PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

MATERIALS AND MANUFACTURING PROCESSES
MET 1012

Class Hours: 3.0 **Credit Hours: 4.0**

Laboratory Hours: 3.0 **Revised: Fall 2010**

Catalog Course Description:

An overview of material science regarding a spectrum of metals and plastics, along with a survey of traditional, as well as, technically advanced manufacturing processes with a strong emphasis on environmental responsibility, OSHA regulations, and accepted safety practices.

Entry Level Standards:

Students entering this course must have completed basic skills in reading comprehension, written communication, and mathematics.

Corequisites:

ENGT 1000

Textbook(s) and Other Course Materials:

Modern Materials and Manufacturing Processes: Gregg Bruce, Mileta Tomovic, John Neely and Richard Kibbe, Prentice Hall, Latest Edition.

I. Week/Unit/Topic Basis:

Week	Topic
1	Introduction Atomic And Crystalline Structure Of Materials
2	Metallurgical Science
3	Heat Treatment Of Metals
4-5	Extraction & Refinement Of Common Metals
6	Selection And Application Of Materials
7	Foundry Processes
8	Hot Working And Cold Working Operations
9	Powder Metallurgy
10	Plastics And Composites Processing

11	Corrosion
12	Production Line Automation
13	Industrial Safety
14	Right To Know and OSHA Act
15	Final Examination/Presentation/Project

II. Course Goals*:

The course will:

A. Expand student understanding of the atomic and crystalline structure of metals and the use of metallurgical diagrams as related to heat treatment. (I-V)

B. Guide students to demonstrate their understanding of the extraction and refinement processes of both metallic and nonmetallic materials. (I-V)

C. Enhance effective understanding of the basic processes used in forming metals. (I-V)

D. Guide students to demonstrate their understanding of the basic processes used in powder metallurgy and in the forming of plastics and composite materials. (I-V)

E. Guide students to an understanding of basic Industrial Safety Concepts, Right to Know Legislation, and the OSHA Act and Administration. (I-V)

* Roman numerals after course goals reference goals of the Engineering Technology Program

III. Expected Student Learning Outcome*:

The student will be able to:

1. describe and analyze the crystalline structure of metals. A
2. describe the ramifications of the iron carbon diagram and isothermal transformation diagrams as related to heat treated steels. A
3. explain and perform basic heat treating operations on carbon steels. A
4. describe basic mining and extraction techniques and list the ores from which the various metals are extracted. B
5. identify and explain basic steel making equipment and processes. B
6. identify and describe alloying techniques for various metals. B
7. identify and explain basic casting processes used in industry. C
8. identify and explain basic hot metal working processes used in industry. C
9. identify and explain the basic cold metal working processes used in industry. C
10. identify and explain common mass production techniques used in industry. D
11. identify and explain basic plastic forming processes used in industry. D

12. explain basic processes, operations, and concepts used in making powder metallurgy parts. D

13. identify and discuss concepts related to industrial and occupational safety. E

14. discuss the rational and operation of the Right To Know and OSHA Acts. E

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures:

Evaluation of both classroom and laboratory work is required in this course. Total evaluation will be based on the following point distribution.

Unit Exams (50 Points)

There will be 5-8 unit exams administered during the course. They will include discussion questions, short answer questions, true/false questions, and problem solving.

Comprehensive Final Exam (10 Points)

B. Laboratory Projects:

Project 1: Metal Sample Analysis (15 Points)
Project 2: Research & Presentation (20 Points)

Guidelines and requirements for each project will be provided by the instructor.

C. Field Work:

Industrial visitations are required as part of the course assignments and will be announced in advance.

D. Other Evaluation Methods:

Participation (5 Points)

Based on instructor observation during the course, each student will be evaluated on participation activities. Evaluation parameters to include active participation in class discussions, being prepared, efficient use of lab time, striving to achieve more than minimum requirements, and regular attendance.

E. Grading Scale:

Final grade for this course will be based on the following alphabetical/numerical scale.

A 93-100
B+ 88-92
B 83-87
C+ 79-82
C 74-78
D 65-73
F Below 65

V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of the Learning Division, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of the Learning Division.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:
• Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
• Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
• Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
• Taking an exam for another student.
• Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
• Any of the above occurring within the Web or distance learning environment.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at www.pstcc.edu/departments/swd/.

D. Other Policies:

Safety and Equipment Abuse: Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury will result in automatic failure of the course.