The University of Georgia

Department of Computer Science

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	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	Prerequisite: MATH 1113 - PreCalculus
Required, Elective or Selected Elective	Elective Course
Approved Textbooks (if more than one listed, the textbook used is up to the instructor's discretion)	Author(s): Zed Shaw Title: Learn Python the Hard Way Edition: 3rd Ed., 2013 ISBN-13: 978-0321884916
Specific Learning Outcomes (Performance Indicators)	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.

Relationship Between Student Outcomes and Learning Outcomes

		Student Outcomes										
		a	b	c	d	e	f	g	h	i	j	k
Learning Outcomes		●	●	●	●					●	●	●
		●		●						●	●	●
		●		●						●		
		●		●						●		
		●	●	●						●	●	

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)

Course Master

Dr. Shannon Quinn