

EMA3010 Introduction to Materials Science and Engineering

Summer 2016 Section 9552

1. Catalog Description (3) – Conceptual perspective for origin of materials behavior and the interrelationships of structure/property/performance. Materials selection and use of familiar material - metals, ceramics, polymers, electronic materials and composites - in electronics and structural and other engineering applications.

2. Pre-requisites and Co-requisites: Prereq: CHM2045

3. Course Objectives - To present the fundamental concepts in materials science and engineering. To describe the structure, properties, and applications of metallic, ceramic, polymeric and composite materials. To generalize structure-property-performance interrelationships in materials.

4. Contribution of course to meeting the professional component.

Professional Component # of credits Math and science. Engineering. 3General education. Other.
Does it contain design (Y or N)?

5. Relationship of course to program outcomes

Outcome Assessed? Assessment Method

a: Apply knowledge of math, science, and engineering. (Formative, Summative)

c: Solve materials selection and design problems. (Formative, Summative)

d: Function on teams. (Formative)

e: Identify, formulate, and solve engineering problems. (Formative, Summative)

f: Understand professional and ethical responsibility. (Formative, Summative)

g: Communicate effectively. (written and oral) (Formative, Summative)

h1: Understand economic impact. (Formative, Summative)

h2: Understand global, societal, and environmental impact. (Formative, Summative)

i: Engage in lifelong learning.

j: Knowledge of contemporary issues. (Formative, Summative)

k: Use techniques, skills, and tools of MSE. (Formative, Summative)

6. Instructor – Dr. Nancy Ruzycski

a. Office location – 135 Rhines Hall

b. Telephone – (352) 846-2991

c. E-mail address – nruzycki@mse.ufl.edu

d. Class Web site - <http://lss.at.ufl.edu> (E-Learning in Canvas)

e. Office hours – MW 1-3 PM (or any day by appointment)

7. Teaching Assistant – TBD

a. Office location –

b. Telephone –

c. E-mail address –

d. Office hours –

8. Meeting Times – Monday, Wednesday and Friday 3rd period 11:00 AM -12:15 PM

9. Class/laboratory schedule – Class meets three periods weekly; for 75 minutes.

10. Meeting Location – CSE A101

11. Material and Supply Fees – None

12. Textbooks and Software Required. You will be asked to bring/have a text available for in class work.

- a. Title – Fundamentals of Materials Science and Engineering: An Integrated Approach
 b. Author – William D. Callister, David Rethwisch
 c. Publication date and edition – 2016, 5th Edition
 d. ISBN number - 978-1-119-17548-3
 e. This course will use Canvas extensively as a communication and archival tool. The students can access all relevant course information (course notes, homework and exam solutions, announcements, grades, etc.) via the Canvas entry link: <https://lss.at.ufl.edu/>. **You will need Wiley plus to do your homework.**

13. Recommended Reading (see 12 above)

14. Course Outline - Below is the tentative schedule of topics, activities, reading assignments, exams, and homework. See Sakai for Chapter and Unit Objectives, Learning Outcomes, assignments, and rubrics. This schedule is subject to change based on class topic coverage speed

Week	Topic	Student product(s)/Class Activities
Mon 5/9 Wed 5/11 Fri 5/13	Materials Tetrahedron Materials Selection Process Start Unit 1 (Chapters 2-4, 12) Chapt 2 – Atomic Structure and Bonding, Chapter 3 Structure of crystalline solids	Class – Pre test Materials Selection process for material of choice (Materials Tetrahedron paper part 1) Homework on chapter 2 -4, 12 in class problem solving, formative assessments
Mon 5/16 Wed 5/18 Friday 5/20	Chapter 3 Structure of crystalline solids, Chapter 4 Polymer structures, Chapter 12 –Electrical properties	Homework on chapter 2 -4, 12 in class problem solving, formative assessments
Mon 5/23 Wed 5/25 Friday 5/27	Review for Unit 1 (2-4, 12) Assessment Start Unit 2 (5,6, 16-19) Chapter 5 imperfections in solids	Homework 2-3, 14 due Assessment on chapter 2-3, 14 Homework on chapter 5, in class problem solving, formative assessments
Mon 5/30 - Holiday Wed 6/1 Friday 6/3	Chapter 6 Diffusion Chapter 17 Thermal properties	Homework on chapter 6, 17, in class problem solving, formative assessments Materials Tetrahedron paper part 1 due Materials Selection and structural aspects for material of choice (Materials Tetrahedron paper part 2)
Mon 6/6 Wed 6/8 Fri 6/10	Chapter 17 Corrosion, Chapter 18 Magnetic properties, Chapter 19 Optical Properties	Homework on chapters 18-19, in class problem solving, formative assessments
Mon 6/13 Wed 6/15 Friday 6/17	Chapter 19 Optical Properties Review of Chapters 5,6, 16-19 Assessment of Chapters 5, 6, 16-19	in class problem solving, formative assessments Homework due on chapter 5, 6,17-19 Assessment of chapters 5,6 16-19
Mon 6/20 - Holiday Wed 6/22 - Holiday Fri 6/24 - Holiday		
Mon 6/27 Wed 6/29 Fri 7/1	Start Unit 3 (Chapter 7-9) Mechanical Properties Chapter 8 Deformation and strengthening mechanisms	Materials Tetrahedron paper part 2 due Homework chapt 7-8, in class problem solving, formative assessments Materials Selection and properties aspects for material of choice (Materials Tetrahedron paper part 3)
Mon 7/4 - Holiday Wed 7/6	Chapter 8 Deformation and	Homework chapt 9, in class problem solving,

Fri 7/8	strengthening mechanisms Chapter 9 Failure	formative assessments
Mon 7/11 Wed 7/13 Fri 7/15	Review of Unit 3(chapters 6-9) Assessment chapters 6-9 Start Unit 4 (Chapter 10-11)	Homework due chapt 6-9, Assessment chapters 6-9
Mon 7/18 Wed 7/20 Fri 7/22	Chapter 10 Phase Diagrams Chapter 11 Phase transformations Review Unit 4 (chapters 10-11)	Materials Tetrahedron paper Part 3 due Materials Selection and performance aspects for material of choice (Materials Tetrahedron paper part 4) Homework Chapter 10 -11, in class problem solving, formative assessments
Mon 7/25 Wed 7/27 Fri 7/29	Assessment Chapters 10-11 Start Unit 5 (Chapters 13-15) Chapter 13 Types and applications of materials, Chapter 14 Synthesis, fabrication and processing, Chapter 15 Composites	Homework Chapter 10 -11 due, Assessment Chapter 10-11 Homework Chapter 10 -11, in class problem solving, formative assessments
Mon 8/1 Wed 8/3 Fri 8/5	End of class wrap up All work due today	Homework chapters 13-15 due Final version of Materials Tetrahedron paper due (parts 1-4) Optional Final exam (bonus) FE style questions

15. Attendance and Expectations - Attendance is **strongly** suggested since significant amount of participative, as well as individual and collaborative work will be performed during the class sessions and will be worth as much as 20% of the course points. Proper behavior in class is always important and leads to a relaxed and productive educational environment. Thus, **eating, drinking, texting, reading of newspapers, working on homework for this or other courses, or other activities that are not part of the class are not allowed. Students who do not comply with these requirements or who behave disorderly or disrespectfully WILL be asked to leave the classroom. Leaving your cell phone on, leaving early or arriving late can be VERY distracting, you should avoid it. All electronic devices (laptops, cell-phones, etc.) should be turned off or in silent mode.**

Use of smartphones, laptops, tablets or similar personal computers for videotaping lectures is not allowed unless explicitly requested by the individual student the first day of class and for note taking purposes only. No audio/video recording is allowed with express permission of lecturer.

16. Grading – The course grade will be based on a point system with each class related activity receiving points. Your points are binned according to the activity category, and the final grade is a sum of all of the category percentages. I will post your grades in Canvas, but be aware that Canvas scores are a bit iffy for rounding purposes. The categories for your grades are below.

Formative Assessments (exit tickets, in class problem solving, in class pop quizzes, online quizzes, etc..) 20% weight

Summative Assessments (Assessments/exams, homework) 50 % weight

Student Products (take home activities, and Materials Tetrahedron Paper) 30 % weight

17. Grading Scale - Grades will not be curved but some is some extra credit on a pop up basis. However, optional earned points will be binned at the discretion of the instructor.

Grading will be assigned based on a sum of the categories

Grade:

A 93

A- 88

B+ 84

B 80

B- 76
C+ 72
C 68
C- 65
D+ 62
D 59
D- 56
E 50

This statement must be included in every grade scale for undergraduate level 1000-5000 syllabi:

“A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

18. Make-up Assessment/Exam Policy – Make up exams will be provided only with the ***prior approval of the instructor in accordance with university policies***. In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, and religious holidays. In all cases you will be required to provide written documentation, and obtain prior instructor approval. You will not be excused from any exam without following the policy above, with no exceptions. Students not in attendance for the scheduled exam will receive a score of zero. To be clear, Make-up exams will only be allowed in exceptional cases, with prior instructor approval, sufficient documentation, and in accordance of university policies. Make-up exams for excused absences as well as exam conflicts must occur within 1 week of the missed exam, and may occur before the missed exam. Any student anticipating missing class, must send an email to the instructor to be allowed to make up work. Students may not miss exams except for a documented illness, or a documented leave. Documentation includes, doctor’s notes, and pre-excused absences documented by email at least a week prior to the missed date. Make up exams must be scheduled within 2 days of a student’s return. There will be no make ups for assignments without permission of instructor.

19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. UF Counseling Services –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.

22. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity