CS 280: Programming Language Concepts
Spring 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 Instructors:

1. **Dr. Bassel Arafeh (Sections 02, 04, and 06)**
   Course Coordinator
   GITC, Rm. 4408
   E-mail: ba62@njit.edu
   Office Hours:
   Monday: 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

2. **Mr. Jonathan Kapleau (Sections 08, and 10)**
   GITC, Rm. 4412
   E-mail: kapleau@njit.edu
   Office Hours:
   Monday: 8:30 am to 9:50 am
   Thursday: 8:30 am to 9:50 am

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
- Overview of C++ Language
- 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 Programming Assignments	**32%**
Short Programming Assignments	**10%**
Midterm	**25%**
Final	**33%**

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

Lectures will be held on **Mondays and Thursdays for all sections.** There will be two groups of programming assignments. These are:

1. **Short Programming Assignments (SAs)**
   There will be 4 short programming assignments with a weight of 10% of your total grade. A SA work will be due five days from the posting 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 SA submissions will be considered after the extended deadline. See also the course calendar schedule for more details.

2. **Project Programming Assignments (PAs)**
   There will be **3 programming projects** with a weight of **32%** of your total grade. **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 programming projects and their due dates are as shown below.

Project Assignment	Points (%) Total: 30	Posting Date	Due Date	Deadline with Penalty
1	12	2/24/2025	3/12/2025	3/15/2025
2	10	3/24/2025	4/7/2025	4/10/2025
3	10	4/14/2024	4/28/2024	5/1/2025

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

3. **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, March 10, 2025, from 4:00 pm till 5:15 pm**. The **final exam** date will be determined later on. However, the **Spring 2025** finals will be during the period **May 10-16, 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.

Any course that uses online proctoring for exams may require you to do an environmental scan. You are responsible for selecting a location where you are comfortable with yourself and your room being video and audio recorded. You may be asked to use your camera to scan all four walls of the room you are in, as well as the workspace, desk, and area around the computer. Ideally, your exam environment should be well-lit and free from distractions and interruptions.

In this course you will be required to use the following proctoring method to ensure academic integrity for exams. See below for more information about how exams will be proctored in this course.

Respondus Lockdown Browser Proctoring

The Respondus proctoring solution has three possibilities:

1. **LockDown Browser***:* A locked browser used to prevent students from printing, copying, going to another URL, or accessing other applications during an assessment in Canvas.
2. **Monitor:** Used in conjunction with LockDown Browser, Monitor is the usage of a webcam to record a user during the exam session.
3. **Live Proctoring:** Used in conjunction with both LockDown Browser and a video conferencing solution, the instructor live proctors students during the assessment.

Respondus works with both “Classic” and “New” quizzing engines in Canvas, but the process to enter the exam is different based on the quizzing engine. If information is not posted about which quiz will be used, contact your instructor.

If virtual machine software is detected on your device, you won't be able to run LockDown Browser, and you'll receive a warning, "The browser can't be used in virtual

machine software such as Virtual PC, VMWare, and Parallels." You can find examples of VM software and troubleshooting steps on Respondus's FAQ page for this topic.

If you want to take your exam on your iPad, you must ask your instructor to enable this feature from within the course settings and download the LockDown Browser app.

In using LockDown Browser, students need:

- High-speed internet connection
- Windows or Apple Operating System

In using Monitor or Live Proctoring, students need:

- Webcam (internal or external)
- Microphone and Audio (internal or external)
- NJIT ID or Photo-Issued ID
- To perform an environment check

Helpful Resources:

- Introduction to Respondus LockDown Browser for Students Video
- Respondus Monitor Resources
- Respondus Computer Requirements
- Tips for Ensuring a Smooth Experience
- Respondus Privacy Policies
- Questions or Problems? Contact:
    - Respondus Live Chat
    - IST Service Desk: 973-596-2900 or Help.njit.edu

Using LockDown Browser with "New" Quizzes in Canvas

When accessing a New Quiz in Canvas using LockDown Browser, students must:

1. Download and install the LockDown Browser link.
2. Log into Canvas using your standard browser.
3. Click on the course within your "Courses" list 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.
8. Once the exam has been submitted, Respondus will close to allow you to continue using your regular browser window.

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.
- Assess 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.

YWCC Tutoring for CS 280

Tutoring assistance is provided to CS 280 students through the College. Please visit the College page for Spring 2025 undergraduate tutoring scheduled periods at https://computing.njit.edu/tutoring.

Notes:

1. When you communicate with me by email, please include CS280-0xx where xx is your section number in the Subject line of any email you send me.
2. For tutoring assistance, visit the YWCC site for undergraduate tutoring.
3. 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 the instructor of your class. After that, no grade change is possible.
4. You are responsible for any material that you miss if you don't attend a lecture.
5. **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.**
6. **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.

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 Calendar:

Week	Date	Lect./Lab Topic	Reading Assignment (Chs.)	SA/PA	SA/PA Due Dates
1	Thurs. Jan. 23, 2025	1. Introduction & Preliminaries	T: 1		
	Mon. Jan. 27, 2025	2. Introduction to C++	R1: 2-3	SA1	January 31, 2025
2	Thurs. Jan. 30, 2025	3. C++ Streams & Files	R1: 4		
	Mon. Feb. 3, 2025	4. C++ Functions, References, Pointers & Arrays	R1: 8, 10, 11	SA2	February 7, 2025
3	Thurs. Feb. 6, 2025	5. C++ Structures & Classes	R1: 10.4, 10.6, 12, 16.1		
	Mon. Feb. 10, 2025	6. C++ Operator Overloading, Generic Functions and Recursion	R1: 16.2, 16.3, 18	SA3	Feb. 14, 2025
4	Thurs. Feb. 13, 2025	7. C++ Standard Template Library (STL)	R1: 17		
	Mon. Feb. 17, 2025	8. Describing Syntax	T: 3	SA4	Feb. 21, 2025
5	Thurs. Feb. 20, 2025	9. Lexical Analysis	T: 4.1-4.2		
	Mon. Feb. 24, 2025	10. Description of PA 1: Building a Lexical Analyzer		PA 1 (Lexer)	March 12, 2025
6	Thurs. Feb. 27, 2025	11. Variables, Bindings, and Scopes I	T: 5		
	Mon. March 3, 2025	12. Variables, Bindings, and Scopes II	T: 5		
7	Thurs. March 6, 2025	13. Midterm Exam Review: Examples & Exercises			
	Mon. Mar. 10, 2025 4:00 pm-5:15 pm	Midterm Exam			
8	Thurs. Mar. 13, 2025	14. Syntactic Analysis	T: 4.3		

	Mon. Mar. 17, 2025	**Spring Recess**			
9	**Thurs. Mar. 20, 2025**	**Spring Recess**			
	Mon. Mar. 24, 2025	**15. Description of PA 2: Building a Parser**		**PA 2 (Parser)**	**April 7, 2025**
10	**Thurs. Mar. 27, 2025**	**16. Data Types I**	**T: 6**		
	Mon., Mar. 31, 2025	**17. Data Types II**	**T: 6**		
11	**Thurs. April 3rd, 2025**	**18. Expressions and Assignment Statements**	**T: 7**		
	Mon. April 7, 2025	**19. Statement-Level Control Statements**	**T: 8**		
12	**Thurs. April 10, 2025**	**20. Attribute Grammars**	**T: 3.4**		
	Mon. April 14, 2025	**21. Description of PA3: Building an Interpreter**		**PA 3 (Interp.)**	**April 28, 2025**
13	**Thurs. April 17, 2025**	**22. Subprograms**	**T: 9.1-9.2, 9.5, 9.10**		
	Mon. April 21, 2025	**23. Subprograms implementation**	**T: 10.1-10.3**		
14	**Thurs. April 24, 2025**	**24. Abstract Data Types**	**T:11**		
	Mon. April 28, 2025	**25. Support for OPP I: Inheritance & Polymorphism**	**T: 12**		
15	**Thurs. May 1st, 2025**	**26. Support for OPP II: Inheritance & Polymorphism**	**T: 12**		
	Mon. May 5, 2025	**27. Exception Handling**	**T: 14.1-14.2 R1: 16.4 R2: 3.6.3**		
	Tues. May 6, 2025 (Thursday Classes Meet)	**28. Final Exam Review: Examples & Exercises**			
16	**Thurs. May 8, 2025**	**Reading Day 1**			
May 10-16, 2025		**Final Exams**			