ENGINEERING MANAGEMENT (ENMGT)

ENMGT 3101 - Introduction to Python for Engineering (1 Credit)
Crosslisted with CEE 3101
Python is one the most popular programming languages for machine learning and data science in various engineering fields. This course rapidly introduces students to programming in Python, focusing on practical tools for data analysis, visualization, and scientific computing. We will learn to work with data, create visualizations, and write simple functions and scripts. We will install and use libraries such as NumPy, Matplotlib, and Pandas, and create and manage virtual environments. Basic computer science and software engineering concepts will be introduced, however, the focus of this short course is on learning to use Python as a computational tool for engineering and data analysis problems, and creating a foundation for continued learning.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Learning Outcomes:

- Install and set up Python and additional computational libraries.
- Be fluent in the use of expressions, variables, functions, conditional statements, and loops.
- Use Python to load, analyze, and visualize data.
- Set up and use virtual environments such as Anaconda to install and manage packages and other tools, for project portability and collaboration.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 3102 - Basics of Programming in Python (1 Credit)
Crosslisted with CEE 3102
The goal of this course is to provide students with a quick introduction to programming that will allow them to use Python as a problem solving tool for work, research, or study, and present a basis for continued learning of Python and other programming tools.The course focuses on practical tools, including basic programming concepts and methods, introduction to data analysis, visualization, and scientific computing using Python, as well as setting up and managing project environments, libraries, and dependencies. We will work with libraries designed for scientific programming such as NumPy, Matplotlib, and Pandas.
Last Four Terms Offered: Spring 2025, Spring 2024, Spring 2023, Spring 2022
Learning Outcomes:

- Define a problem and design a program to solve the problem by creating executable codes.
- Be fluent in the use of expressions, variables and functions, conditional statements, loops, sequences, and recursion.
- Understand the concept of object-oriented programming used in Python.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5050 - Interdisciplinary Master of Engineering Project (1-6 Credits)
Crosslisted with CEE 5050
Students will participate in a community-engaged, interdisciplinary Master of Engineering (M.Eng.) project to tackle pressing technological and societal challenges surrounding infrastructure, with a specific focus on energy and environmental systems. For example, in 2018/19, projects were focused on Puerto Rico post Hurricane Maria. As part of this course, you will work closely with local stakeholders to hear their perspective on prior challenges and future needs. Each subsequent year will then build upon the prior year's activity to tackle large, complex issues over multiple years. During the course, you will contribute to developing a library of monitoring tools and algorithms which will persist over time and then be applied to solve new challenges with each course iteration.
Enrollment Information: Enrollment limited to: M.Eng. students.
Exploratory Studies: (CU-CEL)

Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5080 - Introduction to Python Basics (1 Credit)
An introduction to the Python programming language focusing on practical coding skills and building strong programing habits. Students will learn how to install and run Python, work with expressions, utilize variables and functions, write conditional statements, design and implement test function, write and visualize loops and learn the basics of programming concepts such as recursion. Applicable to students interested in learning to work with Python or improving basic programming skills, no prior programming experience is required.
Enrollment Information: Enrollment limited to: Engineering Management distance learning students.
Last Four Terms Offered: Summer 2025, Summer 2024, Summer 2023, Summer 2022
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5081 - Storytelling with Data (1 Credit)
This course will guide you through some foundational techniques for finding the story within your data and give you tools to generate professional quality visualizations using the programming language Python. Using the book Storytelling with Data: A Data Visualization Guide for Business Professionals by Cole Nussbaumer Knaflic, you will apply principles in human attention and perception to make simple and effective design choices when preparing to present your data to an audience. Then you will see demonstrations of how to create a variety of different plot types in Python - some with increasing complexity as you progress - that offer a wide range of options to apply and integrate with your own area of work or expertise. You will have opportunities to practice these skills yourself by working with Python scripts to generate and recreate modeled visualizations from data provided. You will begin to realize the huge potential and customization options that programmatically creating visualizations with Python can offer.
Enrollment Information: Enrollment limited to: Engineering Management distance learning students.
Last Four Terms Offered: Summer 2021
Learning Outcomes:

- Apply concepts in human attention and perception to create visuals that effectively depict key points.
- Prepare visual narratives for professional presentation in live or printed format.
- Use Python to customize several different plot types, including advanced subplot visualizations.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5101 - Introduction to Python for Engineering (1 Credit)
Crosslisted with CEE 5101
Python is one the most popular programming languages for machine learning and data science in various engineering fields. This course rapidly introduces students to programming in Python, focusing on practical tools for data analysis, visualization, and scientific computing. We will learn to work with data, create visualizations, and write simple functions and scripts. We will install and use libraries such as NumPy, Matplotlib, and Pandas, and create and manage virtual environments. Basic computer science and software engineering concepts will be introduced, however, the focus of this short course is on learning to use Python as a computational tool for engineering and data analysis problems, and creating a foundation for continued learning.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Learning Outcomes:

- Install and set up Python and additional computational libraries.
- Be fluent in the use of expressions, variables, functions, conditional statements, and loops.
- Use Python to load, analyze, and visualize data.
- Set up and use virtual environments such as Anaconda to install and manage packages and other tools, for project portability and collaboration.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5102 - Basics of Programming in Python (1 Credit)
Crosslisted with CEE 5102
The goal of this course is to provide students with a quick introduction to programming that will allow them to use Python as a problem solving tool for work, research, or study, and present a basis for continued learning of Python and other programming tools.The course focuses on practical tools, including basic programming concepts and methods, introduction to data analysis, visualization, and scientific computing using Python, as well as setting up and managing project environments, libraries, and dependencies. We will work with libraries designed for scientific programming such as NumPy, Matplotlib, and Pandas.
Last Four Terms Offered: Spring 2025, Spring 2024, Spring 2023, Spring 2022
Learning Outcomes:

- Define a problem and design a program to solve the problem by creating executable codes.
- Be fluent in the use of expressions, variables and functions, conditional statements, loops, sequences, and recursion.
- Understand the concept of object-oriented programming used in Python.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5200 - Economics of the Energy Transition (3 Credits)
Crosslisted with CEE 5200, SYSEN 5210
In response to the risks posed by global climate change, many states and countries have set emissions reductions goals necessitating a rapid transition toward zero-carbon energy resources. Achieving these goals entails unprecedented investment in civil infrastructure systems combined with large-scale consumer and industry adoption of clean energy solutions. This course will explore the economic challenges and opportunities associated with this transition, with an emphasis on the electric power sector. The course is broken into two halves. The first focuses on the economic viability of individual projects. The second develops system level models and considers interactions between competing energy sources.
Prerequisites: CEE 3040 or ENGRD 2700, CEE 3230 or ENMGT 5940.
Exploratory Studies: (CU-SBY)

Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5300 - Technology Strategy and Roadmapping for Engineering Managers (3 Credits)
This course will arm students with frameworks to design, implement and scale technologies to transform their organization with sustainable success. Technology is constantly evolving and engineering leaders that deploy these approaches within their organization will position themselves to tackle these opportunities. We will discuss framework and strategies to develop technology strategies informed by best practices from industry and the literature, perform case studies to study successes and failures in this arena, and design a mock technology strategy and roadmap for your organization.
Enrollment Information: Enrollment limited to: graduate students enrolled in distance learning programs.
Last Four Terms Offered: Spring 2025, Spring 2024
Learning Outcomes:

- Students will be able to identify and critically evaluate a company's technology strategy.
- Students will be able to identify and apply frameworks to design, implement and scale technologies to transform an organization.
- Students will be able to adjust or modify a strategy according to changing events or contexts, including developing a technology roadmap based on these events and contexts.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5400 - Applications of Artificial Intelligence for Engineering Managers (3 Credits)
This course will investigate the practice of artificial intelligence to solve technical problems, increase efficiency and productivity, and improve systems. While theory is covered, emphasis is placed on the practical applications of these concepts and the use of existing AI tools by engineering managers. The course is a mix of theory and hands on practical work with a focus on assembling and using a modern AI toolchain to empower engineers and engineering managers. Throughout the course, students will engage in hands-on projects, working with industry-standard tools and frameworks. The goal is to equip engineers with the skills and knowledge needed to leverage AI effectively.
Last Four Terms Offered: Spring 2025
Learning Outcomes:

- Be able to describe the basics of neural networks and artificial intelligence.
- Describe key concepts related to all generative models.
- Be able to describe issues surrounding AI, such as ethics and alignment.
- Competently use modern AI libraries, tools and services.
- Develop a portfolio of hands-on tools and Colab notebooks for a variety of ML tasks.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5500 - Digital Marketing for Engineering Managers (3 Credits)
This course gives engineering management students a broad understanding of the digital marketing landscape combined with specific technical and analytical skills used in advertising and marketing roles such as product managers, product marketers, account executives, marketing managers, marketing engineers and marketing scientists. This will include hands-on work with search engine marketing/optimization, social media and video marketing, creative testing and measurement. Students will apply analytical applications to learn core technical marketing concepts and methods. Students will also work with various mainstream analytics platforms and perform data manipulation and analysis in Python.
Last Four Terms Offered: Spring 2025
Learning Outcomes:

- Build end-to-end multi-channel digital marketing strategies from high level planning down to specific implementation.
- Build search, social media and video advertising campaigns.
- Analyze and optimize performance within and across advertising channels.
- Develop search engine, web analytics and conversion funnel optimizations.
- Apply data analytics methods to understand and forecast digital marketing performance.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5900 - Project Management (4 Credits)
Crosslisted with CEE 5900
Core graduate course in project management for people who will manage technical or engineering projects. Focuses both on the technical tools of project management (e.g., methods for planning, scheduling, and control) and the human side (e.g., forming a project team, managing performance, resolving conflicts), with somewhat greater emphasis on the latter.
Last Four Terms Offered: Spring 2025, Fall 2024, Spring 2024, Fall 2023
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5910 - Engineering Management Project (4 Credits)
Crosslisted with CEE 5910
As Engineering Managers, you need to embrace both technical and business skills to tackle complex, sociotechnical challenges, while staying on top of the current pace of technological change. In this Engineering Management project course, we are bridging from your coursework to your role as an engineering manager. To get there, you will practice the tools, themes, and techniques learned in your Engineering Management coursework through the scaffolding of a large project.
In CEE 5910, you will work in teams to lead and execute a project in collaboration with an industry partner. You will perform an intensive evaluation of some mixture of the technological and management aspects of a major engineering project or system, conducted with a team of students.
Last Four Terms Offered: Spring 2025, Fall 2024, Spring 2024, Fall 2023
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5920 - Product Management (3 Credits)
Product Management is one of the fastest growing careers in engineering and technology-based industries. In this course, you will learn the foundations of product management including (i) preparing for success as a product manager, (ii) identifying and targeting customer needs, (iii) prioritizing your project needs, and (iv) designing, developing, and deploying your product across the product life cycle. Using skills developed through course lectures and discussions, you will complete in a project where you will practice the sprint model utilized in most product teams. This course is for students interested in pursuing a career as a product manager in engineering or technology-based companies, learning about the product management competency, or working in a non-traditional tech setting to apply these skills on complex systems.
Enrollment Information: Enrollment limited to: seniors and graduate students, including M.Eng. and MBA students, or permission of instructor.
Last Four Terms Offered: Spring 2025, Spring 2024, Spring 2023, Spring 2022
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5930 - Data Analytics (4 Credits)
Crosslisted with CEE 5930
Big data is transforming organizations enabling vast improvements in operating efficiency, market identification and segmentation, and many other domains. This course focuses on data collection at all scales, the transformation of that data into knowledge using a variety of data analytic techniques, and the integration of that knowledge into system models for decision-making to better manage organizations. Expertise in R will be developed throughout this course.
Prerequisites: CEE 3040 or equivalent.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Learning Outcomes:

- Develop an ability to manage, analyze, and interpret data.
- Improve the students' ability to identify, formulate, and solve engineering management problems.
- Develop the skills and techniques necessary to become an effective problem solver.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5940 - Economics and Finance for Engineering Management (4 Credits)
An engineering case based exploration of economic models and methods used in analyses, comparisons, and decision making by engineers and engineering teams. Emphasis will be placed not only on the important calculations, but on understanding, communicating and recording their findings, related assumptions, risks, and situational awareness while improving their ability to work on teams.
Enrollment Information: Enrollment limited to: graduate students with an engineering undergraduate degree. Seniors with permission of instructor.
Last Four Terms Offered: Spring 2025, Spring 2024, Spring 2023, Fall 2021
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5950 - Construction Planning and Operations (3 Credits)
Crosslisted with CEE 5950, REAL 5950
Prepares students for responsibilities in overseeing the engineering and management of construction; on time-on budget. Emphasis is placed on the management processes for organizing, planning, and controlling the activities of complex development and construction programs. Students study the contracts for engineering, architecture, and construction; focusing on cost estimation and schedule control, responsibilities and risks, and the relationships among owners, designers, contractors, and suppliers. The potential for project disruption is discussed with special emphasis on dispute resolution methods.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Learning Outcomes:

- Evaluate the client's conceptual design providing broad, yet accurate cost appraisals.
- Have a thorough understanding of the interactions and relationships among the participants within the construction process.
- Prepare a comprehensive construction cost estimate for a complex building, including general construction, and specialty contractors. Develop an understanding of how this estimate is developed and carried forward into the bidding and cost control processes.
- Develop a project schedule from this cost estimate to determine the overall project duration and critical path.
- Confidentially advise a project owner of project delivery options in an ethical and effective manner.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5960 - Negotiations and Contracts for Engineering Managers (3 Credits)
This dynamic scenario-based course guides you through unique weekly exercises to develop mastery in both planning and executing negotiations of all types. Expand your comfort zone and prowess as you explore negotiation types, skills, strategy and tactics required to excel within STEM professions.
Enrollment Information: Enrollment limited to: graduate students and undergraduate seniors.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Spring 2022
Learning Outcomes:

- Effective negotiation planning skills.
- Fluency in various negation tactics and counter-tactics.
- Removal of barriers to negotiation success.
- Understanding of legal processes, instruments and vocabulary required.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5970 - Risk Analysis and Management (3 Credits)
Crosslisted with CEE 5970
Develops a working knowledge of risk terminology and reliability engineering, analytic tools and models used to analyze safety, environmental and technological risks, and social and psychological risk issues. Discussions address life risks in the United States historical accidents, natural hazards, threat assessment, transportation risks, industrial accidents, waste incineration, air pollution modeling, public health, regulatory policy, risk communication, and risk management.
Prerequisites: CEE 3040 or ENGRD 2700 or ILRST 2100 or BTRY 3010 or AEM 2100, MATH 1910, MATH 1920, or by permission of instructor.
Enrollment Information: Enrollment limited to: seniors or graduate students.
Last Four Terms Offered: Fall 2020, Spring 2020, Spring 2019, Spring 2018
Learning Outcomes:

- Students should gain an ability to apply knowledge of mathematics, science, and engineering.
- Students should gain an ability to identify, formulate, and solve engineering problems.
- Students should gain an understanding of professional and ethical responsibility.
- Students should gain the broad education necessary to understand the impact of engineering solutions in a global and societal context.
- Students should gain a knowledge of contemporary issues.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5980 - Decision Framing and Analytics (3 Credits)
Crosslisted with CEE 5980
Framework to structure the way we think about decision situations that are complicated by uncertainty, complexity, and competing objectives. Specific decision analysis concepts and tools, such as decision trees, sensitivity analysis, value of information, and utility theory. Applications to all areas of engineering and life. Includes a group project to analyze a real-world decision.
Prerequisites: at least one of the following courses: CEE 3040, ENGRD 2700, ILRST 2100, BTRY 3010, AEM 2100, or equivalent.
Enrollment Information: Enrollment limited to: seniors and graduate students, or permission of instructor.
Exploratory Studies: (CU-SBY)

Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 5990 - Contemporary Challenges for Engineering Managers (3 Credits)
This course will focus on major modern challenges faced by Engineering Managers, and how our responses are guided and confined by our value systems, external pressures, and available resources. Key areas will include Climate Change, Sustainability, Diversity, Remote work forces, Technology Strategy, Data Privacy, Ethics in Global Engineering and others.
Exploratory Studies: (CU-SBY)

Last Four Terms Offered: Fall 2023
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6000 - Entrepreneurship for Scientists and Engineers (3 Credits)
Last Four Terms Offered: Fall 2019
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6001 - Residential Intensive I (1 Credit)
In this first intensive course, Engineering Management Master of Engineering students will learn the skills and competencies surrounding forming and leading high velocity teams, including the following topics: assessing your leadership skills, learning leadership styles, understanding and developing team cultures, dealing with team conflict and adversity, engaging in negotiations.
Enrollment Information: Enrollment limited to: Engineering Management distance learning students.
Last Four Terms Offered: Summer 2025, Summer 2024, Summer 2023, Fall 2022
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6002 - Residential Intensive II (1 Credit)
In this second intensive course, Engineering Management, Master of Engineering Management students will learn the innovation process utilized in technology-based organizations, develop techniques on how to lead a user research process to understand the needs of their customers, and how to deploy iterate design and development principles to test out new concepts.
Enrollment Information: Enrollment limited to: Engineering management distance learning students.
Last Four Terms Offered: Summer 2025, Summer 2024, Summer 2023, Summer 2022
Learning Outcomes:

- Students will be able to describe the innovation process utilized in technology-based organizations.
- Students will be able to lead a user research process to understand the needs of their customers using empathy.
- Students will be able to deploy iterate design and development principles to test out new concepts.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6020 - Managing a Culture of Innovation (3 Credits)
Innovation is not just ideas, but getting ideas to measurable impact for your customers or employees. While the word innovation is pervasive throughout engineering and business, developing and managing a culture of innovation has only been mastered by few organizations. In fact, no company has remained on the Dow Jones Industrial Average since its inception. Why? Because implementing a culture of innovation is very difficult and is mired by a lack of understanding of proven innovation strategies, competencies, and tools. In this course, you will learn a systematic approach for developing and managing a culture of innovation. You will learn how to develop an innovation strategy to better meet your organizations goals and customer needs. In addition, we will take time to dive into innovation competencies, such as design thinking, lean start-up, and making, along with learn several innovation tools including hackathons, open innovation challenges and competitions, and corporate venture arms. Lastly, we will discuss how to implement and scale your innovation strategies to deliver impact for your customers and organization.
Enrollment Information: Enrollment limited to: graduate students with an engineering undergraduate degree. Seniors with permission of instructor.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6030 - Learning to Lead (3 Credits)
The course is designed for engineers transitioning into management for the first time. The program is for individuals who are between one year prior to and up to five years into their first management assignment (-1 to 5 years). We will use research-based and evidence-based materials in the course. To successfully transition from individual to manager, students will learn how to recognize and develop behaviors and actions needed, how to enhance their leadership skills through self and peer coaching, and how diversity and integrity can be leveraged to optimize production, innovation, creation, and collaboration.
Enrollment Information: Enrollment limited to: ENMGT DL students.
Last Four Terms Offered: Spring 2025, Spring 2024, Spring 2023
Learning Outcomes:

- How to recognize and develop behaviors and actions.
- To enhance leadership skills through self and peer coaching.
- How diversity and integrity can be leveraged to optimize production, innovation, creation, and collaboration.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6090 - Professional and Leadership Development Seminar (1 Credit)
Students will identify the goals for their career and engage in several career development support services, such as networking, interviewing, resume and cover letter writing, and negotiation workshops. In addition, they will engage in a leadership development series to help them further build their engineering management and leadership competencies. Through a variety of tools, one-on-one coaching, workshops, events, and other resources, this course will help students develop and practice critical career management skills, along with build their confidence to find a career opportunity best suited to their interests and needs.
Enrollment Information: Enrollment limited to: ENMGT (on-campus) M.Eng. students.
Last Four Terms Offered: Fall 2024, Fall 2023, Fall 2022, Fall 2021
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6091 - Seminar: Project Management (1 Credit)
Crosslisted with CEE 6091
Weekly seminar aimed at M.Eng students, in particular in the engineering management program. Weekly speaker will come from different engineering applications and discuss insights into project management. Seminar is non-participatory.
Exploratory Studies: (CU-CEL)

Last Four Terms Offered: Spring 2025, Spring 2024, Spring 2023, Spring 2022
Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6092 - Overcoming Gender Bias in Engineering Management Leadership (1.5 Credits)
In this course, we will explore skills, tools, and mindsets to build leadership skills as engineers with a focus of increasing the number of technical women in leadership. Topics include understanding and combatting biases, leading with and without authority, addressing conflict, and negotiations. We will explore various topics using discussion-based lectures, case studies, and invited guest speakers.
Last Four Terms Offered: Fall 2024, Fall 2023
Learning Outcomes:

- Identify systemic and structural biases setting back women in leadership.
- Analyze various leadership styles to identify the optimal type for you.
- Demonstrate command of new skillsets and mindsets to serve as a strong and confident leader.

Schedule of Classes (https://classes.cornell.edu/)

ENMGT 6095 - Special Topics in Engineering Management (0.5-6 Credits)
Individually supervised study of one or more specialized topics not covered in regular courses.
Last Four Terms Offered: Spring 2025, Fall 2024, Spring 2024, Fall 2023
Schedule of Classes (https://classes.cornell.edu/)