HUMAN CENTERED ENGINEERING DESIGN (HCED)

HCED 220   Engineering Design Communication   2 Credit Hours
This course examines the fundamentals of researching, writing, and presenting technical information for diverse audiences and purposes. Students learn to plan, analyze and prepare for different types of communications; differentiate between audience types and their needs for information; conduct research, understand authority of sources, and provide citations; develop effective listening techniques in business and technical situations. Techniques for writing communication documents, developing and delivering effective presentations and design portfolio, along with the media and technologies commonly used for design communication is also covered in this class. (F).
Prerequisite(s): COMP 105*

HCED 370   Needfinding and Research Methods in Design   3 Credit Hours
This course surveys qualitative and quantitative need finding and research methods in human-centered engineering design including usability engineering. Different data collection and measurement techniques are covered for different types of data, including subjective, behavioral, and physiological data. Human subject involved experiment design is also covered in this course. Students learn to formulate research questions and hypotheses, design and conduct a design related research study, and present research results through various case studies. (W).
Prerequisite(s): ENGR 360

HCED 380   Product Prototyping: Tools and Methods   4 Credit Hours
This course introduces the techniques and toolset necessary for developing low and medium fidelity prototypes to support the human-centered engineering design process. This includes CAD modeling, rapid prototyping, 3D printing, inventive problem solving techniques, sketching, storyboards, role-playing, visualization, virtual reality, and interaction prototyping techniques. Prototype testing techniques and tools are also covered in this course. Students work on individual and semester-long team based design projects in the Design Studio Lab by developing various product prototypes that fulfill customer needs using knowledge, methodology and skills obtained in the class. (W).
Prerequisite(s): ENGR 360 and (IMSE 255 or CIS 150 or CIS 1501 or ECE 270 or ENGR 216) and HCED 370* and HCED 220*

HCED 450   Product Realization: Design and Making   4 Credit Hours
Students will build on the foundation created in HCED 380 and will work on a single semester long project that executes the entire design process from conceptualization through presentation of a customer ready prototype, and creation of a project based portfolio. Different high fidelity engineering design and prototyping tools and techniques will also be covered in this class, including CAD/CAE, microcontrollers, process simulation, software platforms, risk analysis methods, virtual reality, data visualization, and 3D printing. (F, W).
Prerequisite(s): HCED 380 and ENGR 250* and (ME 260* or ME 265*) and ECE 210*

HCED 4951   Capstone Project in HCED: Needfinding and Conceptualization   2 Credit Hours
Summary project using knowledge, methodology, and skills obtained in Human Centered Engineering Design major. Students implement an original design concept and present it to a professional jury. (F, W).
Prerequisite(s): HCED 450
Restriction(s):
Can enroll if Program is

HCED 4952   Capstone Project in HCED: Design and Implementation   2 Credit Hours
This course is a continuation of HCED 4951. Students will complete the development process to conceive a functional product. Students present their final design to a professional jury. (F, W).
Prerequisite(s): HCED 4951* and IMSE 4425* and IMSE 421* and IMSE 382*
Restriction(s):
Can enroll if Program is

*An asterisk denotes that a course may be taken concurrently.

Frequency of Offering

The following abbreviations are used to denote the frequency of offering: (F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally