Catalog Data:
MTE 443. 3 semester hours. Principles of engineering design. Problem formulation, concept design, configuration design, parametric design, detail design, materials selection, manufacturing process selection, prototyping, project planning and cost analysis, application of computer-based design tools, concepts of shared responsibility, teamwork and communication. Analysis of problems, design and development solutions. Oral presentations and written reports. A project will be assigned. Final project presentations will be evaluated by the MTE faculty.

Instructor: Professor Laurentiu Nastac, room 3007 NERC, lnastac@eng.ua.edu.

Office Hours: By appointment

Classroom: 11:00 am - 11:50 am MWF, H M Comer (MIB), room 316

Prerequisite(s): EC 110, MTE 362, 373, and 380

Prerequisite(s) with Concurrency: MTE 441 and MTE 481

Textbook(s):

Primary Reference Text(s):

Reporting References:
Additional Reference(s) and Resource(s):
- Other references and resources will be provided throughout the semester via Blackboard.

Course Objectives:
- Students will gain experience in the critical analysis of an open-ended design problem.
- Students will develop and understanding of the application and integration of engineering science, mathematics, and physical science in the context of materials and engineering design.
- Students will learn to work both in teams and individually.
- Students will demonstrate the ability to prepare thorough but concise written reports and proposals.
- Students will demonstrate the ability to deliver thorough, concise, and professional oral technical presentations.

Topics Covered:
1. Engineering design
2. Project planning and flow
3. Conceptual design
4. Material selection
5. Materials process design
6. Embodiment design
7. Detail design
8. Team behavior and tools
9. Information gathering
10. Quality, robust design, and optimization

Course Requirements:
- All students shall maintain a design journal. The design journal is a compilation of Word or PowerPoint documents containing dated entries of all notes, sketches, calculations, schematics and any other record of thoughts or activities related to the design project(s). The journal shall serve as a complete record of all activities related to the design project(s) or other activities of the course. They will be reviewed by the instructor at least three times during the semester (tentatively at end of weeks 6, 10, and 12). The instructor reserves the right to review the journals at any time.
- Projects will be conducted by teams consisting of 2 to 4 students. Teams will be assigned by the instructor. Teams will give short presentations on technical aspects of their projects, provide a report in written form, and defend the report(s) orally before fellow students and the instructor/faculty.
- These elements must be addressed during the course of a project: (i) problem definition; (ii) technical background information; (iii) preliminary design; (iv) design evaluation; (v) parametric design (including geometry, materials choices, fabrication issues, and economic analysis); (vi) implementation schedule; (vii) reporting (oral and written).
- Oral progress reports will be in the form of short oral presentations lasting 15 minutes per group with five minutes for discussion following each presentation. The time for the final presentation will be 30 minutes per group.

Class Schedule:
- Class formally meets three times per week, 50 minutes per meeting. Students are responsible for establishing additional meeting times of at least three (3) hours per week with their design teams,
the instructor, and industrial collaborators (as applicable) to conduct work on their capstone design project(s).

**Grading:**
- Student grades will be based upon three written examinations (45% of grade), homework assignments (15% of grade), design project related activities (40% of grade) including interim progress reports, presentations and completed project proposals.

**Policy on Missed Exams & Coursework:**
If a student misses class in which an exam is administered, the test can only be made up if arrangements were made prior to the exam which was missed. To be eligible for the make-up test, proper documentation for missing the test is required (for example, a doctor’s note if ill). If a student does not make advanced notification and/or does not have proper documentation, a make-up exam will not be granted. For a make-up exam that is granted, it will be scheduled with the instructor as soon as possible to the missed absence. Notification of a missed exam or absence more than one week after the assignment's due date will NOT be granted regardless of excuse or documentation. Also note that the on-line assessments will only be open for a fixed period of time, as indicted on Blackboard. It is the student's responsibility to take the assessment during that time.

**Grading Policy (tentative)**

- Homework: 15%
- Exam #1: 15%
- Exam #2: 15%
- Exam #3: 15%
- Project Proposal (written): 25%
- Proposal presentation (oral): 15%

**Grading breakdown:**

- 98-100% = A+
- 87-89% = B+
- 77-79% = C+
- 60-64% = D+
- 50 and below = F
- 93-97% = A
- 83-86% = B
- 70-76% = C
- 55-59% = D
- 90-92% = A-
- 80-82% = B-
- 65-69% = C-
- 51-54% = D-

**Project Report Grading:**
Written project reports and oral presentations will be evaluated utilizing the ABET outcomes and rubrics adopted by the MTE Department for assessment. Particular relevant this semester are program outcomes (e), (g), (j), (l), and (m). All project/report grades shall be calculated on the basis of these rubrics.

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take the assessment during that time.

**Attendance Policy:**
Though attendance is not mandatory, it is in the students’ best interest to attend each lecture to learn the material and to be aware of when assessments are active and examinations will be given. Test questions will be from both the textbook reading (assigned during the lectures), assessments, and concepts presented in the lectures. If a student is absent, the student is responsible for the information covered during regularly scheduled classes.

Students are required to participate in project activities.

**Policy on Academic Misconduct:**
All students in attendance at the University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student.

The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct.

At the beginning of the semester and on examinations and projects, you may be required to sign the following Academic Honor Pledge: "I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedure resulting from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University."

**Disability Statement:**
If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary. If you have a disability, but have not contacted the Office of Disability Services, please call 348-4285 or visit 133-B Martha Parham Hall East to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

It is the student's responsibility to register with the Office of Disability Services.

**Severe Weather Protocol**
In the case of a tornado warning (tornado has been sighted or detected by radar, sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate life saving actions.

When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the National Weather Service and to
follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take. The Office of Public Relations will disseminate the latest information regarding conditions on campus in the following ways:

- Weather advisory posted on the UA homepage
- Weather advisory sent out through Connect-ED--faculty, staff and students (sign up at myBama)
- Weather advisory broadcast over WVUA at 90.7 FM
- Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM

Weather advisories are broadcast via WUOA/WVUA-TV, which can be viewed across Central Alabama. Also, visit wvuatv.com for up-to-the-minute weather information. A mobile Web site is also available for your convenience.