ENGR 1301 – CRN 33085
Introduction to Engineering
Spring 2025

Dr. William V. Slaton
Office: LSC 015
Telephone: 450-5905
E-mail: wvslaton@uca.edu
Web Page: http://faculty.uca.edu/wvslaton/

IF YOU ARE SICK (OR POTENTIALLY SICK) – STAY HOME!
EMAIL ME – DON'T COME TO CAMPUS.

LECTURE: Monday & Wednesday 10:00 – 10:50AM, Lewis Science Center (LSC) 168
LAB: CRN 33085 – Tuesday, 12:15 – 1:30PM, Conway Corp Center for Sciences (CCCS) 112,
FINAL EXAM: Monday, April 28th, 2025 from 8:00-10:00 AM, Lewis Science Center (LSC) 168

OFFICE HOURS (LSC 015): Tentatively 9:25 – 10:40AM Tues & Thurs & 1:00-2:00 PM Friday. Drop-ins at other times are welcome but I can't guarantee that I will have a lot of time due to other commitments, etc. Email me to set up an appointment if these times do not work with your schedule and we can find a mutually agreeable time to meet. I'll use your cub email addresses and/or Blackboard for important class announcements, assignments, and other information – pay attention to it!

GRADES: A's are 90-100%, B's are 80-89%, C's are 70-79%, etc.

Grades will be based on the following:

Component	Description	Total Points Possible
Lab Reports	8 labs @ 25 pts each	200
Homework	10 sets of 5 @ 2pt each	100
Case Studies	5 case studies (2 individual, 3 group) @ 40 pts each	200
Attendance	100 pts for 100% attendance, etc	100
Exams	3 exams @ 100 pts each	300
Project	1 group project @ 100 pts	100
Total		1000

TEXT & SUPPLIES: *An Introduction to Engineering*; Andreas and Smith, ISBN-13: 978-1480192256. Students are expected to have the textbook listed above as well as a quad ruled composition notebook, calculator, and the usual writing utensils. A laptop is helpful but not necessary.

ENGR 1301 Introduction to Engineering: This course will introduce students to their choice of engineering majors at UCA and elsewhere. It will provide students a broad picture of what it means to be in engineering. It will introduce students to the essential tools for further study in engineering. Students will be introduced to the ethical application of engineering principles throughout this course.

ATTENDANCE: I expect you to attend all classes and labs; by now you know you cannot fully understand a technical discipline like physics or engineering without being present, on-time, and mentally alert in every class and lab. Attendance is part of your final grade. If you are sick, have a family emergency, or university sanctioned event please let me know in advance (or as soon as possible) via email. Documentation for an absence will be necessary. Students who have informed me about an excused absence can make up missed work. Late work is not accepted unless for an excused absence. Turn in what you have by the due date / time. We'll discuss if it is not at the level you want. **IF YOU ARE SICK (OR POTENTIALLY SICK) – STAY HOME! EMAIL ME – DON'T COME TO CAMPUS.**

EXAMS, HOMEWORK, & LAB ACTIVITIES: The course involves lectures and hands-on lab activities. Assignments, exams, homework, and lab reports will be submitted for credit. Please follow the format requested in the specific assignment and be mindful of the policy on generative AI (such as ChatGPT) below.

PROJECT: The project is where student teams showcase what they have learned by using the engineering design process to solve a problem or conduct an experiment. The student teams will present their project to the class at the end of the semester and write a report. More details about the project and how it will be graded will be provided.

SOFTWARE: Appropriate software and environments for programming the Parallax BoE-bot will be provided. Additional software for word processing, spreadsheets, or presentations can be found in your UCA Google account, Libre Office, or MS Office. 3D CAD modeling software such as TinkerCAD and FreeCAD will be available.

BUILDING EMERGENCY PLAN: An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at http://uca.edu/mysafety/bep Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes. We live in an area with frequent severe weather. Pay attention to the weather!

TITLE IX DISCLOSURE: In furtherance of its core values— academic vitality, integrity, and diversity—UCA is dedicated to promoting a campus community free from discrimination. Title IX of the Education Amendments Act of 1972 requires all educational institutions to address gender-based discrimination on campus, and UCA implements these Federal requirements through a fair, consistent, and appropriate process of investigation and adjudication. Please see UCA's Title IX website (https://uca.edu/titleix/) for the university's policy, relevant forms, training opportunities, and related information.

ACADEMIC INTEGRITY: The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the Student Handbook. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy. Be sure to refer to the policy on generative AI (such as ChatGPT) below as regards to academic integrity.

ENGINEERING ETHICS: We will be following the National Society of Professional Engineers Code of Ethics and making use of their case studies in this course.

STUDENT EVALUATIONS: Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. Students may evaluate full term courses they are taking starting on April 7th, 2025 through May 4th, 2025 by logging in to myUCA and clicking on the Course Evaluations task.

AMERICANS WITH DISABILITIES ACT: The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the Office of Accessibility Resources and Services (OARS), 450-3613.

STUDENT HANDBOOK: It is advisable to refer to the Student Handbook for important policies not specifically detailed in the syllabus, for example: Sexual Harassment Policy and other academic policies.

DISCLAIMER: All standard disclaimers apply. The instructor reserves the right to modify the course policies, assignments, due dates, etc. as necessary or appropriate for meeting the goals of the course. Hot glass looks like cold glass. Do not look into laser with remaining eye. If you mess up, 'fess up. Don't be a d^3x/dt^3.

POLICY ON GENERATIVE AI (ChatGPT, etc):
We will use generative AI (such as ChatGPT) in this course. Some assignments will require it (one check mark), some assignments may allow the use of AI in limited ways (two check marks), and some assignments may prohibit the use of AI entirely (three check marks). Assignments will be clearly labeled as to the level of assistance AI may provide. Any assignment that does not specifically denote a level can be assumed to prohibit the use of AI entirely. Failure to use AI appropriately for an assignment or to cite it properly could result in a violation of UCA's academic integrity policy. We will learn how to use it appropriately and ethically since using AI is an emerging skill. In the spirit of transparency, I used ChatGPT to help me write the following sections on the use of AI in the course.

Use of Generative AI Tools in Engineering
In this course, we will explore the use of generative AI tools like ChatGPT as part of your learning. In the context of engineering, these tools offer several benefits:

1. **Technical Problem-Solving and Brainstorming**: AI can assist in generating ideas for project design, coding solutions, and even early-stage problem analysis. It can suggest approaches to tackle engineering challenges or help you explore different strategies for solving technical problems.
2. **Supplementary Learning and Clarifications**: AI tools can help you quickly review concepts in math, physics, and engineering principles. For topics like calculus, mechanics, or circuit design, AI can provide step-by-step explanations and alternative perspectives on solving complex equations or understanding core concepts.
3. **Code Generation and Debugging**: Generative AI can be used to draft code snippets, troubleshoot common programming issues, or even explore different approaches to coding tasks. While it's no replacement for understanding programming languages, it can speed up the process and offer learning insights.
4. **Technical Writing Assistance**: AI can help you structure technical reports, lab documentation, or design proposals. It can provide guidance on clarity, grammar, and technical language while helping you develop concise and effective communication for engineering contexts.
5. **Skill Development**: Engaging with AI encourages critical thinking and analytical skills, especially as you learn to evaluate AI-generated outputs for accuracy and relevance in engineering applications.

6. **Prototyping and Innovation**: For creative design projects, AI can be used to simulate ideas, propose new designs, or suggest optimizations. Integrating AI as part of your prototyping process can enhance innovation and improve iterative design.

Ethical Use of Generative AI in Engineering
When using AI tools in an engineering context, follow these ethical guidelines:

1. **Transparency in AI Assistance**: Clearly disclose when and how AI contributed to your projects, reports, or problem-solving processes. Whether generating design ideas, writing code, or clarifying concepts, it's important to attribute AI's role honestly.
2. **Academic Integrity and Learning**: Ensure your work reflects your understanding and effort. AI can assist with problem-solving, but it's crucial that you develop and demonstrate the core engineering skills you're learning in this course.
3. **Safety and Accuracy in Technical Work**: AI-generated outputs are not always reliable, especially when it comes to technical calculations, design parameters, or safety-critical applications. Verify all AI-generated content against trusted engineering sources or industry standards.
4. **Bias and Ethical Engineering Design**: AI models can introduce biases into design or problem-solving suggestions. It's important to critically evaluate these outputs, particularly in engineering applications that impact diverse populations or involve ethical considerations.
5. **Respecting University and Industry Standards**: Adhere to both academic guidelines and professional engineering standards when using AI. Unauthorized or unacknowledged use of AI in technical reports, design projects, or exams can result in academic penalties.

Citing AI-Generated Content in Engineering Work
If you use AI-generated content, whether for reports, code, or problem-solving, be sure to cite it properly:

- **Technical Reports and Projects**: When using AI-generated text or design suggestions in your reports or presentations, cite the tool used. To comply with IEEE standards, use the format:

  [<#>] <Brand Name>, "<AI Name> Response to <Your Question>," <AI Name>, [Online]. Available: <URL>. Accessed on: <Date>.

  For example:

  [1] OpenAI, "ChatGPT Response to How do I cite chatgpt's response following IEEE's standards?," ChatGPT, [Online]. Available: https:/chatgpt.com/share/007f83e5-4426-41ae-88c6-c53343228e44. Accessed on: Aug. 19, 2024.

- **Code and Algorithms**: If AI contributed to a code snippet or algorithm in your work, include a comment noting its origin and a citation if required by the course or project guidelines.
- **Acknowledgment in Design or Research**: When AI plays a role in idea generation or refining your designs, include an acknowledgment in your report or project documentation explaining how it was used.

Limits of Generative AI in Engineering
While AI tools can be valuable, they have limitations that are particularly important in engineering contexts:

1. **Inaccurate Technical Information**: AI can generate technically incorrect calculations, flawed code, or invalid engineering solutions. Always verify any technical output with reliable sources, reference materials, or calculations.
2. **Limited Understanding of Complex Engineering Problems**: Generative AI may lack the ability to fully grasp the intricacies of advanced engineering concepts, making it less effective for complex analysis or specialized design problems.
3. **Insufficient Depth in Analysis and Design**: While AI can offer general ideas or starting points, engineering solutions require in-depth analysis, modeling, and verification that AI is not capable of providing.
4. **Ethical and Safety Considerations**: In engineering, designs and decisions can have real-world consequences. AI does not account for safety protocols, ethical considerations, or human factors, so always apply your judgment and ensure your work meets safety and ethical standards.
5. **Over-reliance and Skill Development**: Developing foundational engineering skills—like coding, circuit analysis, or problem-solving—requires practice. Overusing AI can prevent you from building the competencies necessary for professional growth and success.
6. **Context-Specific Issues**: Engineering problems are often context-dependent, requiring an understanding of specific conditions, constraints, and requirements. AI lacks the ability to fully integrate such contextual details, which are crucial for robust solutions.

Accreditation Board for Engineering and Technology (ABET) Outcomes:

The Engineering Physics program at UCA has the following mission statement, program educational objectives and student learning outcomes.

Mission Statement: The mission of the Engineering Physics program is to provide the highest quality education for students in the principles of Physics and Engineering with hands-on practical applications relevant to industry. This foundation prepares our students for careers tackling complex problems in multidisciplinary areas that are at the forefront of advancements in science and technology.

Program Educational Objectives:

1. Practice fundamental physics and engineering principles in the workforce or through graduate level education.
2. Develop and innovate new knowledge or technology either individually or as part of a team.
3. Demonstrate leadership through active participation in work, professional societies, non-profit organizations, or community engagement.
4. Commit to continued learning through pursuit of professional licensure, professional certification, or completion of graduate studies.

Student Outcomes:

Students in the program are expected to know and be able to do the following by the time of graduation:

Outcome 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Outcome 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.

Outcome 3: An ability to communicate effectively with a range of audiences.

Outcome 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.

Outcome 5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Outcome 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Outcome 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Student Outcomes addressed by this course: 2, 4, & 5