SMO/SMOH Electives
Fall Semester AYE 2027

Math Elective

SM342 Discrete Mathematics

Track Electives (TRK EL1, TRK EL2)

Descriptions provided below for courses listed in **bold**

SA433 Data Wrangling & Visualization

SA435 Decision Analysis

SA485 OR Reading Course (must have adviser lined up)

SA485A Naval Innovation Capstone I

SM435 Sports Statistics

SM439 Machine Learning for Strategic Decision Making

Breadth Electives (BR EL1, BR EL2)

(All Track Electives count as Breadth Electives)

SM212 Differential Equations

SM315 Partial Differential Equations

SM331H Real Analysis 1

SM333 Sequences, Series & Functions

SM444 Discrete Mathematics II

SM450A Nonlinear ODEs: Modelling and Analysis[1]

SM468 Cryptography, Codes and Information Security

Non-math courses with no prereqs:

SE201 Principles of Microeconomics (limited seats)[2]

SE202 Principles of Macroeconomics (limited seats)

IC210 / SI204 Intro to Computing

SI350 Web & Internet Programming[3]

(Check MIDS for the full list of Breadth Electives)

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[1] No credit if student has taken SM450 with a similar title.

[2] Students cannot receive credit for both FE210 and (SE201 or SE202). (FE210 is a HUM SS elective.)

[3] SI350 does not yet appear in BR EL list in mids and therefore requires annotation. SA233 is a valid prereq. See the course description in the list below.

SA433 Data Wrangling & Visualization

In this course, midshipmen will learn to (i) wrangle (i.e. clean and manipulate) large, messy data sets into forms suitable for modeling and analysis (in particular, operations research and statistical models), and (ii) create sophisticated visualizations of large data sets that provide useful insights for decision-making as well as further modeling and analysis. *Prereq: SA233*

SA435 Decision Analysis

This course provides an introduction to modern theory and methods for decision analysis. Decision making under uncertainty and military applications are emphasized. Topics include decision trees, influence diagrams, the value of information and real options, risk, utility theory, and multiple criteria decision making. *Prereq: SM239*

SA485A Naval Innovation Capstone I

The two-semester capstone course is designed to give students the opportunity to work in depth on a real-world research project that benefits the fleet. Students must be willing to enroll in SA485A in the fall semester and SA475 in the spring semester. Students will be in a 3-to-4-person research team and work on the same project for both semesters. Interested students should apply for department chair approval for this capstone course sequence via Google Form sent out to all SMO majors before pre-registration begins. In most previous years, the level of student interest is higher than the 24-student limit for the course. Interested students will fill out a Google Form before fall semester pre-registration to indicate an interest in course enrollment. The top 24 students will be enrolled in the course. Priority is given to students that performed a summer internship with a project sponsor. Past project partners include Joint Chiefs of Staff (J4 directorate), Commander, Naval Air Forces Force Readiness Analytics Group (CNAF FRAG), Commander Naval Surface Forces, Marine Corps Recruiting Command (MCRC), Military Sealift Command, Naval Air Training Command, Lockheed Martin, MITRE Corporation, Naval Information Warfare Command, Atlantic (NIWC LANT). There is a potential for a new partnership with LMI corporation in AY26.

SM435 Sports Statistics

An introduction to the statistical analysis of sports data via a case studies approach. Statistical topics include linear and logistic regression, maximum likelihood estimation, bootstrapping, the multivariate normal distribution, random forests, Markov chains, and simulation. Sports topics include: player valuation, game outcome prediction, the hot hand controversy, and cheating detection. *Prereqs: SM239 and (SM339 or SM317)*

SM439 Machine Learning for Strategic Decision Making

Predictive modeling empowers organizations to optimize operations, enhance customer satisfaction, manage budgets, uncover new markets, and anticipate external impacts, among countless other

applications. As technology becomes more accurate, accessible, and cost-effective, the value of predictive analytics continues to grow. By leveraging statistical techniques, machine learning, deep learning, and artificial intelligence, predictive modeling forecasts future outcomes based on historical and current data. It builds on descriptive analytics, which answers 'what happened', and lays the foundation for prescriptive analytics, which explores 'why'; and 'what next'. This field is rapidly evolving, and the goal of this course is not only to teach current modeling techniques but also to equip students with the critical skills to assess, appraise, and adapt to new modeling practices. By engaging with practical examples, students will become agile decision-makers and innovative problem-solvers, prepared for the dynamic challenges of tomorrow. *Prereqs: SM239, SM339*

SM468 Cryptography, Codes and Information Security

Cryptography, Codes, and Information Security investigates the mathematics of secret and error-correcting codes. *Prereq: SM261*

SI350 Web & Internet Programming

Interested in advancing your programming skills by designing interactive web pages using HTML5, CSS, JavaScript, Dynamic HTML, and PHP? Want to know how to build the web? How to make sense of all of the available information? The course is divided into four areas (HTML and building pages, CSS, Client side scripting, Server side scripting using PHP). After the course, you should be able to design effective ways in which to portray complex information, enable users to interact with backend servers via the web. *Prereq: Intro programming (IC210 or SI204 or SI268 or SD211 or **SA233** or EW300)*
This BR EL offered by the Computer Science department is recommended for students who enjoy programming.