

## Course Syllabus for Fall, 2008 Materials Technology

**Office Hrs:** MW 0900-1100, TR 1300-1400

**Email:** [sbates@sjsu.edu](mailto:sbates@sjsu.edu)

**Sections & Rooms:** 025-01, T 3:00-4:45 (IS 132), 025-11 R 3:00-5:45 (E105)

**Office Room:** Industrial Studies Building, Room 111

**Web:** [www.engr.sjsu.edu/sbates](http://www.engr.sjsu.edu/sbates)

**Office Phone:** (408) 924-3227

**Department phone:** (408) 924-3190

**FAX:** (408) 924-3198

*[I do not accept assignments by Fax.]*

### Purpose

This is an introductory course designed to familiarize the student with materials, their properties and testing, and their processing as used in design and production by industry. The course will cover material characteristics, treatments and preparations, forming, processing, and inspections required for use in construction and maintenance by product manufacturers and aircraft and aerospace companies.

### Prerequisites

All Aviation and Technology majors must have completed Chem. 1A and Phys 2A, or be taking this at the same time as this course. Students from Industrial Design or other majors should discuss their chemistry and physics background with the instructor. Students who do not meet prereqs. must drop the course or lose credit for work performed class. Students must own and be able to use a pocket calculator. Basic computing skills in word processing and spreadsheet work are advisable and encouraged. (Format: Lect. 2 hours, 2 units, Lab. 3 hours, 1 unit.) There will be two hours of lecture and one laboratory period per week.

### Course Description

Study of industrial materials and their applications including metals, polymers, and composite materials. Selection principles. Laboratory experimentation, testing and evaluation procedures. Prerequisite: Chem 1A and Phys 2A (or equivalent). Misc/Lab: Lecture 2 hours/lab 3 hours. 3 Units.

### General Course Objectives

All students who participate in Tech025 should come away with

- (1) Knowledge of how materials have shaped the history of the world including current technologies.
- (2) A recognition of the necessity of materials selection in each engineering/technology discipline and an understanding of some ways that material properties determine performance in applications.
- (3) A recognition of the practice of materials engineering and materials testing, and an identification of some ways that material process choices influence structure, properties, and processability.
- (4) An identification of various types of materials that would be appropriate for use in biomedical, communication, electronics, transportation, recreation, construction, and other applications.

**Lab Fees:** \$25.00. The fee is incorporated into your registration process.

### Required Texts

Callister: *Materials Science and Engineering: An Introduction, 7th Edition*, Wiley; 7 edition.

- ISBN-10: 0471736961, • ISBN-13: 978-0471736967. *Student companion site to this book is at <http://bcs.wiley.com/he-bcs/Books?action=index&bcsId=1188&itemId=0471135763>*

*Tech 25 Laboratory Handbook:* Modules available as needed through the class website. Print these and read and mark them thoroughly BEFORE each corresponding lab period. Bring your marked copy to lab with your lab book. The reading schedule is provided in the document **Tech025\_Readings\_F08.doc** on the web site.

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## **Course Website and Communications**

The course Website can be accessed from Dr. Bates' homepage: <http://www.engr.sjsu.edu/sbates>

When you find the Tech025 Website, open it in it's own window, then set a bookmark to get back to it easily. Check the Tech025 Website frequently for homework, exam solutions, and course updates. The site also has links to interesting sites where you can learn more about materials engineering.

This course uses email for correspondence. You must have and regularly use an email account which can send and receive documents in Microsoft Word format. Send your instructor an email during the FIRST week of class which contains the following information on the subject line:

Subject: tech025, your name, subject (e.g., 'greeting')

Include your name, mailing address, phone numbers, and email address in the body of the email. I will reply to you in order to verify that we each have the correct email. Your email will be added to a class email list, which will be used to communicate with the class – to clarify material covered in lecture, hints and changes on the homework, or other class information. Keep your email active and check it regularly, or you may miss important information. DO NOT Zip files, and do not send files only in pdf or Word formats.

## **Class and Lab Times and Activities**

Your ACTIVE participation in both the lecture and laboratory sessions is required. You will be expected to ask questions, answer questions, and work together with your peers to solve problems during class time. The reading assignments for each week are listed on the Lecture Schedule (available on the web site). You are expected to complete the week's reading before class and before attending the lab section. There will be quizzes on the readings! Bring your textbook and a calculator to lecture and lab - collaborative group learning activities will take place during classes. Please turn off cell phones during both lecture and lab!

## **Academic Integrity - <http://www.sjsu.edu/senate/F06-1.htm>**

Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the university's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The policy on academic integrity can be found at [http://sa.sjsu.edu/student\\_conduct](http://sa.sjsu.edu/student_conduct).

Strict standards of academic honesty will be enforced in this class. Students who plagiarize any portion of their lab reports will receive an F (0) on that report with no chance of make-up and will also be reported to the University. Plagiarism constitutes copying any portion of your lab from textbooks, lab notes, previous years' lab reports, or the reports of other students. Verbatim copying from web sites is also plagiarism. We will discuss correct ways to use and cite references in class.

Any figures used from textbooks or the Lab Notes must be properly credited. Homework assignments that you turn in must have been worked out entirely by you. You can study with friends and work out the problems together, but you must then independently work it through and record your own work. Students who provide their homework or labs to other students so that they can be copied are also committing a breach of academic honesty. If you wish to help other students learn the material, studying together is acceptable as long as each individual goes on to produce their own independent work.

## **Students with Disabilities**

Campus policy in compliance with the Americans with Disabilities Act:

[http://www.sjsu.edu/president/docs/directives/PD\\_97-03.pdf](http://www.sjsu.edu/president/docs/directives/PD_97-03.pdf)

If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability.

### **Laboratory Activities**

Some weeks the lab sessions will be devoted to experiments; other sessions will be devoted to tutorials, workshops, demonstrations or other activities. Laboratory activities are an integral part of this course, and attendance is required. Unexcused absences in lab will result in a zero for any assignments related to that lab as well as your overall lab grade being reduced 10% for every lab missed unexcused.

Laboratory quizzes will be averaged into the overall laboratory grade along with lab reports and other activities. There will generally be a quiz at the beginning of each lab period, covering the previous week's lab material and/or the reading assignment. There will also normally be an exit quiz each week, which will demonstrate your mastery of the material covered in the lab that day. You can prepare for the quizzes by reviewing what we did in lab the previous week, by doing the appropriate data analysis on your experimental data from the previous week, and by being fully prepared for each lab before you arrive at lab. The appropriate reading assignment for each lab is listed in the Schedule (below).

Laboratory work requires the use of safety glasses, which you must purchase. See the lab safety guide for information on lab safety. Section lab grades may be scaled up or down to account for discrepancies in grading between lab instructors.

### **Laboratory Reports**

Laboratory reports are due one (1) week after the laboratory unless otherwise specified. Only reports that are prepared on a word processor will be accepted. Lab reports will be accepted late, with a letter grade deduction per day late (lab reports more than 5 days late will not be graded). Late lab reports must be time stamped at the department office (IS 111) and left for the instructor.

The course instructor will inform you of specific report requirements. Consult guidelines on the web site for a list of the sections required in the lab reports. Lab reports must be turned in to turnitin.com as well as to your instructor. Directions for turnitin.com will be given in lab. Reports not turned in to turnitin.com will be given a zero grade.

### **Homework Assignments and Quizzes**

Homework must be submitted on the due date at the start of class period. No late assignments will be accepted. There may be unannounced quizzes given only at the beginning of class, and assignments are late if turned in after these quizzes begin. If you arrive late to class to turn in a paper, your paper will be marked late. Exceptions will be made to this policy only in critical situations, which must be documented by you. Please call or email your instructor as soon as possible to take care of such documentation. If you cannot be present on the day an assignment is due, you should arrange to do one of the following.

- Arrange to have the assignment delivered at the beginning of class,
- mail the assignment to your instructor at the university (It must be post-marked by the due date).
- Email the assignment to your instructor (your email system will date and time stamp the transmission before the due date indicated in the assignment)..

Your name and section number must be listed in the upper right hand corner of the assignment. You are encouraged to work together on the assignments; however, you must turn in individual homework solutions. You are required to list the names of the students you worked with *below your name* in the upper right hand corner of your packet. Groups can be no larger than 3 students. *If similar solutions are passed in by multiple*

students but they do not state they worked together, all the students with similar solutions will receive a '0' on that assignment.

You must have actively participated in solving everything you pass in and have a full understanding of the solution you submitted. Copying partial or complete answers from other students is unacceptable. You will receive a 0 on the assignment and be reported to the University if you copy any portion of the homework or if you allow your homework to be copied.

Test questions will target material learned through the homework, readings, and lab exercises. If you do not fully understand the solutions you pass in, you not only risk getting a 0 on that assignment but you will not be able to answer the related questions during the tests. This will significantly affect your overall grade! Come to office hours if you are having trouble doing the homework yourself.

## Examinations

There will be one midterm examination and one final examination. Examinations will cover material from lectures and labs as well as homework problems. Use the learning objectives as a guide for studying. The dates of each examination are indicated in the Lecture Schedule. These dates may be changed depending on the progress of the lecture. Seating assignments may be given out for exams. Absence during examinations, without prior approval, will result in a zero. Prior approval will be given only under exceptional circumstances.

## Withdrawing / Changing Sections

Please be aware of the University Withdrawal schedule. It is your responsibility to drop or add classes. Pay particular attention to the 'Last day to drop for refund of fees and without a "W"' and the 'Add Deadline'. Withdrawals after the drop deadline are granted only for "serious and compelling reasons"; this usually refers to extreme personal or family problems, which must be documented. Registering for too many units is not considered a serious and compelling reason to drop a class. Note that if you fail the course and attempt to take it the following semester under Academic Renewal, you will have last choice for adding the class. If you stop coming to class without filing a withdrawal, or do not take examinations, you will receive a grade of "U" which reverts to an F on your transcript.

## Grading

mid-term		20%	
Final examination		20%	
Homework		10%	
In-Class Quizzes & Activities		10%	
Lab		40%	
	(Lab reports & Oral Quiz		70%)
	(Lab participation and neatness		10%)
	(Worksheets and lab quizzes		20%)
<b>Total</b>		<b>100%</b>	<b>100%</b>
A+ 97 – 100	A 94 – 96	A- 90 - 93	
B+ 87 – 89	B 84 – 86	B- 80 – 83	
C+ 77 – 79	C 74 – 76	C- 70 – 73	
D 60 – 69	F <60		

The final course and laboratory grades may be normalized to a standard curve.

**Final Exam:** See online exam schedule at <http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-232.html>

## Learning to use ASTM Standards, Specifications, and Definitions

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Website: [www.astm.org](http://www.astm.org)

### About ASTM International

Organized in 1898, ASTM International is one of the largest voluntary standards development organizations in the world. ASTM International is a not-for-profit organization that provides a forum for the development and publication of voluntary consensus standards for materials, products, systems, and services. More than 20,000 members representing producers, users, ultimate consumers, and representatives of government and academia develop documents that serve as a basis for manufacturing, procurement, and regulatory activities.

### Why we use ASTM Standards

ASTM is the primary source for standards methods of testing, definitions, and specifications in the United States. Internationally, ISO and DIN standards may be more well known. Find the web sites for a number of standards organizations and collect them in a section of your assignment.

## Assignment

Locate the ASTM Standards volumes in the MLK, Jr. Library. They are stored in two sections: Stacks, and Technical Reference. Find them both. If you decide to check out a volume from stacks, please return it to the library as soon as possible so others can use it!

1. Locate the first volume of the set. This should be a comprehensive index for the set. Look at it and see how it is organized (two ways).
2. Describe the two sections of the index in your homework.
3. Select a volume of the Standards at random or according to your personal interests. Within the volume, look for three different kinds of entries:
  - *Standard Method of Test for ...*
  - *Definitions of Terms relating to ...*
  - *Specifications for ...*

If you cannot find an example of each of these, look in another volume or use the index. Each of these kinds of entries serves a different kind of purpose. For each standard that you find, do the following:

- *List the full number and title of the entry.*
- *In your own words, summarize the purpose of the method or standard*
- *In your own words, indicate the kinds of material(s) that the standard relates to, and what specific kinds of specimens are used in the standard, if any.*
- *Why would the standard be of value to you, or not.*

Prepare your report in a word processor, using the standard report format from the [website](#). Do this succinctly (look it up). Keep your complete assignment to one page if possible, no more than 1 ½ pages maximum. Submit the report in hard copy on the date specified in the topic outline. See the course syllabus and topic outline for information on due dates and late reports.