

**New York University Tandon School of Engineering**

CS-GY 6373 Programming Languages

Spring 2020

Professor Thomas Reddington

Friday 10:30 – 12:55 PM; 2 MTC Rm 9.011

To contact professor: [treddington@nyu.edu](mailto:treddington@nyu.edu)

370 Jay Street Floor 8, Rm: 843

Office hours: by appointment

**Graduate Assistants**

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**Prerequisites**

CS-GY 5403

Be familiar with Linux, c and Python.

**Course Description:**

This course covers the structures, notations and semantics of multiple programming languages. Topics: Issues of scope, type structure and parameter passing. Control structures, including support for exception handling and concurrency. Abstract data types and object-oriented languages. Functional, logic programming languages. Examples from a variety of languages will be used especially the newer concepts that are now appearing. This is not a class on any one programming language but a class on a series of concepts that underlie one of more programming languages. We will focus for instance, on c, Lisp/scheme, Haskell, Julia and Prolog. I will provide documentation for each. It is assumed you have some familiarity with Python3. You are expected to learn each language and demonstrate through your homework that you understand concepts.

**Course Objectives**

- 1) Understand different concepts and constructions across multiple programming languages
- 2) Be able to critique how one language provides support for a concept versus another language.
- 3) Learn functional, logic, Aspect Oriented programming languages.
- 4) Be able to compare Imperative, functional and logic language features.

**Textbooks (supplied as pdfs)**

Robert W. Sebesta, Concepts of Programming Languages (10th ed.)

Kent Lee, Foundations of Programming Languages

A Linux Virtual Machine (VM) will be provided that has languages preinstalled. Class exercises will be done on this VM. It will be preloaded with flex, python, python3, swi-prolog, lisp, c & C++, and Haskell, Julia, ocaml, php, ruby, bison, go, golang, fortran, mit-scheme, clojure1.6, smlnj, aspectj.

**Grade Calculations**

30% Homework

35% Midterm exam

35% Final exam

**Course Requirements**

- 1) reading before class
- 2) class participation
- 3) assignments
- 4) exams

**Lessons**

Homework is the key to success in this course. There will be assignments that are done in the Vital. There may also be writing assignments. You are responsible for reading Chapters 1 and 2 of Sebesta on your own.

A rough schedule of topics/chapters (These may change as the semester progresses).

**Policies:**

The exact topics listed in this syllabus are subject to change. As the class progresses we will gauge where your interests lie and may adjust topics and schedule appropriately.

All homework and laboratory assignments are due on the date indicated on the course website. **Late assignments will not be accepted** so don't ask for an extension if you are late. Failure to submit an assignment will result in a grade of zero for that assignment. You will have ample time from the time an assignment is given until it is due. We will not consider a network outage, unavailability of your computer or a computer in the lab (whether a specific computer or any computer in general), or other computer problem that occurred the night before the due date to be a justification for submitting an assignment late. You may assume that there will be one lab and/or homework for each lecture.

**Individual Work and Collaboration**

In preparing your submissions for homework and laboratory projects you are authorized to use the textbook, your notes, web sites, on-line documentation and any other reference materials to which you have access. You may also discuss the assignment in general with other members of the class or with anyone else whom you believe can be of assistance (including possibly the instructor).

The work that you submit for grading **must**, however, be exclusively your own work. If you do obtain assistance from another individual, you must include an explicit note to that effect in your submission for the assignment. Further all references used must be cited. This means that if you are using various web sites for assistance in laboratory assignments and/or homework you must cite the exact URLs. In addition, any other printed material used must be explicitly cited.

**NYU School of Engineering Policies and Procedures on Academic Misconduct**

See: <https://engineering.nyu.edu/campus-and-community/student-life/office-student-affairs/policies/student-code-conduct>

**Cheating & Plagiarism**

Cheating or plagiarism on a lab or homework will result in a zero and the Computer Science department will track you going forward for subsequent infractions. **Cheating on an exam is a much more serious infraction and may result in a lower grade for the course or an F.**

**Moses Center Statement of Disability**

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at [212-998-4980](tel:212-998-4980) or [mosescsd@nyu.edu](mailto:mosescsd@nyu.edu). You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at [www.nyu.edu/csd](http://www.nyu.edu/csd). The Moses Center is located at 726 Broadway on the 2nd floor.

**NYU School of Engineering Policies and Procedures on Excused Absences – complete policy is found [here](#) with associated [form](#):**

- A. Introduction: An absence can be excused if you have missed no more than **10 days of school**. If an illness or special circumstance has caused you to miss more than two weeks of school, please refer to the section labeled Medical Leave of Absence.
- B. Students may request special accommodations for an absence to be excused in the following cases:
  - 1. Medical reasons
  - 2. Death in immediate family
  - 3. Personal qualified emergencies (documentation must be provided)
  - 4. Religious Expression or Practice

Deanna Rayment, [deanna.rayment@nyu.edu](mailto:deanna.rayment@nyu.edu), is the *Coordinator of Student Advocacy, Compliance and Student Affairs* and handles excused absences. She is located in 5 MTC, LC240C and can assist you should it become necessary

**NYU School of Engineering Academic Calendar – complete list is [here](#):**

The final exam is on May 15, 2020. Final exams for graduate courses will be held on the last day of class. Do not make any travel plans until the exam schedule is finalized.

Also, please pay attention to notable dates such as Add/Drop, Withdrawal, etc. For confirmation of dates or further information, please contact Susana M. Garcia-Henriquez at [sgarcia@nyu.edu](mailto:sgarcia@nyu.edu).

**Schedule**

Lectures	Date	Assignment	Topics
1	31-Jan	Ch 3	Introduction; VLAB, Parse Trees
2	7-Feb	Ch 3, 4	Lambda Calculus, Lexical and Syntactic Analysis
3	14-Feb	Ch 15, Haskell	Functional Programming Languages, Lisp Scheme
4	21-Feb	Haskell	Haskell
5	28-Feb	Haskell	Haskell + Monads
6	6-Mar	mro paper	Closures, Object Oriented Programming, Method Resolution Order Decorators, Review
7	13-Mar		Midterm
8	20-Mar	Spring Break	Spring Break
9	27-Mar	Julia	Julia
10	3-Apr	Julia	Julia Metaprogramming
11	10-Apr	Ch 16, Prolog	Logic Programming, Prolog
12	17-Apr	Ch 16, Prolog	Logic Programming, Prolog
13	24-Apr	CH 9,10	Subprograms, Implementing Subprograms
14	1-May	Ch 11, 12	Exception Handling, Generic Functions, Advice, Aspect Oriented Programming
15	8-May		Review
16	15-May	Final Exam	Final Exam