SIE 507 Information Systems Programming

Course Description

Coding and understanding of basic programming techniques are essential for students regardless of their field of studies. This course is tailored for graduate students with little to no previous programming experience that have a need for practical programming skills. Firstly, this course will introduce basic programming concepts (variables, conditions, loops, data structures, etc.), and the Python programming environment. The second half of this course will be a getting started guide for data analysis in Python including data manipulation and cleaning techniques. By the end of this course, students will be able to take tabular data, read it, clean it, manipulate it, and run basic statistical analyses using Python. (Lec. 3. Cr. 3.)

Prerequisites

SIE or MSIS graduate students or permission of the instructor

Course text

Python Programming: An Introduction to Computer Science by John M. Zelle, Ph.D.
(Power-point slides, video guides, and other lecture materials will be available in Blackboard)

Course Goals and Objectives

- Introduce students to central concepts of information system development
- Develop an understanding of software design processes
- Acquire essential computer programming skills
- Acquire skills in basic data analysis in Python

Faculty Information

Dr. Nimesha Ranasinghe
School of Computing and Information Science
333 Boardman Hall
r.ranasinghe@maine.edu

Grading, Class Policies and Course Expectations

As a graduate level course, you are expected to exhibit high-quality work that demonstrates a sound understanding of the concepts and their complexity. Earning an "A" represents oral and written work that is of exceptionally high quality and demonstrates a superb understanding of the course material. A "B" grade represents oral and written work that is of good quality and demonstrates a sound understanding of course material. A "C" grade represents a minimally satisfactory completion of assignments and participation demonstrating a limited understanding of course material.

Grading criteria:

     Weekly assignments – 30%
     Midterm project – 20%
     Final project – 40%
     Weekly exercises – 10%

Course topics (tentative):

The software development process and simple program elements:
- Identifiers
- Expressions
- Assignments
- Debugging

Computing with Numbers
- Understanding data types
- Numerical data types
- Conversion and rounding
- Using the math library

Sequences: Strings, Lists and Files
- The string data type
- Simple string processing
- Lists as sequences
- Lists and their methods

Defining Functions
- What are functions?
- Functions with parameters
- Functions that return values

Decision Structures
- Simple decisions
- Two-way decisions
- Multiway decisions
- Exception handling

More on Loops
- Simple loops
- Indefinite loops
- Interactive loops
- Nested loops
- Boolean operators and loops

Defining classes (introducing Object-Oriented Programming)
- Why classes?
- How to use them?

Introduction to Data Analysis with Python
- Installing libraries: (Numpy, Matplotlib)
- Finding data series
- Getting started with simple analysis, plotting graphs

Data analysis scenarios
- Applying software development process to data analysis problems
- Sample problems
- Developing specification for final project
- Final project on data analysis and basic visualizations

Policies:

Students are expected to attend class sessions (in person or virtual) or office hours (virtual).

Late assignments will result in 10% deduction in grade.

Standard Syllabus Notices

- Important Disability Notice
- Academic Honesty Notice
- Nondiscrimination Notice
- UMaine Student Code of Conduct
- Classroom Civility
- Sexual Discrimination Reporting
- Course Schedule Disclaimer
- Contingency Plans in the Event of an Epidemic