Senior Design Project - MECH 4366
Spring 2022 CRN 15840/19302

MW 3:00 pm - 4:20 pm, MAIN 214

Instructors:

Dr. Chris Danek, (cjdanek@utep.edu) See MS Teams for my cell and office hours link.

Co-instructors: Dr. Frank Medina (frmedina@utep.edu) and
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TAs: See MS Teams for office hours and preferred contact info.
Robert Lazarin (ralazarin@miners.utep.edu) and
Andres Gutierrez Hernandez (andres@Bessel.co).

Goals

In this course, students will:
- Acquire and practice tools and mindsets for rapid innovation
    - Design Thinking: Human-Centered Design and Customer Development
    - Agile Teamwork
- Exercise and build technical proficiency and critical skills including
    - Leadership
    - Teamwork suited for multidisciplinary environments
    - Communication
    - Collaboration in product design and development
    - Critical Thinking: Analysis, Modeling, Interpreting
    - Digital engineering workflow and simulation driven design
    - Designing and applying experiments to support development
    - Iterative Design and Development
- Develop a strong understanding of value creation

Our Values and Culture

- Culture of Caring and Respect
    - We care for and respect the students, teaching team, and community
    - We actively listen to stakeholders and strive for empathy
    - We improve our results through inclusiveness and diversity
- Culture of Discipline
    - We make weekly progress
    - We honor our commitments
    - We pursue excellence in documentation
- Culture of Achievement
    - We learn and grow through our project work
    - Our projects will create value in society
    - We aim for successful project delivery

Course Format & Agile Method

Teams will tackle real-world projects much as would happen in a professional setting.

(1) Iterative Development with weekly, measurable progress organized into 3 Agile Sprints

   (a) Stakeholder/customer discovery to test ideas and assumptions

   (b) Technical development (research, prototyping, testing, engineering analysis and simulation).

(2) Pre-work may be assigned prior to class meetings.

(3) Classroom sessions will typically include a brief discussion of the pre-assigned prep, followed by workshops or guest speakers. Most of the course meeting time will consist of team presentation of progress and feedback from peers and the teaching team.

Course Calendar and Timing of Agile Sprints

Teams will aim to iterate (design-build-test) a complete prototype during each of the 3 Sprints. Each Sprint is kicked off with an in-class workshop for Sprint Planning. At the end of each Sprint are team "Sprint Demos" which are detailed presentations of the project and its deliverables.

Start on Aug 22 > **Sprint 1: Frame your Design Challenge** > **End on Sept 23**	
Labor Day > no class September 5	
Sample Workshops/Student Toolboxes	**Sprint Deliverables due 9/21**
Kickoff HCD Mindsets Scrum Fast Start Timebox Writing User Needs / Solution Concept synthesis **Class project: 2D Robot**	2D Robot: Demo / contest Project executive summary Literature Review Customer discovery User Needs Product Requirements Risk assessment Concept Iteration (3) Sprint 2 and 3 Roadmap in Jira

Start on Sep 26 > **Sprint 2: Rapid Innovation Sprint** > **End on Oct 28**	
Sample Workshops/Student Toolboxes	**Sprint Deliverables due 10/28**
Journey Map / Task Analysis Technology Strategy Lightning Design Jam > Team Boost Scrum Git Workflow Code of Ethics Codes & Standards	Project executive summary User Needs Product Requirements Risk assessment D>B>T>L cycles (3) Simulation driven design Simulation to confirm design Sprint 3 Plan

Start on Oct 31 > Sprint 3: Completion > End on Wed Nov 30	
Sample Workshops/Student Toolboxes	**Sprint Deliverables**
Guest speaker TBD	Final Report Documentation Package Final Presentation Explainer Video Reflection Video

Assessments

Weekly Timescale: Student teams receive regular assessments from peers and the teaching team (in class working sessions) and mentors (meetings outside of class), on a weekly timescale.

Sprint Timescale: Student teams receive assessments of their team's project progress at milestone points at the end of each of 3 Agile Sprints. Students receive feedback from peers and the teaching team on individual participation.

Semester Timescale: Student teams receive assessment of the final project through the in-class Course Finale. Each student alone or with a partner has shared a Toolbox.

Grading

75% Project - all team members are expected to participate on a weekly basis

> 45% Development Process
> > ● Sprint 1 Deliverables: 15%
> > ● Sprint 2 Deliverables: 15%
> > ● Sprint 3 Deliverables: 15%
>
> 15% Weekly 'Lessons Learned' presentations, team assignments, and Technical
> > Development - prototype, test, modeling/simulation, documentation
>
> 15% Final Presentation

25% Individual participation, judged at the discretion of the instructors.

- 15% individual contribution to team project; up to 2/3 of which may be informed by input from performance feedback by your teammates.
- 10% presentation of a Student Toolbox and participation in workshops

Academic Dishonesty: If any academic dishonesty is suspected, the student will be referred to the Office of Student Life. Academic dishonesty can include copying during an exam, receiving outside help, etc. If you are unsure about what constitutes academic dishonesty please consult the following site:

> https://www.utep.edu/student-affairs/osccr/student-conduct/academic-integrity.html

Students with Special Needs: Students with disabilities or special needs, including both permanent disabilities (learning disabilities, Attention Deficit Disorder, visual, mobility and hearing impairments, psychological disabilities, and chronic systemic disorders) as well as some temporary medical conditions (e.g. a broken arm), are encouraged to contact the UTEP Disabled Student Services Office (DSSO) located at Union East Room 106 in person, or by call/email at (915) 747-5148 or at dss@utep.edu.

Covid-19 Precautions (current as of 8/17/2022)
Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID 19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.

Course Materials and Additional Resources

THE FIELD GUIDE TO HUMAN CENTERED DESIGN, by IDEO.ORG. Download from designkit.org

Course Methods & Technology Stack

The technology stack is aimed to help your team learn industry-relevant tools and execute on an agile-based approach to your project. Develop an effective way to work within your team:
- Weekly scrum
- Weekly mentor checkin
- Rotate roles and share the burden

Required Elements
- *Agile approach: Create a team working session schedule that supports weekly progress on the project.*
- Jira for agile project management
- MS Teams
- Fusion 360
- Simulation, for example with Ansys Discovery or Fusion 360

Contributions of Course to Meeting the Professional Components and Program Objectives:

This capstone project based course provides professional development in content mastery and critical cognitive skill development for students of all majors across the University.

Human Centered Design Component: through purpose-driven entrepreneurial projects, students will gain practical experience and demonstrate mastery in applying Human Centered Design Mindsets and Methods.

Customer Development component: students will gain practical experience obtaining direct feedback from customers / stakeholders to guide product and company development.

Agile Engineering component: This course will require the application of engineering analysis and technical problem solving to real-world, open-ended problems. Students will frame problems and use technical analysis, prototyping, and testing to evaluate hypotheses and advance development.

Ethics of Innovation component: Students will be introduced to ethics and ethical decision making.

Critical Skills Development: The course will also give students experience and development of additional critical skills including leadership, teamwork, external collaboration, communication, and critical thought -- through workshops and direct application to in project work.

UTEP & ME Department Policies

ACES & Tutoring Center

Please note there are tutoring services available in the ACES center. Tutoring is free to you; the Department pays them. If tutors are not used, the Department may stop funding them. Check the schedule of the tutors and make use of the services. For more details visit the

ME Advising Blackboard -> cc mech acadav: MECH Academic Advising -> Tutoring & Resources

At the link you can find tutor schedules, location of the ACES center and the list of tutors available. For more information send email to METutors@utep.edu

Academic Honesty

During exams and quizzes, you are not allowed to use any form of wifi enabled electronic device, including cell phones or other electronic communication devices or methods (wrist watches, earbuds, etc.). No wrist watch or other electronic device may be worn. Calculators and watches may be subject to inspection. You may be asked to temporarily remove glasses to allow for their inspection.

You may not bring backpacks, hats, bulky coats or hoodies into the exam room. Lockers are not available at the exam site so plan and leave your belongings in a secure location. You may NOT sit them in a corner of the exam room.

You must show your work for all problems. You must use the paper provided by the instructor. If no work is shown you may not receive credit. After the exam, the instructor may require you to explain how you solved a problem on the exam. If you refuse to or cannot explain your work you may be subject to disciplinary action.

No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor. As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities and you may receive a zero on the exam or an F in the class. Other actions including suspension may also be pursued.

No one will be allowed to leave the room during an exam. This includes restroom breaks.

University approved recording devices may be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media. The instructor may create a record of your activity during the exam and may take photographs of your work during the exam.

If you are suspected of scholastic dishonesty you may or may not be directly confronted about your conduct by the instructor or proctor. You will however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam may not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling, this may adversely impact your ability to enroll in other classes.

If you arrive more than 15 minutes late to an exam, you will not be allowed to take the examination.

There will be no makeup exams administered. If you have a university approved excuse, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.

If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid.

No food or drink may be brought into the examination room.

Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam. No other IDs will be accepted.

Scholastic dishonesty on homework, lab assignments and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

Class Attendance Policy

Attendance is mandatory. Anyone with 5 or more absences will be dropped from the class. A drop for not attending will count toward the State Allowed Six Drop Limit. If you are failing the class at the time of the drop you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid and other programs.

As per UTEP rules, you may be asked to show a UTEP ID at any time during class. Anyone who is present and not registered in the class will be subject to disciplinary action unless the instructor gives prior approval.

Excused Absence for Exams

The UTEP catalog allows Exam Absence to be excused ONLY for University-Recognized Activities and very specific other situations. Medical absence is NOT allowed in the UTEP catalog. For consistency with the catalog, students will NOT be excused from exams due to illness.

Harassment Policy

The University (see Handbook of Operating Procedures 1.2.2.4) has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

· Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.

· Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.

· Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.

· Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students, and should be treated with due respect.