COSC 120 Computational Principles for Mathematics and Scientists

WINTER 2017 **COSC 120-0, CRN: 27146**

T Th 11:00 – 12:15pm **203 PH**

Instructor: Professor Haynes, shaynes@emich.edu
511 E Pray Harrold
Office hours: `See http://emunix.emich.edu/~haynes`

Course Homepage: `http://emunix.emich.edu/~haynes/120/wi17`
Course materials, including links, lecture notes, assignments, will be posted to the course website.

Any change of policy will be posted to the course website.

Textbook information:
Shapiro, *Scientific Computation: Python Hacking for Math Junkies*, version 3.0, Sherwood Forest Books (January 11, 2015), ISBN-13**:** 978-0692366936.

Catalog description: A hands-on introduction to programming and computational principles; use of programming and mathematical modeling to solve computational problems. Variables, types, data imprecision, arrays, conditionals, iteration, functions, recursion, file I/O, scripting, and documentation. Data analysis simulation and visualization. MATLAB or similar environment.

3 credit hours
Prerequisites: Mathematics – ready for calculus.

Important Dates:

Date	*Item*
1/5	First day of class
2/21	No class (winter recess)
2/23	No class (winter recess)
4/18	Last day of class
4/20	Final exam 9:00 – 10:30 (note time change)

Goals:

1. To understand and be able to make use of algorithmic thinking when problem solving in mathematics and the sciences:
    - search,
    - modeling,
    - problem simplification,
    - problem decomposition,
    - re-use,
    - testing,
    - performance,
    - step-wise refinement
2. To become a competent programmer in an important scientific/engineering language:
    - sequence,
    - iteration,
    - branching,
    - modularization and block structure,
    - functions,
    - visualization.

Pedagogical philosophy*:* This class will be about doing as much as it will be about theory. Think of this class as you would piano lessons or golf lessons. You should code *every single day* for at least 15 minutes.

Tutoring:
The tutors in 513 PH will be of limited help. OBVIOUSLY do NOT allow them to write code for you. Most tutors will not know Python. However, they should be helpful with logic errors and understanding pseudo-code.

Student Work:
10% Midterm
15% Final (cumulative)
75% Programs and Homework

Assignment of grades:

91 -100%	A range
81 -90%	B range
71 -80%	C range
61 -70%	D range
60% and below	F

Academic Honesty:
I expect, and your fellow students expect, that every person in this class will adhere to the highest ethical standards. All work handed in to me must be your own independent work unless otherwise specified. If you act in an academically or

ethically dishonest manner, you should expect an E for the final your name to be submitted to the dean of students for dismissal or academic sanction from this university.

Caveat*:* This syllabus will be changed as I deem pedagogically necessary or preferable. I will publish written changes to the syllabus. Such a change may require a change in grading rubric.