Mécanique rationnelle II

Lecturer
Pierre LAMBERT (Coordinator)

Course mnemonic
MECA-H200

ECTS credits
5 credits

Language(s) of instruction
French

Course period
First term

Campus
Solbosch

Course content

Basics – Solid kinematics in 2D and 3D. Virtual works. Inertia. Solid kinetics. Vectorial and analytical methods (Lagrange). Various problems of solid dynamics. Variable mass systems. Numerical solving of motion equations.

Optional (may change every year) – Hamilton equations. Variational principles. Kepler's laws. Chaos. Impact mechanics.

Objectives (and/or specific learning outcomes)

Solids and systems of solids dynamics. Write the number of degrees of freedom of a system. Write motion equations. Compute reaction forces. Solve ODE2 numerically.

Pre-requisits and co-requisits

Pre-requisites courses

MECA-H100 | Mécanique rationnelle I | 5 crédits

Courses having this one as co-requisit

MECA-H303 | Cinématique et dynamique des machines | 5 crédits
and MECA-H305 | Fluid mechanics II | 5 crédits

Required knowledge and skills

The course is based on bachelor BA1 courses : algebra, analysis, mechanics (systems statics and point dynamics), physics, informatics and introduction to engineering sciences.

More particularly, the following concepts are assumed to be mastered : free body diagram, partial and total derivatives of a function with n variables, equilibrium equations, analytical solving of simple ODE2 equations, among which the harmonic oscillator.

Teaching method and learning activities

Therory (syllabus), exercises, practical labs, Q&A sessions.

References, bibliography and recommended reading

Courses notes (« syllabus ») of "Mécanique rationnelle II" and related references

Course notes

Syllabus and Université virtuelle

Other information

Place(s) of teaching

Solbosch

Contact(s)

Pierre LAMBERT, TIPs, http://plambert.ulb.be

Evaluation method(s)

Other

Evaluation method(s) (additional information)

January (written examination) + mandatory participation to experimental labs

Determination of the mark (including the weighting of partial marks)

First session

- Written examination : exercises and theory studied in the course, the exercises, and the labs.
- Mandatory participation to labs. Absence will lead to a penalty applied to the examination grade.

Second session

- Written examination : exercises and theory studied in the course, the exercises, and the labs.
- Mandatory participation to labs. Absence will lead to a penalty applied to the examination grade.

Main language(s) of evaluation

French

Programmes

Programmes proposing this course at the Brussels School of Engineering

BA-IRCI | Bachelor in Engineering Sciences | option Bruxelles/unit 2