Code	INI383	Prerequisites	CBQ208 ING217
Name	Materials Science and Engineering	Co-requisites	INI383L

Credits	Contact Hours
04	44
Categorization of credits	
Math and basic science	
Engineering topic	X
Other	

Coordinator's name	Vesselina Radeva

Text book
Ashby, M. F., Shercliff, H., & Cebon, D. (2014). Materials: engineering, science, processing and design. (3rd Ed.), Elsevier, Butterworth-Heinemann (BH). Askeland, D., and Wright, W. (2017). Materials science and engineering. (7th Ed.) Mexico City : Cengage Learning Editors. CES Edupack Granta. (2018). Cambridge, United Kingdom: Granta Design Limited.
Other supplemental materials
Callister, W., Rethwisch, D., Molera Solaná, P. y Salá Ballesteros, N. (2016) Materials science and engineering. (2nd Ed.). Barcelona: Reverté. Shackelford, James F. (2014). Introduction to materials science for engineers. (7th Ed.). Madrid: Pearson Prentice Hall. Van Black, L. (1980). Engineering Materials. (2nd Ed.). Mexico: CECSA.

Description	
Materials Science is a scientific discipline closely related to research, which aims at basic knowledge of the internal structure, properties and processing of materials. Materials Engineering deals with the knowledge of materials at fundamental and applied levels, so that they can be converted into products needed or desired by a technological society. It is sometimes difficult to define the border between the two as there is a common area of use. What is clear is that the two must walk together.	
Type of course	Required ☒ Elective ☐

Specific goals for the course	
Outcomes of instruction	1. Uses up-to-date selection and design tools and programs for the conceptualization, development and evaluation of new materials and product improvement.

	2. Appropriately uses the main concepts of materials science and engineering to solve problems concerning materials and their properties.
Student outcomes	SO1. Identifies, formulates and solves complex Engineering problems by applying the principles of Engineering, Science and Mathematics. SO7. Acquire and apply new knowledge using appropriate learning strategies.

Topics
Unit I. Introduction
Unit II. Ideal crystalline structures
Unit III. Real crystalline structures
Unit IV. Movement of atoms
Unit V. Phase diagrams in equilibria
Unit VI. Control of micro-structure and mechanical properties of materials
Unit VII. Engineering Materials
Unit VIII. Protection against material deterioration and failure