

COURSE NUMBER	ME 215		
COURSE TITLE	Engineering Materials and Processes		
COURSE STRUCTURE	(2-2-3) (lecture hr/wk - lab hr/wk – course credits)		
COURSE COORDINATOR	Veljko Samardzic		
COURSE DESCRIPTION	This course introduces the student to combined lecture and laboratory relating to the study of engineering materials. Processes of formation from liquid and particle state, plastic forming, molding deformation, and metal removal. Effects of heat treatment on material properties. Laboratory exercises involve basic machine tools and computer-controlled equipment.		
PREREQUISITE(S)	Chem 126 – General Chemistry II or Chem 122 - Fund of Chemical Principles II		
COREQUISITE(S)	None		
REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required		
REQUIRED MATERIALS	E. Paul De Garmo, J.T. Black, R.A. Kohler. Materials and Processes in Manufacturing, John Wiley and Sons, Inc., NY, 11 th Edition, 2012.		
Other supplemental materials (not Required)	<ol style="list-style-type: none"> 1. R. Dubrovsky, Laboratory Manual for ME 215A, CAPCO Pub., Oklahoma, 1998. 2. William D. Callister, Jr., Materials Science and Engineering. An Introduction. John Wiley and Sons, Inc., NY, 3 Edition, 1994 		
COMPUTER USAGE	Lab report writing, data acquisition.		
COURSE LEARNING OUTCOMES/ EXPECTED PERFORMANCE CRITERIA:	Course Learning Outcomes	SOs*	Expected Performance Criteria
	1 design new alloys or select new alloy for required application	1, 2, 4	Exam Question (80% of the students will earn a grade 70% or better on this question
	2. select a desired material for part design	1, 2, 4, 7	Report (80% of the students will earn a grade 70% or better on this question
	3. describe the mechanical properties of different steels and cast iron	1, 2, 4	Report and Library Research Assignment (80% of the students will earn a grade 70% or better on this question

	4. select appropriate manufacturing process & bring selected material to manufacturing	1, 2, 4	Report (80% of the students will earn a grade 70% or better on this question)				
	5. plan the sequence of operation in order to achieve final part configuration	1, 2, 4, 7	Report (80% of the students will earn a grade 70% or better on this question)				
	6. explain the manufacturing process required for achieving desired part configuration	1, 2, 4	Exam Question (80% of the students will earn a grade 70% or better on this question)				
	7. define tolerances, allowance and difference between clearance & allowance	1, 2, 4	Report (80% of the students will earn a grade 70% or better on this question)				
	8. select required tolerance using tables in the System of Limits & Fits	1, 2, 4, 7	Report (80% of the students will earn a grade 70% or better on this question)				
	9. use different measuring tools and take readings from them with required accuracy	1, 2, 6	Lab Practice and Report (80% of the students will earn a grade 70% or better on this question)				
CLASS TOPICS	<ol style="list-style-type: none"> 1. Introduction: Basic Atomic Structure & Crystalline Solids; The Solid State; Forming of Engineering Materials. 2. Materials from the Elements. 3. Fundamentals of Metal Alloys; Equilibrium Diagrams. 4. Testing of Engineering Materials. 5. Heat Treatment of Metals. 6. Classification of Steels. Material Selection for Designed Product. 7. Manufacturing Processes. Material Deformation Processes 8. Casting, Welding, Powder Metallurgy and Their Influence on the Design Aspects of Machine Components. 9. Measurement, Inspection, System of Fits, Computer Controlled Inspected Stations. 10. Theory of Cutting. 11. Machining Processes: Conventional and Computer Controlled. 						
STUDENT OUTCOMES (SCALE: 1-3)	1	2	3	4	5	6	7
	3	3		3			3
	3 – Strongly supported			2 – Supported		1 – Minimally supported	

* Student Outcomes