

# Syllabus

## CPSC/ECE 3520:

### Programming Systems

### Spring 2020

rev. 12.29.2019

Note: This syllabus incorporates the ECE Common Syllabus.

## 1 Pragmatics

**Instructor:** Dr. R.J. Schalkoff, EIB 334, 656-5913, [rjschal@g.clemson.edu](mailto:rjschal@g.clemson.edu).

**Meeting:** 12:30-1:45 TuTH 001 Kinard. Occasionally, a lecture video may be substituted for an in-class lecture. This will be available on Canvas and may be viewed asynchronously.

Notes:

- Unless it is announced in advance (or the University is closed), assume class will meet.
- In the unlikely event I am unable to make it to a class meeting, I will notify the class *via Canvas e-mail* as quickly as possible.
- In a sense, this is a 'hybrid' class, wherein the lectures will consist of in-class lectures and a few online video lectures. On occasion, I will substitute a video lecture for a class meeting. I will announce this well in advance in class and via Canvas. Also, office hours may be either on-campus or via email, as my schedule dictates.

**Web Page: We will be using Canvas.** You will find this syllabus as well as other related materials and resources on the CPSC/ECE 3520 Canvas

page. **Be sure you can access this, since it will be the conduit for handouts, selected video lectures, software assignments and other interaction.** This repository will evolve over the semester.

**Text:** Schalkoff, *Programming Languages and Methodologies*, Jones and Bartlett Publishers, 2007. REQUIRED.

Note: The least expensive and easiest way to get this is via Campus Copy Shop in Clemson.

Campus Copy Shop  
189 Old Greenville Hwy.  
Clemson, SC 29631  
Phone: 864-654-3863

**Office Hours:** Primary office hours are via email. On-campus office hours will be announced in advance.

## 2 Course Overview / Goals and Objectives

A more advanced course in programming languages and systems for computer engineering/science majors. *The objective of this course is to enable a more complete understanding of programming topics and related supporting tools, including philosophy, methodology, formal syntax and semantics, and examples of programming paradigms, languages and development approaches.*

## 3 Course Outline by Topics (not in chronological order):

1. Programming: the Concept, History and Trends
  - (a) (How) did you learn to program?
  - (b) There's Lots More Than c...
  - (c) How do you Convey Aspects of a Programming Language?
  - (d) Taxonomy and History of Programming Languages and Approaches
2. Specifying and Enforcing Syntax

- (a) Grammars
  - (b) BNF Notation and Alternatives
  - (c) Parsing
  - (d) "mini-c"
  - (e) Scanning/parsing using **flex** and **bison**
- 3. Prolog, Applications and Parsing in Prolog
- 4. Functional Programming Approaches
  - (a) The Lambda Calculus
  - (b) LISP
  - (c) ML (SML/NJ)
  - (d) CAML
- 5. "OO" Paradigms
  - (a) Why, What, How?
  - (b) CLOS/c++/Windows examples
- 6. Specifying Semantics
  - (a) Why?
  - (b) Relationship to "Correctness"
  - (c) Translational Semantics
  - (d) Operational Semantics
  - (e) Denotational Semantics
  - (f) Axiomatic Semantics
  - (g) Algebraic Semantics

## 4 Software Development Languages and Tools

Some example languages or software tools we may use include:

1. flex and bison
2. Prolog
3. ocaml
4. c

In addition, **all of our work will be done using the linux operating system.**

## 5 Course Grading Procedures

- Your final grade is solely based upon 6 instruments: 3 Quizzes, 2 Assignments (referred to as Software Development Exercises or SDEs) and the Final Exam. The schedule for these is given in Sections 5.2 and 5.3. No re-tests or 'extra credit assignments' are given. **All scores are used. Quizzes (each) have a 25% weighting, SDEs (each) have a 10% weighting and the Final Exam has a 5% weighting.**

It is probably not too early to emphasize that an SDE grade is based upon a **syntactically and semantically correct working solution which meets the given specifications and is submitted before the deadline<sup>1</sup>.**

**You are expected to take the in-class quizzes at the scheduled times,** unless there are extenuating circumstances and arrangements are made in advance.

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<sup>1</sup>Contrast this rubric with a grade based upon the perceived amount of time invested in the SDE solution.

## 5.1 Students with Disabilities: Requesting Accommodations and Related Policies

Students with special accommodations must provide me with your letter **at least two weeks prior to the first in-class quiz**. If your Accommodation Letter concerns special provisions for in-class quizzes or the final, you **MUST** arrange to take **ALL** quizzes/exam through the Clemson Testing Center.

## 5.2 Assignment and Due Dates of SDEs

SDE	Assigned	Due
1	1/23	2/20
2	3/5	4/9

Notes:

- No in-class or video lecture is scheduled on a day when an SDE is due.
- There is a 0-credit SDE0, which is simply a test of your ability to submit an assignment to Canvas. This must be completed for you to continue in the class. For most students, it takes less than 10 minutes.

## 5.3 In-Class Quiz Dates

- Quiz 1: 1/30
- Quiz 2: 2/27
- Quiz 3: 3/12
- Final Exam: Monday, 4/27, 3:00-5:30PM.

## 6 Attendance

In-class lecture attendance is a significant contributor to success in this class, and is required. I will circulate an attendance sheet at each in-class lecture. **You are responsible for anything discussed in class.**

Of course, participation in the course via the in-class quizzes and SDEs is also essential. University class attendance policies can be found in the Undergraduate Announcements.

**If you decide to withdraw from the class, it is your responsibility to inform the Registrar of this fact. It is not my responsibility.**

Students are required to monitor their university email. See:

<http://www.clemson.edu/studentaffairs/student-handbook/universitypolicies/email-communications.html>

## 7 Additional Remarks and Incorporation

The *Clemson Announcements* and The ECE Common Syllabus contain additional information and guidelines on a number of important and related topics, including attendance, special needs, emergency procedures and **academic integrity**. These are incorporated into CPSC/ECE 3520 by reference.

## 8 Title IX Statement

This is now contained in the ECE Common Syllabus.

## 9 Procedures to Keep SDE 'Gaming' in Check

In the previous course offerings, I learned some things which have lead to the following important rules. They may sound harsh, and I hope someday they will become unnecessary. Their purpose is to reward the efforts of those in this course who work diligently and ethically. Here are the rules:

- We assume what you submit to Canvas is not an 'opening bid', rather it is your best and final solution to an assignment (SDE).
- Multiple submissions: Canvas allows multiple submissions for a graded Assignment prior to the deadline. If you submit multiple archives for an SDE, **we will open and grade ONLY the latest (i.e., most recent)**.
- **We grade (only) what you submit**, not what you meant to submit, corrections to what you did submit, etc. This is occasionally a huge conceptual stumbling block for a small number of students.
- A late submission is recorded as a 0 grade. Canvas does a nice job of enforcing this. Deadlines and schedules matter.
- A corollary is: we don't grade what you didn't submit, with the exception of the following:
- **If you don't submit anything (or an empty archive), you will receive a 0.** We will not 'chase down a solution', or prod you to submit it, or remind you it was due. Taking this course is voluntary, as is your Canvas submission.

These procedures are well served by the admonitions:

1. **Before you submit the SDE archive, check it. Make sure the required archive format (zip), function/predicate prototypes, and any directory structures are as specified in the SDE assignment.** Test your submission one last time, to be sure you are actually submitting what you think you are submitting.
2. After submitting your SDE archive, download it and repeat step 1.  
About once every semester, a student submits SDE  $x$  for SDE  $y$  where  $x \neq y$ . This is unfortunate for the careless student, since, as indicated, we grade what you submit.  
Another good admonition is:
3. **Don't wait until 1 minute before the deadline to (try to) submit your SDE.**

And here's an important one:

4. It is never too early to get started on an SDE.

## 10 A Procedure to Keep Your Progress in 3520 in Check

*All questions about an in-class quiz or an SDE grade must be brought to my attention no later than **1 week** after the quiz or SDE is returned. This 1 week time limit does not change because you did not attend one or more classes. Thus, do not expect reconsideration for quizzes and SDEs at the end of the course (possibly because you 'need points').*

## 11 Teaching Philosophy

My teaching philosophy may be summarized in these remarks:

- The class (you) and I are 'in this together' for the session. **However, your progress is up to you.**
- Sometimes we can have fun with the material; sometimes work is required. Not everything can be made simple or fun.
- Academic integrity is a serious issue.
- There are standards for academic achievement, and they should be employed. Excessive whining has never been shown to facilitate the installation, creation or debugging of software.
- All our interactions should be conducted within a framework of mutual respect.
- **The time to put effort into 3520 is prior to the quizzes, final and SDEs and before the course is over.**