

Materials

EMA 3010 Section 5989 (20379), 2484 (23278)

Class Periods:

Section 5989 (20379): MWF, Period 4 (10:40am – 11:30am)

Section 2484 (23278): T Period 4 (10:40am – 11:30am), R Period 4-5 (10:40am – 12:35pm)

Location:

Section 5989 (20379): LAR 0310

Section 2484 (23278): CSE E121

Academic Term: Fall 2025

Instructor:

Kevin Gilley

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352-846-3339

Office Hours: Monday 1:00pm – 3:00pm, Thursday 2:00pm – 4:00pm, RHN 112

Teaching Assistant/Supervised Teaching Student:

Please contact through the Canvas website

- TBA

Course Description

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

Course Pre-Requisites / Co-Requisites

CHM 2045 (or equivalent)

Course Objectives

This is an introductory course, designed to provide the fundamental concepts of Materials Science and Engineering. Students will be able to describe structure, properties, and applications of metallic, ceramic, polymeric and composite materials and how to select materials for a given application.

Materials and Supply Fees

N/A

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the	

impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- Title : Fundamentals of Materials Science and Engineering: An Integrated Approach
- Author : William D. Callister and David G. Rethwisch
- Publication date and edition: Zybooks 6th Edition
- ISBN number : 979-8-203-26676-7

PLEASE NOTE: You need to acquire the e-book version with access to zyBooks as this interactive online learning tool will be used for assessment as indicated in the evaluation of grades. The simplest and affordable way to acquire the e-book is via UF ALL ACCESS. Login at the following website and Opt-In to gain access to your UF All Access course materials - <https://www.bsd.ufl.edu/AllAccess> – UF All Access will provide you with your required materials digitally at a reduced price, and the charge will be posted to your student account. This option will be available starting one week prior to the start of the semester and ends three weeks after the first day of class.

Required Computer

Recommended Computer Specifications: <https://it.ufl.edu/get-help/student-computer-recommendations/>
 HWCoe Computer Requirements: <https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/>

Course Schedule

Below is the intended/tentative schedule of classes and exams. The instructor reserves the right to make changes to the syllabus as needed. Any changes will be clearly announced on CANVAS and in class.

PLEASE NOTE: THERE ARE 2 SCHEDULES ONE FOR EACH SECTION. MAKE SURE YOU ARE LOOKING AT THE CORRECT SCHEDULE FOR YOUR SECTION

SECTION 5989 MWF Period 4

Week	Class #	Class dates	Topic	Chapter
1	1	August 22	Course Objectives, Syllabus, Instructor Introduction	0
2	2	August 25	Introduction	1
	3	August 27	Atomic Structure and Interatomic Bonding	2
	4	August 29	ICE1: Atomic Structure and Interatomic Bonding	2
3		September 1	NO CLASS - HOLIDAY	
	5	September 3	Structure of metals, ceramics	3
	6	September 5	Structure of metals, ceramics	3
4	7	September 8	ICE2: Structure of metals, ceramics	3
	8	September 10	Structure of Polymers	4
	9	September 12	Structure of Polymers	4
5	10	September 15	ICE3: Structure of Polymers	4
	11	September 17	Exam 1 Review	2,3,4
	12	September 19	Exam #1 (in class; lectures 2 – 12)	2,3,4
6	13	September 22	Imperfections in Solids	5
	14	September 24	Imperfections in Solids	5
	15	September 26	ICE4: Imperfections in Solids	5
7	16	September 29	Diffusion	6
	17	October 1	ICE5: Diffusion	6
	18	October 3	Exam 2 Review	5,6
8	19	October 6	Exam #2 (in class; lectures 14 – 19)	5,6
	20	October 8	Mechanical Properties	7
	21	October 10	Mechanical Properties	7
9	22	October 13	ICE6: Mechanical Properties	7
	23	October 15	Deformation and Strengthening Mechanisms	8
		October 17	NO CLASS - HOMECOMING	
10	24	October 20	ICE7: Deformation and Strengthening Mechanisms	8
	25	October 22	Failure	9
	26	October 25	Exam 3 Review	7,8,9
11	27	October 27	Exam #3 (in class)	7,8,9
	28	October 29	Phase diagrams	10
	29	October 31	Phase diagrams	10
12	30	November 3	ICE8: Phase diagrams	10
	31	November 5	Phase transformations	11
	32	November 7	ICE9: Phase transformations	11
13	33	November 10	Composites	15
	34	November 12	ICE10: Composites	15
	35	November 14	Composites	15
14	36	November 17	Economic, Environmental and Societal Issues in MSE	20
	37	November 19	Exam 4 Review	10,11,15,20
	38	November 21	EXAM 4 (in class, lectures 34 – 38)	10,11,15,20
15		November 24	NO CLASS - THANKSGIVING	
		November 26	NO CLASS - THANKSGIVING	
		November 28	NO CLASS - THANKSGIVING	
16	39	December 1	Hurricane Flex Day	
	40	December 3	Hurricane Flex Day	
			NO FINAL EXAM	

Section 2484 (23278): T Period 4 (10:40am – 11:30am), R Period 4-5 (10:40am – 12:35pm)

Week	Class #	Class dates	Topic	Chapter
1	1	August 21	Course Objectives, Syllabus, Wiley Introduction	0
	2	August 21	Introduction	1
2	3	August 26	Atomic Structure and Interatomic Bonding	2
	4	August 28	ICE1: Atomic Structure and Interatomic Bonding	2
	5	August 28	Structure of metals, ceramics	3
3	6	September 2	Structure of metals, ceramics	3
	7	September 4	ICE2: Structure of metals, ceramics	3
	8	September 4	Structure of Polymers	4
4	9	September 9	Structure of Polymers	4
	10	September 11	ICE3: Structure of Polymers	4
	11	September 11	Review lecture	1 - 4
5	12	September 16	Exam #1 (in class; lectures 2 – 11)	1 - 4
	13	September 18	Imperfections in solids	5
	14	September 18	Imperfections in solids	5
6	15	September 23	ICE4: Imperfections in solids	5
	16	September 25	Diffusion	6
	17	September 25	ICE5: Diffusion	6
7	18	September 30	Mechanical properties	7
	19	October 2	Mechanical properties	7
	20	October 2	Review lecture	5 - 6
8	21	October 7	Exam #2 (in class; lectures 13 – 17)	5-6
	22	October 9	ICE6: Mechanical properties	7
	23	October 9	Deformation and strengthening mechanisms	8
9	24	October 14	ICE7: Deformation and strengthening mechanisms	8
	25	October 16	Failure	9
	26	October 16	Phase diagrams	10
10	27	October 21	Phase diagrams	10
	28	October 23	ICE8: Phase diagrams	10
	29	October 23	Review lecture	7 - 9
11	30	October 28	Exam #3 (in class; lectures 18 - 20, 22 - 25)	7 - 9
	31	October 30	Phase transformations	
	32	October 30	ICE9: Phase transformations	11
12	33	November 4	Composites	15
	34	November 6	ICE10: Composites	15
	35	November 6	Economic, Environmental and Societal Issues in MSE	20
13		November 11	Veteran's Day - Holiday	
	36	November 13	Review lecture	10,11,15,20
	37			
14	38	November 18	Exam #4 (in class, lectures 26 – 28, 31 - 35)	10,11,15,20
	39	November 20	Hurricane Flex Day	
	40	November 20	Hurricane Flex Day	
15		November 25	Thanksgiving Holiday	
		November 27	Thanksgiving Holiday	
		November 27	Thanksgiving Holiday	
16	41	December 2	Hurricane Flex Day	
			NO FINAL EXAM	

Important Dates (Please note dates are tentative and subject to change)

Sep. 16	Exam 1 (in-class) Sect. 2484
Sep. 19	Exam 1 (in-class) Sect 5989
Oct. 6	Exam 2 (in-class) Sect 5989
Oct. 7	Exam 2 (in-class) Sect 2484
Oct. 27	Exam 3 (in-class) Sect 5989
Oct. 28	Exam 3 (in-class) Sect 2484
Nov. 18	Exam 4 (in-class) Sect 2484
Nov. 21	Exam 4 (in-class) Sect 5989

Evaluation of Grades

Assignment	Number	Percentage of Final Grade
Reading (zybooks)*	16	20%
In-Class Exercises**	10	20%
Exams (in-class)	4	60%
		100%

* Earn activity points by completing textbook reading assignments in zyBooks, 16 in total (longer chapters are split into two assignments). While activity points for each reading assignment in zyBooks vary, each Canvas assignment is set as 10 points (zyBooks sends scores to Canvas as percentages).

** Two lowest scores (or missing submissions) within this category will be discarded when computing the total points of the category for the final grade.

Grading Policy

Percent	Grade	Grade Points
100 – 92.0	A	4.00
91.9 – 88.0	A-	3.67
87.9 – 84.0	B+	3.33
83.9 – 80.0	B	3.00
79.9 – 76.0	B-	2.67
75.9 – 72.0	C+	2.33
71.9 – 68.0	C	2.00
67.9 – 65.0	C-	1.67
64.9 – 62.0	D+	1.33
61.9 – 59.0	D	1.00
58.9 – 56.0	D-	0.67
55.9 – 0.0	E	0.00

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: <https://go.ufl.edu/syllabuspolices>. Instructor-specific guidelines for courses must accommodate these policies.

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.

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.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University 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.

Commitment to a Positive 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.

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

- Your academic advisor or Undergraduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu