

# ART & DESIGN/PRODUCT DESIGN (PRDN)

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## **PRDN 100 Design Visualization I - Concept Sketching (3 credits)**

Prerequisite(s): PRDN 101 and PRDN 102 should be taken concurrently. Restriction(s): Product Design majors only. Students gain an understanding of the relevance and role of effective sketching and drawing techniques, as essential research and communication tools for product designers. The course work addresses 2D geometry and fundamental 3D, descriptive geometry. The course focuses on developing students' freehand sketching abilities, necessary to accurately communicate design ideas in conceptual, aesthetic and technical terms as it places a role in the design development process.

## **PRDN 101 Product Design I - Design Thinking (3 credits)**

Prerequisite(s): PRDN 100 and PRDN 102 should be taken concurrently. Restriction(s): Product Design majors only. This fundamental design course focuses on the concept and significance of design thinking, the design development process and problem-solving. Students will learn how designers employ research, analysis and synthesis as well as use iterative test modeling and prototyping for testing and evaluating design concepts. Students will get an overview of design research methods and will read case studies of notable designs. Some project assignments of this course may be in conjunction with PRND 100 and PRND 102.

## **PRDN 102 Anatomical Drawing for Product Designers (3 credits)**

Prerequisite(s): PRDN 100 and PRDN 101 should be taken concurrently. In this fundamental course, students learn about how the human body is built, how it is structured, and how it works. The skeletal structure of the human body will be studied, analyzed, and drawn to learn how the structure allows the body to move. The various configurations of joints will be explored to understand how the body can resist physical stress, load, and force. The muscle structure will be examined to understand how and where they attach to bones and how they move the skeletal structure. Through drawings of anatomical studies of human-product interaction, students will learn the basics of human-centered design principles. The course also introduces students to various anthropometric characteristics of humans.

## **PRDN 110 Materials and Technology (3 credits)**

Prerequisite(s): PRDN 100, PRDN 101 and PRDN 102. Corequisite(s): PRDN 111 and PRDN 112. The primary objective of this course is to equip students with the theories of traditional manufacturing production technology. Various methods for producing mass manufactured consumer products are analyzed, together with examining material properties best suited for a particular design. Students will learn about the most common material families used in Product Design and the manufacturing processes applied to satisfy production feasibility and optimal design outcome. Equivalent course PRDN 210 effective through Fall 2020.

## **PRDN 111 Design Visualization II - Persuasive Rendering (3 credits)**

Prerequisite(s): PRDN 100 and PRDN 101. Restriction(s): Product Design majors only. Corequisite(s): PRDN 110 and PRDN 112. Building on the skills and knowledge obtained in PRDN 100 and PRDN 101, students will engage in developing persuasive design delineations for presentation purposes. The relevance of explanatory and exploratory renderings will be addressed as integrated components of the design development process. Emphasis will be materiality, color and surface development. Course assignments challenge students to be detailed-oriented.

## **PRDN 112 Product Design II - Form Language (3 credits)**

Prerequisite(s): PRDN 100 and PRDN 101. Corequisite(s): PRDN 110 and PRDN 111. Restriction(s): Product Design majors only. Students will study product architecture and the development of topology in relation to user perceptions and cognitive principles. The importance of cultural and social factors will be emphasized. Students will learn about the various philosophies that guide the development of product aesthetics, such as the gestalt principles and design semiotics. Students will gain an understanding of the rules of conscientious and responsible form development as it applies to the theory of "user-centered design" and will be able to differentiate designs of functional and emotional nature. Equivalent course PRDN 120 effective through Fall 2020.

## **PRDN 201 Design Visualization III - Digital Sketching (3 credits)**

Prerequisite(s): PRDN 100 and PRDN 110 and PRDN 111. Corequisite(s): PRDN 211 and PRDN 220. The course builds on the knowledge gained in PRDN 100 and PRDN 111 to develop the students' skills in digitally created sketches, drawings, and presentations. Using industry-standard Sketchbook Pro, projects will focus on communicating the development of design concepts and supporting research in a coherent form. The course also incorporates knowledge gained in PRDN 110 Materials and Technology.

## **PRDN 202 Design Visualization IV - Adobe CS (3 credits)**

Prerequisite(s): PRDN 100, PRDN 111 and PRDN 201. Corequisite(s): PRDN 212 and PRDN 221. Restriction(s): Product Design majors only. Building on skills gained in previous coursework, the course concentrates on digitally developed and enhanced 2D presentation techniques using Adobe CS and other industry-standard computer applications. The course material extends students' technical knowledge and skill level in creating effective presentations employing digitally enhanced sketches and computer generated renderings in design concept and idea development. Logic of effective presentation techniques appropriate for product designers is part of the coursework. The course material extends students' technical knowledge in creating effective portfolios.

## **PRDN 211 Product Design III - Design Sustainability (3 credits)**

Prerequisite(s): PRDN 101, PRDN 110 and PRDN 112. Restriction(s): Product Design majors only. Corequisite(s): PRDN 201 and PRDN 220. This course emphasizes the application of technical knowledge pertinent to sustainable Product Design. In addition to building on their knowledge of traditional manufacturing technology, students will engage in researching emerging technologies and new materials for incorporating them with their design projects. The course covers how design aesthetics, functionality, ergonomics and other factors influence production and sustainability. Laboratory activities and projects are in conjunction with PRDN 220 and experimentation with 3D printing.

## **PRDN 212 Product Design IV: User-Centered Design (3 credits)**

Prerequisite(s): PRDN 101, PRDN 102, PRDN 111, PRDN 112 and PRDN 211. The focus of the course is the approach to design products, services, systems, and experiences that address the core needs of the user. Human-centered design includes research, scenario-building, lateral thinking, and testing of solutions for feasibility. Students will learn to immerse themselves in a problem, collecting data for analysis and synthesis. Based on knowledge gained in previous design courses, students will deepen their knowledge in ergonomics, user experience, and user interaction. Students will develop design projects that address the needs of users.

**PRDN 220 Digital Modeling: 3D CAD I (3 credits)**

Prerequisite(s): PRDN 100 and PRDN 101 and PRDN 111. Restriction(s): Product Design majors only. Corequisite(s): PRDN 211 and PRDN 201. The focus of this course is to teach students the fundamentals of 3D digital parametric modeling, using SolidWorks, and industry standard engineering application. Content is organized around part modeling, assembly models and technical drawing generation. Students are taught to build conceptual and performance models required in the design practice for visualizing and testing design scenarios. This subject requires students to apply their knowledge of descriptive geometry, problem solving and 3D visualization ability. Students are expected to explore the possibilities of digital modeling (3D Printing) with curiosity and inventiveness, maximizing their confidence and skill level.

**PRDN 221 Digital Modeling: 3D CAD II (3 credits)**

Prerequisite(s): PRDN 110, PRDN 111, PRDN 112, PRDN 201, PRDN 211 and PRDN 220. Restriction(s): Product Design majors only. Corequisite(s): PRDN 212 and PRDN 202. The second part of the Digital Modeling # 3D CAD course sequence focuses on expanding students' knowledge gained in Digital Modeling I and builds on the material of other content providing an in-depth knowledge of computer-aided design as it applies to product development on the corporate level. Simulation and visualization of problems, related to form and manufacturing technology are covered. The course also covers 3D Rendering and product animation for marketing uses. Students are expected to independently explore the wide range of possibilities and approaches to 3D digital modeling, rendering and animation to take full advantage of the capability of the SolidWorks software.

**PRDN 300 Transportation Design I (3 credits)**

Prerequisite(s): PRDN 202, PRDN 212, PRDN 221. In this course, students will learn the inception and evolution of transportation design. Ways of public and personal transportation will be explored, along with technical and material advancements. Students will learn, the influence of cultural changes, consumer tastes, and market preferences on the transportation industry. Essential design elements will be explored utilizing both traditional and digital tools. Applying the principles of user-centered and sustainable design, students will develop a vehicle aimed at a specific market segment, based on an existing brand, with an emphasis on exterior, realistic form and proportion. Course deliverables will be presentation of research, adequate amount of design exploration sketches, final renderings, and 1:5 scale professional tape drawing.

**PRDN 301 Transportation Design II (3 credits)**

Prerequisite(s): PRDN 201, PRDN 202, PRDN 211 and PRDN 212. In this course, students will continue to study the transportation industry and incorporate this information into the automotive design process. Special attention will be paid to the fragmentation within the industry that results in careers in visualization, rendering, modeling, clay modeling, interior design, exterior design, CMF (colors, materials and finish), accessory design, and aftermarket product development. Traditional and digital techniques will be employed, including, hand sketching, digital sketching, and the creation of 3D models/renders and physical mock-ups.

**PRDN 302 Product Design V - Industry Collaboration I (4 credits)**

Prerequisite(s): PRDN 202, PRDN 211 and PRDN 221. Restriction(s): Product Design majors only. This course builds upon all knowledge obtained in preceding semesters and focuses on utilizing diverse design philosophies and approaches of the development process. Students will work on industry-sponsored projects that require user research, market analysis, critical thinking and the development of coherent arguments in all stages of the design process, Students will gain an understanding of professional expectations, the importance of brand DNA and marker appropriateness, product development timeline from inception to completion of the design. Students will further explore the employment of model making for both in terms of research and presentation. Students are expected to demonstrate thorough knowledge in all previous subject areas to successfully complete this course. The class is a combination of lectures, tutorials, and studio practice.

**PRDN 303 Product Design VI - Industry Collaboration II (4 credits)**

Prerequisite(s): PRDN 221 and PRDN 302. Restriction(s): Product Design majors only. In this complex product design studio environment, students invest the skills, knowledge and experience developed in previous coursework. Students work in collaboration with industry partners as well as independently on industry-sponsored real-life projects. Students will concentrate on commercially viable, user-centered sustainable design solution. Aesthetic and technical aspects of design expected to be presented at a professional level to industry partners.

**PRDN 360 Business of Product Design (3 credits)**

Prerequisite(s): PRDN 112, PRDN 202, PRDN 211 and PRDN 220. Restriction(s): Product Design majors only. This course explores the contractual, legal, financial and ethical issues related to profession of Product Design (and industrial Design). During the semester, students will also focus on developing their resume and a junior level portfolio, for consideration of future COOP and Internship. The expectation is based on actual entry level job advertisements, therefore the portfolio must give evidence of creativity and aesthetic sense, the understanding of the design process, visualizing ideas, technical development, ergonomic study and feasibility testing. The course also introduces students to professional organizations and career development. Successful completion of this course will enable students to develop the appropriate professional conduct associated with the field of Product Design and create a competitive portfolio.

**PRDN 410 Product Design Thesis: Concept Development (3 credits)**

Prerequisite(s): PRDN 302, PRDN 303 and PRDN 360. Restriction(s): Product Design majors only. Students begin to research and explore design opportunities, developing multiple project concepts based on their own interests for the purpose of proposing a complex industrial design thesis project. Students are required to provide evidence of all the knowledge they have obtained in the major, and to present data resulting from independent studies, exploration and research. The project complexity is expected to be on the level of a senior thesis and a faculty appointed panel evaluates its viability. Students work in conjunction with faculty, external consultants, or an actual client. The class is a combination of lectures, tutorials, and Studio practice. Students required to present one coherent design concept, for final development, supported with technical and user data, as well as several study models that illustrate their thinking process and decision making.

**PRDN 411 Product Design Thesis: Detail Design (3 credits)**

Prerequisite(s): PRDN 410. Restriction(s): Product Design majors only.

This course is the second part of a two#part course sequence. Students focus on the completion of their thesis projects. They work independently, but receive regular feedback from faculty and their external consultant.

The objective is to build students' confidence in developing and finalizing design details and perfecting their projects to achieve a rational design solution. Preparing design documentation, study and presentation models and illustrative presentation panels is compulsory. The class is a combination of lectures, tutorials, and Studio practice.