

Engineering methods

Mathematical and Numerical Tools for Engineering 1 AS1 AM1 EU1 2022-23

IDENTIFICATION

CODE : PC-S1-OMNI-ACEM
ECTS : 3.0

HOURS

Lectures :	11.0 h
Seminars :	26.5 h
Laboratory :	6.0 h
Project :	0.0 h
Teacher-student contact :	43.5 h
Personal work :	25.0 h
Total :	68.5 h

ASSESSMENT METHOD

one written test of 1h30 : IE.
one IEFS of 2h : IEF.
Average : $(1,5 * IE + 2 * IEF) / 3.5$

TEACHING AIDS

Course handout [with exercises].

TEACHING LANGUAGE

French

CONTACT

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AIMS

Master the notions of vector calculus, differential and integral calculus, scalar and vector fields.

CONTENT

1. Vector calculus: bases, cross product and triple scalar product.
2. Complex numbers : very basic notions.
3. System of coordinates: cartesian, polar, cylindrical and spherical. Parametric curves.
4. Differential calculus of functions of several variables: partial derivatives, differentials. Closed and exact differential forms, integration of exact differential forms.
5. Linear differential equations with constant coefficients.
6. Multiple integrals.

Some Python Numerical Calculus practical sessions will illustrate the contents of the course.

BIBLIOGRAPHY

- Cours de physique. Mathématiques pour la physique. Y. NOIROT. J.P. PARISOT. N. BROUILLET [Dunod]
- Techniques Mathématiques de la Physique - J. RENAULT [DUNOD]
- Mathématiques pour le physicien - A. BAUMY. M. BONNAUD - 2 tomes [MAC GRAWHILL]

PRE-REQUISITE

High school mathematics speciality.