COURSE OUTLINE: MET207 - METALLURGY

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

Course Code: Title	MET207: METALLURGY
Program Number: Name	4039: MECH. ENG. TN-MANUFA 4040: MACHINE SHOP
Department:	MECHANICAL TECHNIQUES PS
Semesters/Terms:	19W, 19S
Course Description:	The general objective of this course is to give students destined for the mechanical trades a basic understanding of metals and alloys they will be working with in heavy industry. A heavy emphasis is placed on the iron-carbon system and the physical metallurgy of steel including heat treating and welding. Some laboratory work on heat treating steel is included to witness the effect heat treating has on the microstructure and harness of carbon steel.
Total Credits:	3
Hours/Week:	2
Total Hours:	30
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Substitutes:	ASR118, MET212
General Education Themes:	Science and Technology
Course Evaluation:	
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail)49% and below 0.00 CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar`s office. W Student has withdrawn from the course without academic penalty.
Books and Required Resources:	Safety Boots and Safety Glasses Publisher: Handouts provided by Prof Safety Boots and Safety Glasses

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. INTRODUCTION TO METALLURGY	Potential Elements of the Performance: 1.1 Define: i. Extractive Metallurgy ii. Mechanical Metallurgy iii. Physical Metallurgy
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. ATOMIC STRUCTURE OF METALS	Potential Elements of the Performance: 2.1 Explain the differences between the atomic c i. Gases ii. Liquids iii. Solids iv. Describe the atomic and crystalline structures function of temperature. v. Describe how carbon can be in solid solution v
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. IRON-CARBON EQUILIBRIUM DIAGRAM	Potential Elements of the Performance: 3.1 Demonstrate an understanding of the iron ca
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. TIME/TEMPERATURE/TRANSFORMATION DIAGRAM	Potential Elements of the Performance: 4.1 Describe what happens when iron-carbon all from the austenitic temperature region to room te real time. 4.2 Describe how differing cooling rates affect th iron-carbon alloys. 4.3 Describe what happens to the time/temperatu when the carbon content is varied and when othe elements are added. 4.4 Determine and demonstrate a plain carbon s process as assigned. 4.5 Identify certain microstructures using a micro
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5. STEEL ALLOYING AND PROCESSING (ROLLING/FORGING)	Potential Elements of the Performance: 5.1 To describe the effect that alloying and mech has on: i. The crystal structure of steel ii. The mechanical properties of steel
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. HEAT TREATING	Potential Elements of the Performance: 6.1 To describe the processes and reasons for: i. Normalizing ii. Quenching and tempering iii. Case hardening iv. Annealing v. Stress relieving
Course Outcome 7	**Learning Objectives for Course Outcome 7**
7. MECHANICAL PROPERTIES AND TESTING OF STEEL	Potential Elements of the Performance: 7.1 Explain the procedures and interpretation of

		for Rockwell hardness 7.2 Explain how elevated temperatures affect str 7.3 Explain the procedure and interpretation of to testing and how low temperature affect toughnes 7.4 Explain the phenomena of fatigue and creep.
	Course Outcome 8	**Learning Objectives for Course Outcome 8**
	8. WELDING	Potential Elements of the Performance: 8.1 To describe metallurgical effects of welding o and properties of weldments.
	Course Outcome 9	**Learning Objectives for Course Outcome 9**
	9. INTRODUCTION TO STEEL SPECIFICATIONS	Potential Elements of the Performance: 9.1 Explain what a standard is 9.2 Explain what a specification is 9.3 Explain how the numbering system in the AIS specification relates to chemical content of steel

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight	Course Outcome Assessed
Labs / Assignments	15%	
Participation	15%	
Tests and Quizzes	70%	

Date: August 28, 2018

Please refer to the course outline addendum on the Learning Management System for further in