ENGR 2322 - Material Science

Course Description
Mechanical, optical, thermal, magnetic and electrical properties of solids; differences in properties of metals, polymers, ceramics and composite materials in terms of bonding and crystalline structure.

Learning Objectives
1. To learn about materials for engineering
2. To learn about atomic bonding
3. To learn about crystalline structure
4. To learn about crystal imperfections
5. To learn about mechanical behavior of Materials
6. To learn about thermal behavior of Materials
7. To learn about phase diagrams
8. To learn about sustainable and green materials and its engineering applications

Major Course Requirements

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Project</td>
<td>20%</td>
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<tr>
<td>Mid-Term</td>
<td>25%</td>
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<tr>
<td>Final</td>
<td>25%</td>
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<tr>
<td>Participation</td>
<td>5%</td>
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</tbody>
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Grading Scale: A = 100-90; B = 80-89; C = 70-79; D = 60-69; F = below 60

Required or Recommended Readings


State Adopted Proficiencies/TExES competencies (COE)

Course Policies

Attendance/tardiness
No attendance will be taken after the beginning of the semester. I expect all students to attend all classes and arrive on time. Students are responsible for all materials assigned and covered in class. If a student is absent, it is his/her responsibility to get the notes, etc. If there are assignments, it is the student’s responsibility to obtain them. Absence is not an excuse for assignments not turned in as due.
Late work and Make-up Exams
Late homework will only be accepted under rare conditions with prior approval from the instructor. Homework will be accepted if it is placed in my mailbox or e-mailed to me by the due date.

Extra Credit
Extra Credit questions/problems will be in some of the tests and homework.

Cell Phone/Electronic Device Usage
Usage of cell phones and other electronic devices such as laptops, ipod etc. are strictly not permitted in class during the lecture.

Academic Integrity/Plagiarism.
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a 0 for the assignment and possibly an F for the class.

Dropping a Class
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. 3/30 is the last day to drop a class with an automatic grade of “W” this term.

Preferred methods of scholarly citations
Homework/project calculations should be submitted in an organized and neatly presented form. Circle or box the answers to each problem. Appropriate units must be included on all answers. All calculations need to be on an engineers pad. Write your name, the course number, the assignment number, and date. Pages are to be numbered and stapled.

Classroom/professional behavior
The “participation” grade is my qualitative evaluation of the student. Is this someone I would want to work with? Is this someone I would want to hire? It will be based on the student’s attendance, on time homework, class participation, neatness & organization of the homework & lab reports.

Student collaboration: I strongly encourage collaboration on homework. It will help many of you to understand the ideas better if you explain them to each other. Collaboration to understand problems and concepts is how best to succeed in the “working world

Grade Appeals*
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamu-cc.edu/provost/university_rules/index.html.
For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

Disabilities Accommodations*

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

*Required by SACS

Syllabus

Tentative Starting Date

1. Topic# 1 – Materials for Engineering (01/12)
2. Project 1 – Materials Research Paper (01/21)
3. Topic# 2 – Atomic bonding (01/24)
4. Topic# 3 – Crystalline Structure (02/04)
5. Project 2 – Crystalline Structures (02/09)
6. Topic# 4 – Crystal Imperfection (02/14)
7. Project 3 – Impact Test (02/16)
8. Midterm Exam #1 (02/28)
9. Topic# 5 – Mechanical Behavior (03/04)
10. Project 4 – Tensile Test (03/04)
11. Topic# 6 – Thermal Behavior (03/21)
12. Project 5 – Hardness Test (03/23)
13. Topic# 7 – Phase Diagrams (04/01)
14. Topic# 8 – Sustainable Materials (04/11)
15. Midterm Exam #2 (04/25)
17. Finals (05/09)