DIGITAL DESIGN & FABRICATION

Digital Design & Fabrication (DDF) represents a unique partnership between the Schools of Fine & Performing Arts and Science & Engineering aimed at preparing students to conceptualize and design for 21st-century manufacturing.

DDF programs combine Fine & Performing Arts' expertise in design with Science & Engineering's expertise in materials science to introduce students to design theory, aesthetics, 3D modeling skills, and material properties and constraints, while applying analytical approaches to problem solving. An undergraduate minor, described here, and a Master of Arts (MA) program, offer an interdisciplinary curriculum that encourages research and communication across fields to provide students with a foundation in design thinking for a modern world.

Computer-aided design classes are augmented with specialized courses covering computer programming and the use of open-source microprocessor boards, providing students with an understanding of the application and the technological aspects of emerging processes and materials. The minor culminates with a design course focused on the application of human-centered design for the manufacture of functional products that address real-world problems.

Student Learning Outcomes

Successful completion of the minor in Digital Design & Fabrication will enable students to:

- Develop proficiency in 3D CAD Modeling and the ability to apply those skills to design;
- Cultivate a knowledge of manufacturing and fabrication processes, both advanced and traditional, and the ability to blend the two;
- Understand the application of computational processes in art and design for developing new tools and systems, form finding, and a medium of expression;
- Develop a design methodology that uses adaptive and iterative problem-solving strategies to reach solutions throughout the design process;
- Implement novel technological solutions bridging the liminal space between digital and physical systems.

For DDF program information, contact:

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Digital Design & Fabrication Team

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- Minor in Digital Design & Fabrication

DDF205. Computer Aided Design I. 3 Credits.

Introduces 3D computer aided design and drawing, rapid manufacturing. Students become acquainted with the virtual spaces of CAD software and NURBS geometry with the intent to output tangible objects through 3D printing. COURSE FEE.

Restrictions:
- Must have the following level: Undergraduate

Prerequisites:
- Math Placement Level Minimum Score of 3 or MAT 153 Minimum Grade of C or MAT053 Minimum Grade of C

May be repeated for credit

DDF210. Computer Aided Design II. 3 Credits.

This course furthers knowledge learned from DDF205, developing as advanced understanding of NURBS surfacing along with introducing organic modeling and mesh sculpting. Further application of 3D visualization technologies and advanced manufacturing will be emphasized. COURSE FEE.

Restrictions:
- Must have the following level: Undergraduate

Prerequisites:
- DDF205 Minimum Grade of C or ARS 337 Minimum Grade of C

May not be repeated for credit

DDF220. Introduction to Computation for Media. 3 Credits.

This course focuses on fundamental concepts of programming (variables, conditional, iteration, functions, and objects) and then uses these concepts to create animations, graphics, sound and 3D-models. It also touches on more advanced techniques such as image processing, computer vision, data parsing and 3D graphics. COURSE FEE.

Restrictions:
- Must have the following level: Undergraduate

Prerequisites:
- DDF205 Minimum Grade of C
- DDF210 Minimum Grade of C

May not be repeated for credit

DDF293. Dgtl Dsgn & Fab Selected Topic. 0 Credits.

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.
May be repeated for credit

DDF305. Advanced 3D Printing. 3 Credits.

This course takes students though preparing and printing files on professional level 3D printers. Students will develop the hands on technical skills needed to operate and maintain a variety of industrial grade printers in the work force. They will use critical thinking skills to identify the material, method and machine best suited for a particular application. Students will have an opportunity at the end of the course to take an exam to receive Stratasys 3D printing certification.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration): Digital Design and Fabrication (DDF)

Prerequisites:

- DDF205 Minimum Grade of C
- DDF210 Minimum Grade of C

May not be repeated for credit

DDF310. Introduction to Designing with Microprocessors. 3 Credits.

This course introduces students to the integration of mechanical, electrical, and computer technologies into the design of computer controlled electro-mechanical systems. Students will learn the basics of component creation and part selection for practical use. Programming and interfacing an industry standard microcontroller will provide the intelligence needed to sense, control, actuate, and communicate. Emphasis will be placed on the use of additive manufacturing (3D Printing) as the output platform.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration): Digital Design and Fabrication (DDF)

Prerequisites:

- DDF205 Minimum Grade of C
- DDF210 Minimum Grade of C
- DDF220 Minimum Grade of C
- DDF305 Minimum Grade of C

May not be repeated for credit

DDF320. Design Intents. 3 Credits.

This course introduces collaborative team research and interdisciplinary practices that approach real world challenges. Tenets of design practices include being human-centeredness, prototype-driven, and mindful of process. Topics include design processes/innovation methodologies, need finding, human factors, visualization, rapid prototyping, team dynamics, storytelling, and project leadership. COURSE FEE.

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- DDF205 Minimum Grade of C
- DDF210 Minimum Grade of C
- DDF310 Minimum Grade of C

May not be repeated for credit

DDF393. Dgtl Dsgn & Fab Selected Topic. 1-12 Credits.

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

May be repeated for credit

DDF495. Indep Study Digital Design Fab. 1-12 Credits.

May be repeated for credit