Instructor: Dr. Ozgul Yasar  
OCNL 424  Phone: 530-898-6142  
email: oyasar@csuchico.edu  
Office Hours: Monday 10am-12,  Wednesday 10-11 am in OCNL 424

Prerequisites: PHYS 204A (Mechanics), CHEM 111 (General Chemistry), or equivalents

Class Times: Lecture (AYRS 106)  MWF 09:00 – 09:50 am


Homework: Homework sets will be assigned for the semester. These problem sets will be posted on the Blackboard Learn class site and will be collected at the start of the class period on the due day specified. Homework handed in after the specified deadlines will receive no credit, unless prior arrangements are made with the instructor, or there is an officially-verifiable illness or emergency. Tardiness or absence from class on the due day is not an excuse for late submission of homework. Assignments submitted later than the class time will be marked as late homework. No late homework will be graded.

Tests: There will be quizzes, midterms, and a final exam for the semester. All tests are close-book. These midterms primarily cover the key topics discussed since the previous test. The final exam is comprehensive. Makeup tests will be given only with documented compelling reasons. Students will take the final exam on the day and time scheduled by the university. Time conflicts with other final exams should be brought to the instructor’s attention as early as possible. Answers to the test problems should include relevant work in a logical order with explanation where necessary. When calculation is needed to arrive at a final answer, the formula(s) used along with numerical substitutions and correct units should be clearly shown. A complete and correct answer is necessary for full credits.

Collaboration: Collaboration and discussion on the homework is encouraged in this class, but assignments turned in for a grade must be a student’s own work. Consulting with your colleagues is fine, but copying from somebody else’s homework solution is considered academic misconduct. (I strongly recommend that you first attempt every homework problem on your own, and only then meet with your colleagues to check and improve your work. The best learning usually comes after getting stuck on your own.) Academic misconduct will be referred to Student Judicial Affair.
**Grading**  
The overall course grade will be based on homework, quizzes, midterms, and final exam.

- Homework 15%
- Quizzes 15%
- Midterms 25%
- Project-Presentation 10%
- Final Exam 35%

**Catalog Description**  
Processing, structure, properties, and performance of engineering materials. Applied knowledge of material properties as engineering design parameters. Advanced manufacturing processes, including microfabrication, are discussed.

**Expectations**  
Students are expected to acquire knowledge of the following major topics.

1. Crystal structures and microstructures of metals, molecular structures of polymers
2. Microstructural imperfections and their effects on properties of metals and polymers
3. Fick’s Laws (steady-state and non-steady-state diffusion) and applications in manufacturing
4. Elastic and plastic deformation of metals
5. Viscoelastic behavior of polymers
6. Strengthening methods for metals and polymers
7. Introductory fracture mechanics
8. Mechanical testing (tensile, hardness, impact, fatigue) and material property determination
9. Phase diagrams and development of equilibrium and non-equilibrium microstructures
10. Isothermal transformation diagrams and applications in processing of steels
11. Polymeric materials
12. Selected non-ferrous alloy groups (aluminum, stainless), and cast irons
13. Processing methods and their effects on properties of metals, polymers, and composites
14. Simple property analysis of particular and fiber-reinforced composites
15. Fundamentals of electrochemical corrosion, corrosion rate calculation, corrosion prevention
16. Oxidation of metals
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<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>1/23-1/27</td>
<td>Introduction, Overview of material property-structure relationships, Non destructive tests</td>
<td>Ch.1</td>
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<td>Week 2</td>
<td>1/30-2/3</td>
<td>Atomic structure and interatomic bonding</td>
<td>Ch.2</td>
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<td>Week 3</td>
<td>2/6-2/10</td>
<td>Crystal structure and crystallography,</td>
<td>Ch.3</td>
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<td>Week 4</td>
<td>2/13-2/17</td>
<td>Imperfections in solids and diffusion in solids</td>
<td>Ch.4 and 5</td>
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<td>Week 5</td>
<td>2/20-2/24</td>
<td>Mechanical properties of metals</td>
<td>Ch.6</td>
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<td>Week 6</td>
<td>2/27-3/3</td>
<td>Dislocations and strengthening mechanisms</td>
<td>Ch.7</td>
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<td>Week 7</td>
<td>3/6-3/10</td>
<td>Failure, fatigue, fracture and creep</td>
<td>Ch.8</td>
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<td>Week 8</td>
<td>3/13-3/17</td>
<td>Spring Break</td>
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<td>Week 9</td>
<td>3/20-3/24</td>
<td>Phase diagrams</td>
<td>Ch.9</td>
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<td><strong>Midterm 1</strong></td>
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<td>Week 10</td>
<td>3/27-3/31</td>
<td>Gibbs phase rule, Iron-Carbon system</td>
<td>Ch.9</td>
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<td><strong>No Class March 31 (Cesar Chavez Day)</strong></td>
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<td>Week 11</td>
<td>4/3-4/7</td>
<td>Phase transformation development of Microstructure</td>
<td>Ch.10</td>
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<td>Week 12</td>
<td>4/10-4/14</td>
<td>Applications and processing of metal alloys</td>
<td>Ch.11</td>
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<td>Week 13</td>
<td>4/17-4/21</td>
<td>Polymer structures</td>
<td>Ch.14</td>
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<td><strong>Midterm 2</strong></td>
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<td>Week 14</td>
<td>4/24-4/28</td>
<td>Characteristics, applications and processing of polymers</td>
<td>Ch.15</td>
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<td>Week 15</td>
<td>5/1-5/5</td>
<td>Composites</td>
<td>Ch.16</td>
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<td>Week 16</td>
<td>5/8-5/12</td>
<td>Corrosion and degradation of materials</td>
<td>Ch.17</td>
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<td>Week 17</td>
<td>5/15-5/19</td>
<td>Final Exam (TBA)</td>
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** Note: The schedule may change during the semester.

**Dropping and Adding Class**

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc., found in the CSU Chico University Catalog. You should be aware of the new deadlines and penalties for adding and dropping classes.

**University Policies and Resources**

**Academic Integrity**

Students are expected to be familiar with the University’s Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, 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 Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found at: http://www.csuchico.edu/sjd/integrity.shtml.

**Americans with Disabilities Act**

If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make 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. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

**Accessibility Resource Center**

530-898-5959
Student Services Center 170
arcdept@csuchico.edu

**Student Learning Center**

The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners. The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The SLC is online at http://www.csuchico.edu/slc.