

## Course Syllabus

### Course Title: Programming Logic & Technique, CIS1400-006 SP 2022

Credit hours: 4 -Clinical Hours: 0 Lecture Hours: 4 Lab Hours: 0 VC

Instructor: Robert Burrows

E-Mail: [burrows@cod.edu](mailto:burrows@cod.edu) Every attempt will be made to answer e-mail on a daily basis. When sending e-mails please clearly indicate the problem or concern you are having, your name and course enrolled. If you have a programming problem you can't figure out (after spending at least 30 minutes trying ☺), I will have an alert set up so that if you enter 1400 HELP in the subject line of your email I will get paged and try to get back to you as soon as possible. All communications and e-mail will be through the COD email and/or blackboard.

Office Hours/additional help: By request in class or via email— there will be periodic help sessions arranged outside of class as requested by students

Dates, Day & Time, Classroom: 03/22/2022-05/19/2022 Lecture/Discussion Tuesday, Thursday 06:00PM - 10:00PM, Berg Instructional Center, Room 1C06

#### Textbook & Materials:

Starting Out with Programming Logic and Design, 5<sup>th</sup> Ed. By Tony Gaddis, 2019 ISBN: 978-0-13-480115-5, Publisher: Pearson.

You can get a copy of the book at the COD bookstore, Follet Discovery link, <https://www.bkstr.com/dupagestore/home/en> The online version of the book is around \$36. You can get a printed (hardcopy) of the book to keep as a reference and make notes in as you read, for around \$130 new and also a used copy for around \$100. **Make sure you get the 5<sup>th</sup> edition as some earlier versions maybe free but will not work for this class.** NOTE: there is a license in the book to access additional resources online; these resources are not required or referenced by this course.

We will use the Python programming language in this class. Python is a relatively easy language compared to Java and C++. Python is a free download and the current version used for class is 3.10.3, any 3.10 version is good. **You can install the Python language on your Mac or PC at <https://www.python.org/downloads/> which will detect if you have a PC or MAC. If you need help with the install please email me and I will help you.**

You will need a PC or MAC for the class for homework. If you don't have a computer and cannot afford one at this time the college library can lend you one. See [request form](#) on the [Library website](#).

To be successful in class, besides a computer and the text, you will need a good internet connection for the doing homework and active reading.

#### Course Description

An introduction to computer-based problem-solving techniques. Includes software design tools such as structure charts, Input Processing Output (IPO) charts, flowcharts, pseudocode, and Unified Modeling

Language (UML) diagrams. Concepts such as documentation, structured design, modularity, Object Oriented Program (OOP) design, and event driven programming are covered. Programming of algorithms are implemented using a high level language that emphasize structured and object oriented design techniques.

Repeatable for credit: No Pre-Enrollment Criteria:

Prerequisite: MATH 0482 Foundations for College Mathematics II with a grade of "C" or better, or equivalent or

Prerequisite: MATH 1115 Technical Mathematics I with a grade of "C" or better, or equivalent or a qualifying score on the mathematics placement test or

Consent of Instructor

### **Topical Outline:**

1. Program Development Lifecycle (PDLC)
2. Software design techniques
3. Computer based paradigms
4. Simple data types
5. Variables, constants, and literals
6. Control structures
  - a. Sequential
  - b. Selection
  - c. Repetition
7. Arithmetic, relational, and logical operators
8. Local and global variable scope
9. Modularity, parameter passing, and return values
10. File access
11. Advanced data types: Arrays
  - a. Single dimensional
  - b. Multi-dimensional
  - c. Parallel
12. Searching and sorting algorithms
13. Programming and debugging
14. OOP design concepts
15. GUI and event driven programming

### **General Course Objectives:**

**Upon successful completion of the course the student should be able to do the following:**

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| <ol style="list-style-type: none"><li>1. Explain steps used in program development cycle</li><li>2. Identify tools used in software design</li><li>3. Create algorithms to solve both verbal and written problems</li><li>4. Differentiate simple data types</li><li>5. Differentiate variables, constants, and literals</li><li>6. Apply concepts of structured program design such as modularity, sequence, selection, and repetition</li></ol> |
|---|

7. Differentiate arithmetic, relational, and logical operators in algorithm design
8. Demonstrate variable scoping in program design for local and global variables
9. Apply data transfer techniques between modules using parameters and return values
10. Construct applications to use files for input and output
11. Implement arrays as structures to contain data
12. Use searching and sorting algorithms in problem designs
13. Use a higher level programming language to code, test, and debug software designs
14. Implement concepts of abstraction and encapsulation using Object Oriented Programming (OOP) design
15. Explain advanced OOP design techniques such as inheritance and polymorphism
16. Describe integration of Graphical User Interfaces (GUIs) and event driven programming

### Course Requirements

**Student Responsibilities: Being an 8 week class, this class covers all the material of the normal 16 week class in half the time. You should be prepared to spend 8 hours per week in class and at least 12 outside of class doing active reading of the chapters and homework. If you don't have 20 hours per week available in your schedule you should seriously consider not taking this class.**

**In addition, during the pandemic, being in the classroom you must comply with current school Covid requirements found at <https://cod.edu/coronavirus/index.aspx> or you will not be allowed in the classroom; and if not compliant within two weeks you may be dropped from the class. Finally, if you get Covid, please let me know ASAP and we will make accommodations.**

Class attendance and active participation are essential if students are to receive maximum benefit from the class. Participation requires preparation including completion of reading, labs, assignments, assessments, and exams by the due dates. All due dates will be mentioned on the class blackboard. Students are responsible to submit all work on or before the due dates. It is the students' benefit to use their time wisely whether it is in preparation for class, during scheduled class, or in the lab. When students are in any COD lab environment, they should abide by the college policies. Questions, comments, and suggestions are welcome.

**Exams and make-up policy:** There will be two exams. No retakes of exams are allowed. Make-up exams are not encouraged except on emergency situation.

**Assignments (including weekly quizzes):** It is extremely critical that students complete all assignments on time. Past experience has shown that students that were behind on their assignments never caught up. Students may submit assignments early. Submitting assignments in the order assigned will ensure progression according to academic design of the course. If an assignment is late you will start with half credit.

**NOTE: because Covid-19 I am very understanding, especially for first responders. Let me know in an email if you need extra time for any quizzes or assignments and I will grant an extension. Also, let me know by email if you have other special accommodations that merit consideration.**

E-mail: Help see above under email

Help in person on campus: I will be able to meet with you on campus for one on one or class help sessions. Please send me an email or arrange with me in class. Before and after class will save us both a trip to the college 😊

Academic policy: Any violation of COD policies regarding academic honesty and/or integrity will be referred automatically to the appropriate college authorities for disposition. Please see appropriate pages in the college catalog for definitions and regulations. The minimum penalty for cheating will be a zero for all parties involved on that exam, assignment, lab, or assessment.

Withdrawal policy: Missing three or more assignments or quizzes before mid-term without a reason discussed with me will result in the student withdrawn from the class for non-Pursuit of the course objectives. No longer attending a class does not constitute an automatic withdrawal. **All withdrawals must be done on or before Tuesday April 26th** as in the College's academic calendar (<https://www.cod.edu/academics/pdf/2021-2022-academic-calendar.pdf>) It is important to drop if you cannot complete the work as **an Incomplete grade is not allowed in this class.**

Class Behavior and set up: Class participation is important, during class time, considerate conduct by all persons is important to a favorable learning environment. Any infringement on the rights of others to get education will be dealt with in an appropriate manner. Please to avoid distractions during class and have your computer on mute unless asking a question.

General notes: In order to achieve the course objectives, it is essential that you enjoy the class in addition to complying with the above requirements, the rules and policies of COD contained in the catalog and other COD materials. Most students sign up for courses with the best intentions. If you are experiencing course/college related problems, please feel free to talk with me or one of the colleges counselors before a crisis develops so that we can resolve them in a manner beneficial to all parties involved.

### **Class period rough outline**

- 6:00 – 6:05 Questions from last class
- 6:05 – 7:50 Lecture/discussion - can take break whenever need to
- 7:50 – 8:00 Break
- 8:00 – 9:30 Lecture/discussion
- 9:30 - 10:00 assignment help/Class Review
- 10:00 – 10:30 After class Homework/question session as needed

### **Grading and Evaluation Criteria**

Your final grade is based on accumulation points of all class work including homework, quizzes, and exams. NOTE: Due dates for all homework and Quizzes are as assigned in blackboard Points will be distributed in the following manner:

Programs/Assignments 24 x 10 pts/each – 1 x 20 pts	260
Quizzes 13 x 10 points each	130

Tests (50 points for midterm and 70 points for Final)	120
(Extra Credit) – there will be additional programs for extra credit throughout the semester – 5 points each	Up to 70? points
<b>Total</b>	<b>580</b>

**Final Grades will be assigned using the following point scale at end of class: There are no letter grades given even if you miss the next letter grade by 1 or 2 points. However, after the final exam you will see your point total and have a day and half to complete assignments and/or do extra credit to move your grade up.**

Accumulated Points	Grade	Percentage
450 – 580	A	$\geq 90\%$
400 – 449	B	80 – 89
350 – 399	C	70 – 79
300 – 349	D	60 – 69
299 or lower	F	$< 60\%$

## Course Outline

### NOTES

- 1) Tentative - may change during semester.
- 2) Assignments, Assessments, and hands-on labs will be available on the class blackboard (BB) site. The due dates for assignments below are also in the BB course calendar which should show all your classes' assignments – Drop down by your name on upper right of blackboard. All Python submissions should include test case output in a .txt file
- 3) The dividing line between each class shows what we will cover before break and after break. 4) All **assignments** are from the end of each chapter in your textbook in the Programming Exercises section. For example, Prog EX 2-6 means Programming Exercises Chapter 2 exercise 6 on page 99, and NOT exercises 2 through 6, nor the example 2-6 on page 44.
- 5) **All assignments not turned in by due date in last column of the table below will start with half credit\*. All extra credit assignments are due at the end of the course May 19th at 11:59 PM**
- 6) **Reading is not submitted as an assignment. Your reading is checked by the chapter quizzes which has multiple choice questions on the reading. If your quiz is not submitted by the due date you will start with half credit\***

**\*If you email me with valid reason why you are late or why you are going to be late and when you plan to complete the homework or quiz, at my discretion you may still get full credit. As a programmer/software developer in the real world, it never hurts to ask for additional time**

<b>Class# Date</b>	<b><u>Topics covered in class</u></b>	<b><u>Assign dates to start HW &amp; Quizzes &amp; Extra Credit</u></b> Note: HW is all from the last section of each chapter in your text “Programming Exercises”	<b><u>Due Dates</u></b> Reading textbook Homework and quizzes
1 Mar 22	Course introduction Programming and algorithms OTTO – types of programming logic Review syllabus Install Python Class student Survey to determine your experience objectives, and motivation	HW 1: <b>Student Survey in class</b>	Read Ch 1
	Textbook Active Reading Chapter 1 Introduction- a look inside the computer	HW 2: <b>Exercise 3 – your first name in decimal ASCII Code – page 25 book worth 10 points.</b> Extra Credit – want to be a programmer? Extra Credit Sandra McGuire’s Video on being the best student you can be	
2 Mar 24	Chapter 2 Input, Process, Output – variables Pseudocode & Flowcharts Example: Prog EX 2-8 IPO and pseudocode, flowchart , and Python in class	Extra Credit Python for batting average done from chapter 2 book	Read Ch 2 HW 1 HW 2
	Chapter 2 more examples, review and questions. Do Lab 1-6 Pedometer.docx found in Week 3 notes and materials	HW 3: <b>Prog EX 2-6 Flowchart in class group exercise, just turn in pseudocode</b> Extra Credit Lab 1.6 Pedometer Calculator turn in Python code	

		Quiz Chapter 2	
Mar 29 Mar 31	<b>No class spring break</b>		
3 Apr 5	Chapter 2 finish up and Prog Ex 2-16 – show problem solving technique flowchart, pseudocode, Python Prog Ex 2-16 cookies Structure and Boolean Logic Chapter 4 If statements - Decision	HW 4: - recipe program. Pick your favorite or family favorite recipe and write a program like Prog EX 2-16 shown in lecture on page 101 of book. Should have 3 attachments as shown in the assignment	Read Ch 4 Quiz Ch 1 Quiz Ch 2
	Example: Program Ex 4-2, 4-5 pseudocode and flowchart in class	HW 5: Prog EX 4-1 Roman Numerals Python with at least 2 test cases Quiz Chapter 4	
4 April 7  QTR grades	<b>Review Point Total</b> Finish Chapter 4 Another decision logic flowchart example Chapter 5 Repetition Structure (looping). finding a parking spot	HW 6: Book Club Prog EX 4-6 flowchart and Python	HW 3 Read Ch 5 HW 4 Quiz Ch 4 HW 5
	Chapter 5 continue on looping Prog EX 5-1 in class Flowchart and Python – 5-5 flowchart – python extra credit and/or 5-9 Pennies for Pay Pub Crawl flowchart. <b>Review Your Point Total</b>	Quiz chapter 5 HW 7: Prog EX 5-2 calories pseudocode and Python Extra Credit Program 5-5 tuition in Python Extra Credit Program 5-9 pennies Python	
5 Apr 12	Finish up chapter 5 Chapter 3 Modules – Introduction Divide and Conquer – even though haven't done big programs Prog Ex 3-2	HW 8: Prog EX 5-3 Budget Analysis flowchart and Python	Read Ch 3 HW 6 Quiz Ch 5 HW 7
	Chapter 3 Modules – Pass local variables to a module. Prog EX 3-5 pseudo code and Python in class	HW 9: Prog EX 3-10 Python only	
6 Apr 14	Finish up Chapter 3 Chapter 6 Functions	HW 10: – Prog Ex 6-1 rectangle area pseudocode and Python Quiz Chapter 6	Read Ch 6 HW 8 Quiz Ch 3 HW 9
	Chapter 6 Functions passing variables in class design game of Craps – a true need for a flowchart to see logic Built in functions Turtle package	HW 11: Prog EX, 6-7 Python after we do flowchart and pseudocode together in class	
7 Apr 19	Chapter 6	HW 12: Prog EX 6-12 (Rock-Paper-Scissors) Python only Extra Credit Python Turtle design Extra Credit Python program for craps	Read Ch 7 – (only 10 pages) HW 10 Quiz Ch 6

	Chapter 6 finish up and review Chapter 7 Input validation – only 13 pages Prog EX 7-5 in class – edit Rock, Paper, Scissors Practice Midterm – handout to try chap 1-7	HW 13: <b>Prog EX 7-1 submit Python</b> No Quiz for chapter 7 <b>Extra Credit - p339-340.py – 5 points extra credit if can make program not fail if "abc" entered</b>	HW 11
8 Apr 21	Review practice midterm	Review – Homework, Practice Midterm, Other Questions <b>NOTE: no homework/quizzes accepted after midterm</b>	HW 12 HW 13 Midterm Exam
	Midterm chapters 1-7 - 50 points 6:00-10:30 PM	<b>Midterm</b> should have 3-4 hours	
9 Apr 26	Go over Midterm -5 minutes Arrays Chapter 8 Array/Lists and Flowcharting. Goes with Repetition – loops and arrays like pizza and beer or pizza and pop. Prog EX 8-3 in class Group exercise Help on Lottery program <b>Review Your Point Total</b>	<b>From here and for the rest of class just submit Python with test cases for homework</b> <b>Quiz Chapter 8</b> HW 14: <b>Prog EX 8-2</b> (Python -write lottery number horizontally from an array with a space between picks) <b>Extra Credit PROG EX 8-3 Rainfall months with highest and lowest</b>	Read Ch 8
	More Arrays Prog EX 8-3 in class parallel arrays TIC-TAC-TOE	HW 15: <b>Prog EX 8-6</b> days in each month and use parallel arrays <b>Extra Credit Tic Tac Toe ( I will provide part of program and go over in class) and (Lo Shu Magic Square) 5 points each</b>	
10 Apr 28	Finish up arrays Chapter 9 Sorting and Searching Arrays Swapping 2 array elements	<b>Quiz Chapter 9</b>	Read Ch 9 Quiz Ch 8 HW 14
	Finish up Chapter 9 and review	HW 16: <b>Prog EX 9-2</b> (only use 5 names not 20 as problem states) in class HW 17: <b>Prog EX 9-4</b> use/copy bubble sort and binary search Python functions given in class examples and call functions from your program	
11 May 3	Chapter 10 Files Prog Ex 10-1 Examples of Python programs with sequential ASCII files	<b>Quiz Chapter 10</b>	Read Ch 10 HW 15 Quiz Ch 9 HW 16 HW 17
	Finish up Chapter 10 and review <b>Review point total</b> <b>Last day to withdraw from class</b>	HW 18: Prog EX 10-1 use given data file attached to assignment HW 19: Prog EX 10-2 (just print count of names in the file) again use given data file with assignment	



12 May 5	Chapter 11 Menu Driven programming and debugging Example 11-4 and Book example on Metric Conversion Student scores example	Quiz Chapter 11 HW 20: Prog EX 11-1 (Language Translator) <b>Extra Credit code example program 11-6 Inventory in Python</b>	Read Ch 11 Read Ch 12 Quiz Ch 10 HW 18
	Chap 12 Text Processing with String data Example Prog EX 12-2 scan for periods – "whitespace" Flowchart	Read Chapter 12 HW 21: Prog Ex 12-3 count vowels - use scan character program shown in class HW 22: Prog EX 12-1 backward string in class – can get 3 points extra if you use 4 different algorithms Quiz Chapter 12	
13 May 10	Finish Text Processing Chap 14 OOP 14-2 algorithmic workbench 14-1 Pets example get you started Lynda Video on OOP	Quiz Chapter 14	Read Ch 14 HW 19 Quiz Ch 11 HW 20 Quiz Ch 12 HW 21
	Chap 14 OOP and review Prog EX: 14-1 in class	HW 23:Prog EX: 14-1 Pet Class start in class	
14 May 12	Happy Cinco De Mayo Chap 14 Finish	HW 24: Prog Ex 14-2 Car Class	Read Ch 15 Quiz Ch 14 HW 22
	Perhaps bit more on OOP Chapter 15 GUIs <b>Review point total</b> GUI Example of Metric conversion program Practice Exam given out	Quiz Chapter 15 HW 25: Prog EX 15-1 Name and address HW 26: Prog EX: 15-3 Miles per gallon	
15 May 17	Chapter 15 GUI and review HW 25 Prog EX: 15-1 in class	<b>Extra Credit 11-1 Language translator as GUI</b>	HW 23 HW 24 HW 25 in class
	Practice Final Exam review for final Help to complete all homework <b>but should have almost all done now</b> <b>May have extra class session May 18th if anyone needs help</b>	Homework help and Questions on class for final <b>Extra Credit - figure 15-8 p 721 in book</b> <b>Extra Credit figure 15-8 p 721 add formatting to dollar amount and input validation like in program 15-3 shown in class</b> <b>Extra Credit prog Ex 11-1 as GUI – very similar to metric example shown in class</b>	
	Final Exam 6:00-10:30	<b>Final Graded by 5:00 PM 05/20 so you can see if you may want to do extra credit for a higher grade</b>	HW 26 Quiz Ch 15

16 May 19	Complete all assignments and extra credit	Get all work in	
May 20,21	<b>I will be available in school for help Friday evening or Sat if needed</b>	All work due 11:59 PM 5/21	

### Course Expectations

1. All assignments, (including assessments, projects, labs, and any related course work) must be submitted on or before the given due dates for full credit – see 2. below
2. Late assignments are not acceptable unless on medical (with a doctor’s letter) or emergency situation (with proof).
3. When a quiz or assignment due date has passed, it may disappear from the class Blackboard (Bb). Please do not ask the instructor to reset the assignment due date or inform the instructor that you can no longer see the assignment on the Bb.
4. To receive full points, a complete assignment must be submitted by following the assignment’s requirements and specifications.
5. Unless requested by the instructor, no assignments should be sent to the instructor’s email address. Any assignments sent to the instructor’s email without permission will be disregarded.
6. All assignments must be submitted on the class BB. For programming courses, all programs source code listings must be presented with the program output/result.
7. Submitting assignments in the order assigned will ensure progression according to the academic design of the course.
8. Discussions and collaborations are permitted. However, you must do your own assignments to learn and master the material. Dishonest work will be disciplined according to the university’s policy.
9. If you are caught copying someone’s work, you will be placed in one of the following possibilities (depending on the work):
  - a. You get a zero for your current assignment.
  - b. You will get one letter grade less in the course, i.e., if you get an A, you will get a B
  - c. You will be expelled from the university.

If you are caught copying above, all of your previous work relating to the course will be reexamined and re-evaluated. All of your future work in the course will be closely scrutinized.
10. You understand the grading criteria as mentioned in the syllabus above. The grading distribution will not be curved.
11. Your attitude and behavior relating to the course will be considered when a borderline grade befalls to boost up your grade via extra credit class participation to the next higher letter grade. Your grade is based on point scale, and extra credit after the final is the only way to get to the next higher grade.

12. An incomplete grade is allowed only in last two weeks of class due to an unforeseen event. Being behind on homework is not an unforeseen event.
13. You are responsible for withdrawing from the course if no longer attend the class. Please check the university's academic calendar on the last day allowed to withdraw from the class.
14. Bad planning on your part is not an emergency on the instructor's part.