



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 Materials Characterization
Professor(s) Prof. Mauro Cesar Terence, Ph.D
Office hours 48
Course Overview Characterization of the different materials (ceramic, metallic polymer and composites) to be used in the various areas of engineering activity. Absorption spectroscopy in the infrared region. Thermal Analyzes. Optical Microscopy. Quantitative metalography. Image analysis. Scanning Electron Microscopy. Formation of images with secondary and backscattered electrons. Semi-quantitative microanalysis by X-ray dispersive energy. Backscattered electron diffraction. Transmission electronic microscopy. X-ray diffractometry. Determination of phases. Residual stress. Crystallographic texture.
Topics outline Absorption spectroscopy in the infrared region. Thermal Analyzes. Optical Microscopy. Quantitative metalography. Image analysis. Scanning Electron Microscopy. Formation of images with secondary and backscattered electrons. Semi-quantitative microanalysis by X-ray dispersive energy. Backscattered electron diffraction. Transmission electronic microscopy. X-ray diffractometry. Determination of phases. Residual stress. Crystallographic texture.
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

LENG, Y. *Materials Characterization: Introduction to Microscopic and Spectroscopic Methods*, Wiley-VCH, Alemanha, 2013.

KAPLAN, W. D., BRANDON, D. *Microstructural Characterization of Materials*, Wiley, 2a Ed., New York, 2008.

R.W.CAHN, P.HAASEN, E.J.KRAMER, *Materials Science and Technology a comprehensive treatment-Characterization of Materials*, Wiley-VCH, 2005.

CANEVAROLO JUNIOR, S. V. *Técnicas de Caracterização de Polímeros*. São Paulo: ArtLiber, 2004.

CULLITY, B.D.; STOCK, S.R. *Elements of X-ray Diffraction*. 3th. ed. New Jersey:Prentice Hall, 2003.

FLEWITT, P.E.J.; WILD, R. K. *Physical Methods for Materials Characterization*. 2nd. ed., London: CRC Press, 2001.

SMITH, W. F. *Princípios de Ciência e Engenharia dos Materiais*. 3 ed. Lisboa:McGRAW-HILL, 1998.

CATTI, M. *Fundamentals of Crystallography*. 2nd. ed. UK:OUP/International Union of Crystallography, 2002.

HARRIS, D.C. *Análise Química Quantitativa*. 5. ed. Rio de Janeiro:LTC, 2001.

MOTHÉ, C.G.; AZEVEDO, A.D. de. *Análise Térmica de Materiais*. São Paulo:Ieditora, 2002.

SOUZA SANTOS, P. *Ciência e Tecnologia de Argilas*. 2. ed. São Paulo: Edgard Blucher, v. 1, cap.13. 1992.