CSCI 4510: Topics in Computer Science
Applied Evolutionary Computation
Fall 2025 Syllabus

Instructor: Dr. Vincent A. Cicirello **Office:** G116
E-mail (course related): Use course Blackboard Course Messages tool. **Phone (office):** x3526
E-mail (other than this course): See campus directory for address.

Course Time and Location:
- Hybrid Course
  - In-person part (50%): Tuesdays, 12:30pm-2:20pm, D009 (attendance is mandatory).
  - Online part (50%): Asynchronous
- The in-person meetings are mandatory. Take note of the portion of your overall grade later in this syllabus that comes from participation and attendance. If you don't attend a class session, you will lose part of your participation/attendance grade.

Office Hours:
- Wednesdays 10:30am - 12:30pm (G116)
- Other days/times by appointment.
- You can also just drop by my office, and if I'm there I'm happy to assist you.

Pre-reqs: Permission of Instructor.

Course Description: In this course, we will work in teams to build solutions to real world optimization problems using evolutionary computation, and related algorithms. Evolutionary computation is a subfield of A.I. that is focused on solving problems using algorithms inspired by natural genetics and evolution. We will use existing evolutionary computation libraries and frameworks. A secondary focus of the course will involve learning and applying various professional development tools, frameworks, and services, such as Apache Maven, GitHub (including GitHub's dependabot and GitHub Actions), various static analysis tools (e.g., SpotBugs, EndSecBugs, RefactorFirst), the Java Microbenchmark Harness (JMH), etc. Coursework and grading will be based on lab assignments using the various tools, participation/attendance, and a group project.

Required Readings:
- Articles as assigned (available digitally)
- Some course content will be in the form of videos in Blackboard

Other Required Resources:
- Java: Minimum Java 17, Preferred Java 21.
  - Eclipse Temurin distribution of OpenJDK 21 can be downloaded from: https://adoptium.net/
- Apache Maven: https://maven.apache.org/
- An account on GitHub: https://github.com/
  - Recommended: Consider signing up for GitHub Education, which gives you a free Pro account for as long as you are a student, as well as a variety of other perks (e.g., free trials of stuff from partners of GitHub, etc). To join GitHub Education, first create a GitHub account if you don't have one already (above link), and then follow: https://github.com/education/students
- GitHub Desktop: https://github.com/apps/desktop
- Your favorite code editor (e.g., Visual Studio Code, Notepad++, Sublime Text, etc).
  - If you prefer an IDE, then Eclipse should be fine (I believe it has an integration for Maven).
  - Don't use BlueJ (it is fine for new programmers, but you are all beyond it): I will take points off from something if I see BlueJ used.

Grading:

	Attendance / participation:	25%
	Lab assignments:	25%
	Group project:	50%

Grading Scale:

A: at least 90.00	A-: at least 89.50	B+: at least 89.00
B: at least 80.00	B-: at least 79.50	C+: at least 79.00
C: at least 70.00	D: at least 60.00	F: less than 60.00

Note: The chart above deliberately does not include C-, D+, or D-. Those grades are not used in this course.

Computer Science Student Outcomes: This course supports students in their development of the following Computer Science student outcomes:

- Outcome 2: An ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
  - 2.a: Students will design a computing-based solution to meet a given set of computing requirements.
  - 2.b: Students will implement a computing-based solution to meet a given set of computing requirements.
  - 2.c: Students will evaluate a computing-based solution to meet a given set of computing requirements.
- Outcome 5: An ability to function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
  - 4.a: Students will share in the work of the team.
  - 4.b: Students will listen and communicate with other teammates.
  - 4.c: Students will fulfill duties of team roles.
- Outcome 6: An ability to apply computer science theory and software development fundamentals to produce computing-based solutions.
  - 6.a: Students will apply computer science theory to produce computing-based solutions.
  - 6.b: Students will apply software development fundamentals to produce computing-based solutions.

Course IDEA Objectives: The IDEA objectives of this course include:

- Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories).
- Learning to apply course material (to improve thinking, problem solving, and decisions).
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course.
- Acquiring skills in working with others as a member of a team.
- Learning how to find, evaluate, and use resources to explore a topic in depth.

Generative A.I. (read carefully before using Generative A.I.): You may use Generative A.I. in this course, such as but not limited to GitHub Copilot, with the following constraints:

- You must document what GenAI tool you used, where you used it, for what purpose, and how much of your code was created by GenAI.
- You may use GenAI for at most 25% of the code of your group project.
- Any code written or partially written by a GenAI tool must be reviewed by at least 2 members of your team, and you must document this.
- You must be able to explain how and why code written by (or using) GenAI works (i.e., you must understand it well enough if I were to ask you to explain it).

Lab Assignments (25%): During the first few weeks of the semester, we will use the in-person lab time for lab assignments involving the tools that we will be using during the semester. Most of these lab assignments will be graded based on completion.

Attendance/Participation (25%): This portion of your grade is not free points. Attendance is mandatory. Participation includes being present on the days when this hybrid course meets face-to-face in the computer lab, participating in all lab assignments, contributing positively and fairly to your team's project (I will look at the commit histories of your group project's GitHub repository), completing all lab assignments on time, completing all assigned readings and viewing any assigned videos on time (e.g., Blackboard tracks what you've views, when you've viewed it, how long you've viewed it, etc). Since a significant part of your course grade is from a group project, I want to help ensure that you don't find yourselves with a free-loading group member, so I am also setting a high percentage of course grade from participation and I will take attendance during all face-to-face course meetings. Although the first few weeks we'll have individual lab assignments, during the later parts of the semester, we'll use the lab time for you to work with your teams. If you miss a face-to-face class session due to illness, please document when you are able to return to your classes to avoid losing attendance/participation points. Provide the documentation of your illness to Stockton's Wellness Center and ask them to contact your instructors. Likewise, if you will miss class due to a religious holiday, you must inform me of the dates of those absences in writing (e.g., message in Blackboard is fine) within the first 10 business days of the semester per Stockton procedure: https://stockton.edu/policy-procedure/documents/procedures/2030.pdf. If you need to miss class for another reason, check with me first on whether or not I consider it to be a reason for an excused absence and document it. Vacations are not a valid reason to miss class, and will not be excused.

Group Project (50%): You will work in teams of 4-5 students during the semester on a group project. The project will involve implementing an application and/or conducting experiments that involve one or more evolutionary algorithms. You will be able to use an existing open source Java library developed by me in these projects. We will have at least one lab assignment toward the beginning of the semester that will introduce you to the relevant library, its functionality, etc. I will provide more information on project constraints and expectations a few weeks into the semester. The project will have the following deliverables:

- Proposal: I will provide some ideas for projects or you can propose your own.
- Implementation.
- Report.

Late Policy: Assignments are graded on a 100 point scale. Penalty is 1 point for each hour (or part of an hour) late. For example, submit 10 hours late and lose 10 points. Submit 1.25 hours late, and lose 2 points. Submit an assignment a full day late and lose 24 points off the assignment's grade. This implies that an assignment must be no more than 100 hours late for partial credit. Additionally, any deadlines during finals week are strict.

Incomplete Policy: In general, no grades of incomplete will be given. The only exception to this rule is an institutionally documented medical emergency that necessitates your complete absence from Stockton for at least two continuous semester weeks. Additionally, you must be caught up on all work up to the point where your medical emergency began and currently in the "C" range or better overall at the point where the emergency began.

Academic Honesty: Please familiarize yourself with Stockton's Student Academic Honesty Procedure. Each violation is penalized by a 0 on the relevant assignment/etc, plus a 10 point penalty on your overall course grade. For example, if you have one violation, you'll have a 0 on that assignment or exam plus 10 points off your overall average, but if you have two violations, you'll have grades of 0 on the two assignments/exams/etc and 20 points off your overall average. Example violations include, but are not limited to: (a) any form of cheating on an exam or assignment, (b) passing off the work of another as your own (including other students, former students, websites, GitHub Copilot and other Generative A.I.), (c) assisting someone in violating the academic honesty procedure, (d) asking someone to assist you in cheating or other academic honesty violations (even if they refuse to help you cheat), etc. [Yes, I encountered that last one once in a General Studies course.] **Reminder from earlier in syllabus: you are allowed to use GenAI tools provided you document your use and follow the other constraints from earlier in the syllabus. Using GenAI tools under those constraints is fine. It is only a violation of Academic Honesty (in this course) if you pass off the product of a GenAI tool as if you wrote it yourself.**

Timeline: The following chart indicates approximately what we will be doing during each class meeting, as well as assignment deadlines. This timeline is subject to change based on unforeseen circumstances.

Date	**What We Are Doing in the Lab**	**Assignments Due**
September 9	Course Overview, and start Lab Assignment 1	Lab 1 due via GitHub by 9/15, 11:59pm
September 16	Lab Assignment 2	Lab 2 due 9/17, 11:59pm
September 23	Lab Assignment 3	Lab 3 due 9/24, 11:59pm
September 30	Lab Assignment 4	Lab 4 due 10/1, 11:59pm
October 7	Lab Assignment 5	Lab 5 due 10/8, 11:59pm; Form project teams by class-time 10/14
October 14	Work in teams on defining project	
October 21	Work on project proposals	Project proposals due, 10/21, 11:59pm
October 28	**Precepting Day: No Classes**	
November 4	Group Project	
November 11	Group Project	
November 18	Group Project	
November 25	Group Project	
December 2	Group Project	
December 9	Group Project	
December 16	Finals Week: Finish up your group project	Group project due 11:59pm

Online Portion of Course: See Blackboard for details of any video lectures, or other online coursework, including expected completion times.

Lab Assignment Deadlines: Rationale for the deadlines of lab assignments is as follows:

- Lab 1 is a slightly modified version of a combination of 4 tutorials provided by GitHub. GitHub estimates a total of 3.5 hours for these. I will spend about 30 minutes on 9/9 with the course overview, leaving 1.5 hours on 9/9, and the other 2 hours is basically the online portion of the course for the first week. Thus, giving you until 9/15, 11:59pm.
- Labs 2, 3, 4, and 5 should be doable within the class period, including time for me to provide relevant overviews. It is possible that you may need a small amount of time to finish these up though before submitting them. I'm setting the deadlines for these at 11:59pm the day after the lab to give you about a day and a half to find the time necessary to finish up and submit.