

**EE 4081: Capstone Design I**  
*Fall, 2023*  
**WORKC 109**  
**MW, 12:00-12:50**

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**Office Hours: TBD**

**Course Description:** Student design teams begin an academic year long capstone design project under the supervision of a faculty advisor. Topics include: team building, design requirements and documentation, detailed planning, identification of project needs and establishment of goals leading toward the successful completion of the project, periodic design reviews and reports, applications of engineering skills, project management and formal presentations. Successful completion of the project requires the application of electronics, applied physics, numerical computation, signal processing, other electrical engineering techniques to real world engineering problems, and related topics.

**Pre-requisites:**

- EE 3011 (Signals & Systems)
- EE 3032 (Electricity & Magnetism)
- EE 3062 (Mixed Electronics Lab II)
- EE 3072 (Modeling and Simulation)

**Place in Curriculum:** This course is a required for EE majors.

**Course Learning Outcomes:**

a) Specific outcomes of instruction

By the end of this course students will be able to

- identify relevant topics from earlier courses and then apply knowledge of those topics to their design project;
- identify and specify design requirements, constraints and considerations from general problem descriptions;
- develop options for conceptual and technical designs, and critically evaluate them;
- plan and manage a project to include plans for a prototype, testing, evaluation, documentation and project's end in the following semester;
- clearly communicate concepts and information; and
- work collaboratively and responsibly as an effective team.

b) Student Outcomes addressed by the course

SO-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

SO-7 an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

***Brief list of topics to be covered***

Engineering design  
Problem definition (needs, requirements, constraints, considerations)  
Conceptual design(s)  
Technical design(s)  
Selection of a "best" design  
Construct prototype/proof-of-concept  
Test and evaluate prototype/proof-of-concept  
Project planning and management (schedule, budget, work breakdown, tasks, monitor, adjust)  
Teams (dynamics, roles, social skills, constructive conflict)  
Communications (diagrams, presentations, reports, audience)

***Text book, title, author, and year***

None

***Other supplemental materials***

None

**Course Requirements:**

*Attendance is required*

*Group projects will be a key part of the course*

*Cellphones set on vibrate*

**Tentative Grading:**

Weekly Reports: 25%  
Mini-Project Report: 25%  
Final Report: 50%

**Academic Honesty:** New Mexico Tech’s Academic Honesty Policy for undergraduate and graduate students is found in the catalog (<https://www.nmt.edu/registrar/catalogs.php/>). Further information about academic honesty can be found on the Academic Affairs website:

[https://www.nmt.edu/academicaffairs/avpaa/academic\\_honesty.php](https://www.nmt.edu/academicaffairs/avpaa/academic_honesty.php)

You are responsible for knowing, understanding, and following this policy.

## **Student Resources**

Wondering where to go for help? Please see the offices below or visit the “[Where NMT Students Should Go for Help](#)” website.

**Student Success:** New Mexico Tech offers numerous peer tutoring services for students who are struggling in their courses, or who just wish to receive friendly advice, including the Office of Student Learning (Skeen Library, <https://www.nmt.edu/osl/>), Math Helproom (<https://www.nmt.edu/academics/math/ugrad/mathhelproom.php>), the Writing and Communication Lab (Skeen Library, <https://www.nmt.edu/academics/class/center.php>), and numerous department-run centers. These services are free of charge to students! Students may also consult the Dean for Student Success Initiatives, Elaine Debrine Howell (Fidel, rm. 237; 575-835-5208; [elaine.debrinehowell@nmt.edu](mailto:elaine.debrinehowell@nmt.edu)) or may receive emails from her if they are struggling in class.

*[Please feel free to add information on tutoring or other student success services in your department or elsewhere on campus]*

**Reasonable Accommodations:** New Mexico Tech is committed to protecting the rights of individuals with disabilities and providing access and full participation in the educational experience. Students with disabilities who require reasonable accommodations are invited to make their needs known to the Office for Student Access Services (SAS) as soon as possible. Accommodations are not retroactive and may take some time to implement. The process for requesting accommodations can be found at their website [https://nmt.edu/ds/for\\_students.php](https://nmt.edu/ds/for_students.php)

You can contact SAS in person at the Fidel Center Room 245, call 575-835-6209, email [access@nmt.edu](mailto:access@nmt.edu) or book through the link on our [website](#).

**Counseling Services:** The Counseling Center is very excited to announce that Tech has partnered up with the Virtual Care Group (VCG), to offer free supplemental healthcare services to our degree-seeking students. This virtual healthcare includes unlimited Tele-medical and unlimited Tele-therapy/counseling sessions available 24/7, as well as life coaching. Both in-person sessions on campus and this virtual healthcare are available for those degree-seeking students currently enrolled for Fall classes. Download The Virtual Care Group app from your app store. For questions about the platform, please email VCG’s Care Team at [care@virtualcaregroup.com](mailto:care@virtualcaregroup.com). For more information on services at NMT, please call 835-6619, email [counseling@nmt.edu](mailto:counseling@nmt.edu) or check out our website at <https://www.nmt.edu/cds/>.

**Respect Statement:** New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the [\*New Mexico Tech Guide to Conduct and Citizenship\*](#): “New Mexico Tech’s primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community.”

**Title IX Reporting:** Sexual misconduct, sexual violence, and other forms of sexual misconduct and gender-based discrimination are contrary to the University’s mission and core values, violate university policies, and may also violate state and federal law (Title IX). Faculty members are considered “Responsible Employees” and are required to report incidents of these prohibited behaviors. Any such reports should be directed to Tech’s Title IX Coordinator ([Dr. Peter Phaijah, 238 Fidel Student Center, 575-835-5953 \(O\), 575-322-0001 \(C\), \[titleixcoordinator@nmt.edu\]\(mailto:titleixcoordinator@nmt.edu\)](#) ) or reports can be filed online to [Tech’s Title IX & Sexual Misconduct Report](#). Please visit [Tech’s Title IX Website](#) ([www.nmt.edu/titleix](http://www.nmt.edu/titleix)) for additional information and resources.

## **Supplemental Information** *(Use as needed)*

### **Online or Hybrid Courses**

Faculty teaching distance education courses must provide the information listed below:

**Delivery Mode:** [Identify the delivery mode used for the course and list

- Any additional requirements for distance education students;
- Types of regular and substantive interactions used in the course – at least two are required. The level of interaction should be commensurate with the course (e.g., number of credits, course level);
- Tentative schedule for when these interactions will occur, if applicable].

An example is below:

**Course Delivery:** This is a synchronous, online course delivered through Zoom with information posted in the course management system Canvas. You are required to have sufficient technology (e.g., computer, webcam and setting to give quality video & audio) and a high-speed internet connection to engage in the course. Regular interaction with the course instructor will be through synchronous lectures & discussions (e.g., responses to instructor questions during class are expected) and weekly assignments. Substantive interaction will be through feedback provided by the instructor on the discussion posts, homework problems, and exams listed in the course schedule, typically within several days of the deadline. During exams, you will be required to have your webcam on (both video and audio).

**Technical Support Information:** [list of required software/hardware needed; link to distance education web portal]

**Verification of Student Identity and Academic Integrity:** New Mexico Tech's Student Identity Verification Policy requires that students' identity be verified and that a substantial component of the course's grade be some form of proctored activity, e.g., proctored exam, presentation, oral exam, etc. Therefore, students are required to [turn on camera during specific assignment, schedule video conference for exams, arrange for a proctored exam, ..] The Student Identity Verification Policy is on the Academic Affairs [website](#).

### **Use of Artificial Intelligence Statements:**

Instructors should be clear with students whether and how (or if) AI programs such as ChatGPT can be used for assignments. In particular, be specific about what types of uses will be penalized and what penalties students might incur. For some misuses of AI programs (e.g., using ChatGPT to generate an essay), instructors should follow the same institutional procedures that they would for any other instance of academic dishonesty. Below is a sample statement. Faculty can modify this statement to fit their classes and assignments:

*The use of generative AI tools (e.g. ChatGPT, Dall-e) is permitted in this course for the following activities with an appropriate citation:*

- Brainstorming and refining your ideas;
- Fine tuning your research questions;
- Drafting an outline to organize your thoughts; and
- Checking grammar and style.

*The use of generative AI tools is not permitted in this course for the following activities:*

- Impersonating you in classroom contexts, such as by using the tool to compose discussion board prompts assigned to you or content that you put into a Zoom chat.
- Completing group work that your group has assigned to you, unless explicitly agreed to by members of your group and the instructor.
- Writing a draft of a writing assignment or writing prompt.
- Writing entire sentences, paragraphs or papers to complete class assignments.

You are responsible for the information you submit based on an AI query (for instance, that it does not violate intellectual property laws, or contain misinformation or unethical content). Your use of AI tools must be properly documented and cited in order to stay within university policies on academic honesty. For example, in MLA: “*Text of prompt*” prompt. *ChatGPT, Day Month version, OpenAI, Day Month Year, chat.openai.com*. Any assignment that is found to have used generative AI tools in unauthorized ways **[insert the penalty here\*]**. When in doubt about permitted usage, please ask the instructor for clarification.