



AMERICAN UNIVERSITY OF BEIRUT
MAROUN SEMAAN FACULTY OF ENGINEERING AND ARCHITECTURE
ENGINEERING MANAGEMENT PROGRAM

ENMG 606: Applied Data Science (3 cr.)

Course Syllabus

I. Meeting Time, Location:

Time:
Location:
Website: Moodle

II. Instructor:

Dr. Maher Nouiehed
Email: mn102@aub.edu.lb

III. Teaching Assistant: TBA

E-mail: TBA

IV. Course Description:

The purpose of this course is to provide theoretical knowledge and practical skills to analyze, visualize and explore data. The covered material provides an introduction to applied data analysis, with an emphasis on providing conceptual framework for viewing data from both statistical and machine learning perspectives. The course starts with a brief introduction on data summarization and visualization. Then extends to focus on using data to develop predictive capabilities using supervised and unsupervised machine learning models (regression, classification, clustering, PCA, ...). Finally, the basics of frequentist estimation and hypothesis testing are covered. The course will include a project and data-driven problem sets.

Prerequisite: Basic Probability, Multivariate Calculus, Basic Matlab skills.

V. Course Outcomes:

- Utilize data visualization and summarization tools and techniques.
- Understand the basic concepts and applications of regression and classification predictive tasks.

- Understand and utilize supervised machine learning models and their applications.
- Establish a good understanding of inference tasks and hypothesis testing.
- Apply the learned concepts to analyze real datasets.

Optional Textbooks:

- Data Analysis Using Regression and Multilevel/Hierarchical Models, by Andrew Gelman and Jennifer Hill.
- Machine Learning: A Probabilistic Perspective, by Kevin Murphy

VI. Tentative Performance Evaluation and Grading:

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|-------------------------------------|-----|
| • Project | 30% |
| • Midterm | 20% |
| • Problem Sets (Best 4 out of 5) | 40% |
| • Participation in discussion forms | 10% |

VII. Course Policies:

Homework Requirement:

- Homework problems will be posted on Moodle.
- Homework assignments must be electronically submitted via Moodle. Only one pdf file should be submitted for every homework assignment. You can submit latex pdf files, word converted pdf files, or scanned images which are converted to pdf.
- Homework assignments that involve coding should include a copy of the code in the submitted pdf file.
- Late homework assignments are not acceptable under any circumstances.
- It is encouraged to discuss homework assignments with other students. However, each student is required to submit his/her own personal work.

Project:

This project requires the students to develop a predictive model on a real dataset. A full report that includes experimental results along with the code should be submitted.

University Policies:

- By signing up for this course, you confirm that you have read and accepted the terms and provisions of AUB's [Privacy Statement](#).
- **Academic Integrity:** Please refer to AUB Student Code of Conduct: <https://aub.policytech.eu/dotNet/documents/?docid=147&public=true>, in particular section 1.1, which concerns academic misconduct including cheating, plagiarism, in-class disruption, and dishonesty. Please be aware that misconduct is vigorously prosecuted and that AUB has a zero-tolerance policy. Course policy is that **credible evidence of cheating will result in course failure.**
- **Recommended Accessibility Statement to Acknowledge the Unique Learning Needs of Students with Disabilities:**

AUB strives to make learning experiences as accessible as possible. If you anticipate or experience academic barriers due to a disability (including mental health, chronic or temporary medical conditions), please inform me immediately so that we can privately discuss options. In order to help establish reasonable accommodations and facilitate a smooth accommodations process, you are encouraged to contact the Accessible Education Office: accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314.

- **Non-Discrimination and Anti-Discriminatory Harassment, including Sexual Harassment at AUB**

In line with its commitment to the principle of equal opportunity in education and employment, AUB policies protect you from discrimination on the basis of protected characteristics, including discriminatory harassment and sexual harassment. Protected characteristics include: race, color, religion, age, national or ethnic identity, sex, gender or gender identity, sexual orientation, pregnancy, marital status, disability, genetic predisposition or carrier status, alienage or citizenship status, and political affiliation.

The policies are applicable to all the AUB Community including: officers, faculty, staff, academic appointees, students (including medical interns and residents), visiting students, alumni, trainees, visitors, contractors, subcontractors, suppliers, located on campus and at AUB Medical Center, Advancing Research Enabling Communities Center (AREC), or any other facility or program affiliated with the University. The “AUB community” also includes the dependents and domestic employees of faculty and staff dwelling on campus and at AREC.

If you think you have experienced discrimination, discriminatory harassment, or sexual harassment, we encourage you to inform the Equity/Title IX Coordinator, Mitra Tauk at 01-350000 ext. 2514, titleix@aub.edu.lb, report to a Title IX deputy at your faculty or at any other faculty (www.aub.edu.lb/titleix), or report online (www.aub.ethicspoint.com). Reports may be submitted anonymously or not. Please know that the University will maintain the confidentiality of the complaint and privacy of the persons involved to the greatest extent possible, consistent with its goal of conducting a thorough and complete investigation and to the extent permitted by law.

You need to also know that the University has designated academic and administrative department/unit heads, managerial level staff, academic advisors, protection officers, and residence hall staff/monitors, as responsible employees or “mandatory reporters”, and may designate others at its discretion. These individuals are obligated to report actual or suspected discrimination or discriminatory harassing conduct to the Equity/Title IX Coordinator, unless they are a “confidential” resource. The following have been designated as confidential resources: on campus counselors in the Counseling Center of the Office of Student Affairs and AUB Medical Center counselors, and healthcare providers at the University Health Services (UHS) and at the AUB Medical Center. Confidential resources are not required to report actual or suspected discrimination or harassment to appropriate university officials, except in cases of suspected abuse of a minor, in the event of an external investigation or prosecution, or in the event of imminent danger to the reporting party or others.