CS 280: Programming Language Concepts
Fall 2025

Syllabus

CS 280 - Programming Language Concepts
Prerequisites: CS 114 or CS 116 or IT 114 or equivalent with a grade C or better.
Conceptual study of programming language syntax, semantics and implementation. Course covers language definition structure, data types and structures, control structures and data flow, run-time consideration, and interpretative languages.

Course Instructor and Coordinator:

Dr. Bassel Arafeh
GITC, Rm. 4408
E-mail: ba62@njit.edu
Office Hours:
Tuesday: 1:10 pm to 2:10 pm
Wednesday: 10:00 am to 12:00 noon
Thursday: 1:10 pm to 2:10 pm
Or by Appointment

Textbook:

T: Robert W. Sebesta, Concepts of Programming Languages, 12th Edition., Pearson, 2019.

References:

The following sources are recommended as supporting references for the topics of the course.

- **R1:** Nell Dale; Chip Weems; Tim Richard, Programming and Problem Solving with C++, 6th/7th Edition, Jones & Bartlett Learning.
- **R2:** Michael D. Adams, Lecture Slides for Programming in C++ [The C++ Language, Libraries, Tools, and Other Topics] (Version 2021-04-01) http://www.ece.uvic.ca/~mdadams/cppbook

Goals for the Course:

At the conclusion of this course, the successful (passing) student would have developed:

1. Ability to recognize common features of different programming languages.
2. Ability for learning new programming languages.
3. Appreciation of the strengths and weaknesses of different programming languages.

4. Ability to apply programming language syntax and semantics concepts in the implementation of a specified programming language.
5. Ability to apply computer science concepts and software development fundamentals to produce computing-based solutions for some programming languages issues.

Major Topics:

- Common features of programming languages
- Language syntax and semantics
- Lexical and syntax analysis
- Variables bindings, scopes and lifetimes
- Data types
- Expressions, and assignment statements
- Control flow statements
- Subprograms
- Abstract data types
- Support for object-oriented programming
- Exception Handling

Weight of Each Course Component:

Project Assignments	**26%**
Recitation Assignments	**15%**
Quizzes	**9%**
Midterm	**20%**
Final	**30%**

Grading Scale:

A	**>= 88%**
B+	**82%-88%**
B	**76%-82%**
C+	**70%-76%**
C	**60%-70%**
D	**50%-60%**
F	**< 50%**

Course Format and General Policies

CS280 is being taught in lecture/lab format. Lectures will be held on **Tuesdays for all sections.** While recitation classes for all sections will meet on **Thursdays.** More detailed instructions related to recitation assignments (RAs), project assignments (PAs), vocareum environment and Exams are given next.

1. **Recitation Assignments**
   Recitation Assignments (RA) are short programming assignments that will be graded as part of your final course grade. **There will be 7 recitation assignments with a weight of 15% of your total grade. A RA work will be posted on a recitation class day or before, and will be due five days from the recitation class day. An extended submission period of two days will be allowed after that with a penalty of 25% deduction from the student's score. Note, no RA submissions will be considered after the extended deadline for submission. See also the course calendar schedule for more details.**

2. **Project Assignments**
   The project will be consisting of 3 programming assignments with a weight of **26%** of your total grade. All submissions are done through Canvas to the Vocareum Environment. **Extended submission period of PAs will be allowed after the announced due date with a fixed penalty of 25% deduction from the student's score for 3 days.** The schedule of posting the project assignments and their due dates are shown in the course calendar.

Project Assignment	Points (%) Total: 26	Posting Date	Due Date	Deadline with Penalty
1	9	10/9/2025	10/22/2025	10/25/2025
2	9	10/30/2025	11/14/2025	11/17/2025
3	8	11/20/2025	12/8/2025	12/11/2025

   Note: All project assignments must be written in C++, and must be submitted through Canvas to the Vocareum Environment for automatic grading.

3. **Quizzes**
   Three online quizzes will be conducted in the recitation classes as scheduled in the course calendar. The three quizzes will carry a total weight of 9% of the final grade. The Quizzes will be given at the beginning of the class and will take about 15-20 minutes of the class time.

4. **Mid-term and Final Exams**
   All Exams are conducted online in the designated exam rooms. All exams require Respondus Lockdown Browser. Please read the following NJIT policy in regard to using Lockdown Browser as the proctoring method. The course will use the "New" quizzes engine on Canvas. The instructions required to prepare yourself for an online quiz with a Lockdown Browser are shown below.

The common midterm will be on **Monday 4:00 pm - 5:30 pm – 10/27/2025**. The final exam date will be determined later on. However, the **Fall 2025** finals will be during the period **December 14-20, 2025**. **Both exams MUST be taken by all students and cannot be rescheduled.**

General Language for All Courses

NJIT policy requires that all midterm and final exams must be proctored, regardless of delivery mode, in order to increase academic integrity. Note that this does not apply to essay or authentic based assessments. Effective beginning Fall semester 2019, students registered for a fully online course section (e.g., online or Hyflex mode) must be given the option to take their exam in a completely online format, with appropriate proctoring.
In this course you will be required to use the following proctoring method to ensure academic integrity for exams. Please see NJIT's response to questions about online proctoring here. See below for more information about how exams will be proctored in this course.

For "New" Quizzes in Canvas:
If a *New Quizzes* assessment requires the use of LockDown Browser, it will automatically launch from the student's regular browser session. At the end of the quiz, LockDown Browser will close, allowing the student to continue with their standard browser. To be clear, the LockDown Browser application must first be installed to the computer or device. But once installed, it will automatically launch (and close) as needed with New Quizzes.

1. Download and install LockDown Browser from this link: http://www.respondus.com/lockdown/download.php?id=264548414
2. Once your download and installation has finished, log into Canvas using your standard browser.
3. From your Dashboard or under "Courses", click on the course in which you have to take the exam that requires LockDown Browser.
4. After you enter the course, find the exam and click on it.
5. A new tab will open with a message stating "Assessment Loading". You will also see a pop-up window asking you to open Lockdown Browser. Click "Open Lockdown Browser".
6. Lockdown Browser will automatically launch and your quiz will be loaded into Lockdown Browser. Click "Begin" to take the quiz. Once a quiz has been started with LockDown Browser, you cannot exit until the "Submit Quiz" button is clicked.
7. If you are required to use a webcam (Respondus Monitor), you will be prompted to complete a Webcam Check and other Startup Sequence steps.

YWCC Tutoring for CS 280

Tutoring assistance is provided to CS 280 students through the College. Please visit the College page for Fall 2025 undergraduate tutoring scheduled periods at
Undergraduate Tutoring | Ying Wu College of Computing

Academic Integrity:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Course Perspective Regarding the Use of AI Tools:

Complete Prohibtion:

This course expects students to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, AI usage is not permitted throughout this course under any circumstance.

Note: All instances of AI usage will be reported to the Dean of Students.

Reasoning for the Policy:

- Focus in the course on developing foundational skills in applying programming language syntax and semantics concepts in the implementation of a specified programming language that are not dependent on AI technologies.
- Assessing skills based on a student's own efforts and understanding.
- Encourage creativity through a student's own exploration and thinking.
- Acquire ability to apply computer science concepts and software development fundamentals to produce computing-based solutions for some programming language issues.

Notes:

1. When you communicate with me by email, please include CS280-0xx where xx is your recitation section number in the Subject line of any email you send me.
2. If your inquiry is about a recitation class material, a recitation assignment or C++ help, please contact your Recitation class Instructor first.
3. For tutoring assistance, visit the YWCC site for undergraduate tutoring.
4. You will have one calendar week from when a grade for any assignment or exam is posted on Canvas to raise any questions that you may have about your grade to me or the instructor of your recitation class. After that time, I will not discuss any grading changes.
5. You are responsible for any material that you miss if you don't attend a lecture or a recitation class.
6. **No request for an assignment submission extension will be considered, if it is not supported by a confirmed evidence from the Office of the Dean of Students.**
7. **Requests of waiving the late submission penalty will not be considered in most situations, specially, those submissions that are done with no history of activities for that assignment before.**
8. **If you need accommodations due to a disability please contact:**
   Marsha Williams-Nicholas, Associate Director of Office of Accessibility Resources and Services (OARS),
   e.mail: marsha.williamsnicholas@njit.edu
   (973) 596-2994
   Kupfrian Hall 201
   A Letter of Accommodation Eligibility from the office authorizing student accommodations is required.

Course Calendar:

Week	Date	Lect./Lab Topic	Textbook/ Reference Chapter	RA/PA	RA/PA Due Dates
1	Tues. Sept. 2, 2025	Lecture 1: Introduction & Preliminaries	T: 1		
	Thurs. Sept. 4, 2025	Rec 1: Introduction to C++	R1: 2-3	RA 1	9/8/2025
2	Tues. Sept. 9, 2025	Lecture 2: Variables, Bindings & Scopes	T: 5 R1: 10.7, 10.8		
	Thurs. Sept. 11, 2025	Rec 2: C++ Streams & Files	R1: 4	RA 2	9/15/2025
3	Tues. Sept. 16, 2025	Lecture 3: Data Types I	T: 6.1-6.7 R1: 10-12		
	Thurs. Sept. 18, 2025	Rec 3: Functions, Pointers and Arrays	R1: 8, 11	RA 3	9/22/2025
4	Tues. Sept. 23, 2025	Lecture 4: Data Types II	T: 6.8-6.14 R1: 10-12		
	Thurs. Sept. 25, 2025	Rec 4: C++ Classes, Templates, and Overloaded Operators	R1: 12, 16.1, 16.3	RA 4	9/29/2025
5	Tues. Sept. 30, 2025	Lecture 5: Describing Syntax	T: 3.1-3.3		
	Thurs. Oct. 2, 2025	Wellness Day (No Classes)			
6	Tues. Oct. 7, 2025	Lecture 6: Lexical Analysis	T: 4.1-4.2		
	Thurs. Oct. 9, 2025	Rec 5: PA1-Building a Lexical Analyzer		PA 1 (Lexer)	10/22/2025
7	Tues. Oct. 14, 2025	Lecture 7: Expressions & Assignment Statements	T: 7		
	Thurs. Oct. 16, 2025	Rec 6: PA 1 Implementation Issues	R1: 17	Qz 1 RA 5	10/20/2025
8	Tues. Oct. 21, 2025	Lecture 8: Syntax Analysis	T: 4.3		
	Thurs. Oct. 23, 2025	Rec 7: Mid-term Review: Examples & Exercises			
	Mon, Oct. 27, 2025 4:00 pm-5:30pm	Midterm Exam			

9	Tues. Oct. 28, 2025	No Lectures (Due to Midterm Exam on Mon. 10/27/2025)			
	Thurs. Oct. 30, 2025	Rec 8: PA2-Building a Parser		PA 2 (Parser)	11/14/2025
10	Tues. Nov. 4, 2025	Lecture 9: Control Statements	T: 8.1-8.4 R1: 5-7		
	Thurs. Nov. 6, 2025	Rec 9: Recursion: Definitions & Examples	R1: 18	RA 6	11/10/2025
11	Tues. Nov. 11, 2025	Lecture 10: Subprograms & Their implementation	T: 9.1-9.2-9.5, 10.1-10.3		
	Thurs. Nov. 13, 2025	Rec 10: Attribute Grammars: Definitions & Examples	T: 3.4	Qz 2	
12	Tues. Nov. 18, 2025	Lecture 11: Generic Functions & Abstract Data Types	T:9.10, 11.1-11.5		
	Thurs. Nov. 20, 2025	Rec 11: PA3-Building an Interpreter		PA 3 Interp.	12/8/2025
13	Tues. Nov. 25, 2025 (Thurs. Classes Meet)	Rec 12: Mixed Mode Expressions Evaluation		RA 7	12/3/2025
	Thurs. Nov. 27, 2025	**Thanksgiving Recess Begins**			
14	Tues. Dec. 2, 2025	Lecture 12: Support for OOP: Inheritance & Polymorphism	T: 12 R1: 15.1-15.3		
	Thurs. Dec. 4, 2025	Rec 13: C++ Inheritance & Polym. Examples	T: 12 R1: 15.1-15.3	Qz 3	
15	Tues. Dec. 9, 2025	Lecture 13: Exception Handling	T: 14.1-14.2 R1: 16.4		
	Thurs. Dec. 11, 2025 (Last Day of Classes)	Rec 14: Final Exam Review: Examples & Exercises			
16	Dec. 14-20, 2025	FINAL Exams			