

ENGS-200-A ENGINEERING DESIGN EXPLORATION

Spring 2026

Meeting Space: Lucas 207 Time: Thursdays 1:10 pm – 4:10 pm

Instructor: Dr. Okioga Office Location: Trexler 180

Email: okioga@roanoke.edu

Office Hours (By Appointment Only):

- Virtually: Mondays and Friday: 12:00-1:00pm
- In Person: Thursdays: 4:10 pm – 5:10 pm

1. **Course Overview and Specific Learning Outcomes:**

This course is an introduction to the process of engineering design with an exploratory “hands-on” approach. The course explores the engineering design process, including planning, decision analysis/alternatives evaluation, conceptual design, cost estimating/value engineering, and project and construction management. The focus of the course is experiential learning while supported by instruction and guided activities that highlight the underlying concepts in engineering design. Strength-based leadership, communication, teamwork, critical thinking, professionalism, and use of technology/application tools for engineering solutions are emphasized.

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

- Apply engineering design processes to produce a pre-selected, proposed community-oriented project
- Analyze, interpret and use existing engineering data for project development
- Recognize and apply personal and team strengths to achieve project goals
- Effectively communicate the project process
- Interact with the larger community in a professional manner

Prerequisites: ENGS 191 - Engineering Foundations

2. **Required Materials:**

- **Laptop - Bring to each class!**
- Optional Text Book: Dym, Clive L. Cornerstone Engineering Design. Wiley & Sons Canada, Limited, John, 2013. ISBN: 9781118324585; ISBN10: 1118324587
- Software
 - PDF software capable of viewing, annotating, and marking up documents
 - Geographic Information System (GIS) software or approved web-based GIS tools

3. **Attendance:** Each student is expected to attend every class and is accountable for missed content and assignments. Attendance will be taken at the beginning of every class meeting. If you arrive late it is your responsibility to make sure you are not marked absent in my grade book. Your fourth and

each additional absence will result in a 2-point reduction in your final course grade. You get three freebies so that I do not have to distinguish between excused and unexcused absences.

College athletes (or students officially representing the college in any college-sponsored activity) will be afforded wiggle room; please come see me immediately if this applies to you. Practices or meetings related to the college-sponsored activities are not included as official participation or representation.

If you should have an emergency that requires you to miss a large chunk of the course, please notify me ASAP. If you have a temperature of 100.4 or higher or other flu or COVID symptoms, don't come to class. Having a fever is a good reason for students to miss class. If you have exceeded your freebies and don't want to be penalized due to illnesses, be sure to have a note from your Doctor or from Student Health. Wearing a mask while out and about if you feel a bit ill is good for everybody.

4. **Grading:** Standard letter grades (A–F) are assigned according to the following scale for this course:

“A” (91–100), “B” (81–90), “C” (71 - 80), “D” (60–70), “F” (< 60).

Final grades will be based on the following course components:

- 20% - Project Proposal
- 20% - Substantial (Intermediate) Project Design
- 30% - Final Project Design
- 20% - Assignments and In-Class Activities
- 10% - Feedback from Clients and Peers
- Extra points for participation in MCSP Conversation Series

5. **Testing:** Final examinations are scheduled at the times designated by the Registrar's office and as detailed in the Academic Calendar. As this course is focused on an engineering design end-product that students will work on throughout the semester, the final engineering design documents will be delivered by students, in lieu of a written exam.

6. **Test make-up:** Late submission of work or make-ups due to absences will only be allowed for legitimate reasons that must be reported with appropriate documentation/certifications. Any make-up/late submission must be within one week of the missed submission deadline or within one week of returning to class if based on certified absences and as dictated by Roanoke College policies.

7. **Expected Number of Hours of Work per Week:** This course expects you to spend at least 12 hours of work each week inside and outside of class. A feedback survey at the end of each client milestone will provide the opportunity for each student to evaluate each of your team member's contributions. It is expected that you will offer consistent and honest feedback about the amount of work you and your team members contribute. Multiple negative feedback may reduce your overall score.

8. **Academic Integrity:** Roanoke College (RC) policies of academic integrity are enforced in all aspects of this course, and it is the responsibility of the student to be aware of these policies and to strictly adhere to them. Plagiarism and cheating are unacceptable and also violate RC policies. Being aware of others' such violations and not reporting it is also considered a contributing aspect of cheating. To avoid plagiarism, all source material must be properly cited using the MLA conventions, and paraphrased using your own words or otherwise using quotations when appropriate. Drafts must include citations. In addition to myself, the Writing Center can offer assistance and other resources for writing and presentation. Since an emphasis on the course work is based on analytical and critical thinking, you are discouraged from extensive using generative AI tools to create presentations/reports. If you do use AI-generated content, such as to create graphics or any other work in your assignments, you must clearly indicate what work is yours and what part is generated by the AI.
9. **Office Hours:** I will be available to meet virtually between 12 and 1pm on Mondays and Fridays. I will be able to meet in person on Thursdays from 4:10 pm – 5:10 pm (after class). Appointments are required for all meetings. I will initiate and send meeting invitations and links for confirmed virtual appointments.
10. **MCSP Conversation Series:** Part of being a project team player is being a good listener, being open to others' points of views and also being able to reflect of those views and either support or present your arguments and alternative ideas clearly. You are encouraged to attend at least 2 of the several MCSP talks offered throughout the semester and write a ½ page paper on your reflections of the talk. The reflection papers are due within one week of the talk. MCSP credits will be factored in while determining the final grade. This particularly helps students who are on the cusp of a letter grade.
11. **Class Disruption:** All students are entitled to a professional learning environment. Students should not act in a manner which will distract and disrupt the class learning experience. Such practices will not be tolerated. Cell-phones or any other electronic communication/entertainment devices, except for tablets/laptops used for taking notes, must be either turned off or silenced at all times during the lecture period.
12. **Project Execution and Design Assessment:** Students will be grouped into teams that will separately respond to a Request for Proposal (RFP) and deliver scope of work provided by a designated client. Project work will be assessed at different stages to ensure adequate progress of the project, both from individual and group perspectives. Student assessments will be based on whether the students have understood the client's goals and problem statements, applied appropriate engineering and science concepts, and tools for the proposed solution; conducted feasibility studies or decision-making analysis for proposed solutions, performed appropriate cost/value engineering, and completed and documented their design. Assessments will also be based on innovation/creativity, project management, and soft engineering skills including client communication, leadership and professionalism.

13. Project Reporting/Presentations : Effective project communication, including communicating design and development processes, is an important skillset required of all aspiring engineers. As such, presentation delivery will be emphasized throughout the course. Students will be required to discuss their work as presentations to the class, clients and faculty, as well as some invited members of the community. Students are required to observe and provide feedback to their peers during practice presentations in preparation for the final presentation.

Schedule (See Addenda Documents for Schedule Changes)

Item	Date
Topic 1: Class Intro. Project Intro. and Engineering Drawings Overview.	01/15/26
Class Intro	
DISC Leadership (Individual in-class assignment)	
Commitment document overview	
Project overview and discussions	
Engineering drawings intro.	
Due: DISC Analysis- In class assignment (Individual Assignment)	
Topic 2: Preliminary Site Work Class	01/22/26
Reading maps and contours	
Re-review of engineering drawings as needed	
Teams Develop RFP Questions for Owner	
Due: Commitment Document	
Due: List of questions for owner – In class assignment	
SITE VISIT AND PRE-PROPOSAL MEETING - RUTROUGH POINT AT EXPLORE PARK	1/29/2026
Pre-proposal Meeting – Site Visit and Q&A with Owner – Review of owner criteria and performance requirements	
Topic 3: Project Management and Execution: Budget - “Spending” Class	2/5/2026
Project Management and Execution: “Scope, Schedule and Spending”	
Engineering Economics and Budgets (“Spending”)	
Due: Draft Proposal Presentations (Loaded in Inquire before class)	
PROPOSAL PRESENTATION – WVWA 601 S. Jefferson St., Coulter Board Room (2nd Floor)	2/12/2026
Progress to Substantial Completion	2/19/2026
Comments Uploaded in Inquire. Teams implement updates based on comments	
Teams advance project to substantial completion which is due the following week	
Due: Peer Evaluations and Feed Back (Individual Submittal)	
Topic 4: Project Management and Execution: “Scope and Schedule” Class	2/26/2026
Project Scope/Objectives and Decision Analysis	
Project Scheduling	
Due: Substantial Project Design Presentation (Loaded in Inquire before class)	
LOAD PROJECT PROPOSAL PRESENTATIONS (PDF) IN INQUIRE	

Spring Break (NO CLASS)	3/5/2026
SUBSTANTIAL/INTERIM DESIGN PROJECT PRESENTATION	3/12/2026
Comments uploaded in Inquire for review prior to the next meeting.	
REMOTE MEETING WITH CLIENT/OWNERS	3/19/2026
Remote meeting with Client. Clarification on comments	
Teams implement updates based on comments	
Teams advance project to final completion	
Due: Peer Evaluations and Feed Back (Individual Submittal)	
Topic 5: Engineering Ethics	3/26/2026
Professional Ethics	
Engineering Licensure and Practice	
Fundamental Principles/Rules of Practice	
LOAD SUBSTANTIAL/INTERIM DESIGN PROJECT PRESENTATION IN INQUIRE (PDF)	
Special Topics/Re-review	4/2/2026
Draft final project presentation and preparations	
In-class guidance and any special topics requested or re-reviews	
Due: Draft of the Final Project Design Presentation (Loaded in Inquire before class)	
Final Project Presentation – 601 S. Jefferson St., Coulter Board Room (2nd Floor)	4/9/2026
Last Day of Class: ALL ITEMS DUE TO BE SUBMITTED	4/16/2026
LOAD FINAL PROJECT DESIGN PRESENTATION IN INQUIRE (PDF)	
Due: Individual Feedback Form	
Due: Peer Evaluations and Feed Back (Individual Submittal)	
Due: Any other pending assignments	