School of Computing
UNIVERSITY OF GEORGIA

Course Information Sheet
CSCI 1360
Foundations for Informatics and Data Analytics

Brief Course Description
(50-words or less)

Informatics, or "data science," are rapidly becoming essential skills for scientists across fields; in addition to field-specific specializations, researchers require knowledge of and experience with quantitative analytical techniques for extracting knowledge from raw data.

Extended Course Description / Comments

Use this section to put additional information that's relevant to whom this course is targeting

This course aims to provide an introduction to concepts in scientific programming and data science using the Python language. Students are given hands-on opportunities to learn techniques applicable to quantitative analyses across a broad range of fields. These core techniques involve formulating solutions in terms of their inputs and outputs (functional programming), repeated operations (loops), branching operations (conditionals), different methods of organizing data (data structures), how to implement an optimal problem-solving strategy (algorithm design), and methods for visualizing and interpreting results.

Pre-Requisites and/or Co-Requisites

MATH 1113
Precalculus

Approved Textbooks
(If more than one, course text used during a semester is at the discretion of the instructor)

Author(s): Zed Shaw
Title: Learn Python the Hard Way
Edition: 3rd Ed., 2013
ISBN-13: 978-0321884916

Specific Learning Outcomes (Performance Indicators)

These are a (non-exhaustive) list of specific, measurable outcomes, as they relate to the course & program objectives.

These learning outcomes should avoid using ambiguous language such as "understand" or "familiar".

Performance indicators must include an action verb (identifying the depth to which students should demonstrate performance), and the content referent that is the focus of the instruction (from ABET)

This course introduces students to concepts in scientific programming and informatics. At the end of the semester, all students will be able to do the following:

1. Frame scientific experiments in terms of their inputs and outputs.
2. Formulate algorithms in terms of conditionals, loops, functions, return values, data structures, and existing Python APIs.
3. Write a program or package to implement automated analysis of data.
4. Process data of varying types, such as text or images.
5. Render appropriate visualizations of analysis results, and interpret these visualizations.

Target number 5 - 10

Program Outcomes

(These are ABET-specified and should not be changed)

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

Relationship Between Course Outcomes and Learning Outcomes

	ABET Learning Outcomes						
Specific Learning Outcomes		A	B	C	D	E	F
	1	●	●				●
	2	●					●
	3	●	●				●
	4	●					
	5	●		●			

Major Topics Covered
(Approximate Course Hours)

3 credit hours = 37.5 contact hours
4 credit hours = 50 contact hours

Note: Exams count as a major topic covered

Introduction to informatics (2.5-hours)
"Hello World" and Python Variable types (2.5-hours)
Loops, Conditionals, and Control Flow (5-hours)
Data Structures: lists, arrays, dictionaries, sets, matrices (7.5-hours)
Functions and Functional Programming (5-hours)
Vectorized Programming (2.5-hours)
Data Formats, Transformations, and Preprocessing (5-hours)
Algorithms: regression, classification, clustering (10-hours)
Data Visualization (7.5-hours)
Extending the Python Ecosystem (2.5-hours)

Assessment Plan for this Course

Each time this course is offered, the class is initially informed of the Course Outcomes listed in this document, and they are included in the syllabus. At the end of the semester, an anonymous survey is administered to the class where each student is asked to rate how well the outcome was achieved. The choices provided use a 5-point Likert scale containing the following options: Strongly agree, Agree, Neither agree or disagree, disagree, and strongly disagree. The results of the anonymous survey are tabulated and results returned to the instructor of the course.

The course instructor takes the results of the survey, combined with sample student responses to homework and final exam questions

	corresponding to course outcomes, and reports these results to the ABET committee. If necessary, the instructor also writes a recommendation to the ABET committee for better achieving the course outcomes the next time the course is offered.
How Data is Used to Assess Program Outcomes	Each course Learning Outcome, listed above, directly supports one or more of the Program Outcomes, as is listed in "Relationships between Learning Outcomes and Program Outcomes". For CSCI 1360, Program Outcomes (1), (2), (3), and (6) are supported.
Course Master	Dr. Shannon Quinn
Course History	Lat modified on 1/30/2024 By Dr. Shannon Quinn