

SPRING 2027 SPECIAL TOPICS

Introduction to Machine Learning: CIS-475

This course is designed to provide a general introduction to machine learning and its applications. Topics covered include regression analysis, classification models, clustering analysis, logistic regression, decision trees, k-means, hierarchical clustering, features selection, model selection, model tuning, ensemble techniques, natural language processing, computer vision, and neural networks.

Prerequisite(s): CIS-213

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The Science of Endurance Performance: HPW-470

Course Description: This course will examine the physiological factors that determine endurance and provide a foundation in program design to enhance performance. In addition to lectures, cadets will participate in laboratory and practical field experiences designed to deepen their understanding of exercise physiology and endurance training. Related topics that influence endurance including ergogenic aids, environmental factors, and overtraining will also be explored.

Prerequisite(s): NA

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Politics of Migration: IS-471

This is an International Studies elective course designed to build off of cadets' basic knowledge of political institutions and the interplay of domestic and international politics. First, we discuss trends, terminology, and resources for evidence-backed analysis of immigration-related phenomena, evaluating common rhetorical tropes about migrants that appear in contemporary and historical political discourse. Second, we analyze migration decisions as an outcome, looking at "push" and "pull" factors between sending and receiving countries, including political and economic institutions as well as the role of public opinion in receiving states. Then, we assess varied societal impacts of migration flows, including economic

outcomes in sending and receiving states as well as security considerations, cultural assimilation efforts, and backlash to nationalization.

Prerequisite(s): NA

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Politics and Literature: IS-473

Political philosophy asks questions and seeks answers relating to the nature of justice or the just society. The texts that have explored this question since the earliest Platonic dialogues have predominantly done so through the use of reason or analytic intellect, often taking the form of philosophical treatises, speeches, or letters. However, some of the most penetrating insights into the nature of justice have also been articulated through the use of the imagination, as one finds in certain novels, plays, and short stories. In fact, it may be argued that the aesthetic sense is sometimes superior to reason for its ability to synthesize or combine information into conceptual wholes—precisely not to dissect or separate these elements—to express what is important or significant, as understood from within human experience or reality itself. The scope of fictional writing that addresses questions of justice or the just political order is too vast to cover in a single semester. Therefore, this course will focus on a particular issue or special topic within the latter that is addressed by a narrow subset of these works. By applying the insights of such texts to one's own life and contemporary society, cadets will be asked to comprehend and ultimately respond to each author's claims as part of an ongoing dialogue on the nature of the just society. Questions to be examined may include, but are not limited to: Does the just society require a certain type of character or virtue among its citizens? What are the threats to individual liberty that exist outside the formal institutions of law and government? How do commonly accepted ideals such as "happiness" and "progress" relate to our understanding of political authority? What (if any) are the limits or givens that we must simply accept or contend with as part of any human society?

Prerequisite(s): NA

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Global Populism: IS-478

Populism has gained a successful foothold and generated new challenges in numerous long-established democracies across the globe over the past few decades. It has gone beyond being a noisy opposition. Holding executive offices, forming governments and being at the heart of inter-/supranational institutions, populists now have gained the capacity to redefine the political narrative, pose challenges to their mainstream competitors spanning the ideological spectrum and —directly or indirectly— change institutional and organizational structures. Against such a background, the main objective of this course is to provide students with the conceptual, theoretical and empirical foundations to understand the phenomenon of contemporary populism.

Prerequisite(s): NA

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Leadership Through Dialogue: Navigating Controversy with Purpose and Civility: LEAD-170

Designed to strengthen communication and leadership skills, this immersive and highly participatory course provides students with opportunities to practice civil discourse, participate in debates and community conversations, and engage thoughtfully with diverse perspectives. Through interactive discussions and public speaking exercises, students will develop techniques for effective communication, critical thinking, deep listening, and constructive dialogue. Emphasis is placed on building confidence in public speaking, fostering respectful engagement, and cultivating the skills necessary for leadership in academic, professional, and civic settings.

Prerequisite(s): NA

Restriction(s): NA

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Special Topics in Data, Stats & Covid-19: MA-302

This course explores the use of statistical data in understanding and responding to the COVID-19 pandemic, drawing from David Spiegelhalter's COVID by Numbers. Students will learn to critically analyze pandemic-related data, including infection rates, mortality statistics, vaccine efficacy, and public health metrics. Through this lens, the course will cover key statistical concepts such as uncertainty, risk, and

decision-making under uncertainty. By examining real-world data and case studies, students will gain a deeper appreciation for the role of statistics in public policy and health communication.

Prerequisite(s): NA

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 1

Wargaming: Strategy, Modeling, and Decision-Making: MA-371

An introduction to wargaming as a tool for modeling strategy, decision-making, and conflict under uncertainty. Topics include game design, rules and adjudication, probability, simulation, human behavior, and the analysis of outcomes.

Prerequisite(s): C or better in MA 124

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 1

AI in Physics: PY-272

This course introduces artificial intelligence and machine-learning methods used in physics, with an emphasis on scientific machine learning. Topics include neural networks, training and optimization, automatic differentiation, simple ordinary and partial differential equations, and physics-informed neural networks (PINNs). Students will use Python to explore physics-based examples, compare data-driven and physics-based models, and develop simple computational models that combine physical laws with machine learning.

Prerequisite(s): PY-223 or MA-110 or ME-203

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Special Topics in Nuclear Physics: PY-371

Introduces the fundamental concepts, principles, and applications of nuclear and particle physics. The course covers atomic and nuclear structure, nuclear models, quantum concepts, nuclear reactions, radioactivity and radioactive decay, and radiocarbon dating. In addition, it covers elementary particles, the Standard Model, nuclear forces, particle accelerators, special relativity, radiation detection, and radiation protection. Through quantitative problem-solving, laboratory-based projects, and exposure to current research, students will gain a comprehensive understanding of nuclear phenomena and their technological applications.

Prerequisite(s): [PY 161](#)

Restriction(s): NA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3