Course guide
330121 - MSD - Mechanics of Deformable Solids

Last modified: 21/04/2026

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2016). (Compulsory subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Francesco Greco

Others: Martin Villanueva, Prepedigno

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Deepening in the knowledge and use of the principles of the Resistance of Materials.

Transversal:
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.
4. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
5. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	30.00
Self study	90,0	60.00
Hours small group	15,0	10.00

Total learning time: 150 h

CONTENTS

(ENG) Títol del contingut 1: Eq. bàsiques de l'elasticitat.

Full-or-part-time: 23h 10m
Theory classes: 7h 15m
Laboratory classes: 2h 25m
Self study : 13h 30m

(ENG) Títol del contingut 2: Esforços combinats i cisallament en perfils prims.

Full-or-part-time: 50h
Theory classes: 15h
Laboratory classes: 5h
Self study : 30h

(ENG) Títol del contingut 3: Equacions energètiques i equacions de Navier-Brese.

Full-or-part-time: 50h
Theory classes: 15h
Laboratory classes: 5h
Self study : 30h

(ENG) Títol del contingut 4: Pandeig.

Full-or-part-time: 13h 10m
Theory classes: 4h 15m
Laboratory classes: 1h 25m
Self study : 7h 30m

(ENG) Títol del contingut 5: Anàlisi de plaques.

Full-or-part-time: 15h
Theory classes: 4h 30m
Practical classes: 1h 30m
Self study : 9h

ACTIVITIES

(ENG) TÍTOL DE L'ACTIVITAT 1: PRÀCTICA DE LABORATORI: ELASTICITAT (CONTINGUT 1).

Full-or-part-time: 7h 36m
Laboratory classes: 2h
Self study: 5h 36m

(ENG) TÍTOL DE L'ACTIVITAT 2: PRÀCTICA DE LABORATORI: ESFORÇOS COMBINATS I (CONTINGUT 2).

Full-or-part-time: 11h 24m
Laboratory classes: 3h
Self study: 8h 24m

(ENG) TÍTOL DE L'ACTIVITAT 3: PRÀCTICA DE LABORATORI: ESFORÇOS COMBINATS II (CONTINGUT 2).

Full-or-part-time: 11h 24m
Laboratory classes: 3h
Self study: 8h 24m

(ENG) TÍTOL DE L'ACTIVITAT 4: PROVA INDIVIDUAL D'AVALUACIÓ CONTÍNUA: EQ. BÀSIQUES DE L'ELASTICITAT. ESFORÇOS COMBINATS I CISALLAMENT EN PERFILS PRIMS. (CONTINGUTS 1-2).

Full-or-part-time: 7h
Theory classes: 2h
Self study: 5h

(ENG) TÍTOL DE L'ACTIVITAT 5: PROVA INDIVIDUAL D'AVALUACIÓ CONTÍNUA: EQUACIONS ENERGÈTIQUES I EQUACIONS DE NAVIER_BRESE. PANDEIG. ANÀLISI DE PLAQUES (CONTINGUTS: 3,4,5).

Full-or-part-time: 7h
Theory classes: 2h
Self study: 5h

(ENG) TÍTOL DE L'ACTIVITAT 6: PROVA FINAL: (CONTINGUTS: 1-5).

Full-or-part-time: 13h
Theory classes: 3h
Self study: 10h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

BIBLIOGRAPHY

Basic:
- Rivera Amores, Juanjo. Anàlisi d'estructures: teoria i problemes [on line]. Barcelona: Edicions UPC, 2005 [Consultation: 06/11/2020]. Available on: http://hdl.handle.net/2099.3/36638. ISBN 8483018179.
- Rivera Amores, Juanjo. Mecànica de materials: problemes [on line]. Barcelona: Edicions UPC, 2008 [Consultation: 06/11/2020]. Available on: http://hdl.handle.net/2099.3/36772. ISBN 9788483017616.
- Beer, Ferdinand P.; Johnston, E. Russell; DeWolf, John T. Mecánica de materiales [on line]. 7ª ed. México: McGraw-Hill, 2017 [Consultation: 08/06/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=8071. ISBN 9781456260866.
- Gere, James M. Resistencia de materiales: Timoshenko. 5ª ed. España: Thomson, 2002. ISBN 9788497320658.
- Budevsky, O. Fonaments de l'anàlisi química. Barcelona: Edicions Universitat de Barcelona, 1998. ISBN 8483380331.
- Courbon, Jean. Tratado de resistencia de materiales. 2ª ed. Madrid: Aguilar, 1968.

Complementary:
- Timoshenko, Stephen. Resistencia de materiales. Madrid: Espasa-Calpe, 1989. ISBN 8423963152.
- Argüelles Álvarez, R.. Cálculo de estructuras. Madrid: Escuela Técnica Superior de Ingenieros de Montes, 1981-1986. ISBN 8460024105.
- Ortiz Berrocal, Luis. Resistencia de materiales [on line]. 3ª ed. Madrid: McGraw Hill, 2007 [Consultation: 02/06/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=3962. ISBN 9788448156336.