IWKS 5100: Human-Centered Design, Innovation and Prototyping
Offers a graduate-level introduction to collaborative interdisciplinary design and innovation from a human perspective, as well as introducing key theoretical and computational foundations of innovation. Using the wide array of Inworks prototyping facilities, teams of students will design and implement human-oriented projects of increasing scale and complexity, in the process acquiring essential innovation and problem-solving skills.
Prerequisite: Graduate standing; no previous design or prototyping experience is expected or required.
Credit hours: 3

IWKS 5120: Physical Computing and the Internet of Things
Introduces techniques for (1) designing cyber-physical systems that can sense and respond to humans in meaningful ways, (2) creating networks of physical objects that collect and exchange data, and (3) for creating autonomous artifacts. Examples of such systems include interactive art, wearable health monitors and game playing robots. Working individually and in teams, students develop projects using Inworks’ materials, devices and fabrication tools, culminating with a final project of the students’ choosing. The course involves considerable prototyping and software development, but requires only introductory programming and prototyping experience.
Prerequisite: Graduate standing; Suggested Background: IWKS 5100 & some computing experience
Credit hours: 4

IWKS 5200: Health Data Science
Introduces techniques for capturing, processing, visualizing, and making meaning out of large health-focused datasets. With the exponential growth and decreasing cost of data collection tools such as genome sequencing, mobile phone health trackers, remote sensors, and electronic and personal medical records to name a few, the demand for data scientists to help find meaning in a sea of data has never been greater. This course will introduce the fundamentals of working with health data and large data sets, introduce widely-used data analysis and visualization tools, and culminate in a cumulative health data project.
Prerequisite: Graduate standing; Suggested Background: some computing experience
Credit hours: 3

IWKS 5300: NAND to Tetris
Foundations of Computer Systems
Introduces the computer science principles and technologies that underlie the global information age. Starting from first principles, students gradually construct a fully functional simulated hardware platform, together with a modern software hierarchy, yielding a working basic yet powerful computer system. In the process of building this computer system, students gain a first-hand understanding of how hardware and software systems are designed and how they work together as one enterprise. The course involves considerable software development in the form of a series of laboratory assignments of increasing complexity, but requires only introductory programming experience.
Prerequisite: Graduate standing; Suggested Background: some computing experience
Credit hours: 3

IWKS 5500: Biomedical Innovation and Design
Introduces the biodesign innovation process, which involves identifying important biomedical needs and inventing meaningful solutions to address them. The course examines the design, development and commercialization of innovative medical technologies in a variety of contexts, and explores how these processes can vary across disciplines, geographies and demographics. Working individually and in teams, students explore the many factors that shape healthcare innovation, and through hands-on team-based design projects, invent their own solutions that serve clinical or other biomedical needs.
Prerequisite: Graduate standing; Suggested Background: IWKS 5100 & 5200
Credit hours: 3

1 Note: This course list will be updated frequently. For up-to-date information, visit http://www.inworks.org.
IWKS 5520: Designing for Healthful Human Longevity
Explores the history of life-extension efforts, as well as present day technologies, companies, and organizations that seek to extend healthy human lifespans. Survey of the current state of the field, currently recognized barriers to success, and the ethical and equity considerations associated with success. Examination of leading theories of aging, current research in model organisms, and emerging techniques and technologies. The course will require a significant amount of reading and in-class discussion/debate.
Prerequisite: Graduate standing; Suggested Background: Suggested Background: IWKS 5100
Credit hours: 3

IWKS 5550: Innovation Law and Policy
Introduces legal and regulatory foundations related to innovation, including intellectual property, telecommunications, electronic commerce and the Internet, biotechnology, ethical and equity considerations, and the financing of innovative ventures. The course examines these issues from the diverse perspectives of the legal, business, capital, development, consumer, and policy-making communities.
Prerequisite: Graduate standing; Suggested Background: IWKS 5100
Credit hours: 3

IWKS 5600: Innovating for the Developing World
Explores the design and development of products and services that can be sustainably and gainfully used by the world’s poorest citizens. Students in interdisciplinary teams design, implement and evaluate a viable solution to a real problem faced by real people in the developing world. The goal is to develop an understanding of the extraordinary challenges faced by individuals for whom basic survival is not a given, and the knowledge and skills necessary to create designs that respond appropriately to those unique circumstances. Provides a foundation for further study and practice in the area of technology and development.
Prerequisite: Graduate standing; Suggested Background: IWKS 5100
Credit hours: 3

IWKS 5650: Mobile App Development
Introduces mobile application development, including front-end mobile application clients, data handling, connectivity to back-end services and cloud hosting. The course provides an overview and comparison of technical approaches employed by Apple iOS, Google Android and Microsoft Windows. Students will install, develop, test, and distribute mobile applications while addressing challenges associated with development for any mobile platform: limited screen size and memory, gesture based GUI, varying connectivity, and the wide variety of target mobile devices.
Prerequisite: Graduate standing; Suggested Background: IWKS 5300 or 5120
Credit hours: 3

IWKS 5800: StartUp
So You Want to be an Entrepreneur?
Explores the entire entrepreneurial cycle, from inspiration to IPO. Student teams create and launch an innovative company in a semester. Culminates in a “pitchfest” to area entrepreneurs and venture capitalists. One of two alternative capstone courses for the Inworks Graduate Certificate in Design and Innovation.
Prerequisite: Graduate standing & enrollment in the Inworks graduate certificate, or instructor permission
Suggested Background: Completion of at least two other Inworks courses
Credit hours: 4

IWKS 5900: Graduate Capstone
Working closely with project sponsors, students design, implement, and evaluate a project for use by a local company or non-profit organization. the Inworks Graduate Certificate in Design and Innovation.
Prerequisite: Graduate standing & enrollment in the Inworks graduate certificate, or instructor permission
Suggested Background: Completion of at least two other Inworks courses
Credit hours: 4
IWKS 5930: Special Topics
Emergent issues and professional developments in design, innovation and prototyping. Consult the current online Inworks Course List for semester offerings as new special topics courses are frequently added. With permission, may be repeated for credit.
Prerequisite: Graduate standing
Credit hours: 1-4 (Variable)

IWKS 5970: Independent Study
Studies initiated by students or faculty and sponsored by an Inworks faculty member to investigate a special topic or problem related to design, innovation and prototyping. With permission, may be repeated for credit.
Prerequisite: Graduate standing & Permission of an Inworks faculty member.
Credit hours: 1-4 (Variable)