

**NEW YORK CITY COLLEGE OF TECHNOLOGY/CUNY
DEPARTMENT OF COMPUTER SYSTEMS TECHNOLOGY**

**CST1101–PROBLEM SOLVING WITH COMPUTER PROGRAMMING
(4 hours – 3 credits)
SUMMER I 2020**

Instructor:

Name	Prof. Tamrah D. Cunningham
Office Location	Online for the Summer
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Office Hours	Fridays from Noon - 2:30 pm. First, email for an appointment, and then a Zoom link will be provided along with confirmation. I will respond to emails within 24 hours of receiving them.

Meeting Days:

Monday	11:30 am – 2:00 pm	Blackboard Collaboration Ultra
Tuesday	11:30 am – 2:10 pm	Blackboard Collaboration Ultra
Wednesday	11:30 am – 2:10 pm	Blackboard Collaboration Ultra
Thursday	11:30 am – 2:10 pm	Blackboard Collaboration Ultra

Course Description:

This course introduces students to concepts of problem-solving using constructs of logic inherent in computer programming languages. Students study the nature of problems, common solution approaches and analysis techniques. Students use a flowchart interpreter to diagram problem solutions. Students learn the basics of computer programming by learning Python. Both Python scripts and flowcharts enable students to construct solutions to common algorithmic problems. The major emphasis is on teaching the student to identify solutions to a problem and translate them into various forms that will enable the computer to perform some of the steps in a solution of an actual problem instance. These forms include flowcharting tool, viewing generated software code and the basics of debugging the code. At the end of the class students will write a project Python scripts that demonstrates the students' knowledge of all the basic programming concepts discussed in class (e.g., variables, conditions, loops, functions).

Online Course:

This course is online and will be taught synchronously on Blackboard. What that means is that for every meeting day, students will log on to Blackboard, access Blackboard Collaboration Ultra and join the session for that day. An announcement will be sent every time there will be class. If you are not able to be in front of a computer at that time, you can dial-in and use your phone. If you miss out on the online lecture for that day, a recording of the session will be made available later that day for you to view.

Online Attendance and Participation:

Your attendance will be taken at the end of online session. When you log in, Blackboard will track the time you enter the session and the time that you leave. Participation for the course is based on responding via the chat and/or voice.

If you have any technical issues with Blackboard, check out this link below:

<http://websupport1.citytech.cuny.edu/studentbb.html>

Course Objectives

Upon successful completion of the course, students should be able to:

- Demonstrate understanding of the steps required to solve a problem using a computer;
- Demonstrate understanding of flowcharting techniques to solve an algorithm;
- Demonstrate the knowledge of Boolean algebra (AND, OR, NOT operations);
- Demonstrate understanding of the major programming notions: variables, decision statements, repetition/loop statements (both count- and event-controlled), arrays/lists, modules/functions, classes and objects and their use for basic problem solving;
- Demonstrate understanding of the two major programming paradigms: procedural and object-oriented;
- Install and run the IDLE Python programming environment;
- Design and implement basic Python scripts; and
- Demonstrate broad problem-solving experience by referring to solutions from a problem bank covered during class.

General Education Outcomes

- **SKILLS/Inquiry/Analysis:** Students will employ scientific reasoning and logical thinking.
- **SKILLS/Communication:** Students will communicate in diverse settings using oral (both speaking and listening) and visual means.
- **VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development:** Students will have access to on-line materials and solutions to programming problems and will be required to process those materials and solutions, understand them, use the ideas from them without passing others' ideas as their own.

Prerequisite – CUNY certification in mathematics, reading and writing. General knowledge of a personal computer is needed. Students may enroll in a workshop at the Academic Learning Center, located in the Atrium.

This is an OER (Open Educational Resources) course. All the required reading materials are free. The OER page for the course can be viewed here:

<https://openlab.citytech.cuny.edu/cst1101-problemsolvingpython>

Storage Media – You must have a USB storage media.

Software Download (free, online)

You will need a Windows or Mac computer/laptop with broadband internet access.

- Python official site that includes documentation, downloads (IDLE for Python 3.7), news:

<https://www.python.org>

- Flowchart interpreter
<http://www.flowgorithm.org/>

Recommended reading (free, online)

- Algorithmic Problem Solving with Python by John B. Schneider, Shira Lynn Broschat, and Jess Dahmen.



<http://www.eecs.wsu.edu/~schneidj/swan/index.php>

- How to Think Like a Computer Scientist by Peter Wentworth, Jeffrey Elkner, Allen B. Downey, and Chris Meyers
<http://www.openbookproject.net/thinkcs/python/english3e/>
- Python Bibliotheca: <http://www.openbookproject.net/pybiblio/>

Grading Distribution

Homework Assignments, in-class quizzes	27%
Test1	15%
Test2	15%
Project	10%
Uniform CST 1101 quiz	3%
Final Exam (cumulative)	30%
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Total	100%

Grade System:

Letter Grade	A	A-	B+	B	B-	C+	C	D	F
Numerical Grade	93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	70-76.9	60-69.9	<=59.9

The grade distribution follows the information in the NYCCT Student Handbook (p.43).

NYCCT Student Handbook can be downloaded here: <http://www.citytech.cuny.edu/current-student/docs/StudentHandbook.pdf>.

ONLINE ETIQUETTE AND ANTI-HARASSMENT POLICY

The University strictly prohibits the use of University online resources or facilities, including Blackboard, for the purpose of harassment of any individual or for the posting of any material that is scandalous, libelous, offensive or otherwise against the University's policies. Please see: ["Netiquette in an Online Academic Setting: A Guide for CUNY School of Professional Studies Students."](#)

New York City College of Technology Policy on Academic Integrity:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York (CUNY) and at New York City College of Technology (City Tech) and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Notice on Student Accessibility Services:

"Qualified students with disabilities, under applicable federal, state and city laws, seeking reasonable accommodations or academic adjustments must contact the Center for Student Accessibility for information on City Tech's policies and procedures to obtain such services. Students with questions on eligibility or the need for temporary disability services should also contact the Center at: The Center for Student Accessibility, 300 Jay Street room L-237, 718 260 5143. <http://www.citytech.cuny.edu/accessibility> "

Course Schedule

	Topic	Discussion Board Post	Assignment
06/01	<p>Introduction to the Course</p> <ul style="list-style-type: none"> - Syllabus Review - Class Logistics (Daily Discussion Board Posts, Assignment Submissions, Resources Locations) 		<p>Problem-Solving Assignment 1</p> <p>Due: end of day (EOD), 11:59 pm</p>
06/02	<ul style="list-style-type: none"> - Topic: What is Problem-Solving and Algorithms? <ul style="list-style-type: none"> o Define problems and problem solving in terms of computers o Look at examples of different kinds of problems o Define algorithms o Look at some of the problems discussed earlier and come up with an algorithm to solve the problem o Discuss the 3 rules of algorithms 	<p>Why Algorithms</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> o What are the benefits of coming up with algorithms to solve for a problem? 	<p>Problem-Solving Assignment 2</p> <p>Due: EOD</p>
06/03	<p>Topic: What is PACT and Computer Problem Solving?</p> <ul style="list-style-type: none"> - Breakdown PACT (Problem Definition, Analyze, Carry out Strategy, Test and Evaluate) - Discuss a problem and break it down based on PACT - Input, Process and Output - Defining a program - Defining the different types of instructions: <ul style="list-style-type: none"> o Sequence 	<p>Automating PACT</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> o Which steps of PACT can be handled by a computer? Why do you think so? 	<p>Problem-Solving Assignment 3</p> <p>Due: EOD</p> <p>Download Python 3.9 and Flowgorithm (For MAC users, look for an online alternative)</p>

	<ul style="list-style-type: none"> ○ Conditions ○ Repetitions - Subprograms 		
06/07	<p>Topic: What are Flowcharts?</p> <ul style="list-style-type: none"> - Why Flowcharts? - Introduction to Flowgorithm - 	<p>Using Flowcharts</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> Why do you think programmers should (or shouldn't) make use of flowcharts before coding? 	<p>Problem-Solving Assignment 4</p> <p>Due: EOD</p>
06/08	<p>Topic: What is Python?</p> <ul style="list-style-type: none"> - Why Python? - Introduction to IDLE - Code Readability and Comments 	<p>Using Python</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> ○ Compare Python with another programming language of your choice. What are the differences and similarities? 	<p>Problem-Solving Assignment 5</p> <p>Due: EOD</p>
06/09	<p>Topic: What are Variables?</p> <ul style="list-style-type: none"> - Variable Types of Flowgorithm - Assignments in Flowgorithm - Data Input/Output in Flowgorithm 	<p>Understanding Variables</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> ○ How valuable are variables in coding? 	<p>Problem-Solving Assignment 6</p> <p>Due: EOD</p>
06/10	<p>Topic: What are Variables (cont.)?</p> <ul style="list-style-type: none"> - Variable Types of Python - Assignments in Python - Data Input/Output in Python - Type Conversion - 	<p>Week's Reflection</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> ○ What did you learn about this week? ○ Are there any concepts that you did not understand? ○ What are the benefits of using flowcharts before coding? 	<p>Problem-Solving Assignment 7</p> <p>Due: EOD</p>

06/14	<p>Topic: What are Conditions?</p> <ul style="list-style-type: none"> - Conditional Executions (If-Else) - Branching in Flowgorithm - Conditions in Python: - If - If-else - -If-elif 	<p>Understanding Conditions</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> o Come up with your own condition-based problem. 	<p>Problem-Solving Assignment 8</p> <p>Due: EOD</p>
06/15	<p>Topic: What is Boolean Logic?</p> <ul style="list-style-type: none"> - Difference between Arithmetic, Relational and Logical Operators - AND/OR/NOT - 	<p>Understanding Boolean Logic</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> o What are the key differences between AND and OR? 	<p>Problem-Solving Assignment 9</p> <p>Due: EOD</p>
06/16	<p>Topic: What are Functions?</p> <ul style="list-style-type: none"> - Why do we create functions within a program? - Examples of functions - Parameters/Arguments - Passing Parameters - 	<p>Understanding Functions</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> o What is the significance of having parameters defined for a function? 	<p>Review for Test 1</p>
06/17	<p>Test 1</p>	<p>Weekly Reflection</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> o What did you learn about this week? o Are there any concepts that you did not understand? o How do you think you did on the first test? Is there anything you could've done differently to prepare for the test? 	<p>No Assignment</p>
06/21	<p>Topic: What are While Loops?</p> <ul style="list-style-type: none"> - Characteristics of a while loop - Nested while loops 	<p>Understanding While Loops</p> <ul style="list-style-type: none"> - In your post, answer the following: 	<p>Problem-Solving Assignment 10</p> <p>Due: EOD</p>

		<ul style="list-style-type: none"> ○ What are the defining features of a while loop? How can we establish an infinite loop? 	
06/22	<p>Topic: What are Lists?</p> <ul style="list-style-type: none"> - Characteristics of a list object Methods and Functions used in lists 	<p>Understanding Lists</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> ○ Can you come up with a problem that requires the user to fill in a list? 	<p>Problem-Solving Assignment 11</p> <p>Due: EOD</p>
06/23	<p>Topic: What are For Loops?</p> <ul style="list-style-type: none"> - Characteristics of a for loop - Nested for loops 	<p>Understanding For Loops</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> What are the differences between a for loop and a while loop? When would you use one over the other? 	<p>Review for Test 2</p>
06/24	<p>Test 2</p>	<p>Weekly Reflection</p> <ul style="list-style-type: none"> - In your post, answer the following: <ul style="list-style-type: none"> ○ What did you learn about this week? ○ Are there any concepts that you did not understand? How do you think you did on the second test? Did you try any of the suggestions you made last week? 	<p>No Assignment</p>
06/28	<p>Topic: What are Strings?</p> <ul style="list-style-type: none"> - Defining strings as a special case of lists - Strings and Iterations 	<p>Understanding Strings</p> <ul style="list-style-type: none"> - In your post, answer the following: 	<p>Practice Quiz</p> <p>Due: EOD</p>

		<ul style="list-style-type: none"> ○ What makes strings similar to lists? 	
06/29	Topic: What is OOP? Introduction of the OOP paradigm	<p>Understanding OOP</p> <ul style="list-style-type: none"> - In your post, answer the following: How do you see object-oriented programming being utilized in coding? 	Review for Final
06/30	Final		
07/01	Final Day of Class		<p>Project</p> <p>Due: EOD</p>

Assessment Criteria

For the successful completion of this course a student should be able to:	Evaluation methods and criteria
1. Demonstrate understanding of the steps required to solve a problem using a computer.	Students will describe problem, identify inputs, processes and desired outcomes in laboratory assignments, class work and tests.
2. Demonstrate understanding of flowcharting techniques to solve an algorithm.	Students will solve problems using the flowchart interpreter software and Python 2.7 in laboratory assignments, class work and tests.
3. Demonstrate the knowledge of Boolean algebra (AND, OR, NOT operations)	Students will solve Boolean algebra problems in laboratory assignments, class work and tests and incorporate these solutions in flowcharts and Python scripts.
4. Demonstrate understanding of the major programming notions: variables, decision statements, repetition/loop statements (both count- and event-controlled), arrays/lists, modules/functions, classes and objects and their use for basic problem solving.	Students will create algorithms for problem solving using the basic programming notions in laboratory assignments, class work and tests.
5. Demonstrate understanding of the two major programming paradigms: procedural and object-oriented.	Students will create new classes and objects of these classes in laboratory assignments, class work and tests.

6. Install and run the IDLE Python programming environment.	To complete homework assignments and practice programming skills outside the college students will install the IDLE Python environment on their own computers.
7. Design and implement basic Python scripts.	Students will use the knowledge of Boolean Algebra, problem solving paradigms and basic programming notions to write Python scripts in laboratory assignments, class work and tests.
8. Demonstrate broad problem-solving experience by referring to solutions from a problem bank covered during class	Students will demonstrate problem-solving ability in laboratory assignments, class work and tests.

General Education Outcomes and Assessment

Learning Outcomes	Assessment Method
SKILLS/Inquiry/Analysis Students will employ scientific reasoning and logical thinking.	Students will describe problem, identify inputs, processes and desired outcomes in laboratory assignments, class work and tests. Students will solve problems using the flowchart interpreter software and Python in laboratory assignments, class work and tests. Students will identify coding paradigms in Laboratory Assignments, Class work and tests
SKILLS/Communication Students will communicate in diverse settings using oral (both speaking and listening) and visual means.	Students will discuss various problems and approaches towards solving these problems in class
VALUES, ETHICS, RELATIONSHIPS/ Professional/Personal Development Students will have access to on-line materials and solutions to programming problems and will be required to process those materials and solutions, understand them, use the ideas from them without passing others' ideas as their own.	Students will learn to respectfully use the code generated by other programmers giving.