



Course Syllabus

Department/Faculty School of Engineering
Graduate Program Materials Engineering and Nanotechnology
Degree <input checked="" type="checkbox"/> Academic Master's <input checked="" type="checkbox"/> Doctorate (PhD) <input type="checkbox"/> Professional Master's
Course Name Mechanical Behavior of Materials
Professor(s)
Office hours 48
Course Overview Elastic behavior and plastic deformation of materials. Theory of dislocations and hardening mechanisms of materials. General Considerations on Materials Testing. Standardization of Materials Testing. Application of Materials Testing in Materials Engineering. Study of the main static mechanical tests: tensile test, hardness, compression, torsion, bending. Study of the main dynamic mechanical tests: impact test, fracture toughness and fatigue. Study of mechanical behavior at elevated temperatures: hot tensile test and creep test. Mechanical behavior of polymeric materials. Mechanical behavior of ceramic materials. Failure analysis.
Topics outline <ul style="list-style-type: none">• Elastic behavior;• Plastic deformation;• Static mechanical tests (traction, compression, torsion, flexure, folding, hardness);• Dynamic mechanical tests (impact, fracture toughness, integral J, fatigue);• Mechanical behavior in high temperatures (creep);• Mechanical Behavior of Metallic Materials;• Mechanical Behavior of Polymeric Materials;• Mechanical Behavior of Ceramic Materials;• Failure Analysis.
Letter Grade Assignment Grade A (Excellent) - Grade points between 9 and 10 Grade B (Good) - Grade points between 8 and 8.9 Grade C (Satisfactory) - Grade points between 7 and 7.9 Grade D (Unsatisfactory) - Grade points between 0 and 6.9



Texts, Materials, and supplies

- ANDERSON, T. L. Fracture Mechanics: fundamentals and applications. 3 ed. Boca Raton:Taylor & Francis, 2005.
- HERTZBERG, R. W. Deformation and Fracture Mechanics of Engineering Materials. 4 ed. New York:John Wiley & Sons, 1996.
- JONES, D.R.H. (Ed.). Failure Analysis Case Studies II. USA:Pergamon, 2001.
- REED - HILL, R. E. Physical metallurgy principles 1994 3^a ed.
- DIETER, G. E. Metalurgia Mecânica; McGraw-Hill. 1981.
- JANSSEN, M., ZUIDEMA, J. WANHILL, R. J. H., Fracture Mechanics, Second Edition: Fundamentals and Applications, Ed.: 2nd ed. London : CRC Press. 2004.