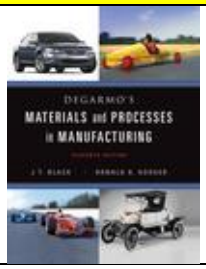
MT 124: Metallurgy and Materials

Course Description: This course introduces students to the matter and its existence, forms and combinations. Introduction to mechanical behavior and the structure-property relationships of materials, general properties and applications of metals, polymers, concrete and wood are also introduced. Additional topics include solidification of pure and alloyed metals, introduction to phase diagrams, and solid solutions. Fundamentals of the Fe-C system, principles of heat treating, stainless steels and corrosion are presented. Overview of composite materials and their applications are also discussed.

Hours	3 credit, 3 class hours
Prerequisites	MA-010 or satisfactory score on the Mathematics Placement Test, and BE -122 (or BE-226), or satisfactory score on the CUNY/ACT Assessment Test.
Corequisites	
General Education Objectives	Meet requirements for successful transfer into the junior year of baccalaureate programs (transfer Programs) Demonstrate mastery of discipline-specific knowledge, skills and tools required for entry into or advancement in the job market in their field (career programs) Use analytical reasoning skills and apply logic to properly select materials Use quantitative skills and practical reasoning to analyze different types of materials
Course Objectives	• Students will have understandings of the role of materials in technology design and manufacturing. • Students will be familiar with the basic philosophy of classifying materials according to their functionality and the variation for modifying microstructure. • Students will be able to select materials based on design conditions, manufacturing, economics and environmental issues.

Textbooks	Author	Publisher	ISBN	
DeGarmo's Materials and Processes in Manufacturing	J. T. Black and Ronald A. Kohser	John Wiley & Sons	ISBN-13: 978-0-470-92467-9	

Course Topics		
Recitation	**Text Section**	**Topics**
Week_1	Chapter 1	Introduction to metallurgy and materials
Week_2	Chapter 3	Properties of Materials
Week_3	Chapter 4	Nature of Metals and Alloys
Week_4	Chapters 1, 3 and 4	Exam #1
Week_5	Chapter 5	Equilibrium Phase Diagram and Iron-Carbon System
Week_6	Chapter 6	Heat Treatment
Week_7	Chapter 7	Ferrous Metals and Alloys
Week_8	Chapters 5 to 7	Exam #2
Week_9	Chapter 8	Nonferrous Metals and Alloys
Week_10	Chapter 9	Nonmetallic Materials: Plastics, Elastomers, Ceramics, and Composites
Week_11	Chapter 10	Material Selection
Week_12	Chapters 8 to 10	Exam #3
Week_13	Chapter 11	Fundamentals of Casting
Week_14	Chapter 14	Fabrication of Plastics, Ceramics, and Composites
Week_15	Handout	Properties of Woods

Laboratory Experiments		
Lab		**Topics**

Computer Proficiency:

None.

Grade Components			
Item		**Description**	**Weight**
1		Attendance	5 %
2		Homework	15 %
3		Term Paper	20%
4		Four (4) Exams	60%
		TOTAL	100 %

Grade Scale											
A	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**D-**	**F**
100-96	95-90	89-87	86-84	83-80	79-77	76-74	73-70	69-67	66-64	63-60	59-0

Notes	
1	Reading before the lecture is highly recommended.
2	Exams will be open book and notes.
3	No talking or texting during lecture.

Prepared By: Prof. Kee M. Park **Revision Date: August 27, 2013**
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Office hours: Mon 1-2 pm; Tues 11-12 pm; Thurs 11-12 pm, or by appointment