

CE 103 MECHANICS

Co-ordinator: Dr M. A. Wadee (Room 443), a.wadee@imperial.ac.uk

Lecturers: Dr M. A. Wadee (MAW) (Room 443)
Dr G. R. Hunt (GRH) (Room 331)

Structure: 24 hours of lectures and tutorials

Links: From A-level or equivalent study of mechanics, to CE 104 Structural Mechanics, CE 105 Fluid Mechanics and CE106 Geotechnics

Aims

To introduce and reinforce the fundamental principles of mechanics.

SYLLABUS

Preliminaries: (MAW: 6 contact hours) Scalar and vector quantities, dimensions, Newton's Laws of motion and free-body diagrams. Force vectors, moments and couples, hydrostatic forces and friction.

Statics: (MAW: 10 contact hours) Static equilibrium in one and two dimensions. Deformable bodies, constitutive laws, mechanical energy and stability of equilibrium. Examples cover simple applications in fluids, geotechnics and structures.

Dynamics: (GRH: 8 contact hours) Integration of Newton's Second Law of motion. Kinematics of systems of particles undergoing rectilinear / curvilinear motion. Coordinate systems. Extension to kinetics. Conservation principles of energy and momentum. Applications focus on the free and forced vibrations of systems.

Coursework and submission dates

None

Assessment

One 2-hour written examination at the end of the session containing 6 questions. Rubric: "Answer five questions".

Recommended Textbooks/Reading

Engineering Mechanics (5th Edition) by J.L. Meriam and L.G. Kraige (Wiley).

Learning Outcomes

This lecture course acknowledges from the outset that students entering the first year have different levels of preparation in mechanics. Students should achieve a firm understanding of the fundamental principles of mechanics, both qualitative and quantitative. They should be able to distinguish between and model static and dynamic problems in structural, soil and fluid mechanics and be aware of their appropriate solution methods.