Roanoke College (Academic Year 2022 – 2023, Spring Semester)

Department of Mathematics, Computer Science and Physics

ENGS-192   Engineering Analysis   MW 1:10 – 2:40 PM   Life Sciences Bldg. Room 301

Instructor: John F. Pescatore

Office: Trexler #175

Student hours: MTW 3:00 – 5:00 PM and by appointment

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ENGS 192 Engineering Analysis

Introduces the methods of conceptual design (orthographic projections and computer aided drafting), mathematical modeling, prototyping and communication. Focus on developing proficiency in implementing the design process (validating potential design problems, systematic methods to develop and select solutions, prototyping and iterating to optimize solutions, communicating the final solutions to a broad audience). (1)

Lecture: 3 hrs./wk.

Prerequisites: ENGS 191.

Introduction

This course provides content in engineering design/drawing; projections; mapping and scales; numerical modelling and simulation; engineering calculations & iterative solution processes; engineering economics. Students will be challenged to think critically and apply an organized, systematic approach to achieve solutions to problems. The principles and concepts presented will prepare students for upper-level course in the engineering sciences

Course description

The course will start with a review of ENGS-191 topics including Matlab/Octave & EXCEL applications. Budgetary constraints are an important aspect of engineering design and build processes. In this regard, the subject of the economics of engineering, i.e., the time value of money, cost/benefit analysis, price/demand elasticity, etc., will be introduced, followed by engineering calculations, basic numerical modeling, and iterative solution procedures. The second half of the course will involve engineering drawings/design, maps, scales, and projections.

Learning outcomes

Upon successful completion of this course, students will be able to:

1. Understand the concept of time-value of money and move monetary amounts in time using factors from compound interest tables; understand minimum acceptable rate of return and benefit-cost analyses.
2. Identify and construct drawings and views of figures and objects, i.e., pictorial, oblique, and isometric; linear perspectives.
3. Interpret and use maps of various scales; be familiar with various projections.
4. Write and execute basic code for MATLAB/Octave to conduct engineering calculations and simulations, and generation of graphics.
5. Prepare EXCEL worksheets for various analyses, figures, and charting.

Tentative course schedule

The following schedule table is approximate and subject to change except for the test dates. The table, albeit subject to modification, should provide a general picture of the timing for content presentation and assignments.

Teaching week	Dates	Lecture material	Assignments
1	1/16 – 1/20	Introduction, review of ENGS 191	TBD
2	1/23 – 1/27	ENGS 191 review	
3	1/30 – 2/3	Engineering economics	
4 (test #1)	2/6 – 2/10	Engineering economics	
5	2/13 – 2/17	Engineering economics	
6	2/20 -2/24	Engineering calculations & simulations	
7 (test #2)	2/27 – 3/3	Engineering calculations & simulations	
Spring break March 6 -10			
8	3/13 – 3/17	Maps, scales, projections	TBD
9	3/20 -3/24	Maps scales projections	
10 (test #3)	3/27 -3/31	Engineering drawing	
11	4/3 -4/7	Engineering drawing	
12	4/10 – 4/14	Engineering drawing	
13 (test #4)	4/17 – 4/21	Engineering drawing	
14	4/24 – 4/25 April 25 last day of classes	Course review	
Final examination period 4/27 – 5/2			

Attendance policy

Class attendance is an especially important aspect of a student's success in this course. ***Each student is expected to attend every class and is accountable for missed content and assignments.*** If you have a temperature of 100.4 or higher or other COVID symptoms, do not come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. For your absence to be excused, you must give Health Services permission to notify me that you have consulted them about COVID symptoms. If Health Services informs you that you should isolate and not attend class for multiple days, inform me so that we can plan to keep you current in the course. All absences caused by consultation with Health Services about Coronavirus symptoms or isolation ordered by Health Services will be excused but you will need to do the work and graded assignments even if we extend a deadline for you.

Athletic commitments

College athletes must notify me of any scheduled absences or unavoidable post-injury absences.

Masks

The college is starting the term without a specific mask mandate. Some offices on campus may require that masks be worn (such as Health Services). For this class, masking is optional.

Course materials

(1) Textbook: There is no specific textbook required. I will provide (a) handouts for each class and digital content on Inquire, (b) non-RC books on reserve at Fintel Library if needed.

(2) Calculator: A scientific or graphing calculator is required.

(3) MATLAB/Octave will be used in the second half of the semester. The instructor will provide instruction on installing Octave on your personal computer.

Structure and grading

A letter grade will be assigned after final grades are computed for the term as per the scale below. Attendance and class participation will be considered when determining marginal grades.

Grading scale

A (100-93)   A-(92.9-90)

B+ (89.9-87)   B (86.9-83)   B- (82.9-80)

C+ (79.9-77)   C (76.9-73)   C- (72.9-70)

D+ (69.9-67)   D (66.9-63)   D- (62.9-60)   F (59.9 and down)

The (numerical) final course grade will be determined from the five (5) assessments listed below. Each weighted similarly (20%) for a total of 100%

Assessment	Weighting	Date
Test #1	20%	9/23
Test #2	20%	10/14
Test #3	20%	11/11
Test #4	20%	12/02
Final examination	20%	TBD
Total	100%	

All in-class tests including the final examination are closed book/ notes. The instructor shall provide an equation/formula sheet and/or students will prepare their own sheet.

Homework (including required reading) and class notes are absolutely the best sources of review! Tests will not be designed to be cumulative, but as with any course involving physics and math, material from previous tests can be thought of as a prerequisite for future tests. The final examination is cumulative.

Test make-up policy

Test make-ups are administered in accordance with Roanoke College policy. Anticipated, excused absences must be reported to the instructor with appropriate certification well before the scheduled test date. Legitimate emergency absences must be reported with appropriate documentation within one week of returning to class. No other make-ups will be given.

Corrections to grading

If you think an error may have been made in the grading of your test, carefully review the answer key posted on Inquire and then contact the instructor within 1 week of the test's return with your question. Do NOT alter the original work. The entire test may be re-graded, and the test grade is subject to remain the same, increase or decrease at the discretion of the instructor.

Final examination

The final exam will be comprehensive. As with the tests, it will emphasize both mathematical computations and critical thinking. The best way to review for the final is to review your performance on the four assessments; focus on material that you did not master the first time around and review the topics that you did master.

Expected work policy

This course requires you to spend at least 2 hours of study outside of class for every class hour which is a minimum of 12 hours total work each week inside and outside of class.

Electronic devices

I recommend using only your scientific/engineering calculator during class; students who have their laptop/notebook PC open in class tend to migrate to the internet/ social media during class instruction. I prefer cell phones be left in your backpack and set on silent mode; however, I understand you may need your cell phone active in anticipation of a medical-related call, for example, if you have an immediate family member hospitalized.

Inquire policy

Students are required to be knowledgeable of all postings on Inquire. Each student shall regularly monitor Inquire for course information. Any assignment that requires an Inquire upload will not be accepted in any other form. Uploaded files must be PDF format and readable on the instructor's college computer. Each student must ensure the successful submission of any document and resolve technology problems through the college's IT department.

Academic integrity

I expect all students to follow the rules outlined in Academic Integrity policies of Roanoke College because your learning and integrity are at the core of your RC education.

http://www.roanoke.edu/academicintegrity

https://www.roanoke.edu/aihandbook

In-class assessments will be closed book/notes; therefore, students are not permitted to consult any texts, notes, or other prepared materials during a testing period as such action is a violation under cheating.

All graded work shall be your own work! Questions about how these policies apply to our class should be directed to the instructor. Any violations of AI policies will automatically be turned over to the Academic Integrity Council.

Academic integrity (continued)

All source material must be properly cited using the MLA conventions and use paraphrases or quotations when appropriate. Drafts must include citations. Note that paraphrasing is more than re-arranging a few words. I am happy to help, but also encourage you to use the Writing Center at all stages of your paper writing. The instructor will address the need for proper citation and references pertaining to the writing assignment

Online testing – the instructor does not anticipate quizzes or tests administered via Inquire unless there is another coronavirus outbreak or similar pandemic. In the event of going online, the instructor will address policy regarding open book/notes. Any use of outside assistance for online assessments such as 'web-based apps and Chegg, Course Hero, and r "homework help" sites is not allowed; further, upload of any quiz or test questions to such sites is forbidden.

Accommodations

If you may require an accommodation in this course, please provide me with your documentation within the first 2 weeks of the semester. I must have your documentation at least 48 hours prior to any accommodation made. (Check with the Center for Learning and Teaching for their scheduling guidelines.)

Subject Tutoring

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4 pm – 9 pm, Sunday – Thursday. We are a Level II Internationally Certified Training Center through the College Reading and Learning Association (CRLA). Subject Tutors are friendly, highly-trained Roanoke College students who offer free, one-on-one tutorials in a variety of general education and major courses such as: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, INQ 250, and Social Sciences (see all available subjects at www.roanoke.edu/tutoring).

Tutoring sessions are available in 30 or 60-minute appointments. Schedule an appointment at www.roanoke.edu/tutoring, or contact the center at (540) 375-2247 or subject_tutoring@roanoke.edu.

Writing Center

The Writing Center at Roanoke College offers tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of experience may consult the Writing Center at any point in their process— including brainstorming, drafting, organizing, editing, or polishing presentation skills—to talk with trained peer tutors in informal, one-on-one sessions. Schedule an appointment at www.roanoke.edu/writingcenter, where our staff members and workshops are also posted. Questions? Email the center: writingcenter@roanoke.edu.

Accessible Education Services (AES)

 AES is in the Goode-Pasfield Center for Learning and Teaching in Fintel Library (clt@roanoke.edu)

 AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. To schedule an appointment, call (540) 375-2247 or e-mail aes@roanoke.edu.

If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact the AES at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

References

Digital

MATLAB/Octave and EXCEL references will be uploaded to Inquire throughout the semester

https://www.me.psu.edu/cimbala/Learning/General/units.htm