SUNY OLD WESTBURY

Department of Mathematics, Computer & Information Science

SUMMER 2019

INTRODUCTION TO SCIENTIFIC PROGRAMMING

CS 2521

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TEXTBOOKS: **A Primer on Scientific Programming with Python (Texts in Computational Science and Engineering)** 4th ed. 2014 Edition by Hans Petter Langtangen. ISBN-13:978-3642549588.

PREREQUISITE: MA 2310: Calculus I.

COURSE DESCRIPTION: A fast paced introduction to program design and analysis: algorithmic processes, basic programming techniques, program specification & structure, program development, debugging and testing. Emphasis on scientific applications. Discussion of storage classes, files and string manipulation. Basic data structures and algorithms, data abstractions and object-oriented programming. Students learn the language features of Python with an eye toward scientific and data analysis applications.

COURSE OBJECTIVES: At the completion of this course students will

- Understand what is a program a computer hardware software compiler and basic computer operation.
- Understand various data containers and control structures.
- Be able to access files, write to files and to and from other data streams.
- Understand the object model.
- Be able to use abstract data structures and implement algorithms.
- Apply mathematical and scientific algorithms to various scientific scenarios.

COURSE EVALUATION & GRADING:

Midterm	30%
Final	30%
Lab/Programs	30%
Participation and daily quizzes	10%

		B+	87-89	C+	77-79	D+	67-69				
A	93-100	B	83-86	C	73-76	D	63-66	F	0-69		
A-	90-92	B-	80-82	C-	70-72	D-	60-62				

ACADEMIC INTEGRITY POLICY

As members of the Old Westbury community, students are expected to adhere to standards of honesty and ethical behavior. Plagiarism and other types of academic dishonesty are condemned at all academic institutions. These acts detract from the student's intellectual and personal growth by undermining the processes of higher learning and the struggle with one's own expression of ideas and information.

Good academic procedure requires giving proper credit when using the words or ideas of others.
Plagiarizing means "presenting somebody else's words or ideas without acknowledging where those words and ideas come from" (Ann Raimes, Keys for Writers, 7th ed., p.135). Examples include:

- copying material from the Internet or other sources and presenting it as one's own
- using any author's words without quotation marks; using any quotation without credit
- changing any author's words slightly and presenting them as one's own
- using ideas from any source (even in one's own words) without proper credit
- turning in any assignment containing material written by someone else (including tutor or friend); buying work and submitting it as one's own
- submitting the same assignment in more than one class without permission of the instructor

Know what plagiarism is and how to avoid it; for guidance see Raimes or any other college writing handbook.
Other types of academic dishonesty include unauthorized collaboration or copying of students' work (cheating); falsifying grades or other assessment measures; destroying the academic work of another student; the dishonest use of electronic devices; and others. When detected and verified, plagiarism and other academic dishonesty will have serious consequences.
Please note: In this matter, ignorance of the Academic Integrity Policy is never an acceptable excuse.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:
If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact Stacey DeFelice, Director, The Office of Services for Students with Disabilities (OSSD), NAB, 2065, Phone: 516-628-5666, Fax (516) 876-3005, TTD: (516) 876-3083. E-mail: defelices@oldwestbury.edu. The office will help you determine if you qualify for accommodations and assist you with the process of accessing them. All support services are free and all contacts with the OSSD are strictly confidential. SUNY/Old Westbury is committed to assuring that all students have equal access to all learning activities and to social activities on campus.

Topics to be covered

Chapter 1 Computing with formulas
Chapter 2 Loops and lists
Chapter 3 Functions and branching
Chapter 4 User input and error handling
Chapter 5 Array computing and curve plotting
Chapter 6 Dictionaries and Strings
Chapter 7 Introduction to classes
Chapter 8 Random numbers and simple games
Chapter 9 Object-oriented programming

Some applications may include

- Sequences and difference equations
- Introduction to discrete calculus
- Introduction to differential equations
- Probability and Statistics (Uniform and Normal Distributions)
- Monte Carlo Simulations

Table of Contents for **A Primer on Scientific Programming with Python.**