

**EMA 3050 – Inorganic Materials  
Section 3052**

1. **Course Description:** Uses, structure, processing and properties of inorganic materials, including metals, alloys, and ceramics. Scientific principles are introduced through discussion of developed inorganic materials for high technology applications (3 credit hours).

2. **Course Objectives:** To gain an understanding of the relationships between crystal structure, processing, and properties of inorganic materials including ceramic and metallic materials. To develop the ability to select appropriate materials to meet design specifications for engineering applications.

3. **Prerequisites:** EMA3011

4. **Professional Component (ABET):** This is a 3 credit course. It provides 2 credits towards engineering sciences and 1 credit towards design.

**5. Relation to Program Outcomes (ABET):**

<b>Outcome:</b>	<b>Coverage*</b>
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	High
3. An ability to communicate effectively with a range of audiences	Medium
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	Medium

6. Instructor: **Dr. Jennifer Andrew**

- a. E-mail address: [jandrew@mse.ufl.edu](mailto:jandrew@mse.ufl.edu)
- b. Office hours: **M 3:00p-5:00p**
- c. Website: <https://elearning.ufl.edu/>

7. Meeting Times and Location: **T Period 2 8:30a-9:20a FLG 270**  
**R Period 2 & 3 8:30a-9:20a & 9:35a-10:25a FLG 270**

8. Textbooks Required

- 1a. Title: ***Modern Physical Metallurgy***
- 1b. Author: **R. E. Smallman & A. J. W. Ngan**
- 1c. Edition: **8th**
- 1d. ISBN: **9780080982045**

- 2a. Title: ***Modern Ceramic Engineering: Properties, Processing, and Use in Design***
- 2b. Author: **David Richerson**
- 2c. Edition: **3rd**
- 2d. ISBN: **1574446932**

9. **On the Web:** 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://elearning.ufl.edu/>. Pertinent course information may also be announced via UFL e-mail address in addition to over Canvas.

10. **Conduct, Attendance and Expectations:** Proper behavior in class is always important and leads to a

relaxed and productive educational environment. Excused absences must be in compliance with university policies in the Graduate Catalog: (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>), and require appropriate documentation.

**11. Grading and Grading Scale:** Your final grade will be allocated based on the following distribution:

Homework: 25%  
Three In-Class Exams: 25% each

Percentage	≥ 92	≥ 88	≥ 84	≥ 80	≥ 76	≥ 72	≥ 68	≥ 65	≥ 62	≥ 59	≥ 56	<56
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

The instructor reserves the right to adjust the grade distributions, however grades **will not** be adjusted for individuals.

Exams. You will be given 3 exams throughout the semester, the exam content may change but the dates will not. **There will be no final exam.** Each exam is weighted equally and will be worth 20% of your final grade. Requests for re-grading must be made in writing and within one week after an assignment has been returned. **Make-up exams** will be provided only with the *prior approval of the instructor or excused absence*. In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, religious holidays and participation in official university activities such as music performances, athletic competition or debate.

Homework. Homework problems will be assigned, together with due dates, through e-Learning. These homework questions are *essential* to your study and some exam questions will be adapted from them. Homework will be posted through the Canvas web site. Assignments are due at the **online through Canvas in .pdf format** on the due date, unless otherwise stated. **Late homework assignments will not be accepted and will receive a grade of zero.** The lowest homework score will be dropped.

12. **Course Outline:** Below is the tentative schedule of topics, activities, reading assignments, and exams.

<b>Week of</b>	<b>Topic</b>	<b>Reading Assignments</b>
8/21/23	Periodic Table, Bonding, Symmetry	Smallman (1.1-1.5)
8/28/23	Crystal Structures- Metals, Ceramics, Intermetallics, Amorphous	Smallman (1.5-1.8), Richerson (Ch. 5, 4.4)
9/4/23	Phase Equilibria	Smallman (Ch. 2), Richerson (Ch. 6)
9/11/23	Phase Equilibria, Solidification	Smallman (Ch. 3)
9/18/23	Solidification, Dislocations	Smallman (4.1-4.3)
9/25/23	Solidification, Dislocations	Smallman (4.1-4.3)
10/2/23	Point Defects	Smallman (Ch. 6)
<b>EXAM 1</b>	<b>Thurs. October 5</b>	
10/9/23	Point Defects	Smallman (Ch. 6)
10/16/23	Diffusion	Smallman (Ch. 7)
10/23/23	Properties- Physical, Thermal	Smallman (Ch. 8), Richerson (Ch. 7)
10/30/23	Properties- Physical, Thermal	Smallman (Ch. 8), Richerson (Ch. 7)
<b>EXAM 2</b>	<b>Thurs. November 2</b>	
11/6/23	Properties- Electrical, Dielectric	Richerson (Ch. 8, Ch. 10)
11/13/23	Properties- Mechanical	Smallman (Ch. 9)
11/20/23	Planar Defects & Microstructure	Smallman (Ch. 10)
11/23/23	<i>Thanksgiving Day (No Class)</i>	
11/27/23	Strengthening Mechanisms	Smallman (Ch. 11,12)
<b>EXAM 3</b>	<b>Thurs. November 30</b>	
12/4/23	Alloys	Smallman (Ch. 14)

13. **Honesty Policy** – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

14. **Course Evaluation** - Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

15. **In Class Recording** – Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

**16. Students Requiring Accommodations** – Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

**17. Commitment to a Safe and Inclusive Learning Environment** - The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University’s core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- HWCOE Human Resources, 352-392-0904, [student-support-hr@eng.ufl.edu](mailto:student-support-hr@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

**18. 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.

**19. Student Privacy** - There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

## 20. Campus Resources- Health and Wellness

### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

### **Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

## Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

**Career Connections Center**, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

**Writing Studio**, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

**On-Line Students Complaints:** <https://distance.ufl.edu/getting-help/>; <https://distance.ufl.edu/state-authorization-status/#student-complaint>.