MATH 495R Section 001

Competitive Programming

TTH, 12:00-12:50PM, TMCB 150

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Office Hours: By Appointment

This syllabus is a guide of the semester and as such is subject to change.

Course Description: Competitive coding is a great way to enhance problem solving skills, improve resumes, and have some nerdy fun. This class is designed to give the students opportunities to learn additional problem solving methods and algorithms. This class is not designed to be time-consuming, but it will be engaging and challenge students to grow.

Prerequisite: ACME Enrollment.
Note: Even though credit hours are variable, the expected student output is not and will be the same regardless of number of credit hours. In other words, all students will be expect to attend, participate, and program regardless of their credit enrollment.
Credit Hours: 0.5-2 Variable

Optional Text: *Cracking the Coding Interview*, 6th Edition
Author: Gayle Laakmann McDowell; **ISBN-13:** 978-0984782857

Course Objectives:
At the completion of this course, students will be able to:

1. Work through unknown programming problems making significant progress toward a solution
2. Increase in programming confidence and skill
3. Crush the ACM competition
4. Be comfortable in tech interview situations
5. Gain valuable experience that leads to improved resumes
6. Gain exposure to multiple programming languages not found in the ACME curriculum

Grade Distribution:

ACM	50%
Attendance	20%
Learn and Go	20%
Language Project	10%

Course Policies:

- **Attendance**
  - Attendance is expected and will be taken each class. You are allowed to miss **4** classes during the semester without penalty. Any further absences will result in a 1% drop per day in attendance grade, which can be made up through extra credit work.
- **Learn and Go**
  - In every Learn and Go section there will be 3 problems that are representative of the topic being covered. You are required to complete at least one of these problems in each of the 7 Learn and Go sections before the end of the semester.
- **ACM**
  - The main purpose of this class is to prepare students for the ACM coding competition. It is required that every student attend for the full competition on the date it is held. There are very limited exceptions that must be cleared by the instructors in advance. If the exception is approved, students will be required to spend an equivalent amount of time participating in a proctored ACM with the same questions under the direction of the instructors.
- **Language Project**
  - There are 4 languages that will be covered in this class in addition to python. They are JavaScript, C++, R, and Clojure. These languages were chosen for their applicability to mathematical applications and employability of those with knowledge relating to them. There are 3 problems that must be solved in each of the languages JavaScript, C++, and Clojure to receive full credit. A special data project will be given for R of similar difficulty.
- **Homework**
  - There will be sufficient time in class to complete a large majority of the assignments. However, it may be required to spend 10 hours outside of class this semester completing the Learn and Go questions or the Language Projects. However, if the students will make good use of their class time, they will have to spend significantly less time out of class working on required work. Of course, extra practice is always encouraged and will be the true difference between those who do well at the ACM and those who do not.

Honor Code:

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

Preventing Sexual Misconduct:

As required by Title IX of the Education Amendments of 1972, the university prohibits sex discrimination against any participant in its education programs or activities. Title IX also prohibits sexual harassment?including sexual violence?committed by or against students, university employees, and visitors to campus. As outlined in university policy, sexual harassment, dating violence, domestic violence, sexual assault, and stalking are considered forms of "Sexual Misconduct" prohibited by the university. University policy requires any university employee in a teaching, managerial, or supervisory role to report incidents of Sexual Misconduct that come to their attention through various forms including face-to-face conversation, a written class assignment or paper, class discussion, email, text, or social media post. If you encounter Sexual Misconduct, please contact the Title IX Coordinator at t9coordinator@byu.edu or 801-422-2130 or Ethics Point at https://titleix.byu.edu/report-concern or 1-888-238-1062 (24-hours). Additional information about Title IX and resources available to you can be found at titleix.byu.edu.

Students with Disabilities:

BYU is committed to providing reasonable accommodation to qualified persons with disabilities. If you have any disability that may adversely affect your success in this course, please contact the University Accessibility Center at 422-2767. Services deemed appropriate will be coordinated with the student and instructor by that office.

Tentative Course Outline:

Week	Content
Week 1	• Problem Solving 101 • Problem Solving 102
Week 2	• Problem Solving 103 • Learn and Go 0: Python Essentials
Week 3	• Learn and Go 1: Data Structures • Learn and Go 2: Parsing
Week 4	• Blitz • Learn and Go 3: Number Theory
Week 5	• Learn and Go 4: Strings • Learn and Go 5: Abstract
Week 6	• Blitz • Learn and Go 6: Grids
Week 7	• Blitz • Speed Test • MidTerm: Crush the ACM
Week 8	• Interviewing: The Good, The Bad, The Unexpected • Interviewing: Watch and Learn
Week 9	• Interviewing: Your Turn • Interviewing: Your Turn
Week 10	• R: How to? • R: In class
Week 11	• JavaScript: How to? • JavaScript: In class
Week 12	• Friday Class • Thanksgiving Break
Week 13	• C++: How to? • C++: In class
Week 14	• Clojure: How to? • Clojure: In class