**University of South Florida – Sarasota/Manatee**  
**Course Syllabus – Fall 2014**

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>COP 3375 &amp; COP3375L - Fall 2014 4 credits</th>
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<td>Note:</td>
<td>There is no separate syllabus for the lab component. The lab comprises of several intense programming assignments. These will be in addition to regular assignments. Special interactive HELP sessions will be held to focus on programming.</td>
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| Classroom: | Virtual Classroom & Face-to-face at school  
| Meets every | Tuesday/Thursday 2:00 pm – 3:15 pm via BlackBoard Collaborate.  
| We will meet in a classroom for students who want the face-to-face interactions. Students who wish to avoid the commute can attend online. For students with time conflicts, each session is recorded for later viewing. |

| Course Name & Description: | Data Structures & Algorithms using Python  
| This course is intended to be a first course on data structures and algorithms, implemented using the Python language. As such it deals with abstract data types and data structures. It also deals with writing algorithms (i.e. programming) and problem solving. Please understand this is a programming intensive course! |

| Learning Outcome: | This course focuses at an introductory level on the abstract aspects of computing science known as data structures and algorithms (typically covered in CS2). Throughout the course, students are given deliberate and incremental exposure to the fundamental ideas. Students are also given considerable practice with programming algorithms so there is thorough understanding before they continue to more complex applications. |

| Instructor: | Dr. Sunita Lodwig |

| Office: | A345 USF-SM CAMPUS  
| Phone: | 941-966-1260 (home)  
| e-mail: | slodwig@sar.usf.edu |

| Office Hours: | By appointment! We can meet face-to-face at school in my office, or we can meet one-on-one or in small groups via specially scheduled Collaborate/Skype sessions.  
| Best way to contact me is via email. |

| Required Materials: | There are two textbooks we will use quite a bit! One is a free ebook. Bradley N. Miller and David L. Ranum, Problem Solving with Algorithms and Data Structures using Python. 2nd Edition. Franklin, Beedle and Associates, Inc., 2011 ISBN: 978-1-59028-257-1. This is a free e-book, based on Python 3.2:  
http://interactivepython.org/runestone/static/pythonds/index.html  
We will use it extensively in this course; so it will be a practical necessity for students to download it and use it.  
Another textbook, you may wish to obtain is:  
Fundamentals of Python: Data Structures, 1st Edition  
• Kenneth Lambert Washington and Lee University |

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S. Lodwig
This text is based on Python 3.3 and its latest edition is available. Please make sure you do not buy the International edition. Also, if the bookstore is out of copies, try buying it on amazon.com or halfprice.com or ebay.

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<th>Prerequisites:</th>
<th>COP 2030 – Programming Concepts or Instructor Permission!</th>
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<th>Attendance Policy:</th>
<th>CLASS ATTENDANCE IS OPTIONAL. However, due to the heavy nature of the course material, students are strongly encouraged to attend the live sessions. The course moves through the material at a rapid pace, and each topic builds on the ones that preceded it. Catching up is difficult, and attempting to “cram” the material will surely lead to failure to adequately grasp it. Therefore, students are responsible for their class attendance, and are advised that repeated absences or falling behind in assignments will affect their grades (see Performance Evaluation and Grading). Sessions are recorded and will be made available to students after the class.</th>
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<tr>
<th>Intellectual Property Policy</th>
<th>Students are not permitted to take notes or tape lectures for the purpose of sale. This includes the recordings as well.</th>
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<th>Special Needs:</th>
<th>If anyone has a disability or special needs or other problem that warrants need for special accommodations to complete course work, please see the instructor as soon as possible.</th>
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<tr>
<th>Religious Observances:</th>
<th>Students who anticipate being absent from class due to the observation of major religious holidays can do so after providing written notice of the date(s) to the instructor by the second class meeting.</th>
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<th>Performance Evaluation and Grading:</th>
<th>Student performance will be evaluated based on exercises and assignments. All assignments are expected to be turned in on time. Each assignment will be reviewed in class after the Due Date, and once it has been reviewed, late hand-ins will not be graded. The relative weights for each of these components in determining the final grade are as follows:</th>
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<td>Exercises, Assignments 45% 2 Tests (midterm &amp; final) 45% In-class and online participation 10% Total 100%</td>
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<td>A grade will be determined based on the total of possible points earned: A 90-100; B 80-89; C 70-79; D 60-69; F 0-59.</td>
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**COURSE OBJECTIVES**

This course is ultimately about the fundamentals of data structures and algorithms—the basic elements from which large and complex software artifacts are built. Developing a solid understanding of a data structure and its uses requires the student to do the following:

- Become familiar with the algorithms for manipulating the information contained in the data structure.
• Understand the performance characteristics of the data structure so that when called upon to select a suitable data structure for a particular application, an appropriate decision can be made.

Students are expected to have programming experience including familiarity with pointers, recursion, and object-based programming, and some basic knowledge of discrete mathematics.

The CANVAS on-line course tools package, which may be accessed from campus computer labs and via the Internet at https://my.usf.edu, will be used to enhance the course. All that is required is Internet access and a reasonably up-to-date web browser. Except for response speed, there should be no difference in functionality between accessing from a lab and from home. Any exceptions to this will be announced as they become apparent.

GRADING POLICY
Your grade in this course will depend on the following:
Two exams. Each of these exams is worth 22% of your grade (45% in all). The exams are not cumulative - each covers only the topics indicated, although an understanding of earlier material may be a practical necessity for understanding and solving problems on new material. There will be no makeup exams! Exceptions on medical grounds will require a doctor’s letter which will be verified by the appropriate department personnel.

Quizzes and programming assignments will be required. You should submit all work on time. Tardiness in submission will be penalized (and, as announced for some assignments, not permitted). These will be worth a total of 45% of your grade. As assignments and quizzes will occur as we complete corresponding topics in the course, and how quickly we cover those topics can vary, dates for these assessments cannot be given in advance.

Participation in discussions constitutes 10% of your grade. You are expected to frequently review the CANVAS discussion function and take part in discussions of assigned topics. It is anticipated that there will be several discussion topics during the course, with announced (and possibly overlapping) participation timeframes. Participation that occurs after the closing participation date for a topic will not be counted for credit!

Class Attendance: Attendance is automatically recorded by Elluminate. Even though the sessions are recorded for review, it is my observation that final course grades tend to be positively correlated with regular class attendance, even in the absence of any credit for attendance. Understanding of the material is best gained through a combination of exposures to the material, of which course lecture is an important and key component. In any event, you are responsible for the material covered in class, any announcements, schedule changes, etc. Absenteeism is not an excuse for late work or missed exams unless approval from your instructor is obtained in advance.

Extra Credit: An assignment or two, or other activities may have an extra credit component associated with them. Points earned in this manner will be not be included in the assignment or exam grade or in the final course average These will be considered after course letter grades have been tentatively assigned. Extra credit may result in an increase in your final letter grade, especially in borderline situations, and will never reduce your grade. For this reason, you should take full advantage of extra credit opportunities.

Incomplete Grade: An Incomplete grade in the course is reserved for those with good reason for having missed a small amount of work, and are agreed to by the student and instructor during the course, as circumstances require. Otherwise, exams not taken or assignments not turned in will receive a zero for that grade, and the course grade assigned accordingly. Please note, it is the student’s responsibility to ensure the work is completed before the end of the following semester and the Incomplete changed to a regular grade. If this is not done before the end of the following semester, the Incomplete automatically becomes an F!
STATEMENT ON ACADEMIC HONESTY

The instructor of this course trusts that all students behave in strict compliance with accepted standards of academic honesty. A conscious effort is made to ensure that grading standards are fair, and that anyone who makes an honest and consistent attempt to do well in the course will succeed, as, by this time in your degree program, it is expected that you are capable of doing the work. There will be no tolerance for anyone who attempts to "succeed" by dishonest routes.

Academic honesty includes, but is not limited to:

- Honesty in taking examinations.
- Honesty in completing your assignments yourself. There is no objection to some degree of helpful collaboration in completion of assignments; often a rough spot can be overcome with a helpful word. But assignments passed in for grading must be substantially one person's - the submitter's - work. Please note that in many of the assignments for this course, it will be fairly obvious to the instructor when students have collaborated beyond a reasonable degree (having exactly the same wrong answer, for example, is usually a dead giveaway).
- Honesty in attributing others' work. In all submitted work, including papers and presentations, ideas, concepts and quotations obtained from other persons' works must be properly attributed. Not doing so constitutes theft of intellectual property.

Consequences for violating this trust will be severe. Credit will not be given for any work that does not meet the above criteria. In an extreme violation or repeated violations, a failing grade in the course for reasons of academic dishonesty is an appropriate and reasonable penalty.

Academic Dishonesty: In accordance with university guidelines as found in the Student Handbook, anyone found cheating during exams, submitting work that is not theirs, plagiarizing or falsifying work that is submitted to represent work they have done shall receive an “F” with numerical value of zero on the item submitted, and the “F” shall be used to determine the final course grade. It is the option of the instructor to assign the student a grade of “F” or “FF” (the latter indicating dishonest) in the course.

The instructor may use the “Turnitin.com” software to access potential plagiarism and precise obligation to reference all materials taken from electronic sources.

EMERGENCY PROCEDURES

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: CANVAS, Skype, and email messaging and/or an alternate schedule. It’s the responsibility of the student to monitor CANVAS for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

COURSE DESCRIPTION AND SCHEDULE

Basic data structures concepts and their performance analyses are covered.

Pre-Class Assignments: For this course you will need to access the Python Web site at http://www.python.org/download. The most recent version is Python 3.3; Assuming you are using a Windows-based computer, you will want to download the Windows Installer version of the latest release. Install Python into a directory called “C:/python33.” You should also install and use IDLE (Python Development Environment), the site http://www.annedawson.net/Python_Install_Run.htm is very helpful. You will notice also that the documentation includes a concise tutorial on Python. Other tutorials can be found at http://docs.python.org/3/tutorial/.
Please complete this download and start getting familiar with Python before the first day of class.

The weekly schedule for the class includes the following topics:

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignments Due</th>
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| Week 1 – 8/25 | • Course Introduction  
|            | • Readings: Miller & Ranum  
|            |   o Chapter 1-Introduction  
|            | • Readings: Lambert – Chapters 1, 2, 4-9, 11  
|            |                                                                      | Completed Pre-class assignment         |
| Week 2 – 9/1 | Readings:  
|            | • Miller & Ranum - Chapter 2-Algorithm Analysis  
|            | • Lambert – Chapter 3, “Complexity Analysis”  
|            |                                                                      | Assignment 1                           |
| Week 3 – 9/8 | Readings:  
|            | • Chapter 2-Algorithm Analysis  
|            | • Lambert – Chapter 3, “Complexity Analysis”  
|            |                                                                      | Assignment 2                           |
| Week 4 – 9/15 | Readings:  
|            | • Miller & Ranum - Chapter 3-Basic Data Structures  
|            | • Lambert - Chapters 1, 2, 4-9, 11  
|            |                                                                      | Assignment 3                           |
| Week 5 – 9/22 | Readings:  
|            | • Miller & Ranum - Chapter 3-Basic Data Structures  
|            | • Lambert - Chapters 1, 2, 4-9, 11  
|            |                                                                      | Assignment 4                           |
| Week 6 – 9/29 | Readings:  
|            | • Miller & Ranum - Chapter 3-Basic Data Structures  
|            | • Lambert - Chapters 2-6, 12-16  
|            |                                                                      | Assignment 5                           |
| Week 7 – 10/6 | Readings:  
|            | • Miller & Ranum - Chapter 4 – Recursion  
|            | • Lambert – Recursion is distributed over a few chapters – sections will be identified in class  
|            |                                                                      | Assignment 6                           |
| Week 8 – 10/13 | MID-TERM EXAM  
|            | Readings:  
|            | • Miller & Ranum - Chapter 5-Searching and Sorting  
|            | • Lambert – Chapter 3 - Searching, Sorting  
|            |                                                                      | Assignment 7                           |
| Week 9 – 10/20 | Readings:  
|            | • Miller & Ranum - Chapter 5-Searching and Sorting  
|            | • Lambert – Chapter 3 - Searching, Sorting  
|            |                                                                      | Assignment 8                           |
| Week 10 – 10/27 | Week of 3/10 – Spring Break  
|            |                                                                       | Assignment 9                           |
| Week 11 – 11/3 | Readings:  
|            | • Miller & Ranum - Chapter 5-Trees  
|            | • Lambert - Chapter 10, Hierarchical Collections: Trees  
|            |                                                                      | Assignment 10                          |
| Week 12 – 11/10 | Readings:  
|            | • Miller & Ranum - Chapter 5-Graphs  
|            | • Lambert - Chapter 12 - Graphs  
|            |                                                                      | Assignment 11                          |
| Week 13 – 11/17 | Readings:  
|            | • Miller & Ranum - Chapter 5-Graphs  
|            |                                                                      | Assignment 12                          |
| Week 14 – 11/24 | Week of Thanksgiving!  
Readings:  
• Miller & Ranum - Chapter 5 - Graphs  
• Lambert - Chapter 12 - Graphs |
|-----------------|------------------------------------------------------------------------------------------------------------------|
| Week 15 – 12/1  | Miller & Ranum - Chapter 8 - Additional Topics  

**Please Note:**  
This is a tentative schedule. There will be some shifting due to length and difficulty of subject matter. The tests could also shift either way by a week or so.