INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

2nd YEAR CONSTRUCTION ENGINEERING

Practical info

Location(s)

Toulouse

Mathematical theory applied to mechanics

ECTS
7 crédits

Hourly volume
80h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

Theoretical Part
Norms and scalar product on IR^n
Properties of special matrices (symetric matrices, projection matrices, orthogonal matrices).
Continuity and derivation on IR^n (partial derivatives, jacobian and gradients, chain rule)
Taylors expansion
Critical points of a function of several variables
Integration on domains of IR^n, with dedicated techniques (Fubini, change of variable) and applications (computation of volumes, averages, centers of gravity).

Numerical Part (Numerical Analysis)

Numerical errors, conditioning numbers
Methods to compute numerically integrals
Methods to solve nonlinear equations and linear systems
Method of the Lagrange interpolating polynomial
Least-squares method.

Necessary prerequisites

Modulus I1ANMAAR, I1ANMATC, I1ANMAEF, et I1ANMAAL of mathematics of first year.

Practical info

Location(s)

Toulouse

Mechanics, network and electric machines

ECTS
7 crédits

Hourly volume
73h

Practical info

Location(s)

Toulouse

Science of materials

ECTS
3 crédits

Hourly volume
38h

Practical info

Location(s)

Toulouse

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Industrial Sciences – Computer Aided Design

ECTS
6 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Company knowledge and communication

ECTS
5 crédits

Hourly volume
75h

Introducing

Objectives

Objectives:

At the end of this module, the student will have understood and be able to explain (main concepts):
- how to give an oral presentation
- some of the historical, geographical and/or geopolitical aspects of different English-speaking socio-cultural contexts
- how to produce a structured written synthesis in French.
- how to write a training period report and present it orally
- inner workings of contemporary economy and interdependence of macroeconomic scales

The student will be able to:

In French
- write the synthesis of a set of press articles and present it orally with Powerpoint visual aids
- write a training period report and give an oral presentation describing a particular company, reporting on and analysing a work experience.

In English:
- give a Powerpoint oral presentation in front of a group and orally interact with the audience
- demonstrate creativity, initiative and open mindedness in teamwork
- develop a thorough knowledge and a critical mind about different English-speaking socio-cultural contexts, taking into account historical, geographical and/or geopolitical considerations.

In Economics :

- understand current major economic and societal stakes
- discuss and debate using arguments grounded in the knowledge of fundamental economic mechanisms and some economic thinking theories

Necessary prerequisites

Expression 1 in the first-year « Grand Domaine Humanités » (D1ANHU01)
Writing and oral skills in English in the first-year « Grand Domaine Humanités » (D1ANHU01)

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 2A

ECTS
2 crédits

Hourly volume
44h

Practical info

Location(s)

Toulouse

Refresher course 2nd year

ECTS

Hourly volume
162h

Practical info

Location(s)

Toulouse

Mathematical tools II

ECTS
5 crédits

Hourly volume
78h

Introducing

Objectives

At the end of this course, the students will be able to solve easy EDO or to predict qualitative properties of more complex ones and to implement with Python some approximative solutions.
In the probability and statistics part, the students will be able to understand hazardous phenomena, use probability modelisation and predict statistical issues through tests.

Necessary prerequisites

First year mathematics, Analyse Numérique and mathematics from first semester

Practical info

Location(s)

Toulouse

Sizing theory

ECTS
7 crédits

Hourly volume
152h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts) continuum mechanics, the notions of stress, strain and displacement fields, and the constitutive relation in linear elasticity.

The student will be able to:
- Analyse the stress and strain states of a solid submitted to a loading.
- Compute the stress, given the strain and conversely.
- Compute the strain state given the displacement field.
- Write the equations of the local equilibrium.
- Propose a relevant model of a real problem with particular attention to boundary conditions.

Strength of materials: Introduction to beam theory
- Drawing internal forces diagrams for an isostatic, straight, planar beams.
- Calculate the beam strains and stresses for a few simple loads in the case of a simple section and a slender beam.
- Final objective is to learn how to analyse and design beam-like structural members or machine elements subjected to tension, compression, torsion, and bending.

- Determine the mechanical loads and motions in dynamics systems

Necessary prerequisites

Analysis, function of multiple variable, Taylor expansion, partial derivatives
Linear algebra, vectors, matrix, eigenvectors and eigenvalues
Algorithms, bases of programming in Python
Rigid solid mechanics, equilibrium, resultant force and moment.

Practical info

Location(s)

Toulouse

Conception and construction

ECTS
8 crédits

Hourly volume
110h

Practical info

Location(s)

Toulouse

Communicating in Foreign Languages

ECTS
5 crédits

Hourly volume
57h

Introducing

Objectives

LV2 Module (Spanish/ German / Chinese / Portugese / French Sign Language):
The objectives defined with reference to the CERL for the 5 language skills are specific to the language studied and the student¿s level.

The student will be able to :
-strengthen their listening, reading and note-taking skills
-analyse and synthesise information
-organise and efficiently communicate information
-speak in front of a group
-attend or lead a job interview
-interact with another person in the foreign language

Remedial English
A module can be proposed to students in certain very specific cases, as a substitute to LV2.

Necessary prerequisites

Necessary knowledge:

First-year LV1, Expression and LV2 skills (D1ANHU01)
Second-year LV1 and Expression skills (I2CCGE31)

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 2B

ECTS
5 crédits

Hourly volume
130h

Practical info

Location(s)

Toulouse