

EGR 211: Materials and Mechanics

Fall 2019

Professor A

Professor B

Graduate TAs: Teach Assist 1, Teach Assist 2

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Class time: MWF 9:15 am – 11:05 am
MWF 1:15 pm – 3:05 pm
Location: Wake Downtown Rms.
1616, 0605



COURSE DESCRIPTION

Look around you – every manmade object that you see was fabricated with materials that have been carefully engineered over decades, or even centuries, to provide desired behaviors, which we call “material properties” and “material performance” in engineering. In this course, we will draw heavily on your foundations in the sciences and math as we explore why ceramics are strong but brittle, how buildings are designed to survive major earthquakes, why bridges are constructed with expansion joints, and how earthworms burrow, among so many other fascinating concepts and phenomena.

The format of our course will follow the four corners of the materials engineering tetrahedron: Structure, Processing, and Properties (Module 1), and Performance (static loading – Module 2; dynamic loading – Module 3).

LEARNING GOALS

- Select appropriate materials for use in mechanical designs;
- Apply relevant mechanics theory (static and dynamic) in the analysis and design of mechanical structures and systems;
- Predict, prevent, and interpret failure in materials and mechanical designs; and
- Effectively report scientific findings by tailoring technical writing and visual presentation formats to your audience.

COURSE RESOURCES

There is no assigned textbook for EGR 211 this semester. However, many textbooks and other resources will be made available to you through Canvas and in class.

CLASSROOM POLICIES AND PROCEDURES

This is a hands-on laboratory setting style class. Thus the following policies will be in place:

- No food or drink in lab.
- Eye-protection, closed-toe shoes and long pants should be worn at all times in lab.
- The lab area should be cleaned after you are done with the area.
- You should show up with all preparatory items complete. This will sometimes include notes on safety and thus are required to participate.

DISABILITY ACCOMMODATION

If you have a disability that may require an accommodation for taking this course, please contact the WFU Learning Assistance Center (336-758-5929) within the first two weeks of the course. We will be happy to meet with you privately to discuss particular needs in more detail.

POLICY ON LATE ASSIGNMENTS

We will not accept late assignments unless extenuating circumstances have occurred. If you are going to miss class when something due, please talk to us prior to the due date and we can try to accommodate you as best as possible.

POLICY ON RE-SUBMISSION

Some resubmission options will become available throughout the semester with restrictions and criteria. These will be given out in class.

POLICY ON ATTENDANCE

Since this is a hands-on class, attendance will have a big effect on your final grade and ability to complete coursework. We will not guarantee make-up options for every in-class activity so please make your best effort to attend. In the case of extenuating circumstances we will do our best to accommodate.

POLICY ON ACADEMIC INTEGRITY

“Wake Forest University is firmly committed to principles of honor and ethical conduct. The Honor Code embodies a spirit of trust that pervades all aspects of student life. Each student’s word should be worthy of trust. A violation of this trust is an offense against the community. Membership in the student body signifies a student’s commitment to the Honor Code and Conduct system. It is the responsibility of every student to act honorably in all phases of student life, to understand student rights and responsibilities, and to preserve the integrity of the Honor Code.” (p. 15, [WFU Student Code of Conduct](#), ed. 2017-18)

GRADES

Final grades will be determined on a weighted structure of the modules and other graded materials.

EGR 311 Module/Category	Weight	Description
ASSIGNMENTS	15%	Assignments will range from worksheets to hands-on activities and simulations to problem sets and design projects.
LAB/CLASS PARTICIPATION	10%	Lab, in-class activities, as well as prep work required for class participation will be evaluated in this category, often as a binary (Y/N) complete.
LAB WRITE-UPS	20%	You will author and submit a variety of reports, in various formats, throughout the semester.
EXAM 1	15%	There are two (2) in-semester exams scheduled for EGR 211 this semester. Each exam will be scheduled for the entire class period (1 h 50 m), and the content of that exam will be cumulative of the entire semester to date.
EXAM 2	15%	
FINAL	25%	Your final exam will be cumulative of the entire semester.

SCHEDULE

The modules will follow this tentative schedule. Please use Canvas and reminders in class for individual dead-lines.

Week	Day	Date	Module	Key Dates
Week 1	M	26-Aug	1 Structure, Processing, Properties of Materials	
	W	28-Aug		
	F	30-Aug		*Lab 1 – Structure of Materials
Week 2	M	2-Sep		Assignment 1
	W	4-Sep		
	F	8-Sep		
Week 3	M	9-Sep		Assignment 2
	W	11-Sep		
	F	13-Sep		
Week 4	M	16-Sep		Assignment 3
	W	18-Sep		
	F	20-Sep		*Lab 2 – Properties of Materials
Week 5	M	23-Sep		Assignment 4
	W	25-Sep		Exam 1 – Cumulative of Module 1 (Review Assignment 1)
	F	27-Sep		
Week 6	M	30-Sep	Assignment 5	
	W	2-Oct		
	F	4-Oct		
Week 7	M	7-Oct	Assignment 6 & Lab Report 2	
	W	9-Oct		
	F	11-Oct	FALL BREAK	
Week 8	M	14-Oct	Assignment 7	
	W	16-Oct		
	F	18-Oct	*Lab 3 – Beams in Bending	
Week 9	M	21-Oct	Assignment 8	
	W	23-Oct		
	F	25-Oct		
Week 10	M	28-Oct	Lab Report 3 & Assignment 9	
	W	30-Oct		
	F	1-Nov	*Lab 4 – Column Buckling	
Week 11	M	4-Nov	Exam 2 – Cumulative of Modules 1 & 2 (Review Assignment 2)	
	W	6-Nov		
	F	8-Nov		
Week 12	M	11-Nov	Lab Report 4 & Assignment 10	
	W	13-Nov		
	F	15-Nov		
Week 13	M	18-Nov	Assignment 11	
	W	20-Nov		
	F	22-Nov		
Week 14	M	25-Nov	*Lab 5 – Vibrations in Systems & Assignment 12	
	W	27-Nov	Thanksgiving Break	
	F	29-Nov	Thanksgiving Break	
Week 15	M	2-Dec		
	W	4-Dec		
	F	6-Dec	Lab Report 5 & Assignment 13	
Final Exam	W	11-Dec	2:00 PM for MWF 1:15	Cumulative Final (Review Assignment 3)
Final Exam	Th	12-Dec	9:00 AM for MWF 9:15	Cumulative Final (Review Assignment 3)