

**DESCRIPTION OF COURSE:** Properties of engineering materials and their performance so as to minimize or eliminate failure modes will be discussed. Manufacturing or processes with the usage of fundamental concepts will be introduced to improve quality assurance.

**EDUCATIONAL OBJECTIVES:** The course has the following objectives:

- A. Students will have demonstrated the fundamental concepts of material structure, properties, processing and performance.
- B. Students will have the ability of applying phase equilibria toward microstructures, transport phenomena (e.g., mass transfer, fluid flow and heat transfer), and kinetics.
- C. Students will have the ability to select metallic and ceramic systems for applications.

**TEXT:**

- 1. D. R. Askeland, P. P. Fulay and W. J Wright: The Science and Engineering of Materials, 6<sup>th</sup> Edition, Cengage Learning, 2011.

**REFERENCES:**

- 1. J. F. Shackelford: Introduction to Materials Science for Engineers, Pearson, 2015.
- 2. W. D. Callister: Materials Science and Engineering: An Introduction, 7<sup>th</sup> edition, John Wiley & Sons, 2007.

**GRADING:** Exams and assignments will weigh as follows:

ITEM	WEIGHT
Assignments*	10 Points/Assignment
Class Examinations	250 points/Examination
Final Examination	350 points

\*Assignments will be suggested and the grading will depend on the characteristics of the course. Examinations will be based on readings assigned for the text by Askeland et al., lectures, technical references given in class, and class "throwaways."

Final Grade*	Minimum Points
A	0.90 X Total Points
B	0.80 X Total Points
C	0.70 X Total Points
D	0.60 X Total Points

\*At the end of the semester, a grade of Incomplete will not be given unless hospitalization occurs. Make-up examinations will not be given.

**ATTENDANCE POLICY:** Attendance will be sporadically taken during the semester and with excessive absences amounting to five, a student will be dropped from the course. In addition, examinations will be prepared from class notes, readings from technical references given and discussed in class and class "throwaways," as well as the readings given in the course outline noted from the text by Askeland, Fulay and Wright. Further comments on attendance policy are noted in the Addendum to Syllabus.

**COURSE OUTLINE  
ME 2331**

Monday of Week	Description of Class Lectures for the Week	Reading Assignment for Class
1. Aug 28	Introduction, Organization, Schedule and Classification of Materials	Chapter 1 to 2
2. Sep 4	(No class on September 4) Atomic and Crystalline Structure, Crystal Defects in Metals and Ceramics	Chapters 2 to 4
3. Sep 11	Diffusion and Mechanics in Solids	Chapters 5 and 6
4. Sep 18	Phase Diagrams and Microstructural Analysis	Chapter 10-11
5. Sep 25	Continuation of Microstructures	Chapter 11-12
6. Oct 2	Ferrous Alloys Initiated from Fe-C Phase Diagram	Chapter 13
7. Oct 9	Time-Temperature-Transformation Diagrams	Chapter 13.4+
8. Oct 16	<b>(Examination)</b> Aluminum Alloys, Precipitation Hardening and Nickel/Cobalt Alloys	Chapter 14.1 and 14.4
9. Oct 23	Titanium Alloys and Ti Aluminides	Chapter 14.5
10. Oct. 30	High Temperature Reactions of Oxide and Carbide Systems	Chapter 15
11. Nov 6	Continuation of High Temperature Reactions of Metals and Ceramic Systems	Chapter 15
12. Nov 13	Solidification and Casting Analysis	Chapter 9
13. Nov 20	Electronic Materials primarily Si and ZrO <sub>2</sub> systems	Chapter 19
14. Nov. 27	Continuation of Electronic Materials	
15. Dec. 4	<b>Review for Final Examination</b>	
16. Dec. 15	<b>Comprehensive Final Examination on Friday, Dec. 15, at 7:00 – 9:45 AM (Exam Does Not start @ 7:30 AM)</b>	

## **Addendum to Syllabus**

### **Academic Honesty**

During exams and quizzes, you are not allowed to use any form of wireless networking (or “wi-fi”) enabled electronic device, including cell phones or other electronic communication devices or methods (e.g., wrist watches and earbuds). No wrist watch or other electronic device may be worn. No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor.

As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam; or if you share your work with someone else, you will be reported to the proper authorities and you may receive a zero on the exam and an F in the class. Other actions including suspension may also be pursued. If you have a disability that requires the use of an electronic device during exams you must have a letter of accommodation from the Center for Accommodations and Support Services (CASS). This accommodation must be coordinated in advance with the instructor.

During exams, you will not be allowed to leave the examination room until you complete the exam. This includes restroom breaks. Students with disabilities must have a letter of accommodation and coordinate this in advance with the instructor.

Instructors and/or proctors may record and/or use their personal cell phones to document activity during the exam. Recording devices may also be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media.

If you are suspected of scholastic dishonesty you may not be directly confronted about your conduct by the instructor or proctor. You will however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam will not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling, this may adversely impact your ability to enroll in other classes.

No makeup exams will be administered. If you have a university approved excuse, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given. No food or drinks will be allowed in the examination room. If you arrive more than 15 minutes late to an exam, you will not be allowed to enter the examination room. If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid.

Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign-in. Not having a UTEP issued ID when asked will result in forfeiture of the exam.

Scholastic dishonesty on homework, lab assignments and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

### **Class Attendance Policy**

Attendance is mandatory. Anyone with 5 absences will be dropped from the class. A drop for not attending class will count toward the Texas State allowed Six-Course Drop Limit, as explained in the Undergraduate Catalogue. If you are failing the class at the time of the drop you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid and other programs. As per UTEP rules, you may be asked to show a UTEP ID at any time during class.

## **Harassment Policy**

The department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Remaining in an office after the occupant requests you to leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.
- Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are available to help students, and they should be treated with due respect.