# CSC 495007 Course Syllabus

## CSC 495007 – Programming Languages and Modeling

**Section ?**

**FALL 2017**

**3 Credit Hours**

### Special Notes

THis is proposed here a special topics subject which, if successful, should move to a permanent number in the future.

### Course Description

Given a commercial software problem, how can we best select a programming language for that problem? Fruther, given the ever-changing nature of comptuer programming languages, what can we learn now that will help us in the future to better understand future programming languages? To answer these questions, this subject takes a pragmatic and a theoretical approach.

At  a pragmatic language, students will implement the same program using four different programming language paradigms (object-oriented, functional, logic-based, data-driven). Extensive tutorial material will be offered to teach how to program in each of these paradigms. For 2017, the languages covered will be Closure (functional), Python (OO),  Prolog (logical), Elixr (hybrid: supports pattern matching and many other langauge features). In subsequent years, this list will evolve as the landscape of languages evolves.

At a theoretical level, the class lectures will explore these paradigms to describe the underlying concepts that distinguish these approaches (regular expressions, finite state machines, type theory, lambda calculus, functions, closures and objects, predicates, resolution theorem proving, etc).

### Learning Outcomes

**Specific subject outcomes**

* Most specific: be able to map the demands of a problem to the appropriate language selection
* Have the knowledge of the basic principles and methods of programming language translation.
* Be familiar with advanced concepts of several specialized computer science areas.

**Outcomes from the CSC learning outcomes site:**

Be proficient in one programming language and have a basic knowledge of several others

Be able to communicate effectively about computer science-related topics

demonstrate the ability to participate in professional practices related to software engineering

* negotiate, clarify, and document customer requirements
* apply knowledge of fundamental algorithms, programming language concepts, and design patterns to determine an overall design for a software system,
* implement a fully specified system
* test a fully specified system,
* plan and monitor the progress of software projects to ensure on time delivery of a high-quality system.

Be able to communicate effectively about computer science-related topics and be able to

* deliver an audience-sensitive oral technical presentation,
* write an audience-sensitive technical document,
* contribute effectively on software-based system development teams

### Course Structure

* Lectures
* Weekly Homeworks (very small)
* Projects, 4 deliverables, due monthly (coding the same spec four different ways)
* Exam (mid-term and final).

### Instructors

**Timothy James Menzies** (tjmenzie) - *Instructor*  
**Email:** [tjmenzie@ncsu.edu](mailto:tjmenzie@ncsu.edu)   
**Web Page:** <http://menzies.us>   
**Phone:** 304 376 2859   
**Office Location:** Engineering Building II (EB2)   
**Office Hours:** Tues, Wed 3-5pm

### Course Meetings

#### Lecture

**Days:** TH   
**Time:** 3:50pm - 5:05pm   
**Campus:** Centennial   
**Location:** meeting time is really tbd. whatever works with our other subjects   
*This meeting is required.*

### Course Materials

#### Textbooks

**Programming Language Pragmatics,** - *Michael L. Scott*   
**Edition:** 4th   
**ISBN:** 978-0124104099   
**Web Link:** <https://www.amazon.com/Programming-Language-Pragmatics-Fourth-Michael/dp/0124104096/ref=sr_1_1?s=books&ie=UTF8&qid=1467943748&sr=1-1&keywords=programming+languages>   
**Cost:** 60   
*This textbook is optional.*

#### Expenses

None.

#### Materials

None.

### Requisites and Restrictions

#### Prerequisites

Not sure.. could take advice here. What subjects should i list in order to ensure students have done some largeish software programming before this subject

#### Co-requisites

None.

#### Restrictions

None.

### General Education Program (GEP) Information

#### GEP Category

This course does not fulfill a General Education Program category.

#### GEP Co-requisites

This course does not fulfill a General Education Program co-requisite.

### Transportation

This course will not require students to provide their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

### Safety & Risk Assumptions

None.

### Grading

#### Grade Components

| **Component** | **Weight** | **Details** |
| --- | --- | --- |
| **items** | **100%** | * Mid-term: 20% * Final: 30% * 7 Homeworks: 1% each, 7% in total * 3 spot quizes:  3% each * Monthly project deliverables: 10% each, 40% in total. |

#### Letter Grades

**This Course uses Standard NCSU Letter Grading:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 97 | ≤ | **A+** | ≤ | 100 |
| 93 | ≤ | **A** | < | 97 |
| 90 | ≤ | **A-** | < | 93 |
| 87 | ≤ | **B+** | < | 90 |
| 83 | ≤ | **B** | < | 87 |
| 80 | ≤ | **B-** | < | 83 |
| 77 | ≤ | **C+** | < | 80 |
| 73 | ≤ | **C** | < | 77 |
| 70 | ≤ | **C-** | < | 73 |
| 67 | ≤ | **D+** | < | 70 |
| 63 | ≤ | **D** | < | 67 |
| 60 | ≤ | **D-** | < | 63 |
| 0 | ≤ | **F** | < | 60 |

#### Requirements for Credit-Only (S/U) Grading

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. Refer to the Registration and Records calendar for deadlines related to grading. For more details refer to <http://policies.ncsu.edu/regulation/reg-02-20-15>.

#### Requirements for Auditors (AU)

Information about and requirements for auditing a course can be found at <http://policies.ncsu.edu/regulation/reg-02-20-04>.

#### Policies on Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at <http://policies.ncsu.edu/regulation/reg-02-50-3>.

#### Late Assignments

Homeworks can be resubmitted 4 times each, with no grading penalty.

Late monthly projects will cost 1% mark per 2days late (weekend = 1% loss)

### Attendance Policy

For complete attendance and excused absence policies, please see <http://policies.ncsu.edu/regulation/reg-02-20-03>

#### Attendance Policy

Attendance is extremely important for your learning experience in this class. Once you reach three unexcused absences, each additional absence will reduce your attendance grade by 10%.

#### Absences Policy

As per https://policies.ncsu.edu/regulation/reg-02-20-03. The only valid excuses for absence are

* Representing an official university function,
* Required court attendance as certified by the Clerk of Court.
* A minimum of two excused absences per academic year for religious observances
* Required military duty as certified by the student's commanding officer.
* Short-term illness or injury affecting the ability to attend or to be productive academically while in class. Students must notify instructors prior to the class absence, if possible, that they are temporarily unable to attend class or complete work on time.
* Death or serious illnesses in the family when documented appropriately.

#### Makeup Work Policy

None.

#### Additional Excuses Policy

None.

### Academic Integrity

#### Academic Integrity

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at <http://policies.ncsu.edu/policy/pol-11-35-01>

#### Academic Honesty

See <http://policies.ncsu.edu/policy/pol-11-35-01> for a detailed explanation of academic honesty.

#### Honor Pledge

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

### Electronically-Hosted Course Components

There are no electronically-hosted components for this course.

### Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (<http://www.ncsu.edu/dso>), 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at [http://policies.ncsu.edu/regulation/reg-02-20-01.](http://policies.ncsu.edu/regulation/reg-02-20-01)

### Non-Discrimination Policy

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at <http://policies.ncsu.edu/policy/pol-04-25-05> or [http://www.ncsu.edu/equal\_op/.](http://www.ncsu.edu/equal_op/) Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

## Course Schedule

**NOTE:** The course schedule is subject to change.

### Lecture TH 3:50pm - 5:05pm — 1 — 08/15/2017 - 11/30/2017

* Week 1: Overview
* Week 2,3:Object-oriented programming
* Week 4: Grammars
* Week 5,6: Functional programming
* Week 7: Abstraction Mechanisms
* Week 8: Declarations and Types
* Week 9: Basic language translation
* Week 10: Virtual machines
* Week 11,12: Logic Programming
* remaining weeks: special topics