Computer Science

2025-26 School year

Instructor: Michael Wolverton
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Location: **CEC Robotics & Computer Science Lab**
(D102 'Fabrication Lab')

Web Page: https://cec-code-lab.aps.edu

Times: **CEC Session IIIB**
Tue./Thu. 2:50-4:50 pm

Course Description

This course introduces students to commercially used programming languages and code libraries in professional grade code editing tools. We will begin will learn fundamentals with small daily objective based assignments and gradually branch outward to larger code projects guided by the instructor. Programming concepts will emphasize logic structure use in branches and loops, use of classes and objects (object orientation), array methods, data types, and use of an application programming interface (API) reference document. Programming language emphasis will be on Java and Java FX APIs. All software tools used in this class are free to use commercially and many are even open source to encourage students to take their skills home and into the professional world. Primary course topics include:

- Fundamentals of programming
  - Use of logic structures in program flow control
  - Use of repetition in the form of loops, arrays and recursion
  - Use of mathematics and comparisons in programming
  - Use of subroutines in the form of functions (Java methods) using both parameters and returns.
  - Data typing and its effects on functions, mathematics, computing efficiency and platform compatibility
- Object Oriented Programming
  - Effective organization of data and methods into classes to allow construction of large code projects
  - Class inheritance including overriding of methods, abstract methods, and overloading of methods
- Use of Professional Programming Tools and Technical Reference Material
  - Effective use of an application programming interface (API) reference document
  - Debugging techniques
    - Diagnosing syntax errors using the integrated development environment (IDE) error logging
    - IDE Debugging tools including breakpoints
- Interactive Graphic User Interfaces
  - Create responsive applications with interactive 2D graphics, animation and sound

Learning Resources

Typically, there are no fees or formal equipment requirements for participation in this class. All software and reference material will be supplied on school lab computers. A course resources website is available at the course web page below:

https://cec-code-lab.aps.edu

The course web page will also provide links to sample code, reference materials, and software. All software used in this course will is either open source or free to use so that students have no barriers to use of their skills.

Course Format & Grading Policy

Instruction

significant portion of the course material will be presented by instructor coding demonstrations. Ideally, these will be delivered by live screen broadcast with oral presentation. If needed, the same content will be delivered through virtual meetings, videos and web pages. Sample code (including code written during presentations) will be provided on the course web page.

Assignments

Graded items will fall broadly into two categories.

- Code Assignments – Students will be issued an assignment document and due date. They must write a program that meets the objectives and technical criteria in the document. Typically some lecture, tutorials, hints or examples will be provided with each assignment to help students get started.
- Participation Grades – Students are expected to attend and participate in all scheduled online meetings and live classes unless excused. Students can be penalized for not participating.

Assignment Submission

Each student will be given an account to the File Server on cec-code-lab.aps.edu where they can upload completed assignment files.

Grading Weights

Overall grades are semester cumulative. The relative weighting may be as follows.

(Weights are subject to change based on changes in course due to scheduling and public health orders)

Coding Assignments: 70-80%	Participation: 20-30%	Sem. end Project : 10%

0-59% **F**	60-69% **D**	70-79% **C**	80-89% **B**	90-100% **A**

Code plagiarism

Submission of copied code for credit will not be tolerated. Code submissions which contain significant code blocks copied directly from the internet or tweaked only in a trivial fashion will receive no credit whatsoever.

Assignments determined to contain plagiarized code will receive zero credit.

Students that submit plagiarized code may receive an overall failing grade and be referred to CEC administration.

The intent for the projects and assignments is to learn to program by *writing* code. It is better to present a flawed but genuine effort that you made instead of a showpiece you cobbled together from other people's code that the student doesn't understand. Small blocks of code copied from our class reference materials or from previously completed assignments are acceptable, but students must write the vast majority of their code for credit.

CEC Cell Phone Policy

To create an optimal learning environment, cell phone use is to be limited to educational and medical purposes only. Teachers do have discretion to have students use cell phones for educational purposes. Students who need to use their cell phone for medical purposes must have documentation in Synergy.

Teacher Discretion

Teachers have the authority to establish specific cell phone rules in their classrooms. These rules must be communicated clearly to students in the course syllabus at the beginning of the term and must align with the overall school policy. Teachers will clearly communicate to students when the use of cell phones is allowed for educational purposes. Students who need to use their cell phone for medical purposes must have documentation in Synergy.

Consequences (per class)

1. First Offense: Verbal warning by teacher and confiscation of the cell phone for the remainder of the class. The Student will be reminded of classroom policy when they retrieve their phone.
2. Second Offense: Confiscation of the cell phone for the remainder of the Session, and the teacher will contact parent/guardian by phone or email that same day, and log contact in Synergy. Teacher will contact the front desk and a staff member will come to the classroom to retrieve, log and secure the confiscated phone until the end of the Session. The student will retrieve their phone from the front desk at the end of the Session.
3. Third Offense: Confiscation of the cell phone by front office staff, administrator contact with parent, and the parent must pick up the cell phone from school personnel.
4. Fourth Offense or Repeat Offenses in Multiple Classrooms: Administrator conference with parent/guardian and student. Student will not be allowed to bring a cell phone to the CEC Campus for the remainder of the school year. Violation will result in disciplinary action.

Emergency Use

Parents/guardians needing to contact students during school hours should do so through the front office.

CEC Front Office: `(505) 247-3658 extension 45400`

College Credit

In partnership with the University of New Mexico Computer Science department, the Career Enrichment Center will be able to offer a college class credit for UNM CS 152 Lab: Computer Programming Fundamentals in addition to APS high school elective credit. The dual credit opportunity applies to the spring (second) semester. ***Note that dual credit enrollment is not guaranteed for all students****. Application for dual credit is dependent upon completion of extra assignments as well as good performance in the first semester. Dual credit applications can be rejected by the instructor or the UNM Dual Credit admissions office for a variety of reasons.* Students not approved for dual credit may remain enrolled as APS high school students receiving elective credit, as in the fall semester. Dual credit students will be assigned significantly more work, and graded more rigorously and need to work outside of class on additional assignments. A second syllabus will be issued at the start of second semester describing relevant changes in grading and classroom policy.

Tentative Curriculum Sequence

The class will progress through programming topics in the following order. Pacing will be adjusted based on the progression of the students and course scheduling changes due to public health orders. As such some topics may be excluded, reordered or revisited.

Introduction: binary, programming Languages, Java and IntelliJ IDE

Unit 1. variables, data types and math operations, string formatting

Unit 2. boolean logic and branches

Unit 3. loops, repetition and arrays

Unit 4. methods, parameters and returns

Unit 5. classes and object orientation

Unit 6. APIs, Java FX, class inheritance, anonymous classes, lambda expressions

Unit 7. timers, interfaces, motion/animation using vectors

Unit 8. image sound resource files, sound effects, canvas

Unit 9. basic collision detection, basic 2D physics,

Unit 10. text file creation, text file parsing

Unit 11. threads and parallel processing

Unit 12. Network Packets and NetSockets or JBox2D open source physics engine

Final. Student Projects