Is the AI Pathway Right for You?

Through this AI elective pathway, you'll practice Python programming, statistics, probability, and explore the fundamental principles, techniques, challenges, and applications of AI, machine learning, and more. Understanding how AI works and what it can do is essential in today's information technology environment, and the Comprehensive Foundation in AI elective courses take your learning to the next level, where you'll learn about the latest real-world AI applications and agents, along with the ethical considerations. Part of two elective courses, you'll produce a final team project applying collaboration, professional presenting, and academic writing. These courses will not only give you a stronger technical grasp of AI foundations but also prepare you to confidently influence your organization's AI-related solutions through an ethically responsible lens.

In preparation for your program start in the AI pathway, all students are encouraged to review the following resources:

Installation/Getting Started Resources

➢ Self-Assessment Test (Answer Key)
➢ Python (Anaconda) Installation and Navigating the Jupyter Ecosystem
➢ Python (An Introduction to Jupyter and Python)
➢ Python & Jupyter Notebook Installation Instructions

Programming and Software Resources

➢ IBM: Python Basics for Data Science
➢ Coursera: Python 3 Programming Specialization
➢ Dive into Python 3
➢ Python Standard Library
➢ Python Data Science Handbook
➢ LearnPython.org: Free Interactive Python tutorial
➢ DataCamp.com: Free Interactive Intro to Python
➢ Slack Pro Channel ($20/semester); includes AI Teaching Assistant
➢ Git/ GitHub (free account available!)

Technical Resources and Requirements

➢ USD's Information Technology Services Hardware Recommendations
➢ Windows Operating System - 16 GB, 1.5 GHz Speed I7 + 500 GB external memory (preferably SSD hard disk drive). How-to-Check Guide Here!
➢ Microsoft Office is required (free with your USD account!)
➢ Speakers or headset – to listen and record multimedia.
➢ Webcam – for recording video.
➢ High-speed internet connection required (DSL or better).
➢ Browser Plug-ins – Windows Media Player, QuickTime, Adobe Reader, and Java.

Additional Academic Resources

➢ Practical Statistics for Data Scientists
➢ Khan Academy: Calculus
➢ Khan Academy: Statistics
➢ Khan Academy: Linear Algebra
➢ Math is Fun: Statistics
➢ Calculus eTextbook by Gilbert Strang
➢ Paid Tutoring: Wyzant.com – external tutoring resources available per hour

Course Descriptions

The curriculum of this specialized track blends IT leadership core courses with artificial intelligence-focused electives, as shown below.

AAI 500 Probability and Statistics for Artificial Intelligence	This course is an introduction to probability and statistical concepts and their applications in solving real-world problems, as well as an introduction to coding in Python. This introductory course provides a solid background in the application of probability and statistics that will form the basis for advanced AI methods. Statistical concepts, probability theory, random and multivariate variables, data and sampling distributions, descriptive statistics, and hypothesis testing will be covered. In addition, the use of Python for the performance of basic statistics will be covered in this course. Covered topics include the numerical and graphical description of data, elements of probability, sampling distributions, probability distribution functions, estimation of population parameters, and hypothesis tests. This course will combine the learnings from texts, case studies, and standard organizational processes with practical problem-solving skills to present, structure, and plan the problem as it would be presented in large enterprises and execute the steps in a structured analytics process. Team collaboration, professional presenting, and academic writing will be covered as well through a final team project.
AAI 501 Introduction to Artificial Intelligence	Recent advances in big data, computational power, smart homes, and autonomous vehicles have rendered artificial intelligence (AI) as a major technological revolution in engineering and computer science. The goal of this course is to introduce students to the fundamental principles, techniques, challenges, and applications of AI, machine learning, and natural language processing. Topics covered include heuristic search and optimization techniques, genetic algorithms, machine learning, neural networks, and natural language understanding. Several applications of AI will be explored, including computer vision, pattern recognition, image processing, biomedical systems, Internet of Things, and robotics.