

FALL 2022 NEW COURSES & DESCRIPTIONS

BU-450 Introduction to Healthcare Management

Introduction to Healthcare Management is designed as an essential overview of the role of management in health provider settings and other non-direct patient care segments of the healthcare industry. The course highlights the changes in healthcare management being driven by evolving “patient-centric” and value-based goals for improving long-term patient outcomes and for addressing the complexities of the industry. For cadets considering health-related career options, this course is designed to provide nuanced views of leadership expectations. Prerequisites: None

Instructor: Mr. David Beauregard

EE-477 RF Circuit Design-I (Lecture + Lab)

This first course on radio-frequency (RF) circuit design aims at introducing cadets to the fundamentals of high-frequency passive circuit analysis and design. Specifically, in this course, cadets learn basic concepts of transmission lines, microwave network analysis including the s-parameters, impedance matching including the smith chart, and common microwave passive components such as power dividers, couplers, and filters. In the accompanying lab sessions, cadets will learn the Advanced Design System (ADS)- leading industry-standard software for high-frequency circuit and system design. Linear and non-linear electrical (schematic), electromagnetic (EM), and EM co-simulation will be introduced.

Furthermore, cadets will be doing a project around the design and PCB fabrication of a microstrip version of the above-mentioned passive components and their measurement using a vector network analyzer (VNA). Prerequisite: EE-223, MA-124

Instructor: Dr. Maktoomi

EE-225 or EE-476 Electromagnetic Fields

This course is designed to provide the cadets with the tools to analyze electric and magnetic fields. The course explores Maxwell’s equations for static systems. Electrostatics: fields in vacuum and material bodies, Coulomb’s law, Gauss’ law, divergence theorem, Poisson’s and Laplace’s equations with solutions to elementary boundary value problems. Magnetostatics: fields in vacuum and material bodies, Ampere’s law, Biot-Savart’s law, Faraday’s law, and Stoke’s theorem. Prerequisite: MA-215

Instructor: Dr. Maktoomi

HNL 380WX Power and Politics in Shakespeare

In this course we will explore what some of Shakespeare’s most interesting plays suggest about the nature of power: how both heroes and villains establish and use their authority, how they shape their own identities and destinies, and how they serve and/or undermine justice. We will also read other works that will contextualize our understanding of Shakespeare’s portrayal of power by deepening our appreciation of the distinctive culture of this period.

HNL 380WX is cross-listed as ERH 321WX. Registration under the ERH designation is by permission of the instructor.

HNL 385W Text + Image: Contemporary Nonfiction

Cadets in this seminar will explore the use of images, principally photographs, to illustrate, amplify, or otherwise extend the implications of the written word. The course will begin with close study of examples of the use of images and words together to strong effect. The remainder of the term will be devoted to each student’s development and completion of an extended essay requiring integration of

text and image. Ideally, cadets will end the course with a substantial polished work suitable for submission and publication. Cadets should expect an intensive workshop experience requiring writing for every class period and active participation in whole-class critiques. A strong commitment to the creative process and to the workshop model of drafting and response is required.

HNL 385W is cross-listed as ERH 475W. Registration under the ERH designation is by permission of the instructor.

HNS 376WX The Social, Ethical, and Economic Issues Surrounding Science and Medicine

This seminar will address the rapid and almost unmanageable speed of breakthroughs in science and medicine that have tested our abilities to keep up with the many social, religious, ethical and economic issues that they evoke. Through a case-based study of actual problems and controversies, we will discuss ways to address these issues as concerned individuals and members of a society. Included will be such issues as patients' rights, the use of animals in research, human cloning, stem cell research, screening for human diseases, euthanasia, health care coverage, and access to medical care.

HNL 376WX is cross-listed as BI 331WX.

HNS 384W BioArt

The term BioArt was coined by Eduardo Kac to be any art using living cells or organisms in its creation. Kac is most famous for his work "Alba," a glow-in-the-dark rabbit genetically engineered to express a jellyfish gene for green fluorescent protein. BioArt has received great scrutiny and criticism from both artists and scientists alike for ethical considerations. In this course, we will explore the history and ethics of BioArt while learning about the science that makes each work possible. Students will also create MicroArt, working cultures of bacteria, fungi, and protists. We will use pigmented and fluorescent bacteria as paints and dyes, use bioluminescent bacteria as a light source for photography, create living photographs from bacteria, and create fabric and paper from microbial biofilms. No prior experience in biology or art is required.

HNS 384W is cross-listed as BI 352W. Registration under the BI designation is by permission of the instructor.

Honors Thesis

HN 400-401

Honors Thesis/Project Research

Research for and completion of the Institute Honors thesis under the guidance of a faculty adviser. First class cadets must enroll in this course (for one semester or two) or another appropriate research or independent study course in order to earn credit for completing the thesis required for Institute Honors. Enrollment is restricted to cadets in the Institute Honors Program and requires permission of the program's director. To enroll, complete the Registrar's INDEPENDENT STUDY/RESEARCH COURSE REGISTRATION form for COL McDonald's approval. The link to the form is:

<https://etcentral.vmi.edu/#form/209>. A new section of HN 400/401 will be created for each individual cadet, listing the faculty mentor as the professor of record.

MA 472

Introduction to Statistical Learning

The course covers selected topics from the field of Statistical Learning which include some classical statistical methods, like simple linear regression, logistic regression, clustering, as well as some newer

methods, like Boosting, Bagging, and Random Forests. Thanks to the recent rapid growth in computing power, the field of Statistical Learning provides powerful tools for comprehensive data analysis and data visualization. Learning such methods equips one with skills that are in high demand in the job market. The applications include marketing, finance, military, medicine, biology, sociology, psychology and many other fields where one has to work with data, and big data in particular. The course is very applied in nature and emphasizes applications of the statistical learning techniques, keeping the theory to the minimum necessary to understand the methods. A significant portion of the course is dedicated to the in class labs, where students get an opportunity to apply the methods they learn using real life datasets and the R statistical software. In addition, students will have multiple projects to work on in order to apply the skills learn. At the end of the course the students should have some theoretical and practical knowledge of a number of statistical learning methods, and be able to apply the methods and interpret the results in a meaningful manner.