

**EAS 4240 Aerospace Composites**  
**EAS 5242 Mechanics of Composite Materials**

**Location:** Online – Asynchronous

**Academic Term:** Spring 2021

- URL for lecture videos: [https://ufedge.video.ufl.edu/Mediasite/Catalog/catalogs/spring-2019-eas6939\\_eas4240](https://ufedge.video.ufl.edu/Mediasite/Catalog/catalogs/spring-2019-eas6939_eas4240)
- **Class Periods:** MWF, 5<sup>th</sup> period, 11:45 AM – 12:35 PM (used for exams and synchronous class activities)
- Students should watch each lecture video on or before the day shown in the course schedule given below.
- *It may become necessary to modify this syllabus during the semester. In this event, students will be notified, and the revised syllabus will be posted on the course web site.*

**Instructor:**

Professor B.V. Sankar <[sankar@ufl.edu](mailto:sankar@ufl.edu)>

Office Hours: MWF 7<sup>th</sup> period (1:55 PM – 2:50 PM) Zoom. Students should email instructor questions, if possible. Additional Zoom office hours upon request.

**Course Description**

Credits: 3; Micro- and macro-mechanics, thermo-mechanical analysis and failure theories for composite materials. Design and analysis of composite structural elements.

**Course Pre-Requisites / Co-Requisites**

EGM 3520 Mechanics of Materials

**Course Objectives**

**Goals:** The major goal of this course is to give the student an introduction to the theory and applications of advanced fiber-reinforced composite materials. After completing this course, the student should be able to select and use appropriate composite materials in a variety of applications.

**Engineering Applications:** Currently fiber reinforced and particle reinforced composites are used in aerospace, automobile, marine and rail transport, electronic packaging, buildings and bridges (civil infrastructure), sporting goods, biomedical devices etc. This course will help engineers to design these structures based on sound mechanics principles.

**Materials and Supply Fees** Additional Course Fees: \$27.99

**Professional Component (ABET):** N/A

**Required Textbooks and Software**

**Textbook:** Principles of Composite Material Mechanics (Third or Fourth Edition) by R.F. Gibson, CRC Press, Boca Raton, FL (ISBN 9781439850053).

MATLAB and Excel should be sufficient for homework assignments and projects

## Topics

1. Introduction
2. Lamina (composite) stress-strain relations
3. Strength of composite materials
4. Laminate Analysis
5. Micromechanics
6. Fracture of composite materials
7. Mechanical testing of composites

## Course Schedule (Tentative, subject to some changes)

Lecture	Date	Day	Chapter	Topics	HW/Quiz/Exam
1	11-Jan	MON	1	Introduction	
2	13-Jan	WED	1	Introduction	
3	15-Jan	FRI	2	Lamina stress-strain relations	
-	18-Jan	MON	2	<b>Martin Luther King Holiday</b>	
4	20-Jan	WED	2	Lamina stress-strain relations	<b>HW01</b>
5	22-Jan	FRI	2	Lamina stress-strain relations	
6	25-Jan	MON	2	Lamina stress-strain relations	<b>Quiz 1</b>
7	27-Jan	WED	2	Lamina stress-strain relations	<b>HW02</b>
8	29-Jan	FRI	2	Lamina stress-strain relations	
9	1-Feb	MON	4	Strength of composite materials	
10	3-Feb	WED	4	Strength of composite materials	<b>Quiz 2, HW03</b>
11	5-Feb	FRI	4	Strength of composite materials	
12	8-Feb	MON	4	Strength of composite materials	
13	10-Feb	WED	4	Strength of composite materials	<b>HW04</b>
14	12-Feb	FRI	7	Laminate Analysis	
	15-Feb	MON		<b>EXAM 1</b>	<b>Exam 1</b>
15	17-Feb	WED		Laminate Analysis	
16	19-Feb	FRI	7	Laminate Analysis	<b>HW05</b>
17	22-Feb	MON	7	Laminate Analysis	
18	24-Feb	WED	7	Laminate Analysis	<b>HW06</b>
19	26-Feb	FRI	7	Laminate Analysis	<b>Quiz 3</b>
20	1-Mar	MON	7	Laminate Analysis	
21	3-Mar	WED	7	Laminate Analysis	<b>HW07</b>
22	5-Mar	FRI	7	Laminate Analysis	
23	8-Mar	MON	7	Laminate Analysis	
24	10-Mar	WED	7	Laminate Analysis	<b>Quiz 4, HW08</b>
25	12-Mar	FRI	7	Laminate Analysis	
26	15-Mar	MON	7	Laminate Analysis	
27	17-Mar	WED	7	Laminate Analysis	<b>HW09</b>
28	19-Mar	FRI	7	Laminate Analysis	
-	22-Mar	MON		<b>Exam 2</b>	<b>Exam 2</b>
-	24-Mar	WED	7	<b>Recharge Day</b>	
29	26-Mar	FRI	7	Micromechanics	
30	29-Mar	MON	3	Micromechanics	
31	31-Mar	WED	3	Micromechanics	<b>HW10</b>

32	2-Apr	FRI	3	Micromechanics	
33	5-Apr	MON	3	Micromechanics	
34	7-Apr	WED	3	Fracture of composite materials	<b>Quiz 5, HW11</b>
35	9-Apr	FRI	3	Fracture of composite materials	
36	12-Apr	MON	9	Mechanical testing	
37	14-Apr	WED	9	Mechanical testing	<b>HW12</b>
38,39	16-Apr	FRI	9	Mechanical testing	
40,41	19-Apr	MON	10	Mechanical testing	<b>HW13</b>
-	21-Apr	WED	10	<b>Exam 3</b>	<b>Exam 3</b>

***Online Course Recording***

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

***Attendance Policy, Class Expectations, and Make-Up Policy***

It is extremely important that students watch the lecture videos on or before the suggested date in the course schedule. Not watching videos in a timely manner results in poor or mediocre performance. Excused absences at the quizzes and exams must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

**Attendance Policy:** Students are expected to attend all classes. They will be responsible for any announcement made in the class regarding assignments, quizzes and exams.

**Make-Up Exam Policy: No make-up quiz will be given**

Attendance at the exams is required, unless otherwise stated explicitly in advance.

Unexcused absences will be reported as a failure.

Acceptable reasons for absence: Personal or family (immediate family member) illness, death of an immediate family member, or other situations of comparable gravity

Documentation must be presented prior to final determination. Examples include but are not limited to

- (i) A physician’s note which documents an illness and indicates the severity of the illness that would have prohibited taking the examination
- (ii) An obituary which documents the death of a close family member and their relationship to the student

**Note: No make-up quiz will be given**

**Re-grading Policy:** Any re-grade requests must be submitted in writing using the form available in the course website in CANVAS within two days after return of the graded paper. The written request must explain in

detail what you want the grader to do and where you believe s/he has made a mistake in grading. These requests will be accepted by Dr. Sankar only.

**Project(s)** Students will develop a computer program (MATLAB) for the analysis of composite laminates.

**Homework:** Homework problems are due at 11:59 PM on most **Wednesdays**. Late homework will not be accepted, but two home-works with lowest scores will be dropped.

**Quizzes:** There will be five quizzes. One quiz with lowest score will be dropped. No Makeup quiz will be given.

**Examinations:** There will be three in-class exams. NO final exam.

**Grading:** Homework 10%, Computational Projects 10%, 4 quizzes 20%, three exams 60%

### ***Grading Policy***

<b>%</b>	93.0	90.0	86.5	83.0	80.0	76.5	73.0	70.0	66.5	63.0	60.0	0 - 59.9
<b>Grade</b>	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
<b>Grade Points</b>	4	3.7	3.3	3	2.7	2.3	2	1.7	1.3	1	0.7	0

More information on UF grading policy may be found at:  
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**Sorting Number SN and Digital Sum D:** Each student has a unique SN and D. These numbers will be used in the quizzes and exams as variables. The formula to calculate your SN and D is given in the folder Syllabus and General Information in CANVAS.

### ***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/policies/student-honor-code-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 Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

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
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@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)

### ***Software Use***

All faculty, staff, and students 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.

### ***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>

### ***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:** <http://www.counseling.ufl.edu/cwc>, 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](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling.  
<https://www.crc.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://care.dso.ufl.edu>.

**On-Line Students Complaints**: <http://www.distance.ufl.edu/student-complaint-process>.