

# INFSCI 0310 COMPUTATION IN INFORMATION SCIENCE (Fall 2024, 3 Credits)

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**Instructor:** Dr. Yuqi Ouyang

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**Section 1:** Monday, 8:15 – 11:00, 3-103

**Section 2:** Wednesday, 8:15 – 11:00, 3-103

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## Office Hours:

Tuesday, 9:00 – 17:00. New SCUPI building, Room 523.

Please send an email to schedule a meeting.

## Course Description:

This course introduces the essential role of computational thinking in information science. Students will engage in hands-on programming to address fundamental computational challenges while exploring modern topics in information and data science. Through problem-based learning, the course aims to develop and refine students' computational skills, enabling them to adapt to new questions, methods, and data in a rapidly evolving world. The curriculum begins with fundamentals such as information representation and programming basics, advances to mathematical techniques for statistical simulation, modeling and optimization, and concludes with the application of computations in real-world scenarios.

## Course Objectives:

- **Develop Computational Thinking:** Develop computational thinking that enable students to understand and break down computational problems systematically and efficiently.
- **Train Programming Skills:** Learn to design, construct, and apply Python programs to solve basic computational tasks.
- **Build Statistical Mind:** Understand fundamental statistics in information science topics for simulation, modelling, and optimization.
- **Real-World Case Awareness:** Study real-world examples where computational techniques are employed, bridging theory with practical applications.

## Prerequisites:

MATH 0220 Analytic Geometry and Calculus 1

CMPINF 0401 Intermediate Programming

## Textbook:

No textbook required, please focus on lecture slides and other course materials.

**Assessment:**

Attendance	10%
Assignments	20%
Midterm project	20%
Final exam	50%

**List of Topics:**

Course Overview, Course Introduction;  
Introduction to Python and Jupyter Notebook;  
Representing Information, Data Visualization;  
Optimization Problems;  
A Recap on Statistical Inference;  
Stochastic Thinking, Simulation and Sampling;  
Data-Driven Modelling: Regression Models;  
Data-Driven Modelling: Case Study and Brainstorm on Modern AI Applications.

**Mitigating Circumstances:**

If you have a medical situation or any personal circumstances that substantially affect your study or exam. You are encouraged to contact the department or the instructor as soon as possible. With valid proof, mitigation may be applied when assessing your assignments, coursework or exam sheets.

**Course Policies:**

- Please regularly check the announcements on Blackboard.
- We can not assure instant respond to emails, we suggest bring urgent questions to face-to-face sessions.
- Google skill is one of the most important skills in Computer Science study, try Google your questions first.
- Treat ChatGPT as an auxiliary tool only. Use your brain first because it is much more powerful.
- Zero-tolerance to both two persons in plagiarism. Checks will be done to detect plagiarism.
- Late submissions cause penalties, unless due to approved mitigating circumstances, prior to the deadline.
- Students with documented emergencies, after careful evaluation, may jump to the make-up exam.
- All course materials or any recordings are for your personal use and for educational purposes only

**Learning Outcomes:**

- Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.