluated on the following skills:

- Mastering structured data processing tools: Excel and Stats (C4)
- Know how to make a decision based on numerical results (C1)
- Choose a processing method based on the data and objectives (A3, A5, A6, C1, C11, B2, B3)

CONTENT

DATA ANALYSIS

1.Data

Characteristics: origin, quality, coding

Preparation: restoration, filtering, synchronization, construction of classes

Dependence: distances, ultra metric, correlation

2.Tools :

Descriptive methods: principal components analysis, correspondences, preferences

Explanatory methods: regression, segmentation, canonical analysis, discriminated analysis

Structural methods: ultra metric and hierarchical classification, dynamic swarms.

3.Analysis :

Analysis methodologies

Interpretation rules

Case studies

BIBLIOGRAPHY

**** Data analysis ****

1. E.Diday, J.Lemaire, J.Pouget, F.Testu, Eléments d'analyse de données, Dunod 1982
2. G.Saporta, Probabilités, Analyse de données et Statistiques, Technip 1990
3. Jean-Pierre , Analyse interactive des données (ACP, AFC) avec Excel 2000 : théorie et pratique / Georgin. Presses universitaires de Rennes , 2002
4. Alain Morineau et Yves-Marie Chatelin , L'analyse statistique des données [Texte imprimé] : apprendre, comprendre et réaliser avec Excel, Ellipses , 2005 , 407 p

**** Data warehouse ****

1. Entrepôts de données. Guide pratique de modélisation dimensionnelle, 2ème édition, R. Kimball, M. Ross
2. Piloter l'entreprise grâce au data Warehouse, J.-M. Franco, S de Lignerolles

PRE-REQUISITES

Statistics, data base

IDENTIFICATION

CODE : GI-4-S1-EC-BIN
ECTS : 2

HOURS

Cours : 0h
TD : 12h
TP : 14h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h

ASSESSMENT METHOD

Written exam at the end of the tutorial part ("TD")
Project evaluation : collective presentation and written report

TEACHING AIDS

Slides

TEACHING LANGUAGE

English

CONTACT

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AIMS

GI-4-S1-UE-GEDE
GI-4-S1-EC-BIN

General engineering skills:

- Develop an experimental approach;
- Identify, formulate and solve a complex engineering problem.

Specific Industrial Engineering skills:

- Observe, measure, analyze and interpret an activity or system from data
- Modeling, designing a system of information, decision-making and production of goods and services;
- Evaluate, prototype or simulate a system.

Abilities :

Collect customer needs for analysis; Identify sources of production data useful for an analytical approach; Process voluminous information for analysis; Exploit the data in the perspective of the analyzed activity: Carry out a project, working in a group.

Knowledge: operational and analytical database schemas; Elementary actions and sequencing for data transformation; Methods and tools for visualizing information from data.

CONTENT

DATA WAREHOUSE

1. Dimensional modeling for decision support systems
2. The Extract-Transform-Load (ETL) task : data cleaning, fusion and restructuration methods, ETL tools
3. Query tools and methods : reporting, scorecards, etc.

BIBLIOGRAPHY

systèmes d'information décisionnels, E. Ferragu, 2013 (available at Doc'INSA)
- Piloter l'entreprise grâce au data warehouse, Jean-Michel Franco, Sandrine de Lignerolles, 2000
(available at the Industrial Eng. dept. local library)

PRE-REQUISITES

Relational Databases, SQL

IDENTIFICATION

CODE : GI-4-S1-EC-SIE
ECTS : 3

HOURS

Cours : 6h
TD : 16h
TP : 18h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 40h
Travail personnel : 2h
Total : 42h

ASSESSMENT METHOD

Situational assessment Group score

TEACHING AIDS

Project Subject, Company Data
Readings to be done before some sessions (theoretical complements)
Methodological guides presented during the sessions

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to the Management and Exploitation of Company Data (GI-4-S1-UE-GEDE) teaching unit and contributes to the following skills:

By allowing the student to work and be evaluated on the following knowledge:

- BPMN modeling
- Process Value Analysis
- Evaluation of the performance of a process
- Process mining
- The various industrial information systems

By allowing the student to work and be evaluated on the following abilities:

- Model a complex business process
- Diagnose a business process in terms of inefficiencies and non-value-added tasks/flows
- Identify and evaluate business process improvement solutions
- Specify the information system supporting a business process

CONTENT

This course is conducted as a team project and is based on an industrial case. The objective of the project is to carry out a preliminary study for the modernization of a manufacturing company's information system. This preliminary study includes several phases: (1) Analysis of the existing situation (AS-IS) through the modeling of current business processes, the diagnosis of these processes and the identification of improvement solutions; (2) Design of an improvement solution (TO-BE) through the modeling of new processes and the specification of a software/hardware solution to support the new organization (without however developing it).

BIBLIOGRAPHY

1. Marlon Dumas, Marcello La Rosa, Jan Mendling, Hajo A. Reijers. "Fundamentals of Business Process Management". Editions Springer, ISBN :9783662565094 / 3662565099, 2018, 527 pages
2. Heru Susanto, Fang-Yie Leu, Chin Kang Chen. "Business Process Reengineering: An ICT Approach". Editions Apple Academic Press, ISBN :9780429949302 / 0429949308, 2019, 248 pages
3. W.M.P. van der Aalst. "Process Mining: Data Science in Action". Editions Springer-Verlag, 2016. <http://www.springer.com/978-3-662-49850-7>

PRE-REQUISITES

- Process Modeling (BPMN)
- Object-oriented modeling (UML)



IDENTIFICATION

CODE : GI-4-S1-EC-PCO
ECTS : 4

HOURS

Cours : 0h
TD : 8h
TP : 0h
Projet : 0h
Evaluation : 4h
Face à face pédagogique : 12h
Travail personnel : 64h
Total : 76h

ASSESSMENT METHOD

Continuous assessment in an activity situation: evaluation of :
- Requirement analysis,
- Preliminary design,
- Preliminary realization,
- Planning and monitoring, and associated deliverables.
Collective project defense.
Individual assessments of project team members.

TEACHING AIDS

Numerous resources available on the course's Moodle page (presentation materials, process notes, etc.).

TEACHING LANGUAGE

French
English

CONTACT

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AIMS

This course belongs to teaching unit Collectiv project (GI-4-S1-UE-PROJ) and contributes to the following skills :Project management methodes and tools (following a project, steeps of a project, risk management, AMDEC, formalization of the customers objectives , redaction of specifications, redaction of plan realisation.

Place the project and its stakes in the organization ; organize and manage a project and work in team; meetings management ; manage relevant information; communicate, negotiate and defend a project

CONTENT

Project steps: Identification and expression of customer needs and constraints, Study of existing situation and benchmarking, Identification of risks (FMEA), Formulation of "quality" objectives and rules for verifying their achievement, Specifications (functional, metrological, pedagogical, technical, product, etc.), Delivery schedule and contractual commitment. Drawing up an Analysis of Requirements, a Project Management Plan and a Technical Proposal. Implementation of management dashboards. Task planning and identification of mobilized resources. Achievements and actions in the field (specific to the project). Prototype development. Obtaining and formalizing results, checking that initial objectives have been met.

BIBLIOGRAPHY

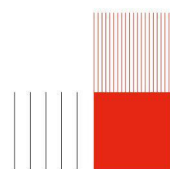
- GIDEL T, ZONGHERO W. « Management de Projet 1 et 2 », Hermès Sciences, 2006
- BOURGEOIS J-P. « Gestion de Projet » Technique de l'Ingénieur T 7700
- CHVIDCHENKO I., CHEVALLIER J. « Conduite et gestion de projet. Principes et pratiques pour petits et grands projets » Cepaduès Edition, 1997
- AFITEP « Le Management de Projet, Principes et Pratique » Afnor Gestion, 1991
- GIARD V. « La Gestion de Projet » Economica, 1991
- PMI Project management Body of Knowledge; Project Management Institute; www.pmi.org
- R. MARCINIAK , M. PAGERIE Gestion de projet . Guide pratique de tous vos projets et produits industriels, Editions WEKA
- J. MAISONNEUVE La dynamique des groupes, Paris Que-sais je ?, PUF, 1964
- B. KAYE Pédagogie de groupe sciences de l'éducation, Dunod, 1975
- R. MUCHIELLI Les méthodes actives dans la pédagogie des adultes, 1991 Gestion de Projets , Tome 1 et 2 , Edition WEKAP7

PRE-REQUISITES

WARNING : This course extends over two semesters. You will only be allowed to take it if you also take its counterpart in semester 2 (GI-4-S2-EC-PCO).

Prerequisites:

- Problem-solving methodology
- Quality tools
- Basic project management tools and methods



IDENTIFICATION

CODE : GI-4-S2-EC-LEA
ECTS : 3

HOURS

Cours : 0h
TD : 20h
TP : 12h
Projet : 0h
Evaluation : 4h
Face à face pédagogique : 36h
Travail personnel : 0h
Total : 36h

ASSESSMENT METHOD

Assessment: participation (10%),
homework case study (30%),
practical work report (30%), poster
on a subject of your choice related
to the course (30%).
Plus 1 ECTS for exchange
students

TEACHING AIDS

Slides of the course, simulation
game, tutorial

TEACHING LANGUAGE

French
English

CONTACT

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lorraine.trilling@insa-lyon.fr

AIMS

This course belongs to teaching unit Management and improvement of business performance (GI-4-S2-UE-GAPE) and contributes to the following skills :

- Appreciate lean as a way of management
- Use VSM to identify and eliminate the wastes,
- Develop the skills necessary to see the flow of a value stream and to create a future state map

CONTENT

- 2 sessions of 2 hours of lectures (CM):
 - Presentation of the history of Lean
 - Basic principles of Lean
 - 7 types of wastes, temple Toyota, Just In Time, Jidoka principles, standardization, management.
- 3 sessions of 2 hours of tutorials (TD):
 - Presentation of the Value Stream Mapping method,
 - Development of an action plan.
- A case study
 - 2 sessions of 4 hours of practice (TP): a simulation game of a production workshop of jacks (Synchro Lean Simulation on hardware FESTO).
 - 3 sessions of 2-hour seminars with industrial invited speakers: workstation organisation, problem solving and escalation, Lean Leadership

BIBLIOGRAPHY

- Learning to see. Mike Rother et John Shook. Avant propos: Jim Womack et Dan Jones .Traduction en Français : Line Perron. N° ISBN: 978-2-9529806-1-6
- Gold Mine. Freddy Ballé et Michael Ballé. N°ISBN: 0-9743225-6-3
- Le Modèle TOYOTA. Jeffrey Liker. Traduction en Français: Monique Sperry. Avant propos: Didier Leroy (président de Toyota Motor Manufacturing France. Préface: Michael Ballé et Godefroy Beauvallet. N° ISBN: 978-2-7440-7390-8
- Lexique Lean. Chet Marchwinski et John Shook. Traduction en Français: Institut Lean France. N° ISBN: 978-2-9529806-0-9
- Seeing the whole. James P. Womack and Daniel T. Jones. N° ISBN: 0-9667843-5-9
- Système Lean. Penser l'entreprise au plus juste 2ème édition. Jim Womack, Dan Jones. Préface: Michael Ballé et Godefroy Beauvallet. Traduction en français: Monique Sperry. N° ISBN: 978-2-7440-7391-5

PRE-REQUISITES

Production management
Problem solving methods

IDENTIFICATIONCODE : GI-4-S2-EC-BCG
ECTS : 2**HOURS**Cours : 8h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h**ASSESSMENT METHOD**Continuous control + Final
examination (2h)**TEACHING AIDS**

Textbook, exercices, case studies

TEACHING LANGUAGE

French

CONTACTMME LADIER Anne-Laure :
anne-laure.ladier@insa-lyon.fr**AIMS**

This course belongs to teaching unit Management and improvement of business performance (GI-4-S2-UE-GAPE) and contributes to the following skills :

CONTENT**FINANCIAL FLOWS AND MANAGEMENT CONTROL**

Financial mechanisms: cycles of a company, financial flows and formation of the needs of financial exploitation. These aspects are taught using a case study of a company creation. Indicators of activity, results and performance: Interpretation analysis, financial dashboard

BIBLIOGRAPHY

- * Gestion financière, Gérard Charreaux, ITEC.
- * Henri Amblard, Ph. Bernoux, G. Herreros, Y-F. Livian, Les nouvelles approches sociologiques des organisations, Seuil, 1996.
- * Philippe Bernoux, La sociologie des organisations, Le Seuil, coll. Points, 1985.
- * Reynald Bourque, Christian Thuderoz, Sociologie de la négociation, La Découverte, coll. Repères, 2002.
- * Philippe Cabin (coll.), Les Organisations. Etat des savoirs, Ed. Sciences Humaines, 1999.
- * Pierre Morin, Eric Delavallée, Le manager à l'écoute du sociologue, Ed. d'organisation, 2000.
- * Christian Thuderoz, Sociologie des entreprises, La Découverte, coll. Repères, 1997

PRE-REQUISITES

Basic knowledge of the operation of the industrial enterprise and its interactions with its environment.

The principles of financial accounting.

IDENTIFICATION

CODE : GI-4-S2-EC-ASO-HU
ECTS : 1

HOURS

Cours : 0h
TD : 12h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 12h
Travail personnel : 0h
Total : 12h

ASSESSMENT METHOD

Final examination (2h)

TEACHING AIDS

Textbook, exercices, case studies,
online ressources (website
"sociologos")

TEACHING LANGUAGE

French

CONTACT

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AIMS

CONTENT

STRATEGIC ANALYSIS OF AN ORGANISATION

Observation and internal strategic analysis, Integration of the technical, economical and socio-organizational aspects

Personal integration reinforced by contacting, necessary for targeted location

Identification of human and social aspects for the future engineering missions

BIBLIOGRAPHY

Henri AMBLARD, Ph. BERNOUX, G. HERREROS, Y-F. LIVIAN, Les nouvelles approches sociologiques des organisations, Seuil, 1996.

Howard BECKER, Les ficelles du métier, La Découverte, 2002.

Philippe BERNOUX, La sociologie des organisations, Seuil, coll. Points, 1985. Sociologie du changement, Seuil, 2004.

R. Bourque, Ch. Thuderoz, Sociologie de la négociation, La Découverte, coll° Repères, Paris 2002.

Philippe CABIN (coll.), Les Organisations. Etat des savoirs, Ed. Sciences Humaines, 1999.

Pierre MORIN, Eric DELAVALLEE, Le manager à l'écoute du sociologue, Ed. d'Organisation, 2000.

R. Reitter, F. Chevalier, H. Laroche, C. Mendoza, P. Pulicani, Cultures d'entreprises, Vuibert, 1991.

M. Villette, Guide du stage en entreprise, La Découverte, 2006.

Christian THUDEROZ, Histoire et sociologie du management, PPUR, 2006. Clefs de sociologie pour ingénieur(e)s, PPUR, 2011. Sociologie des entreprises, La Découverte, coll. Repères, 1997, rééd° 2010.

PRE-REQUISITES

Fluent in French (speaking and writing)

IDENTIFICATIONCODE : GI-4-S2-EC-STI
ECTS : undefined**HOURS**Cours : 0h
TD : 1h
TP : 0h
Projet : 229h
Evaluation : 0h
Face à face pédagogique : 1h
Travail personnel : 0h
Total : 230h**ASSESSMENT METHOD****TEACHING AIDS****TEACHING LANGUAGE**

French

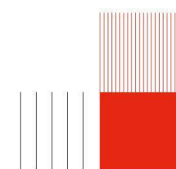
CONTACTM. BERNARD-TREMOLET
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M. MONTEIRO Thibaud :
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Developing observation and analysis skills.

Integrating technical and socio-economical aspects of a project / process.

Improving communication skills.

The industrial internship is an opportunity to experience the role of an engineer in a real industrial environment, where the student is likely to work in the future. It leads not only to technical achievements, but also to a detailed observation of the company, with its history, organization, activities, objectives, social dynamics ...

BIBLIOGRAPHY**PRE-REQUISITES**

IDENTIFICATION

CODE : GI-4-S2-EC-PCO

ECTS : 3

HOURS

Cours : 0h

TD : 0.016666666666666666h

TP : 0h

Projet : 0h

Evaluation : 5h

Face à face 5.016666666666667h
pédagogique :

Travail personnel : 52h

Total : 57.016666666666666h

ASSESSMENT METHODContinuous assessment:
evaluation of processes:

- Final design
- Final realization
- Closing

and associated deliverables.

Final collective project defense.

Individual assessment of project
team members.**TEACHING AIDS**Numerous resources available on
the course's Moodle page
(presentation materials, process
notes, etc.).**TEACHING LANGUAGE**French
English**CONTACT**M. FONDREVELLE Julien :
julien.fondreville@insa-lyon.fr**AIMS**This course belongs to teaching unit Collectiv project (GI-4-S1-UE-PROJ) and
contributes to the following skills :Project management methodes and tools (following a
project, steeps of a project, risk management, AMDEC, formalization of the customers
objectives , redaction of specifications, redaction of plan realisation.Place the project and its stakes in the organization ; organize and manage a project and
work in team; meetings management ; manage relevant information; communicate,
negotiate and defend a project**CONTENT**Steps covered during this second part of the project: following delivery of the prototype
and the preliminary acceptance phase, corrections and improvements to the product
(final design, production and acceptance). Project assessment and feedback.**BIBLIOGRAPHY****PRE-REQUISITES**This course is a direct continuation of the group project started in 4GI-S1: GI-4-S1-EC-
PCO

IDENTIFICATION

CODE : GI-4-S2-EC-PSM
ECTS : 3

HOURS

Cours : 0h
TD : 0h
TP : 32h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 32h
Travail personnel : 4h
Total : 36h

ASSESSMENT METHOD

For a group, evaluation on the report and the application and for each student, evaluation on the individual work in the group.

TEACHING AIDS

Lecture notes

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Information systems projects (GI-4-S2-UE-PRSI) and contributes to the following skills :

- Specify the needs for control systems and MES;
- Use an analysis and design method for a control and information system;
- Implement automation and MES systems;
- Analyze the results and improve physical and information systems.

CONTENT

Application of the course on a real system, implemented with the AIP (local shared industrial workshop). Process and control analysis, study of the existing information system, design and implementation of MES new functions.

FR - practical work in french

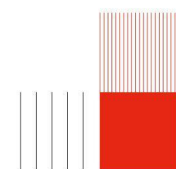
BIBLIOGRAPHY

Heiko Meyer, Franz Fuchs and Klaus Thiel, Manufacturing Execution Systems (MES): Optimal Design, Planning, and Deployment: Optimal Design, Planning, and Deployment, McGraw-Hill Education, 2009, 273 p., ISBN 0071623833

PRE-REQUISITES

Cours MES (GI-4-MES-S1), Automation (GI-4-AUT-S1) and Automation project (GI-4-P/AUT-S1 or GI-4-P/AUT-S2)

- Automated Manufacturing Systems: role, architecture, components (sensors, activators), continuous et batch process control;
- Information systems: role, architecture, design.
- Production Management: role, methods.



IDENTIFICATION

CODE : GI-4-S2-EC-ERP
ECTS : 3

HOURS

Cours : 0h
TD : 0.0166666666666666h
TP : 32h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 32.01666666666666h
Travail personnel : 4h
Total : 36.01666666666666h

ASSESSMENT METHOD

Individual assessment
Summary of case studies,
screenshots

TEACHING AIDS

Case study student booklet
Other documents on Moodle
Software package SAP ERP Help
online

TEACHING LANGUAGE

French

CONTACT

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AIMS

This course belongs to teaching unit Information systems projects (GI-4-S2-UE-PRSI) and contributes to the following skills :

- Mastery of an Enterprise Resource Planning (ERP) system for production planning and management in a discrete production context
- Consciousness raising to business process integration issues

CONTENT

Objective: Master the challenges of an integrated management system (ERP) to support operational and decision-making processes (production, sales, planning processes) by conducting case studies on a leading ERP system.

- Introduction and discovery of SAP S/4HANA (structure, concepts, applications)
- Master data for production planning and sales processes: customer, material, BOM, routing, workcenter, cost center,...
- Case Study : Implementation of several cross-functional business processes : production planning and execution scenarii (make to stock, assemble to order), and a sales management scenario
- discovery of the FIORI environment on an external supply scenario

BIBLIOGRAPHY

Tomas J.L. (2000) : ERP et progiciels intégrés. Dunod 2ème édition.
Reix R. (2002) : Systèmes d'information et management des organisations. Vuibert 2ème édition
Dunleavy J., Hurley J.R., Gibson A., Norris G., Wrigt I. (1999) : SAP/R3 Le guide du décideur. Editions Eyrolles

PRE-REQUISITES

Industrial Management, Introduction to Supply Chain, Business Information Systems
Basics and methods of production management and planning;
Forecasting methods, Sales & Operation Planning
Knowledge of ERP systems: content, challenges and ERP project management

IDENTIFICATION

CODE : GI-4-S2-EC-ASO-HU
ECTS : 1

HOURS

Cours : 0h
TD : 12h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 12h
Travail personnel : 0h
Total : 12h

ASSESSMENT METHOD

Final examination (2h)

TEACHING AIDS

Textbook, exercices, case studies,
online ressources (website
"sociologos")

TEACHING LANGUAGE

French

CONTACT

M. MARIANO José-Pedro :
pedro.mariano@insa-lyon.fr

AIMS

CONTENT

STRATEGIC ANALYSIS OF AN ORGANISATION

Observation and internal strategic analysis, Integration of the technical, economical and socio-organizational aspects

Personal integration reinforced by contacting, necessary for targeted location

Identification of human and social aspects for the future engineering missions

BIBLIOGRAPHY

Henri AMBLARD, Ph. BERNOUX, G. HERREROS, Y-F. LIVIAN, Les nouvelles approches sociologiques des organisations, Seuil, 1996.

Howard BECKER, Les ficelles du métier, La Découverte, 2002.

Philippe BERNOUX, La sociologie des organisations, Seuil, coll. Points, 1985. Sociologie du changement, Seuil, 2004.

R. Bourque, Ch. Thuderoz, Sociologie de la négociation, La Découverte, coll° Repères, Paris 2002.

Philippe CABIN (coll.), Les Organisations. Etat des savoirs, Ed. Sciences Humaines, 1999.

Pierre MORIN, Eric DELAVALLEE, Le manager à l'écoute du sociologue, Ed. d'Organisation, 2000.

R. Reitter, F. Chevalier, H. Laroche, C. Mendoza, P. Pulicani, Cultures d'entreprises, Vuibert, 1991.

M. Villette, Guide du stage en entreprise, La Découverte, 2006.

Christian THUDEROZ, Histoire et sociologie du management, PPUR, 2006. Clefs de sociologie pour ingénieur(e)s, PPUR, 2011. Sociologie des entreprises, La Découverte, coll. Repères, 1997, rééd° 2010.

PRE-REQUISITES

Fluent in French (speaking and writing)

IDENTIFICATIONCODE : GI-4-S2-EC-STI
ECTS : undefined**HOURS**Cours : 0h
TD : 1h
TP : 0h
Projet : 229h
Evaluation : 0h
Face à face pédagogique : 1h
Travail personnel : 0h
Total : 230h**ASSESSMENT METHOD****TEACHING AIDS****TEACHING LANGUAGE**

French

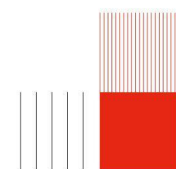
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Stéphane :
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M. MONTEIRO Thibaud :
thibaud.monteiro@insa-lyon.fr**AIMS****CONTENT**

Developing observation and analysis skills.

Integrating technical and socio-economical aspects of a project / process.

Improving communication skills.

The industrial internship is an opportunity to experience the role of an engineer in a real industrial environment, where the student is likely to work in the future. It leads not only to technical achievements, but also to a detailed observation of the company, with its history, organization, activities, objectives, social dynamics ...

BIBLIOGRAPHY**PRE-REQUISITES**

IDENTIFICATIONCODE : GI-4-S2-EC-STI
ECTS : undefined**HOURS**Cours : 0h
TD : 1h
TP : 0h
Projet : 229h
Evaluation : 0h
Face à face pédagogique : 1h
Travail personnel : 0h
Total : 230h**ASSESSMENT METHOD****TEACHING AIDS****TEACHING LANGUAGE**

French

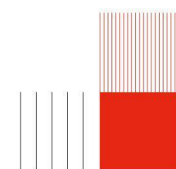
CONTACTM. BERNARD-TREMOLET
Stéphane :
stephane.bernard@insa-lyon.fr
M. MONTEIRO Thibaud :
thibaud.monteiro@insa-lyon.fr**AIMS****CONTENT**

Developing observation and analysis skills.

Integrating technical and socio-economical aspects of a project / process.

Improving communication skills.

The industrial internship is an opportunity to experience the role of an engineer in a real industrial environment, where the student is likely to work in the future. It leads not only to technical achievements, but also to a detailed observation of the company, with its history, organization, activities, objectives, social dynamics ...

BIBLIOGRAPHY**PRE-REQUISITES**

IDENTIFICATION

CODE : GI-4-S2-EC-ASO-HU

ECTS : 1

HOURS

Cours : 0h

TD : 12h

TP : 0h

Projet : 0h

Evaluation : 0h

Face à face pédagogique : 12h

Travail personnel : 0h

Total : 12h

ASSESSMENT METHOD

Final examination (2h)

TEACHING AIDS

Textbook, exercices, case studies,
online ressources (website
"sociologos")

TEACHING LANGUAGE

French

CONTACT

M. MARIANO José-Pedro :
pedro.mariano@insa-lyon.fr

AIMS

CONTENT

STRATEGIC ANALYSIS OF AN ORGANISATION

Observation and internal strategic analysis, Integration of the technical, economical and socio-organizational aspects

Personal integration reinforced by contacting, necessary for targeted location

Identification of human and social aspects for the future engineering missions

BIBLIOGRAPHY

Henri AMBLARD, Ph. BERNOUX, G. HERREROS, Y-F. LIVIAN, Les nouvelles approches sociologiques des organisations, Seuil, 1996.

Howard BECKER, Les ficelles du métier, La Découverte, 2002.

Philippe BERNOUX, La sociologie des organisations, Seuil, coll. Points, 1985. Sociologie du changement, Seuil, 2004.

R. Bourque, Ch. Thuderoz, Sociologie de la négociation, La Découverte, coll° Repères, Paris 2002.

Philippe CABIN (coll.), Les Organisations. Etat des savoirs, Ed. Sciences Humaines, 1999.

Pierre MORIN, Eric DELAVALLEE, Le manager à l'écoute du sociologue, Ed. d'Organisation, 2000.

R. Reitter, F. Chevalier, H. Laroche, C. Mendoza, P. Pulicani, Cultures d'entreprises, Vuibert, 1991.

M. Villette, Guide du stage en entreprise, La Découverte, 2006.

Christian THUDEROZ, Histoire et sociologie du management, PPUR, 2006. Clefs de sociologie pour ingénieur(e)s, PPUR, 2011. Sociologie des entreprises, La Découverte, coll. Repères, 1997, rééd° 2010.

PRE-REQUISITES

Fluent in French (speaking and writing)

IDENTIFICATIONCODE : GI-4-S2-EC-PCS
ECTS : 1**HOURS**Cours : 0h
TD : 12h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 12h
Travail personnel : 0h
Total : 12h**ASSESSMENT METHOD**

For a group, evaluation on the report and the application and for each student, evaluation on the individual work in the group.

TEACHING AIDS

Lecture notes

TEACHING LANGUAGE

French

CONTACTM. ESCUDERO Cedric :
cedric.escudero@insa-lyon.fr**AIMS**

This course belongs to teaching unit Refresher (GI-4-S2-UE-RNIV) and contributes to the following skills :

- Specify the needs for control systems and MES;
- Use an analysis and design method for a control and information system;
- Implement automation and MES systems;
- Analyze the results and improve physical and information systems.

CONTENT

Application of the course on a real system, implemented with the AIP (local shared industrial workshop). Process and control analysis, study of the existing information system, design and implementation of MES new functions.

FR - practical work in french

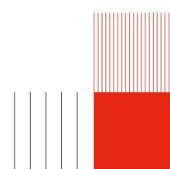
BIBLIOGRAPHY

Heiko Meyer, Franz Fuchs and Klaus Thiel, Manufacturing Execution Systems (MES): Optimal Design, Planning, and Deployment: Optimal Design, Planning, and Deployment, McGraw-Hill Education, 2009, 273 p., ISBN 0071623833

PRE-REQUISITES

Cours MES (GI-4-MES-S1), Automation (GI-4-AUT-S1) and Automation project (GI-4-P/AUT-S1 or GI-4-P/AUT-S2)

- Automated Manufacturing Systems: role, architecture, components (sensors, activators), continuous et batch process control;
- Information systems: role, architecture, design.
- Production Management: role, methods.



IDENTIFICATION

CODE : GI-4-S2-EC-SIE
ECTS : 1

HOURS

Cours : 0h
TD : 12h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 12h
Travail personnel : 0h
Total : 12h

ASSESSMENT METHOD

Situational assessment; Group score

TEACHING AIDS

Project Subject, Company Data
Readings to be done before
certain sessions (theoretical
complements)
Methodological guides presented
during the sessions

TEACHING LANGUAGE

French

CONTACT

MME GZARA Lilia :
lilia.gzara@insa-lyon.fr

AIMS

This course belongs to the Management and Exploitation of Company Data (GI-4-S2-UE-RNIV) teaching unit and contributes to the following skills:

By allowing the student to work and be evaluated on the following knowledge:

- BPMN modeling
- Process Value Analysis
- Evaluation of the performance of a process
- Process mining
- The various industrial information systems

By allowing the student to work and be evaluated on the following abilities:

- Model a complex business process
- Diagnose a business process in terms of inefficiencies and non-value-added tasks/flows
- Identify and evaluate business process improvement solutions
- Specify the information system supporting a business process

CONTENT

This course is conducted as a team project and is based on an industrial case. The objective of the project is to carry out a preliminary study for the modernization of a manufacturing company's information system. This preliminary study includes several phases: (1) Analysis of the existing situation (AS-IS) through the modeling of current business processes, the diagnosis of these processes and the identification of improvement solutions; (2) Design of an improvement solution (TO-BE) through the modeling of new processes and the specification of a software/hardware solution to support the new organization (without however developing it).

BIBLIOGRAPHY

1. Marlon Dumas, Marcello La Rosa, Jan Mendling, Hajo A. Reijers. "Fundamentals of Business Process Management". Editions Springer, ISBN :9783662565094 / 3662565099, 2018, 527 pages
2. Heru Susanto, Fang-Yie Leu, Chin Kang Chen. "Business Process Reengineering: An ICT Approach". Editions Apple Academic Press, ISBN :9780429949302 / 0429949308, 2019, 248 pages
3. W.M.P. van der Aalst. "Process Mining: Data Science in Action". Editions Springer-Verlag, 2016. <http://www.springer.com/978-3-662-49850-7>

PRE-REQUISITES

- Process Modeling (BPMN)
- Object-oriented modeling (UML)

IDENTIFICATION

CODE : GI-4-S2-EC-ISD
ECTS : 1

HOURS

Cours : 0h
TD : 12h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 12h
Travail personnel : 0h
Total : 12h

ASSESSMENT METHOD

TP/ADD TPS (Travaux pratiques surveillés)

Plus 1 ECTS for exchange students

TEACHING AIDS

TEACHING LANGUAGE

English

CONTACT

MME ROBARDET Celine :
celine.robardet@insa-lyon.fr

AIMS

This course belongs to teaching unit Refresher (GI-4-S2-UE-RNIV) and contributes to the following skills :

A3 Implement an experimental approach (Level 2)
A5 Process data (Level 3)
A6 Report on an analysis or on a scientific approach (Level 3)
C1 Observing, measuring, analyzing and interpreting an activity or a system from data (Level 3)
C4 Sizing the hardware and / or software of a system (Level 2)
C11 Understanding and evaluating a structure holistically, through socio-economic frames of reference (Level 1)
B2 work, learn, progress autonomously (Level 2)
B3 interact with people and work in a team (Level 3)

By allowing the engineering students to work and be evaluated on the following knowledge :

x
To be able to :
- (C4)
- (C1)
- (A3, A5, A6, C11, B2, B3)

CONTENT

DATA ANALYSIS

1.Data

Characteristics: origin, quality, coding
Preparation: restoration, filtering, synchronization, construction of classes
Dependence: distances, ultra metric, correlation

2.Tools :

Descriptive methods: principal components analysis, correspondences, preferences
Explanatory methods: regression, segmentation, canonical analysis, discriminated analysis

Structural methods: ultra metric and hierarchical classification, dynamic swarms.

3.Analysis :

Analysis methodologies
Interpretation rules
Case studies

BIBLIOGRAPHY

****Cours Analyse de données : ****

1. E.Diday, J.Lemaire, J.Pouget, F.Testu, Eléments d'analyse de données, Dunod 1982
2. G.Saporta, Probabilités, Analyse de données et Statistiques, Technip 1990
3. Jean-Pierre , Analyse interactive des données (ACP, AFC) avec Excel 2000 : théorie et pratique / Georgin. Presses universitaires de Rennes , 2002
4. Alain Morineau et Yves-Marie Chatelin , L'analyse statistique des données [Texte imprimé] : apprendre, comprendre et réaliser avec Excel, Ellipses , 2005 , 407 p

****Cours Entrepôts de données : ****

1. Entrepôts de données. Guide pratique de modélisation dimensionnelle, 2ème édition, R. Kimball, M. Ross
2. Piloter l'entreprise grâce au data Warehouse, J.-M. Franco, S de Lignerolles

PRE-REQUISITES

Statistics, data base

IDENTIFICATION

CODE : GI-4-S2-EC-LEA
ECTS : 3

HOURS

Cours : 0h
TD : 20h
TP : 12h
Projet : 0h
Evaluation : 4h
Face à face pédagogique : 36h
Travail personnel : 0h
Total : 36h

ASSESSMENT METHOD

Assessment: participation (10%),
homework case study (30%),
practical work report (30%), poster
on a subject of your choice related
to the course (30%).
Plus 1 ECTS for exchange
students

TEACHING AIDS

Slides of the course, simulation
game, tutorial

TEACHING LANGUAGE

French
English

CONTACT

MME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr

AIMS

This course belongs to teaching unit Management and improvement of business performance (GI-4-S2-UE-GAPE) and contributes to the following skills :

- Appreciate lean as a way of management
- Use VSM to identify and eliminate the wastes,
- Develop the skills necessary to see the flow of a value stream and to create a future state map

CONTENT

- 2 sessions of 2 hours of lectures (CM):
 - Presentation of the history of Lean
 - Basic principles of Lean
 - 7 types of wastes, temple Toyota, Just In Time, Jidoka principles, standardization, management.
- 3 sessions of 2 hours of tutorials (TD):
 - Presentation of the Value Stream Mapping method,
 - Development of an action plan.
- A case study
 - 2 sessions of 4 hours of practice (TP): a simulation game of a production workshop of jacks (Synchro Lean Simulation on hardware FESTO).
 - 3 sessions of 2-hour seminars with industrial invited speakers: workstation organisation, problem solving and escalation, Lean Leadership

BIBLIOGRAPHY

- Learning to see. Mike Rother et John Shook. Avant propos: Jim Womack et Dan Jones .Traduction en Français : Line Perron. N° ISBN: 978-2-9529806-1-6
- Gold Mine. Freddy Ballé et Michael Ballé. N°ISBN: 0-9743225-6-3
- Le Modèle TOYOTA. Jeffrey Liker. Traduction en Français: Monique Sperry. Avant propos: Didier Leroy (président de Toyota Motor Manufacturing France. Préface: Michael Ballé et Godefroy Beauvallet. N° ISBN: 978-2-7440-7390-8
- Lexique Lean. Chet Marchwinski et John Shook. Traduction en Français: Institut Lean France. N° ISBN: 978-2-9529806-0-9
- Seeing the whole. James P. Womack and Daniel T. Jones. N° ISBN: 0-9667843-5-9
- Système Lean. Penser l'entreprise au plus juste 2ème édition. Jim Womack, Dan Jones. Préface: Michael Ballé et Godefroy Beauvallet. Traduction en français: Monique Sperry. N° ISBN: 978-2-7440-7391-5

PRE-REQUISITES

Production management
Problem solving methods

IDENTIFICATIONCODE : GI-4-S2-EC-BCG
ECTS : 2**HOURS**Cours : 8h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h**ASSESSMENT METHOD**Continuous control + Final
examination (2h)**TEACHING AIDS**

Textbook, exercices, case studies

TEACHING LANGUAGE

French

CONTACTMME LADIER Anne-Laure :
anne-laure.ladier@insa-lyon.fr**AIMS**

This course belongs to teaching unit Management and improvement of business performance (GI-4-S2-UE-GAPE) and contributes to the following skills :

CONTENT**FINANCIAL FLOWS AND MANAGEMENT CONTROL**

Financial mechanisms: cycles of a company, financial flows and formation of the needs of financial exploitation. These aspects are taught using a case study of a company creation. Indicators of activity, results and performance: Interpretation analysis, financial dashboard

BIBLIOGRAPHY

- * Gestion financière, Gérard Charreaux, ITEC.
- * Henri Amblard, Ph. Bernoux, G. Herreros, Y-F. Livian, Les nouvelles approches sociologiques des organisations, Seuil, 1996.
- * Philippe Bernoux, La sociologie des organisations, Le Seuil, coll. Points, 1985.
- * Reynald Bourque, Christian Thuderoz, Sociologie de la négociation, La Découverte, coll. Repères, 2002.
- * Philippe Cabin (coll.), Les Organisations. Etat des savoirs, Ed. Sciences Humaines, 1999.
- * Pierre Morin, Eric Delavallée, Le manager à l'écoute du sociologue, Ed. d'organisation, 2000.
- * Christian Thuderoz, Sociologie des entreprises, La Découverte, coll. Repères, 1997

PRE-REQUISITES

Basic knowledge of the operation of the industrial enterprise and its interactions with its environment.

The principles of financial accounting.

IDENTIFICATION

CODE : GI-4-S2-EC-ERP
ECTS : 3

HOURS

Cours : 0h
TD : 0.0166666666666666h
TP : 32h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 32.01666666666666h
Travail personnel : 4h
Total : 36.01666666666666h

ASSESSMENT METHOD

Individual assessment
Summary of case studies,
screenshots

TEACHING AIDS

Case study student booklet
Other documents on Moodle
Software package SAP ERP Help
online

TEACHING LANGUAGE

French

CONTACT

MME BOTTA-GENOULAZ Valerie
:
valerie.botta@insa-lyon.fr

AIMS

This course belongs to teaching unit Information systems projects (GI-4-S2-UE-PRSI) and contributes to the following skills :

- Mastery of an Enterprise Resource Planning (ERP) system for production planning and management in a discrete production context
- Consciousness raising to business process integration issues

CONTENT

Objective: Master the challenges of an integrated management system (ERP) to support operational and decision-making processes (production, sales, planning processes) by conducting case studies on a leading ERP system.

- Introduction and discovery of SAP S/4HANA (structure, concepts, applications)
- Master data for production planning and sales processes: customer, material, BOM, routing, workcenter, cost center,...
- Case Study : Implementation of several cross-functional business processes : production planning and execution scenarii (make to stock, assemble to order), and a sales management scenario
- discovery of the FIORI environment on an external supply scenario

BIBLIOGRAPHY

Tomas J.L. (2000) : ERP et progiciels intégrés. Dunod 2ème édition.
Reix R. (2002) : Systèmes d'information et management des organisations. Vuibert 2ème édition
Dunleavy J., Hurley J.R., Gibson A., Norris G., Wrigt I. (1999) : SAP/R3 Le guide du décideur. Editions Eyrolles

PRE-REQUISITES

Industrial Management, Introduction to Supply Chain, Business Information Systems
Basics and methods of production management and planning;
Forecasting methods, Sales & Operation Planning
Knowledge of ERP systems: content, challenges and ERP project management

IDENTIFICATIONCODE : GI-4-S2-EC-PSM
ECTS : 3**HOURS**Cours : 0h
TD : 0h
TP : 32h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 32h
Travail personnel : 4h
Total : 36h**ASSESSMENT METHOD**

For a group, evaluation on the report and the application and for each student, evaluation on the individual work in the group.

TEACHING AIDS

Lecture notes

TEACHING LANGUAGE

French

CONTACTM. ESCUDERO Cedric :
cedric.escudero@insa-lyon.fr**AIMS**

This course belongs to teaching unit Information systems projects (GI-4-S2-UE-PRSI) and contributes to the following skills :

- Specify the needs for control systems and MES;
- Use an analysis and design method for a control and information system;
- Implement automation and MES systems;
- Analyze the results and improve physical and information systems.

CONTENT

Application of the course on a real system, implemented with the AIP (local shared industrial workshop). Process and control analysis, study of the existing information system, design and implementation of MES new functions.

FR - practical work in french

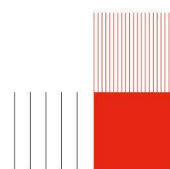
BIBLIOGRAPHY

Heiko Meyer, Franz Fuchs and Klaus Thiel, Manufacturing Execution Systems (MES): Optimal Design, Planning, and Deployment: Optimal Design, Planning, and Deployment, McGraw-Hill Education, 2009, 273 p., ISBN 0071623833

PRE-REQUISITES

Cours MES (GI-4-MES-S1), Automation (GI-4-AUT-S1) and Automation project (GI-4-P/AUT-S1 or GI-4-P/AUT-S2)

- Automated Manufacturing Systems: role, architecture, components (sensors, activators), continuous et batch process control;
- Information systems: role, architecture, design.
- Production Management: role, methods.



IDENTIFICATIONCODE : GI-5-S1-EC-PI1
ECTS :**HOURS**

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	20h
Total :	44h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

Answer to set conditions by taking into account technical, economic, legal and human aspects of the project.

The industrial project is a real company project. Each project is supervised and animated by an industrial project leader during 6 weeks. The student works out solutions in response to a set of conditions. As a potential project leader, each group (i.e., 6 students) proposes and defends its technical, organizational, economical and temporal solutions, while the groups compete to obtain the market. The debate of ideas proposed during these projects is generally beneficial for the industrialists.

These projects generally treat aspects such as production organization, logistics, reliability, quality and maintenance.

Student can choose to participate to 1, 2 or 3 industrial projects.

CONTENT**BIBLIOGRAPHY****PRE-REQUISITES**

- Project management methods
- Basis company management

IDENTIFICATIONCODE : GI-5-S1-EC-PI2
ECTS :**HOURS**

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	20h
Total :	44h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

Answer to set conditions by taking into account technical, economic, legal and human aspects of the project.

The industrial project is a real company project. Each project is supervised and animated by an industrial project leader during 6 weeks. The student works out solutions in response to a set of conditions. As a potential project leader, each group (i.e., 6 students) proposes and defends its technical, organizational, economical and temporal solutions, while the groups compete to obtain the market. The debate of ideas proposed during these projects is generally beneficial for the industrialists.

These projects generally treat aspects such as production organization, logistics, reliability, quality and maintenance.

Student can choose to participate to 1, 2 or 3 industrial projects.

CONTENT**BIBLIOGRAPHY****PRE-REQUISITES**

- Project management methods
- Basis company management

IDENTIFICATIONCODE : GI-5-S1-EC-PRH
ECTS :**HOURS**Cours : 0h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 0.5h
Face à face pédagogique : 14.5h
Travail personnel : 0h
Total : 14.5h**ASSESSMENT METHOD**

Final exam

TEACHING AIDSCourse handbook.
library of mixed integer
programming models for human
resource management decision
making.**TEACHING LANGUAGE**

French

CONTACTMME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr**AIMS**

The students will learn how to dimension human resources, how to specify working hours, how to plan and to schedule human resources. Most of examples are issued from industry.

Several resolution technics are presented : integer programming, constraint programming, meta-heuristics...

It helps to acquire the competence: Design, size, and plan systems required for a given activity of production, service, distribution.

CONTENT

Workforce scheduling

Workforce scheduling issues:
classification,
Demand modelling and capacity management,
Staffing,
cyclical and non-cyclical scheduling,
timetabling.

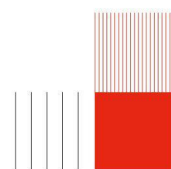
Techniques introduced:
mixed and integer linear programming,
constraint programming,
meta-heuristics.

BIBLIOGRAPHY

Baptiste P., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.

PRE-REQUISITES

Linear programming.
Statistics and forecasting.



IDENTIFICATION

CODE : GI-5-S1-EC-LEA
ECTS :

HOURS

Cours : 0h
TD : 22h
TP : 8h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 30h
Travail personnel : 0h
Total : 30h

ASSESSMENT METHOD

Plus 1 ECTS for exchange students

TEACHING AIDS

TEACHING LANGUAGE

English

CONTACT

MME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr

AIMS

- Appreciate lean as a way of management
- Use VSM to identify and eliminate the wastes,
- Develop the skills necessary to see the flow of a value stream and to create a future state map

CONTENT

- 2 sessions of 2 hours of lectures (CM):
- Presentation of the history of Lean
 - Basic principles of Lean
 - 7 types of wastes, temple Toyota, Just In Time, Jidoka principles, standardization, management.
- 3 sessions of 2 hours of tutorials (TD):
- Presentation of the Value Stream Mapping method,
 - Development of an action plan.
- A case study
- 2 sessions of 4 hours of practice (TP): a simulation game of a production workshop of jacks (Synchro Lean Simulation on hardware FESTO).

BIBLIOGRAPHY

- Bien voir pour mieux gérer. Mike Rother et John Shook. Avant propos: Jim Womack et Dan Jones .Traduction en Français : Line Perron. N° ISBN: 978-2-9529806-1-6
- Gold Mine. Freddy Ballé et Michael Ballé. N°ISBN: 0-9743225-6-3
- Le Modèle TOYOTA. Jeffrey Liker. Traduction en Français: Monique Sperry. Avant propos: Didier Leroy (président de Toyota Motor Manufacturing France. Préface: Michael Ballé et Godefroy Beauvallet. N° ISBN: 978-2-7440-7390-8
- Lexique Lean. Chet Marchwinski et John Shook. Traduction en Français: Institut Lean France. N° ISBN: 978-2-9529806-0-9
- Seeing the whole. James P. Womack and Daniel T. Jones. N° ISBN: 0-9667843-5-9
- Système Lean. Penser l'entreprise au plus juste 2ème édition. Jim Womack, Dan Jones. Préface: Michael Ballé et Godefroy Beauvallet. Traduction en français: Monique Sperry. N° ISBN: 978-2-7440-7391-5

PRE-REQUISITES

GI-4-GP1-S1 et GI-4-GP2-S1

IDENTIFICATION

CODE : GI-5-S1-EC-ACH
ECTS :

HOURS

Cours : 0h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 16h
Travail personnel : 0h
Total : 16h

ASSESSMENT METHOD

2 test during lessons and presence taken in account.

TEACHING AIDS

French plus exchange in english

TEACHING LANGUAGE

English

CONTACT

M. BERNARD Stephane :
stephane.bernard@insa-lyon.fr

AIMS

Reinforce your french technical vocabulary in a course presented in french with interaction in practical exercise open to english as necessary. Evaluation is bilingual and all deliverables could be in english as wishes.

Give a clear view how the sourcing function is organized following necessary steps.
Link the sourcing to project management and related tools.
Grant the device to communicate and transfer sourcing activities.

This EC contributes to:

- Model the process of conducting an activity M2
- Ensure quality by reporting the development of relevant indicators M3
- Promote, protect and sustain the expertise of entities C
- Put into perspective the scientific knowledge with the evolution of knowledge and technology C
- Observe, measure, analyze and interpret an event M3
- Define and implement an action plan M3
- Conduct a project collectively M2
- Identify and sign contracts formalize the needs of a client, follow their evolution and validate compliance (traceability needs) M1

CONTENT

Obtain a clear understanding about the ideal cycle for sourcing, described in a step by step method.
Apply management project's tools to sourcing
Put in place a supplier's monitoring
Be able to communicate, reproduce and transfert those competancies.

BIBLIOGRAPHY

Purchasing and supply chain management: Kenneth Lyons and Brian Farrington
Financial Times 2005
The purchasing Handbook : a guide for the pruchasing and supply professional Joseph I. CAVINATO McGraw Hill 2000
Les Achats : l'abécédaire des mots et expressions utilisés dans le langage des achats.
Jean-Paul DURAND Gualino 2003

PRE-REQUISITES

Frensh European Language Level recommended B1

IDENTIFICATIONCODE : GI-5-S1-EC-LOG
ECTS :**HOURS**Cours : 0h
TD : 26h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h**ASSESSMENT METHOD**

Continuous assessment

TEACHING AIDS**TEACHING LANGUAGE**

English

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

This course aims to provide the fundamental concepts and the methods in supply chains organization and management. The Objective of a Supply Chain and the impact of supply chain decisions on the strategic success of companies. Competitive and Supply Chain Strategies of supply chains as well as the main methods for factory design and configuration. Our focus in these two parts is on methods and tools allowing to take into account several kind of uncertainties as demand, lead-time, operation time, etc.

CONTENT

- 1) Supply chain management and organization
 - General concept of supply chains, Supply Chain Performance, Drivers and Metrics,
 - Location problem in the Supply Chain,
 - Network Design under uncertainty,
 - Demand Forecasting in a Supply Chain,
 - Aggregate Planning in the Supply Chain,
 - Inventory management under uncertainty,
 - Optimal Level of Product Availability,
 - Transportation in a Supply Chain and routing problem,
 - Joint optimization of transportation and inventory
 - Collaboration, Pricing and Revenue Management.
- 2) Facility design and organization:
 - Flow, space and activity relationship, Layout typology,
 - Sizing problem: personnel, space and equipment requirement,
 - Assembly Line Balancing,
 - Computer-aided layout algorithms (SLP, CORELAP, ALDEP, MCRAFT),
 - Warehouse design,
 - Cellular manufacturing system and group technology,
 - Intelligent manufacturing system design

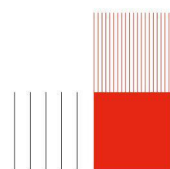
BIBLIOGRAPHY

References:

- 1- Sunil Chopra, Supply Chain Management: Strategy, Planning and Operations, (4th Edition) 2009
- 2- John J. Coyle, Supply Chain Management: A Logistics Perspective, 2008
- 3- Roberta R. Russell, Operations Management: Creating Value Along the Supply Chain, 2007
- 4- James A. Tompkins, Facilities Planning, 2010
- 5- S. Heragu, Facilities Design, Third Edition, 2008
- 6- Ralph M. Barnes, Motion and Time Study: Design and Measurement of Work, 1980
- 7- Mikell P. Groover, Work Systems: The Methods, Measurement & Management of Work, 2006

PRE-REQUISITES

Statistic and Probability, Forecasting, Linear programming, Production Planning and Scheduling Inventory Control,



IDENTIFICATIONCODE : GI-5-S1-EC-OPA
ECTS :**HOURS**Cours : 0h
TD : 20h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 20h
Travail personnel : 0h
Total : 20h**ASSESSMENT METHOD**

Case studies + final exam

TEACHING AIDS

Lecture book and exercises

TEACHING LANGUAGE

French

CONTACTM. MONTEIRO Thibaud :
thibaud.monteiro@insa-lyon.fr**AIMS**

- Methodological skills: analysing and modelling planning or scheduling problems, involving material and / or human resources, mono and multicriteria decision making problems; carrying out a structured approach to address such problems (from identification to validation)
- Technical skills: determining the complexity of a problem and designing potential tools to resolve it

CONTENT

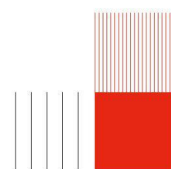
- Advanced planning and scheduling (T. Monteiro): Production scheduling problems: a reminder. Tree-searching methods. Heuristics and Meta-heuristics. Mono-criteria and Multi-objective problems. Case studies with computer applications.

BIBLIOGRAPHY

Baptiste Pi., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Bouyssou D. et Roy B. : Aide multicritère à la décision : méthode et cas, Economica, 1993.
Carlier J. et Chrétienne P. : Problèmes d'ordonnancement : modélisation / complexité / algorithmes, Masson, 1988.
Garfinkel R.S. et Nemhauser : Integer programming, Wiley Interscience, 1972.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.
Roy B. : Méthodologie multicritère d'aide à la décision, Economica, 1985.
Trilling L. : Aide à la décision pour le dimensionnement et le pilotage de ressources mutualisées en milieu hospitalier, Thèse de doctorat, INSA de Lyon, 2006.

PRE-REQUISITES

Monocriterion decision support (Linear Programming), basic and advanced production management (4GI).



IDENTIFICATIONCODE : GI-5-S1-EC-PI1
ECTS :**HOURS**

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	20h
Total :	44h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTM. BABOLI Armand :
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Answer to set conditions by taking into account technical, economic, legal and human aspects of the project.

The industrial project is a real company project. Each project is supervised and animated by an industrial project leader during 6 weeks. The student works out solutions in response to a set of conditions. As a potential project leader, each group (i.e., 6 students) proposes and defends its technical, organizational, economical and temporal solutions, while the groups compete to obtain the market. The debate of ideas proposed during these projects is generally beneficial for the industrialists.

These projects generally treat aspects such as production organization, logistics, reliability, quality and maintenance.

Student can choose to participate to 1, 2 or 3 industrial projects.

CONTENT**BIBLIOGRAPHY****PRE-REQUISITES**

- Project management methods
- Basis company management

IDENTIFICATIONCODE : GI-5-S1-EC-LOG
ECTS :**HOURS**Cours : 0h
TD : 26h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h**ASSESSMENT METHOD**

Continuous assessment

TEACHING AIDS**TEACHING LANGUAGE**

English

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

This course aims to provide the fundamental concepts and the methods in supply chains organization and management. The Objective of a Supply Chain and the impact of supply chain decisions on the strategic success of companies. Competitive and Supply Chain Strategies of supply chains as well as the main methods for factory design and configuration. Our focus in these two parts is on methods and tools allowing to take into account several kind of uncertainties as demand, lead-time, operation time, etc.

CONTENT

- 1) Supply chain management and organization
 - General concept of supply chains, Supply Chain Performance, Drivers and Metrics,
 - Location problem in the Supply Chain,
 - Network Design under uncertainty,
 - Demand Forecasting in a Supply Chain,
 - Aggregate Planning in the Supply Chain,
 - Inventory management under uncertainty,
 - Optimal Level of Product Availability,
 - Transportation in a Supply Chain and routing problem,
 - Joint optimization of transportation and inventory
 - Collaboration, Pricing and Revenue Management.
- 2) Facility design and organization:
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 - Computer-aided layout algorithms (SLP, CORELAP, ALDEP, MCRAFT),
 - Warehouse design,
 - Cellular manufacturing system and group technology,
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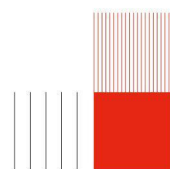
BIBLIOGRAPHY

References:

- 1- Sunil Chopra, Supply Chain Management: Strategy, Planning and Operations, (4th Edition) 2009
- 2- John J. Coyle, Supply Chain Management: A Logistics Perspective, 2008
- 3- Roberta R. Russell, Operations Management: Creating Value Along the Supply Chain, 2007
- 4- James A. Tompkins, Facilities Planning, 2010
- 5- S. Heragu, Facilities Design, Third Edition, 2008
- 6- Ralph M. Barnes, Motion and Time Study: Design and Measurement of Work, 1980
- 7- Mikell P. Groover, Work Systems: The Methods, Measurement & Management of Work, 2006

PRE-REQUISITES

Statistic and Probability, Forecasting, Linear programming, Production Planning and Scheduling Inventory Control,



IDENTIFICATION

CODE : GI-5-S1-EC-OPA

ECTS :

HOURS

Cours : 0h

TD : 20h

TP : 0h

Projet :	0h
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Evaluation : 0h

Face à face pédagogique : 20h

Travail personnel : 0h

Total : 20h

ASSESSMENT METHOD

Case studies + final exam

TEACHING AIDS

Lecture book and exercises

TEACHING LANGUAGE

French

CONTACT

M. MONTEIRO Thibaud :
thibaud.monteiro@insa-lyon.fr

AIMS

- Methodological skills: analysing and modelling planning or scheduling problems, involving material and / or human resources, mono and multicriteria decision making problems; carrying out a structured approach to address such problems (from identification to validation)
- Technical skills: determining the complexity of a problem and designing potential tools to resolve it

CONTENT

- Advanced planning and scheduling (T. Monteiro): Production scheduling problems: a reminder. Tree-searching methods. Heuristics and Meta-heuristics. Mono-criteria and Multi-objective problems. Case studies with computer applications.

BIBLIOGRAPHY

Baptiste Pi., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines. Presses Internationales Polytechniques, 2005.

Bouyssou D. et Roy B. : Aide multicritère à la décision : méthode et cas, Economica, 1993.

Rosier J. et Chrétienne P. : Problèmes d'ordonnancement : modélisation / complexité / algorithmes, Masson, 1988.

Garfinkel R.S. et Nemhauser : Integer programming, Wiley Interscience, 1972.

Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.

Roy B. : Méthodologie multicritère d'aide à la décision, Economica, 1985.

Trilling L. : Aide à la décision pour le dimensionnement et le pilotage de ressources mutualisées en milieu hospitalier, Thèse de doctorat, INSA de Lyon, 2006.

PRE-REQUISITES

Monocriterion decision support (Linear Programming), basic and advanced production management (4GI).

IDENTIFICATIONCODE : GI-5-S1-EC-PRH
ECTS :**HOURS**Cours : 0h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 0.5h
Face à face pédagogique : 14.5h
Travail personnel : 0h
Total : 14.5h**ASSESSMENT METHOD**

Final exam

TEACHING AIDSCourse handbook.
library of mixed integer
programming models for human
resource management decision
making.**TEACHING LANGUAGE**

French

CONTACTMME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr**AIMS**

The students will learn how to dimension human resources, how to specify working hours, how to plan and to schedule human resources. Most of examples are issued from industry.

Several resolution technics are presented : integer programming, constraint programming, meta-heuristics...

It helps to acquire the competence: Design, size, and plan systems required for a given activity of production, service, distribution.

CONTENT

Workforce scheduling

Workforce scheduling issues:
classification,
Demand modelling and capacity management,
Staffing,
cyclical and non-cyclical scheduling,
timetabling.

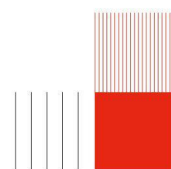
Techniques introduced:
mixed and integer linear programming,
constraint programming,
meta-heuristics.

BIBLIOGRAPHY

Baptiste P., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.

PRE-REQUISITES

Linear programming.
Statistics and forecasting.



IDENTIFICATION

CODE : GI-5-S1-EC-PCO
ECTS : 3

HOURS

Cours : 0h
TD : 60h
TP : 0h
Projet : 0h
Evaluation : 4h
Face à face pédagogique : 64h
Travail personnel : 0h
Total : 64h

ASSESSMENT METHOD

Contrôle continu en situation d'activité :
- Validation de cahier des charges client (CDC), de réponse à appel d'offre (RAO), d'un plan directeur de projet (PDP) incluant un tableau de bord
- Validation d'un ensemble de livrables jalonnant le projet
- Validation finale cohérente en une procédure de recette avec le maître d'ouvrage
- Défense collective finale du projet devant l'ensemble de la promotion
- Évaluation d'un rapport technique par le "tuteur technique"
- Évaluation d'un rapport management par le "tuteur MPC"

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. BERNARD Stephane :
stephane.bernard@insa-lyon.fr

AIMS

project management methodes and tools (following a project, steeps of a project, risk management, AMDEC, formalization of the customers objectives , redaction of specifications, redaction of plan realisation.

place the project and its stakes in the organization ; organize and manage a project and work in team; meetingsmanagement ; manage relevant information; communicate, negotiate and defend a project

CONTENT

Theoretical course of projet management (following a project, etapes of a project, a tool and methodes (risk management, AMDEC, formalization of the customers objectives , redaction of specifications, redaction of plan realisation)

Project: realisation of a project over 6 months by group of 8 students followed by two tutors

BIBLIOGRAPHY

- GIDEL T, ZONGHERO W. « Management de Projet 1 et 2 », Hermès Sciences, 2006
- BOURGEOIS J-P. « Gestion de Projet » Technique de l'Ingénieur T 7700
- CHVIDCHENKO I., CHEVALLIER J. « Conduite et gest. de proj. Princ. et prat. pour pts et grds projets » Cépaduès Edition, 1997
- AFITEP « Le Management de Projet, Principes et Pratique » Afnor Gestion, 1991
- GIARD V. « La Gestion de Projet » Economica, 1991
- PMI Project management Body of Knowledge; Project Management Institute; www.pmi.org
- R. MARCINIAK , M. PAGERIE Gestion de projet . Guide pratique de tous vos proj. et prod. indust., Editions WEKA
- J. MAISONNEUVE La dynamique des groupes, Paris Que-sais je ?, PUF, 1964
- B. KAYE Pédagogie de groupe sciences de l'éducation, Dunod, 1975
- R. MUCHIELLI Les méth. act. dans la pédago des adult., form. perm. en sci. hum., 1991 Gestion de Projets , Tome 1 et 2 , Edition WEKAP7

PRE-REQUISITES

- Méthodologie de résolution de problème
- Outils de la qualité

IDENTIFICATIONCODE : GI-5-S1-EC-PPP-HU
ECTS :**HOURS**

Cours :	0h
TD :	8h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	8h
Travail personnel :	0h
Total :	8h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTSANCHEZ FORSANS Sylvie :
sylvie.sanchez-forsans@insa-
lyon.fr**AIMS**

This course belongs to teaching unit Humanités et activités physiques et sportives (GI-5-S1-UE-HUEPS) and contributes to the following skills :

B1 know oneself; manage mental and physical fitness (Level 3)

B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 3)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Job Search, Personal Branding, Recruitment, Career Management (B1, B6)
- 7 skills of the INSA engineer (B1, B6)

To be able to :

- Present your service offer (B1, B6)

CONTENT

Feedback workshop dedicated to the debriefing of their last internship
Workshop "Active Job Search Campaign": update CV, self-presentation and professional projects using CARE's tools in written, oral and digital communication for their service offer processes; recruitment situations between pairs (CV criticism, role-playing, VRPC training)

BIBLIOGRAPHY**PRE-REQUISITES**

Bring an up-to-date CV with application examples

IDENTIFICATION

CODE : GI-5-S1-EC-IFU
ECTS : 2

HOURS

Cours : 0h
TD : 0h
TP : 24h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h

ASSESSMENT METHOD

Report and oral presentation.
Plus 1 ECTS for exchange students

TEACHING AIDS

To be determined.

TEACHING LANGUAGE

French

CONTACT

M. HADJ HAMOU Khaled :
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M. MONCLA Ludovic :
ludovic.moncla@insa-lyon.fr

AIMS

In this project, the students should mobilise equally their skills in data science and operations research, on a problem related to the industry of the future.

This teaching unit (EC) contributes to the following INSA engineering skills:

- (3) Analyse a system (actual or virtual) or a problem;
- (3) Implement an experimental or a production approach;
- (3) Process data;

as well as the following IEM-specific skills:

- (3) Observe, measure, analyze and interpret an activity or a system from data;
- (3) Manage a production system and react to the dysfunctions;
- (1) Choose adapted production tools, integrate them into an environment and configure them, set up a system of production;
- (1) Locate and allocate the activities of production, storage and transport to the various members of the supply chain;
- (3) Take into account the technological and methodological innovations

and the following transversal skills:

- (3) Interact with others, work in team

CONTENT

The engineering student will work and be assessed on the following knowledge and skills :

- Be able to apply knowledge and skills in supply chain optimization and data science;
- Be able to propose a scientific approach in response to a problem.

BIBLIOGRAPHY

PRE-REQUISITES

Java programming.
OPL language (CPLEX solver mathematical programming language).

It is necessary to follow simultaneously GI-5-S1-EC-DSC and GI-5-S1-EC-OTL

IDENTIFICATION

CODE : GI-5-S1-EC-OTP
ECTS :

HOURS

Cours : 0h
TD : 22h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h

ASSESSMENT METHOD

Final exam, 1h50.
Plus 1 ECTS for exchange students

TEACHING AIDS

To be determined.

TEACHING LANGUAGE

French

CONTACT

M. HADJ HAMOU :
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AIMS

This teaching unit (EC) contributes to the following INSA engineering skills:
(2) Exploit the model of an actual or virtual system.

as well as the following IEM-specific skills:

- (2) Model and design an information, decision and production system for goods and services;
- (2) Manage a production system and react to the dysfunctions ;
- (1) Choose adapted production tools, integrate them into an environment and configure them, set up a system of production;
- (1) Locate and allocate the activities of production, storage and transport to the various members of the supply chain;
- (2) Take into account the technological and methodological innovations.

CONTENT

The engineering student will work and be assessed on the following knowledge and skills :

- (10h) Know the "classical" transportation problems : Traveling Salesman Problem (TSP), Vehicle Routing Problem (VRP), etc.
- (2h) Know the basic methods and tools to design logistic networks.
- (8h) Know the principles and tools for distributed decision-making: game theory, multi-agent systems and agent-based simulation coupled with flow simulation (for instance with Anylogic)
- (4h) Know the tools (especially decomposition methods) to perform joint optimisation.
- Be able to formulate and solve a supply chain optimisation problem, from the viewpoint of transportation and flow management.

BIBLIOGRAPHY

Ilya Grigoryev. AnyLogic 7 in Three Days : A Quick Course in Simulation Modeling. 3rd edition.

Jacques Teghem. Recherche opérationnelle. Tome 1, Tome 1, OCLC : 819196866. Paris : Ellipses, 2012. isbn : 978-2-7298-7509-1.

Paolo Toth et Daniele Vigo, eds. Vehicle routing : problems, methods, and applications. Second edition. MOS-SIAM series on optimization. Philadelphia : Society for Industrial et Applied Mathematics : Mathematical Optimization Society, 2014. 463 p. isbn : 978-1-61197-358-7.

Michael Wooldridge. An Introduction to Multi-Agent Systems. 2d edition. New York, NY, USA: John Wiley & Sons, Inc., 2009.

Murat Yildizoglu. Introduction à la Théorie des Jeux. Dunod, Paris (France), 2003.

PRE-REQUISITES

Inventory management : EOQ, basic replenishment methods (GI-3-IGP-S1)

Flow management (GI-3-PRS-S1, GI-3-PST-S2, GI-4-PSF-S1).

Production management : S&OP, MPS & MRP (GI-3-IGP-S1, GI-4-GPA-S1, GI-4-GPR-S2).

Scheduling: models, standard scheduling notation, heuristic solving methods for scheduling problems (GI-4-GPA-S1, GI-4-ORD-S1)

Combinatorial optimisation: graph theory (GI-4-THG-S2), linear programming (GI-4-ADM-S1)

It is highly recommended to follow GI-5-LOG-S1 and GI-5-OPA-S1 as well.

IDENTIFICATION

CODE : GI-5-S1-EC-RSE

ECTS : 2

HOURS

Cours : 0h

TD : 22h

TP : 8h

Projet : 0h

Evaluation : 0h

Face à face pédagogique : 30h

Travail personnel : 0h

Total : 30h

ASSESSMENT METHOD

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

Mme SUBAI Corinne :
corinne.subai@insa-lyon.fr

AIMS

CONTENT

- Sustainable development, corporate ethics, CSR
- Challenges of sustainable development for business

BIBLIOGRAPHY

PRE-REQUISITES

IDENTIFICATION

CODE : GI-5-S1-EC-KNM
ECTS : 2

HOURS

Cours : 0h
TD : 18h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 20h
Travail personnel : 0h
Total : 20h

ASSESSMENT METHOD

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. LOISEAU Mathieu :
mathieu.loiseau@insa-lyon.fr

AIMS

This course belongs to teaching unit Industrie 4.0 (GI-5-S1-UE-INQZ) and contributes to the following skills :

C2 Modeling and designing an information, decision and production system, of goods and services (Level 1)
C6 Selecting appropriate production tools, integrating them into an environment and configuring them, and setting up a production system (Level 1)
C10 Developing and implementing an action plan as part of a quality and continuous improvement approach (Level 1)
C11 Understanding and evaluating a structure holistically, through socio-economic frames of reference (Level 1)
C12 Changing organizations to meet new constraints or opportunities (Level 1)
C18 Identifying the critical skills and knowledge of an organization and implement tools and methods to sustain the (Level 1)
C19 Conducting a socio-organizational analysis to better understand the effects of change and to adapt strategies (Level 1)
B5 act responsibly in a complex world (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Industrial knowledge-related assets
 - Information, knowledge, and expertise
 - Knowledge management methods in industry, collaborative knowledge management tools
 - Digital knowledge management tools
 - Knowledge management strategies and continuous improvement
 - Technological, human, and organizational knowledge and structure
- To be able to :
- Distinguishing the type of knowledge created by the use of information and Communication
 - Identify industrial capital (human, technological, organizational, informational)
 - Assess the limitations of knowledge management systems

CONTENT

BIBLIOGRAPHY

- Ackoff, Russell Lincoln. 1989. « From Data to Wisdom ». Journal of Applied Systems Analysis 16: 3–9.
- Dejoux, Cécile. 2013. Gestion des compétences et GPEC. 2e édition. Dunod.
- Giezendanner, François Daniel. 2006. « Philosophie et caractéristiques des wikis ». Blog. Ici et là. 2 juin 2006. <http://icietla-ge.ch/voir/spip.php?article124>.
- Grundstein, Michel. 2003. « De la capitalisation des connaissances au management des connaissances dans l'entreprise, les fondamentaux du knowledge management », 19.
- Lemaître, Denis, et Maud Hatano. 2007. Usages de la notion de compétence en éducation et en formation. L'Harmattan, Coll. Action et savoir. <https://hal-ensta-bretagne.archives-ouvertes.fr/hal-00521434>.
- Nelson, Richard, et Sidney Winter. 1982. An Evolutionary Theory of Economic Change. Belknap Press.
- Nonaka, Ikujiro, et Hirotaka Takeuchi. 1995. The Knowledge-Creating Company: How Japanese companies create the dynamics of innovation. Oxford University Press.
- Penrose, Edith. 1959. The Theory of the Growth of the Firm. 4th Edition (2009). Oxford University Press.
- Polanyi, Michael. 1966. The tacit dimension. 2009 edition. The University of Chicago Press.
- Postiaux, Nadine, Philippe Bouillard, et Marc Romainville. 2010. « Référentiels de compétences à l'université. Usages, rôles et limites ». Recherche et formation, no 64 (juillet) : 15-30. <https://doi.org/10.4000/rechercheformation.185>.
- Reagle, J.M. 2010. Good Faith Collaboration: The Culture of Wikipedia. Édité par Michael Buckland et Jonathan Furner. History and foundations of information science. Cambridge, MA: MIT Press. <http://mitpress.mit.edu/books/good-faith-collaboration>.
- Zins, Chaim. 2007. « Conceptual approaches for defining data, information, and knowledge ». Journal of the American Society for Information Science and Technology 58 (4): 479–493. <https://doi.org/10.1002/asi.20508>.

PRE-REQUISITES

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membre de



IDENTIFICATION

CODE : GI-5-S1-EC-MRH-HU
ECTS :

HOURS

Cours :	0h
TD :	20h
TP :	0h
Projet :	0h
Evaluation :	2h
Face à face pédagogique :	22h
Travail personnel :	0h
Total :	22h

ASSESSMENT METHOD

Final examination (2h)

TEACHING AIDS

Textbook, exercices, case studies, learning games, ...

TEACHING LANGUAGE

French

CONTACT

AIMS

CONTENT

Management of human resources

- Introduction to the management of human resources and social relations.
- Reinforcement of one's listening abilities and of the knowledge in interpersonal communication, also in new cultural contexts.
- Management and human resources: team work and information-communication; management roles and styles; principles and tools of HR (recruitment, evaluation and competence management, remuneration, career management, etc.) ; motivation and change management.
- Social relations and employment contracts: social dialogue, IRP, trade-union organizations and collective bargaining; collective agreements; elements of labor law. Intercultural management.

BIBLIOGRAPHY

- N.Alter, Sociologie de l'entreprise et de l'innovation, PUF, Paris 1996H.
- R.Blake & J.Mouton, Troisième dimension du management, Ed° d'organisation, Paris 1987
- O.Devillard, La dynamique des équipes, Ed° d'Organisation, Paris 2000
- J-L.Emery & E.Albert, Le manager est un psy, Ed° d'organisation, Paris 1998
- Y.Enrègle, Du conflit à la motivation, Ed° d'Organisation, Paris 1985.
- P.Fabart, Révélez le manager qui est en vous, Ed° d'organisation, Paris 2002
- B.Galambaud, L'initiative contrôlée ou le nouvel art du manager, EME ,Ed° ESF, Paris 1988
- V.Guibert, Comment manager, Ed° d'Organisation, Paris 2009
- B.Jarrosson, 100 ans de management, Ed° Dunod, Paris 2000
- R-V.Joule & J-L.Beauvois, Petit traité de manipulation des honnêtes gens, PU Grenoble, 2002
- T.Levitt, Réflexions sur le management (trad. M.Speny), Dunod, Paris 1991
- P.Morin, L'art du manager: de Babylone à l'Internet, Ed° d'Organisation, Paris 1997
- Pichault, F. et Nizet, J., Les pratiques de gestion des ressources humaines. Approches contingente et politique, Le Seuil, coll. Points/Essais Sciences humaines, Paris 2000
- J-D.Reynaud, Les règles du jeu. L'action collective et la régulation sociale, Ed. Armand Colin, Paris 1997
- D.Segrestin, Les chantiers du manager. L'innovation en entreprise : où en sommes-nous ? Comment piloter les changements et les maîtriser ?, Armand Colin, Paris 2004
- C.Thuderoz & J.Vandewattyne, Un siècle d'histoire du management des hommes et des organisations, Presses Polytechniques Romandes, 2006
- + les films : « 12 hommes en colère » (Sidney Lumet, USA 1957), « Riens du tout » (Cédric Klapisch, France 1992), « Ressources humaines » (Laurent Cantet, France 1999), « El metodo » (Marcelo Piñeyro, Espagne et Argentine 2005), « Rien de personnel » (Mathias Gokalp, France 2009), "La loi du marché" (Stéphane Brizé, France 2015) etc.
- + ouvrages de synthèse et méthodologiques publiés par l'ANACT (Agence Nationale pour l'Amélioration des Conditions de Travail).

PRE-REQUISITES

Experience of several months in business in an engineering student internship.
Concepts of management control and industrial management.
General knowledge about the industrial enterprise
Fluent in French (speaking and writing)

IDENTIFICATION

CODE : GI-5-S1-EC-ETH-HU
ECTS : 2

HOURS

Cours : 0h
TD : 24h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h

ASSESSMENT METHOD

Press review (collective oral presentation)
Ethical analysis of professional practice (individual written report)

TEACHING AIDS

Case Studies
Scientific and Theoretical Articles in Humanities and Social Sciences
Press Articles
Slideshow Presentations

TEACHING LANGUAGE

French

CONTACT

Mme ESCUDIE Marie-Pierre :
marie-pierre.escudie@insa-lyon.fr
M. LE GUENNIC Thomas :
thomas.le-guennic@insa-lyon.fr

AIMS

The "Engineer Ethics" course aims to meet the following objectives. The details of each are indicated in the course syllabus.

- 1) Explain, using concrete examples, the types (ethical, moral, or legal), the natures (political, social, economic, and environmental), and the scales (micro, meso, macro) of responsibilities of the engineer.
- 2) Discern the causes and stakes of an ethical problem in an engineering context, as well as on the scale of a societal debate.
- 3) Justify a stance (point of view and/or a decision) by mobilizing ethical reasoning according to one's role in the specified context.

CONTENT

Session 1: Positioning of Engineers
Session 2: Socio-history of Engineers
Session 3: Engineering Ethics
Session 4: Session Project 1
Session 5: Traditions of Ethics
Session 6: Ethics of Science and Technology
Session 7: Session Project 2
Session 8: Gender and Work: Raising Awareness of VSS in Businesses
Session 9: Environmental Ethics
Session 10: Session Project 3
Session 11: Democratic Technical Approach
Session 12: Presentations and Wrap-up

BIBLIOGRAPHY

Beck Ulrich, La société du risque, Paris, Flammarion, 1995.
Boltanski Luc et Chiapello Ève, Le Nouvel esprit du capitalisme, Paris, Gallimard, 1999.
Bonneuil Christophe et Joly Pierre-Benoît, Sciences, techniques et société, Paris, La Découverte, 2013.
Bonneuil Christophe, Jean-Baptiste Fressoz, L'événement anthropocène, Paris, Seuil, 2016.
Callon Michel & al, Agir dans un monde incertain, Paris, Seuil, 2001.
Capron Michel et Quairel-Lanoizelée Françoise, La responsabilité sociale d'entreprise, Paris, La Découverte, 2016.
Capron Michel et Quairel-Lanoizelée Françoise, L'entreprise dans la société, Paris, La Découverte, 2015.
Didier Christelle, "Éthique de l'ingénierie. Un champ émergent pour l'éthique professionnelle", Techniques de l'Ingénieur, 2015.
Dubar Claude & al., Sociologie des professions, Paris, Armand Colin, 2015.
Jonas Hans, Le Principe de responsabilité, Paris, Flammarion, 1979.
Latour Bruno, Petites leçons de sociologie de sciences, Paris, La Découverte, 1993.
Renouard Cécile, Éthique et entreprise, Paris, L'Atelier, 2015.
Roby Catherine, Évolution du rôle social à la responsabilité sociétale des ingénieurs, Techniques de l'ingénieur, 2017.
Van de Poel Ibo and Royackers Lamber, Ethics, Technology and Engineering. An introduction, Wiley-Blackwell, 2011.
Vinck Dominique et Sainsaulieu Ivan, Ingénieur aujourd'hui, Lausanne, PPUR, 2015.
Vinck Dominique, Science et société, Paris, Armand Colin, 2007.

PRE-REQUISITES

Sociological Analysis of Organizations (ASO-4GI)
Professional internship

IDENTIFICATIONCODE : GI-5-S1-EC-PI1
ECTS :**HOURS**

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	20h
Total :	44h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

Answer to set conditions by taking into account technical, economic, legal and human aspects of the project.

The industrial project is a real company project. Each project is supervised and animated by an industrial project leader during 6 weeks. The student works out solutions in response to a set of conditions. As a potential project leader, each group (i.e., 6 students) proposes and defends its technical, organizational, economical and temporal solutions, while the groups compete to obtain the market. The debate of ideas proposed during these projects is generally beneficial for the industrialists.

These projects generally treat aspects such as production organization, logistics, reliability, quality and maintenance.

Student can choose to participate to 1, 2 or 3 industrial projects.

CONTENT**BIBLIOGRAPHY****PRE-REQUISITES**

- Project management methods
- Basis company management

IDENTIFICATION

CODE : GI-5-S1-EC-PCO
ECTS : 3

HOURS

Cours : 0h
TD : 60h
TP : 0h
Projet : 0h
Evaluation : 4h
Face à face pédagogique : 64h
Travail personnel : 0h
Total : 64h

ASSESSMENT METHOD

Contrôle continu en situation d'activité :

- Validation de cahier des charges client (CDC), de réponse à appel d'offre (RAO), d'un plan directeur de projet (PDP) incluant un tableau de bord
- Validation d'un ensemble de livrables jalonnant le projet
- Validation finale cohérente en une procédure de recette avec le maître d'ouvrage
- Défense collective finale du projet devant l'ensemble de la promotion
- Évaluation d'un rapport technique par le "tuteur technique"
- Évaluation d'un rapport management par le "tuteur MPC"

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. BERNARD Stephane :
stephane.bernard@insa-lyon.fr

AIMS

project management methodes and tools (following a project, steeps of a project, risk management, AMDEC, formalization of the customers objectives , redaction of specifications, redaction of plan realisation.

place the project and its stakes in the organization ; organize and manage a project and work in team; meetingsmanagement ; manage relevant information; communicate, negotiate and defend a project

CONTENT

Theoretical course of projet management (following a project, etapes of a project, a tool and methodes (risk management, AMDEC, formalization of the customers objectives , redaction of specifications, redaction of plan realisation)

Project: realisation of a project over 6 months by group of 8 students followed by two tutors

BIBLIOGRAPHY

- GIDEL T, ZONGHERO W. « Management de Projet 1 et 2 », Hermès Sciences, 2006
- BOURGEOIS J-P. « Gestion de Projet » Technique de l'Ingénieur T 7700
- CHVIDCHENKO I., CHEVALLIER J. « Conduite et gest. de proj. Princ. et prat. pour pts et grds projets » Cépaduès Edition, 1997
- AFITEP « Le Management de Projet, Principes et Pratique » Afnor Gestion, 1991
- GIARD V. « La Gestion de Projet » Economica, 1991
- PMI Project management Body of Knowledge; Project Management Institute; www.pmi.org
- R. MARCINIAK , M. PAGERIE Gestion de projet . Guide pratique de tous vos proj. et prod. indust., Editions WEKA
- J. MAISONNEUVE La dynamique des groupes, Paris Que-sais je ?, PUF, 1964
- B. KAYE Pédagogie de groupe sciences de l'éducation, Dunod, 1975
- R. MUCHIELLI Les méth. act. dans la pédago des adult., form. perm. en sci. hum., 1991 Gestion de Projets , Tome 1 et 2 , Edition WEKAP7

PRE-REQUISITES

- Méthodologie de résolution de problème
- Outils de la qualité

IDENTIFICATION

CODE : GI-5-S1-EC-OPA
ECTS :

HOURS

Cours : 0h
TD : 20h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 20h
Travail personnel : 0h
Total : 20h

ASSESSMENT METHOD

Case studies + final exam

TEACHING AIDS

Lecture book and exercises

TEACHING LANGUAGE

French

CONTACT

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AIMS

- Methodological skills: analysing and modelling planning or scheduling problems, involving material and / or human resources, mono and multicriteria decision making problems; carrying out a structured approach to address such problems (from identification to validation)
- Technical skills: determining the complexity of a problem and designing potential tools to resolve it

CONTENT

- Advanced planning and scheduling (T. Monteiro): Production scheduling problems: a reminder. Tree-searching methods. Heuristics and Meta-heuristics. Mono-criteria and Multi-objective problems. Case studies with computer applications.

BIBLIOGRAPHY

Baptiste Pi., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Bouyssou D. et Roy B. : Aide multicritère à la décision : méthode et cas, Economica, 1993.
Carlier J. et Chrétienne P. : Problèmes d'ordonnancement : modélisation / complexité / algorithmes, Masson, 1988.
Garfinkel R.S. et Nemhauser : Integer programming, Wiley Interscience, 1972.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.
Roy B. : Méthodologie multicritère d'aide à la décision, Economica, 1985.
Trilling L. : Aide à la décision pour le dimensionnement et le pilotage de ressources mutualisées en milieu hospitalier, Thèse de doctorat, INSA de Lyon, 2006.

PRE-REQUISITES

Monocriterion decision support (Linear Programming), basic and advanced production management (4GI).

IDENTIFICATIONCODE : GI-5-S1-EC-INR
ECTS :**HOURS**Cours : 2h
TD : 0.016666666666666666h
TP : 0h
Projet : 0h
Evaluation : 8h
Face à face 10.016666666666667h
pédagogique :
Travail personnel : 22h
Total : 32.016666666666666h**ASSESSMENT METHOD**

Written report + Oral presentation

TEACHING AIDS

Depending on the subject.

TEACHING LANGUAGE

English

CONTACTMME BOTTA-GENOULAZ Valerie
:
valerie.botta@insa-lyon.fr**AIMS**

This teaching unit (EC) contributes to the following skills:

A3 Implement an experimental approach or a production approach
A5 Process data
A6 Communicate an analysis, a scientific approach, a proof or a solution in a reasoned and logical way
B2 Work, learn, evolve independently
B4 Show creativity, innovate, undertake
C1 Observing, measuring, analyzing and interpreting an activity or a system from data
C2 Modeling and designing an information, decision and production system, of goods and services
C3 Evaluating, prototyping and simulating a system
C13 Considering technological and methodological innovation

Skills mobilized:

A1 Analyze a system (real or virtual) or a problem
A2 Exploit a model of a real or virtual system
B3 Interact with others, team work
B7 Work in an international and intercultural context
C8 Managing supply in connection with the planning and inventory management policy
C9 Localizing and assigning the production, storage and transportation processes to different members of the supply chain
C14 Collectively managing a project: organization, communication, group coordination
C16 Identifying, analyzing and controlling the risks inherent to a project

Understand the subject by mobilizing the relevant theoretical knowledge and by carrying out a state of the art

- Understand and formalize the research problem
- Suggest possible solutions
- Develop solutions and conduct experiments
- Analyze the results obtained and propose recommendations
- Present and defend the results of the research project

CONTENT

Project, in pairs, allowing the student to learn and experiment a research/innovation approach, on a subject proposed and supervised by a teacher-researcher:

- appropriation of the subject
- formalization of the research problem and proposition of resolution tracks
- development of solutions and possible experiments
- results analysis and perspective proposals

BIBLIOGRAPHY

Depending on the subject.

PRE-REQUISITES

Depending on the subject.

IDENTIFICATION

CODE : GI-5-S1-EC-PCI-HU
ECTS :

HOURS

Cours : 0h
TD : 16h
TP : 0h
Projet : 0h
Evaluation : 8h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h

ASSESSMENT METHOD

Organization of a Round Table or a debate

TEACHING AIDS

Handout

TEACHING LANGUAGE

French

CONTACT

M. BERNARD Stephane :
stephane.bernard@insa-lyon.fr

AIMS

This EC is part of the Advanced Technical Engineering Unit 1A (GI-5-TAI 1A-S1) and contributes to the following skills:

A1 Analyze a Real or Virtual System (or Problem) (Level 2)
A3 Implement an Experimental Approach (Level 2)
A4 Designing a Specification System (Level 2) A5 Editing Data (Level 2)
B3 Interact with others, work in teams (level 3)
B4 Creativity, Innovation, Entrepreneurship (Level 3)
C13 Take into account technological and methodological innovation (level 1)
C14 Collectively lead a project: organization, communication, animation, group coordination (level 3)

In addition, it requires the mobilization of the following skills:

C11 Understand and evaluate a structure in a global way, through socio-economic reading grids
C12 Evolve organizations to respond to new constraints or opportunities
C16 Identify, analyze and control the risks inherent in a project
C20 Implement a social responsibility approach

By allowing the student to work and be evaluated on the following knowledge:

- SWOT analysis
- Project management by risks (in a context outside production and services)
- Mastery of his written and oral communication as well as those of external speakers.

By allowing the student to work and be evaluated on the following abilities:

- Organize a round table (C13, C14, B3, B4)
- Identify an industrial problem (A1, A3, A4)
- Define the industrial and structural issues and risks at the organizational and structural levels (A5)
- Interpellate industrial stakeholders (B3, B4)
- Knowing how to control a debate (C14, B3)

CONTENT

From a specific topic, create, organise and lead a debate, a webinar including externals VIP participation

BIBLIOGRAPHY

PRE-REQUISITES

None

IDENTIFICATIONCODE : GI-5-S1-EC-GMA
ECTS :**HOURS**Cours : 0h
TD : 20h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 22h
Travail personnel : 0h
Total : 22h**ASSESSMENT METHOD**

1 two-hour exam

TEACHING AIDSCourse and tutorials handouts
Softwares Carl Source (CMMS),
Minitab (reliability) and Anylogic
(simulation)**TEACHING LANGUAGE**

French

CONTACTM. MOYAUX Thierry :
thierry.moyaoux@insa-lyon.fr**AIMS**

Understanding the usefulness and the functions of a CMMS (Computerized Maintenance Management System) and being able to use reliability for maintenance.

This EC contributes to / Level (1 for sensitization, 2 for appropriation, 3 for mastery):

* School skills in Engineering Sciences:

. Résoudre les questions posées par un problème scientifique en étant conscient des limites / 3

. Développer une démarche expérimentale / 3

. Mettre en œuvre une démarche scientifique / 3

. Identifier, formuler et résoudre un problème d'ingénierie complexe / 3

* School skills specific to GI:

. Observer, mesurer, analyser et interpréter une activité ou un système à partir de données / 3

. Modéliser, concevoir un système d'informations, de décision et de production de biens et de services / 3

. Evaluer, prototyper ou simuler un système

. Piloter un système de production et réagir aux dysfonctionnements / 3

CONTENT

Computerized Maintenance Management System

FR - lecture/tutorial/practical work in french

* Overview of the functions of a CMMS

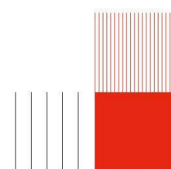
* Maintenance process

* Optimisation of maintenance

* Maintenance tools (manufacturer's documentation, reliability, etc.)

BIBLIOGRAPHY**PRE-REQUISITES**

GI-3-TP/FIAB-S2 GI-4-QMA-S1



IDENTIFICATIONCODE : GI-5-S1-EC-LOG
ECTS :**HOURS**Cours : 0h
TD : 26h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h**ASSESSMENT METHOD**

Continuous assessment

TEACHING AIDS**TEACHING LANGUAGE**

English

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

This course aims to provide the fundamental concepts and the methods in supply chains organization and management. The Objective of a Supply Chain and the impact of supply chain decisions on the strategic success of companies. Competitive and Supply Chain Strategies of supply chains as well as the main methods for factory design and configuration. Our focus in these two parts is on methods and tools allowing to take into account several kind of uncertainties as demand, lead-time, operation time, etc.

CONTENT

- 1) Supply chain management and organization
 - General concept of supply chains, Supply Chain Performance, Drivers and Metrics,
 - Location problem in the Supply Chain,
 - Network Design under uncertainty,
 - Demand Forecasting in a Supply Chain,
 - Aggregate Planning in the Supply Chain,
 - Inventory management under uncertainty,
 - Optimal Level of Product Availability,
 - Transportation in a Supply Chain and routing problem,
 - Joint optimization of transportation and inventory
 - Collaboration, Pricing and Revenue Management.
- 2) Facility design and organization:
 - Flow, space and activity relationship, Layout typology,
 - Sizing problem: personnel, space and equipment requirement,
 - Assembly Line Balancing,
 - Computer-aided layout algorithms (SLP, CORELAP, ALDEP, MCRAFT),
 - Warehouse design,
 - Cellular manufacturing system and group technology,
 - Intelligent manufacturing system design

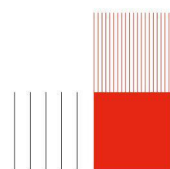
BIBLIOGRAPHY

References:

- 1- Sunil Chopra, Supply Chain Management: Strategy, Planning and Operations, (4th Edition) 2009
- 2- John J. Coyle, Supply Chain Management: A Logistics Perspective, 2008
- 3- Roberta R. Russell, Operations Management: Creating Value Along the Supply Chain, 2007
- 4- James A. Tompkins, Facilities Planning, 2010
- 5- S. Heragu, Facilities Design, Third Edition, 2008
- 6- Ralph M. Barnes, Motion and Time Study: Design and Measurement of Work, 1980
- 7- Mikell P. Groover, Work Systems: The Methods, Measurement & Management of Work, 2006

PRE-REQUISITES

Statistic and Probability, Forecasting, Linear programming, Production Planning and Scheduling Inventory Control,



IDENTIFICATIONCODE : GI-5-S1-EC-PRH
ECTS :**HOURS**Cours : 0h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 0.5h
Face à face pédagogique : 14.5h
Travail personnel : 0h
Total : 14.5h**ASSESSMENT METHOD**

Final exam

TEACHING AIDSCourse handbook.
library of mixed integer
programming models for human
resource management decision
making.**TEACHING LANGUAGE**

French

CONTACTMME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr**AIMS**

The students will learn how to dimension human resources, how to specify working hours, how to plan and to schedule human resources. Most of examples are issued from industry.

Several resolution technics are presented : integer programming, constraint programming, meta-heuristics...

It helps to acquire the competence: Design, size, and plan systems required for a given activity of production, service, distribution.

CONTENT

Workforce scheduling

Workforce scheduling issues:
classification,
Demand modelling and capacity management,
Staffing,
cyclical and non-cyclical scheduling,
timetabling.

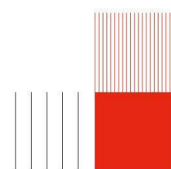
Techniques introduced:
mixed and integer linear programming,
constraint programming,
meta-heuristics.

BIBLIOGRAPHY

Baptiste P., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.

PRE-REQUISITES

Linear programming.
Statistics and forecasting.



IDENTIFICATION

CODE : GI-5-S1-EC-ETH-HU
ECTS : 2

HOURS

Cours : 0h
TD : 24h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h

ASSESSMENT METHOD

Press review (collective oral presentation)
Ethical analysis of professional practice (individual written report)

TEACHING AIDS

Case Studies
Scientific and Theoretical Articles in Humanities and Social Sciences
Press Articles
Slideshow Presentations

TEACHING LANGUAGE

French

CONTACT

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AIMS

The "Engineer Ethics" course aims to meet the following objectives. The details of each are indicated in the course syllabus.

- 1) Explain, using concrete examples, the types (ethical, moral, or legal), the natures (political, social, economic, and environmental), and the scales (micro, meso, macro) of responsibilities of the engineer.
- 2) Discern the causes and stakes of an ethical problem in an engineering context, as well as on the scale of a societal debate.
- 3) Justify a stance (point of view and/or a decision) by mobilizing ethical reasoning according to one's role in the specified context.

CONTENT

Session 1: Positioning of Engineers
Session 2: Socio-history of Engineers
Session 3: Engineering Ethics
Session 4: Session Project 1
Session 5: Traditions of Ethics
Session 6: Ethics of Science and Technology
Session 7: Session Project 2
Session 8: Gender and Work: Raising Awareness of VSS in Businesses
Session 9: Environmental Ethics
Session 10: Session Project 3
Session 11: Democratic Technical Approach
Session 12: Presentations and Wrap-up

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Capron Michel et Quairel-Lanoizelée Françoise, L'entreprise dans la société, Paris, La Découverte, 2015.
Didier Christelle, "Éthique de l'ingénierie. Un champ émergent pour l'éthique professionnelle", Techniques de l'Ingénieur, 2015.
Dubar Claude & al., Sociologie des professions, Paris, Armand Colin, 2015.
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Latour Bruno, Petites leçons de sociologie de sciences, Paris, La Découverte, 1993.
Renouard Cécile, Éthique et entreprise, Paris, L'Atelier, 2015.
Roby Catherine, Évolution du rôle social à la responsabilité sociétale des ingénieurs, Techniques de l'ingénieur, 2017.
Van de Poel Ibo and Royackers Lamber, Ethics, Technology and Engineering. An introduction, Wiley-Blackwell, 2011.
Vinck Dominique et Sainsaulieu Ivan, Ingénieur aujourd'hui, Lausanne, PPUR, 2015.
Vinck Dominique, Science et société, Paris, Armand Colin, 2007.

PRE-REQUISITES

Sociological Analysis of Organizations (ASO-4GI)
Professional internship

IDENTIFICATIONCODE : GI-5-S1-EC-PI2
ECTS :**HOURS**

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	20h
Total :	44h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

Answer to set conditions by taking into account technical, economic, legal and human aspects of the project.

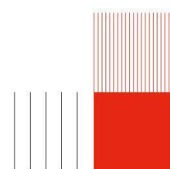
The industrial project is a real company project. Each project is supervised and animated by an industrial project leader during 6 weeks. The student works out solutions in response to a set of conditions. As a potential project leader, each group (i.e., 6 students) proposes and defends its technical, organizational, economical and temporal solutions, while the groups compete to obtain the market. The debate of ideas proposed during these projects is generally beneficial for the industrialists.

These projects generally treat aspects such as production organization, logistics, reliability, quality and maintenance.

Student can choose to participate to 1, 2 or 3 industrial projects.

CONTENT**BIBLIOGRAPHY****PRE-REQUISITES**

- Project management methods
- Basis company management



IDENTIFICATIONCODE : GI-5-S1-EC-PI1
ECTS :**HOURS**

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	20h
Total :	44h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

Answer to set conditions by taking into account technical, economic, legal and human aspects of the project.

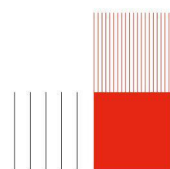
The industrial project is a real company project. Each project is supervised and animated by an industrial project leader during 6 weeks. The student works out solutions in response to a set of conditions. As a potential project leader, each group (i.e., 6 students) proposes and defends its technical, organizational, economical and temporal solutions, while the groups compete to obtain the market. The debate of ideas proposed during these projects is generally beneficial for the industrialists.

These projects generally treat aspects such as production organization, logistics, reliability, quality and maintenance.

Student can choose to participate to 1, 2 or 3 industrial projects.

CONTENT**BIBLIOGRAPHY****PRE-REQUISITES**

- Project management methods
- Basis company management



IDENTIFICATIONCODE : GI-5-S1-EC-OPA
ECTS :**HOURS**Cours : 0h
TD : 20h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 20h
Travail personnel : 0h
Total : 20h**ASSESSMENT METHOD**

Case studies + final exam

TEACHING AIDS

Lecture book and exercises

TEACHING LANGUAGE

French

CONTACTM. MONTEIRO Thibaud :
thibaud.monteiro@insa-lyon.fr**AIMS**

- Methodological skills: analysing and modelling planning or scheduling problems, involving material and / or human resources, mono and multicriteria decision making problems; carrying out a structured approach to address such problems (from identification to validation)
- Technical skills: determining the complexity of a problem and designing potential tools to resolve it

CONTENT

- Advanced planning and scheduling (T. Monteiro): Production scheduling problems: a reminder. Tree-searching methods. Heuristics and Meta-heuristics. Mono-criteria and Multi-objective problems. Case studies with computer applications.

BIBLIOGRAPHY

Baptiste Pi., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Bouyssou D. et Roy B. : Aide multicritère à la décision : méthode et cas, Economica, 1993.
Carlier J. et Chrétienne P. : Problèmes d'ordonnancement : modélisation / complexité / algorithmes, Masson, 1988.
Garfinkel R.S. et Nemhauser : Integer programming, Wiley Interscience, 1972.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.
Roy B. : Méthodologie multicritère d'aide à la décision, Economica, 1985.
Trilling L. : Aide à la décision pour le dimensionnement et le pilotage de ressources mutualisées en milieu hospitalier, Thèse de doctorat, INSA de Lyon, 2006.

PRE-REQUISITES

Monocriterion decision support (Linear Programming), basic and advanced production management (4GI).

IDENTIFICATIONCODE : GI-5-S1-EC-INR
ECTS :**HOURS**Cours : 2h
TD : 0.016666666666666666h
TP : 0h
Projet : 0h
Evaluation : 8h
Face à face 10.016666666666667h
pédagogique :
Travail personnel : 22h
Total : 32.016666666666666h**ASSESSMENT METHOD**

Written report + Oral presentation

TEACHING AIDS

Depending on the subject.

TEACHING LANGUAGE

English

CONTACTMME BOTTA-GENOULAZ Valerie
:
valerie.botta@insa-lyon.fr**AIMS**

This teaching unit (EC) contributes to the following skills:

A3 Implement an experimental approach or a production approach
A5 Process data
A6 Communicate an analysis, a scientific approach, a proof or a solution in a reasoned and logical way
B2 Work, learn, evolve independently
B4 Show creativity, innovate, undertake
C1 Observing, measuring, analyzing and interpreting an activity or a system from data
C2 Modeling and designing an information, decision and production system, of goods and services
C3 Evaluating, prototyping and simulating a system
C13 Considering technological and methodological innovation

Skills mobilized:

A1 Analyze a system (real or virtual) or a problem
A2 Exploit a model of a real or virtual system
B3 Interact with others, team work
B7 Work in an international and intercultural context
C8 Managing supply in connection with the planning and inventory management policy
C9 Localizing and assigning the production, storage and transportation processes to different members of the supply chain
C14 Collectively managing a project: organization, communication, group coordination
C16 Identifying, analyzing and controlling the risks inherent to a project

Understand the subject by mobilizing the relevant theoretical knowledge and by carrying out a state of the art

- Understand and formalize the research problem
- Suggest possible solutions
- Develop solutions and conduct experiments
- Analyze the results obtained and propose recommendations
- Present and defend the results of the research project

CONTENT

Project, in pairs, allowing the student to learn and experiment a research/innovation approach, on a subject proposed and supervised by a teacher-researcher:

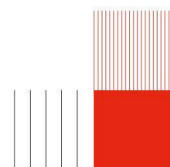
- appropriation of the subject
- formalization of the research problem and proposition of resolution tracks
- development of solutions and possible experiments
- results analysis and perspective proposals

BIBLIOGRAPHY

Depending on the subject.

PRE-REQUISITES

Depending on the subject.



IDENTIFICATION

CODE : GI-5-S1-EC-PCI-HU
ECTS :

HOURS

Cours : 0h
TD : 16h
TP : 0h
Projet : 0h
Evaluation : 8h
Face à face pédagogique : 24h
Travail personnel : 0h
Total : 24h

ASSESSMENT METHOD

Organization of a Round Table or a debate

TEACHING AIDS

Handout

TEACHING LANGUAGE

French

CONTACT

M. BERNARD Stephane :
stephane.bernard@insa-lyon.fr

AIMS

This EC is part of the Advanced Technical Engineering Unit 1A (GI-5-TAI 1A-S1) and contributes to the following skills:

A1 Analyze a Real or Virtual System (or Problem) (Level 2)
A3 Implement an Experimental Approach (Level 2)
A4 Designing a Specification System (Level 2) A5 Editing Data (Level 2)
B3 Interact with others, work in teams (level 3)
B4 Creativity, Innovation, Entrepreneurship (Level 3)
C13 Take into account technological and methodological innovation (level 1)
C14 Collectively lead a project: organization, communication, animation, group coordination (level 3)

In addition, it requires the mobilization of the following skills:

C11 Understand and evaluate a structure in a global way, through socio-economic reading grids
C12 Evolve organizations to respond to new constraints or opportunities
C16 Identify, analyze and control the risks inherent in a project
C20 Implement a social responsibility approach

By allowing the student to work and be evaluated on the following knowledge:

- SWOT analysis
- Project management by risks (in a context outside production and services)
- Mastery of his written and oral communication as well as those of external speakers.

By allowing the student to work and be evaluated on the following abilities:

- Organize a round table (C13, C14, B3, B4)
- Identify an industrial problem (A1, A3, A4)
- Define the industrial and structural issues and risks at the organizational and structural levels (A5)
- Interpellate industrial stakeholders (B3, B4)
- Knowing how to control a debate (C14, B3)

CONTENT

From a specific topic, create, organise and lead a debate, a webinar including externals VIP participation

BIBLIOGRAPHY

PRE-REQUISITES

None

IDENTIFICATION

CODE : GI-5-S1-EC-GMA
ECTS :

HOURS

Cours :	0h
TD :	20h
TP :	0h
Projet :	0h
Evaluation :	2h
Face à face pédagogique :	22h
Travail personnel :	0h
Total :	22h

ASSESSMENT METHOD

1 two-hour exam

TEACHING AIDS

Course and tutorials handouts
Softwares Carl Source (CMMS),
Minitab (reliability) and Anylogic
(simulation)

TEACHING LANGUAGE

French

CONTACT

M. MOYAUX Thierry :
thierry.moyaux@insa-lyon.fr

AIMS

Understanding the usefulness and the functions of a CMMS (Computerized Maintenance Management System) and being able to use reliability for maintenance.

This EC contributes to / Level (1 for sensitization, 2 for appropriation, 3 for mastery):

* School skills in Engineering Sciences:

Résoudre les questions posées par un problème scientifique en étant conscient des limites / 3

- Développer une démarche expérimentale / 3

- Mettre en œuvre une démarche scientifique / 3

• Identifier, formuler et résoudre un problème d'ingénierie complexe / 3

* School skills specific to GI:

Observer, mesurer, analyser et interpréter une activité ou un système à partir de données / 3

1. Modéliser, concevoir un système d'informations, de décision et de production de biens et de services / 3

- Evaluer, prototyper ou simuler un système

• Piloter un système de production et réagir aux dysfonctionnements / 3

CONTENT

Computerized Maintenance Management System

FR - lecture/tutorial/practical work in french

* Overview of the functions of a CMMS

- * Maintenance process

- * Optimisation of maintenance

* Maintenance tools (manufacturer's documentation, reliability, etc.)

BIBLIOGRAPHY

PRE-REQUISITES

GI-3-TP/FIAB-S2 GI-4-QMA-S1

IDENTIFICATION

CODE : GI-5-S1-EC-ACH
ECTS :

HOURS

Cours :	0h
TD :	14h
TP :	0h
Projet :	0h
Evaluation :	2h
Face à face pédagogique :	16h
Travail personnel :	0h
Total :	16h

ASSESSMENT METHOD

2 test during lessons and presence taken in account.

TEACHING AIDS

French plus exchange in english

TEACHING LANGUAGE

English

CONTACT

M. BERNARD Stephane :
stephane.bernard@insa-lyon.fr

AIMS

Reinforce your french technical vocabulary in a course presented in french with interaction in practical exercise open to english as necessary. Evaluation is bilingual and all deliverables could be in english as wishes.

Give a clear view how the sourcing function is organized following necessary steps.
Link the sourcing to project management and related tools.
Grant the device to communicate and transfer sourcing activities.

This EC contributes to:

- Model the process of conducting an activity M2
 - Ensure quality by reporting the development of relevant indicators M3
 - Promote, protect and sustain the expertise of entities C
-
- Put into perspective the scientific knowledge with the evolution of knowledge and technology C
-
- Observe, measure, analyze and interpret an event M3
 - Define and implement an action plan M3
 - Conduct a project collectively M2
 - Identify and sign contracts formalize the needs of a client, follow their evolution and validate compliance (traceability needs) M1

CONTENT

Obtain a clear understanding about the ideal cycle for sourcing, described in a step by step method.

Apply management project's tools to sourcing

Put in place a supplier's monitoring

Be able to communicate, reproduce and transfert those competancies.

BIBLIOGRAPHY

Purchasing and supply chain management: Kenneth Lyons and Brian Farrington
Financial Times 2005

The purchasing Handbook : a guide for the purchasing and supply professional Joseph I. CAVINATO Mcgraw Hill 2000

Les Achats : l'abécédaire des mots et expressions utilisés dans le langage des achats.
Jean-Paul DURAND Gualino 2003

PRE-REQUISITES

Frensh European Language Level recommended B1

IDENTIFICATIONCODE : GI-5-S1-EC-LEA
ECTS :**HOURS**Cours : 0h
TD : 22h
TP : 8h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 30h
Travail personnel : 0h
Total : 30h**ASSESSMENT METHOD**Plus 1 ECTS for exchange
students**TEACHING AIDS****TEACHING LANGUAGE**

English

CONTACTMME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr**AIMS**

- Appreciate lean as a way of management
- Use VSM to identify and eliminate the wastes,
- Develop the skills necessary to see the flow of a value stream and to create a future state map

CONTENT

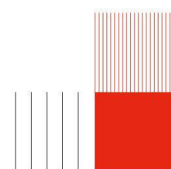
- 2 sessions of 2 hours of lectures (CM):
- Presentation of the history of Lean
 - Basic principles of Lean
 - 7 types of wastes, temple Toyota, Just In Time, Jidoka principles, standardization, management.
- 3 sessions of 2 hours of tutorials (TD):
- Presentation of the Value Stream Mapping method,
 - Development of an action plan.
- A case study
- 2 sessions of 4 hours of practice (TP): a simulation game of a production workshop of jacks (Synchro Lean Simulation on hardware FESTO).

BIBLIOGRAPHY

- Bien voir pour mieux gérer. Mike Rother et John Shook. Avant propos: Jim Womack et Dan Jones. Traduction en Français : Line Perron. N° ISBN: 978-2-9529806-1-6
- Gold Mine. Freddy Ballé et Michael Ballé. N° ISBN: 0-9743225-6-3
- Le Modèle TOYOTA. Jeffrey Liker. Traduction en Français: Monique Sperry. Avant propos: Didier Leroy (président de Toyota Motor Manufacturing France. Préface: Michael Ballé et Godefroy Beauvallet. N° ISBN: 978-2-7440-7390-8
- Lexique Lean. Chet Marchwinski et John Shook. Traduction en Français: Institut Lean France. N° ISBN: 978-2-9529806-0-9
- Seeing the whole. James P. Womack and Daniel T. Jones. N° ISBN: 0-9667843-5-9
- Système Lean. Penser l'entreprise au plus juste 2ème édition. Jim Womack, Dan Jones. Préface: Michael Ballé et Godefroy Beauvallet. Traduction en français: Monique Sperry. N° ISBN: 978-2-7440-7391-5

PRE-REQUISITES

GI-4-GP1-S1 et GI-4-GP2-S1



IDENTIFICATIONCODE : GI-5-S1-EC-LOG
ECTS :**HOURS**Cours : 0h
TD : 26h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 28h
Travail personnel : 0h
Total : 28h**ASSESSMENT METHOD**

Continuous assessment

TEACHING AIDS**TEACHING LANGUAGE**

English

CONTACTM. BABOLI Armand :
armand.baboli@insa-lyon.fr**AIMS**

This course aims to provide the fundamental concepts and the methods in supply chains organization and management. The Objective of a Supply Chain and the impact of supply chain decisions on the strategic success of companies. Competitive and Supply Chain Strategies of supply chains as well as the main methods for factory design and configuration. Our focus in these two parts is on methods and tools allowing to take into account several kind of uncertainties as demand, lead-time, operation time, etc.

CONTENT

- 1) Supply chain management and organization
 - General concept of supply chains, Supply Chain Performance, Drivers and Metrics,
 - Location problem in the Supply Chain,
 - Network Design under uncertainty,
 - Demand Forecasting in a Supply Chain,
 - Aggregate Planning in the Supply Chain,
 - Inventory management under uncertainty,
 - Optimal Level of Product Availability,
 - Transportation in a Supply Chain and routing problem,
 - Joint optimization of transportation and inventory
 - Collaboration, Pricing and Revenue Management.
- 2) Facility design and organization:
 - Flow, space and activity relationship, Layout typology,
 - Sizing problem: personnel, space and equipment requirement,
 - Assembly Line Balancing,
 - Computer-aided layout algorithms (SLP, CORELAP, ALDEP, MCRAFT),
 - Warehouse design,
 - Cellular manufacturing system and group technology,
 - Intelligent manufacturing system design

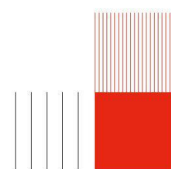
BIBLIOGRAPHY

References:

- 1- Sunil Chopra, Supply Chain Management: Strategy, Planning and Operations, (4th Edition) 2009
- 2- John J. Coyle, Supply Chain Management: A Logistics Perspective, 2008
- 3- Roberta R. Russell, Operations Management: Creating Value Along the Supply Chain, 2007
- 4- James A. Tompkins, Facilities Planning, 2010
- 5- S. Heragu, Facilities Design, Third Edition, 2008
- 6- Ralph M. Barnes, Motion and Time Study: Design and Measurement of Work, 1980
- 7- Mikell P. Groover, Work Systems: The Methods, Measurement & Management of Work, 2006

PRE-REQUISITES

Statistic and Probability, Forecasting, Linear programming, Production Planning and Scheduling Inventory Control,



IDENTIFICATIONCODE : GI-5-S1-EC-PRH
ECTS :**HOURS**Cours : 0h
TD : 14h
TP : 0h
Projet : 0h
Evaluation : 0.5h
Face à face pédagogique : 14.5h
Travail personnel : 0h
Total : 14.5h**ASSESSMENT METHOD**

Final exam

TEACHING AIDSCourse handbook.
library of mixed integer
programming models for human
resource management decision
making.**TEACHING LANGUAGE**

French

CONTACTMME PELLET Lorraine :
lorraine.trilling@insa-lyon.fr**AIMS**

The students will learn how to dimension human resources, how to specify working hours, how to plan and to schedule human resources. Most of examples are issued from industry.

Several resolution technics are presented : integer programming, constraint programming, meta-heuristics...

It helps to acquire the competence: Design, size, and plan systems required for a given activity of production, service, distribution.

CONTENT

Workforce scheduling

Workforce scheduling issues:
classification,
Demand modelling and capacity management,
Staffing,
cyclical and non-cyclical scheduling,
timetabling.

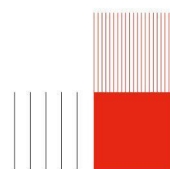
Techniques introduced:
mixed and integer linear programming,
constraint programming,
meta-heuristics.

BIBLIOGRAPHY

Baptiste P., Giard V., Haït A. et Soumis F. : Gestion de production et ressources humaines, Presses Internationales Polytechniques, 2005.
Partouche A. : Planification d'horaires de travail : méthodologies, modélisation et résolution à l'aide de la programmation linéaire en nombres entiers et de la programmation par contraintes, Thèse de doctorat, Université Paris Dauphine, 1998.

PRE-REQUISITES

Linear programming.
Statistics and forecasting.



IDENTIFICATIONCODE : GI-5-S1-EC-PPP-HU
ECTS :**HOURS**

Cours :	0h
TD :	8h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	8h
Travail personnel :	0h
Total :	8h

ASSESSMENT METHOD**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTSANCHEZ FORSANS Sylvie :
sylvie.sanchez-forsans@insa-
lyon.fr**AIMS**

This course belongs to teaching unit Humanités et activités physiques et sportives (GI-5-S1-UE-HUEPS) and contributes to the following skills :

B1 know oneself; manage mental and physical fitness (Level 3)

B6 position oneself, work, and evolve within a company or a socio-productive organization (Level 3)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Job Search, Personal Branding, Recruitment, Career Management (B1, B6)
- 7 skills of the INSA engineer (B1, B6)

To be able to :

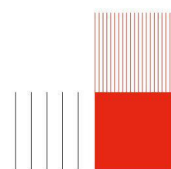
- Present your service offer (B1, B6)

CONTENT

Feedback workshop dedicated to the debriefing of their last internship
Workshop "Active Job Search Campaign": update CV, self-presentation and professional projects using CARE's tools in written, oral and digital communication for their service offer processes; recruitment situations between pairs (CV criticism, role-playing, VRPC training)

BIBLIOGRAPHY**PRE-REQUISITES**

Bring an up-to-date CV with application examples



IDENTIFICATION

CODE : GI-5-S1-EC-RSE

ECTS : 2

HOURS

Cours : 0h

TD : 22h

TP : 8h

Projet : 0h

Evaluation : 0h

Face à face pédagogique : 30h

Travail personnel : 0h

Total : 30h

ASSESSMENT METHOD

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

Mme SUBAI Corinne :
corinne.subai@insa-lyon.fr

AIMS

CONTENT

- Sustainable development, corporate ethics, CSR
- Challenges of sustainable development for business

BIBLIOGRAPHY

PRE-REQUISITES

IDENTIFICATION

CODE : GI-5-S1-EC-KNM
ECTS : 2

HOURS

Cours : 0h
TD : 18h
TP : 0h
Projet : 0h
Evaluation : 2h
Face à face pédagogique : 20h
Travail personnel : 0h
Total : 20h

ASSESSMENT METHOD

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. LOISEAU Mathieu :
mathieu.loiseau@insa-lyon.fr

AIMS

This course belongs to teaching unit Industrie 4.0 (GI-5-S1-UE-INQZ) and contributes to the following skills :

C2 Modeling and designing an information, decision and production system, of goods and services (Level 1)
C6 Selecting appropriate production tools, integrating them into an environment and configuring them, and setting up a production system (Level 1)
C10 Developing and implementing an action plan as part of a quality and continuous improvement approach (Level 1)
C11 Understanding and evaluating a structure holistically, through socio-economic frames of reference (Level 1)
C12 Changing organizations to meet new constraints or opportunities (Level 1)
C18 Identifying the critical skills and knowledge of an organization and implement tools and methods to sustain the (Level 1)
C19 Conducting a socio-organizational analysis to better understand the effects of change and to adapt strategies (Level 1)
B5 act responsibly in a complex world (Level 1)

By allowing the engineering students to work and be evaluated on the following knowledge :

- Industrial knowledge-related assets
 - Information, knowledge, and expertise
 - Knowledge management methods in industry, collaborative knowledge management tools
 - Digital knowledge management tools
 - Knowledge management strategies and continuous improvement
 - Technological, human, and organizational knowledge and structure
- To be able to :
- Distinguishing the type of knowledge created by the use of information and Communication
 - Identify industrial capital (human, technological, organizational, informational)
 - Assess the limitations of knowledge management systems

CONTENT

BIBLIOGRAPHY

- Ackoff, Russell Lincoln. 1989. « From Data to Wisdom ». Journal of Applied Systems Analysis 16: 3–9.
- Dejoux, Cécile. 2013. Gestion des compétences et GPEC. 2e édition. Dunod.
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- Grundstein, Michel. 2003. « De la capitalisation des connaissances au management des connaissances dans l'entreprise, les fondamentaux du knowledge management », 19.
- Lemaître, Denis, et Maud Hatano. 2007. Usages de la notion de compétence en éducation et en formation. L'Harmattan, Coll. Action et savoir. <https://hal-ensta-bretagne.archives-ouvertes.fr/hal-00521434>.
- Nelson, Richard, et Sidney Winter. 1982. An Evolutionary Theory of Economic Change. Belknap Press.
- Nonaka, Ikujiro, et Hirotaka Takeuchi. 1995. The Knowledge-Creating Company: How Japanese companies create the dynamics of innovation. Oxford University Press.
- Penrose, Edith. 1959. The Theory of the Growth of the Firm. 4th Edition (2009). Oxford University Press.
- Polanyi, Michael. 1966. The tacit dimension. 2009 edition. The University of Chicago Press.
- Postiaux, Nadine, Philippe Bouillard, et Marc Romainville. 2010. « Référentiels de compétences à l'université. Usages, rôles et limites ». Recherche et formation, no 64 (juillet) : 15-30. <https://doi.org/10.4000/rechercheformation.185>.
- Reagle, J.M. 2010. Good Faith Collaboration: The Culture of Wikipedia. Édité par Michael Buckland et Jonathan Furner. History and foundations of information science. Cambridge, MA: MIT Press. <http://mitpress.mit.edu/books/good-faith-collaboration>.
- Zins, Chaim. 2007. « Conceptual approaches for defining data, information, and knowledge ». Journal of the American Society for Information Science and Technology 58 (4): 479–493. <https://doi.org/10.1002/asi.20508>.

PRE-REQUISITES

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Tél. + 33 (0)4 72 43 83 83 - Fax + 33 (0)4 72 43 85 00

www.insa-lyon.fr

membre de



IDENTIFICATION

CODE : GI-5-S1-EC-MRH-HU
ECTS :

HOURS

Cours :	0h
TD :	20h
TP :	0h
Projet :	0h
Evaluation :	2h
Face à face pédagogique :	22h
Travail personnel :	0h
Total :	22h

ASSESSMENT METHOD

Final examination (2h)

TEACHING AIDS

Textbook, exercices, case studies, learning games, ...

TEACHING LANGUAGE

French

CONTACT

AIMS

CONTENT

Management of human resources

- Introduction to the management of human resources and social relations.
- Reinforcement of one's listening abilities and of the knowledge in interpersonal communication, also in new cultural contexts.
- Management and human resources: team work and information-communication; management roles and styles; principles and tools of HR (recruitment, evaluation and competence management, remuneration, career management, etc.) ; motivation and change management.
- Social relations and employment contracts: social dialogue, IRP, trade-union organizations and collective bargaining; collective agreements; elements of labor law. Intercultural management.

BIBLIOGRAPHY

- N.Alter, Sociologie de l'entreprise et de l'innovation, PUF, Paris 1996H.
- R.Blake & J.Mouton, Troisième dimension du management, Ed° d'organisation, Paris 1987
- O.Devillard, La dynamique des équipes, Ed° d'Organisation, Paris 2000
- J-L.Emery & E.Albert, Le manager est un psy, Ed° d'organisation, Paris 1998
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- + les films : « 12 hommes en colère » (Sidney Lumet, USA 1957), « Riens du tout » (Cédric Klapisch, France 1992), « Ressources humaines » (Laurent Cantet, France 1999), « El metodo » (Marcelo Piñeyro, Espagne et Argentine 2005), « Rien de personnel » (Mathias Gokalp, France 2009), "La loi du marché" (Stéphane Brizé, France 2015) etc.
- + ouvrages de synthèse et méthodologiques publiés par l'ANACT (Agence Nationale pour l'Amélioration des Conditions de Travail).

PRE-REQUISITES

Experience of several months in business in an engineering student internship.
Concepts of management control and industrial management.
General knowledge about the industrial enterprise
Fluent in French (speaking and writing)

IDENTIFICATIONCODE : GI-5-S2-EC-PFE30
ECTS : 29**HOURS**Cours : 0h
TD : 7h
TP : 0h
Projet : 0h
Evaluation : 0h
Face à face pédagogique : 7h
Travail personnel : 0h
Total : 7h**ASSESSMENT METHOD**45 min presentation
Project dissertation
Summary**TEACHING AIDS****TEACHING LANGUAGE**

French

CONTACTMME BOTTA-GENOULAZ Valerie
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- To develop the capacities of observation and strategic analysis of an organization.
- To integrate the technical and socio-economic aspects of a project or a process (of production, management...).
- To improve the capacities of communication and analysis of situation, by an precise identification of professional environment, by the multiplication of the contacts and the working relationships in the company, etc.

CONTENT

During 18 consecutive weeks (minimum), the final project assignment aims to resolve an industrial problem in a company.
The project provides a mission similar to the one of an engineer. It is in general a question of adopting a project manager behaviour taking part in different phases like analysis and design of a product, implementation of the manufacturing process, organization of the production system...

BIBLIOGRAPHY**PRE-REQUISITES**

All the Industrial Engineering training.