

# COMP SCI 5200 ANALYSIS OF ALGORITHMS

Fall 2021

<b>Instructor:</b>	<a href="#">Xin Liang</a>	<b>Time:</b>	T/TH 8:00am – 9:15am
<b>Location:</b>	203 Computer Science Bldg.	<b>LEC:</b>	3.0
<b>Office hour:</b>	TBD	<b>Office:</b>	333 Computer Science Bldg.
<b>Email:</b>	<a href="mailto:xliang@mst.edu">xliang@mst.edu</a>	<b>Tel:</b>	(573) 341-4541
<b>Grader:</b>	TBD	<b>Email:</b>	TBD
<b>Office hour:</b>	TBD		

**Zoom:** [link](#)

**Passcode:** 001968

**Catalog:** The purpose of this course is to teach the techniques needed to analyze algorithms. The focus of the presentation is on the practical application of these techniques to problems such as sorting, backtracking, and graph algorithms.

**Prerequisites:** A "C" or better grade in Comp Sci 2500.

**Course Description:** The purpose of this class is to develop improved abilities to think abstractly, critically, and rigorously, and to solve problems that require analysis, synthesis, and evaluation. We will build on the theory and applications of algorithm development emphasizing the computation-intensive methods introduced since the 1980s. After taking the class, you should be able to

- Know standard algorithms and be able to analyze their efficiency.
- Recognize standard problems embedded in real-world applications.
- Analyze and compare the performance of competing algorithms for the same problem.
- Modify known algorithms to solve new variations of familiar problems.
- Design and analyze new algorithms using the learned techniques.
- Decide which design technique is most useful for solving a given problem.
- Prove that a problem is NP-complete, and understand implications of NP-completeness.

**Office Hours:** After class, or by appointment. While writing emails to the instructor, please add prefix "CS5200" in your subject line.

**Textbook:** Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein: [Introduction to Algorithms 3rd Edition](#), McGraw-Hill Publishers, 2009. ISBN 978-0262-03384-8.

## **Focused topics and the corresponding chapters in the text book:**

- Asymptotic Analysis (Ch. 3.1-3.2)
- Recurrence and Sorting (Ch. 4, 6-8)
- Dynamic Programming and Greedy Algorithms (Ch. 15-16)
- Amortized Analysis (Ch. 17)
- Graph Algorithms (Ch. 22-26)
- NP-completeness and Approximation Algorithms (Ch. 34-35)
- Selected Topics and Introductory Lectures

**Attendance:** Attendance **required**. Online quizzes will be given in the class, and bonus points will be awarded for active participation.

**Face Covering:** Effective Aug. 2, 2021, all Missouri S&T students, staff, faculty, vendors, suppliers, and visitors will adhere to the following health and safety practices to reduce the spread of infectious disease.

- Face coverings are required for all, regardless of vaccination status, in:
  - Classrooms, lab environments and meeting spaces of university-owned or university-operated buildings when six feet of social distancing is not possible; and
  - During activities when six feet of consistent physical distancing cannot be maintained.
- Face coverings are required for unvaccinated individuals in common indoor areas.
- In classrooms, faculty will wear a face covering or face shield that facilitates enhanced communication to students.

Please refer to Missouri S&T's [policy on face coverings](#) for details.

**Grading Policy:** Exam #1 (15%), exam #2 (20%), exam #3 (20%), exam #4 (20%), assignments (15%, each assignment has equal weight), quizzes (10%), bonus points (including optional projects/assignments, participation in class etc.).

Assignments are posted on Canvas regularly (roughly bi-weekly, but may vary based on the specific topics). Grades will be posted on Canvas as soon as exams/assignments/projects are graded. Any discrepancies must be reported and resolved within **one week** of assignment grade posting. No correction/adjustment will be made afterwards.

**No Makeup exam/assignment/project will be given unless the student contacts the instructor before the exam/assignment/project, and has MS&T-acceptable documented reasons** (i.e. MST required activity, conference presentation, interview, illness, death in the family, etc.) and make prior arrangements with the instructor.

**In order to grade everyone uniformly on homework, late work will not be graded by the graders. Late submission is not accepted.**

**Grading Criteria:** A: 85-100% B: 75-84.9% C: 65-74.9% D: 55-64.9% F: 0-54.9%. Please note that the graduate school does not recognize a grade of D for graduate course so graduate students will get an F if their percentage is below 65%. These cutoffs might be adjusted, but only in the downward direction (to make letter grades higher).

**Important Dates:** The exam dates will be determined and posted shortly. The homework/quiz/project posting/due dates will be available on Canvas.

**Scholarships, state, fed grants:** If a student is in violation of the rules of scholarships, state, fed grants, the instructor is asked:

- Did the student attend the class according to the attendance rules?
- When did you see the student last from roll calls - What is the performance of the student?
- If excessive absences, why the student was not reported/dropped?

The higher ups require that we document all such information, so that if a student is in "question", they want to know the details. To safeguard you from such queries, you must have some MST acceptable letter from higher ups to justify for excessive absence (beyond 3).

**Student Honor Code and Academic Integrity:** Please take a few minutes to stress the importance of academic integrity in class. Discuss why it should matter to the student, why it matters to you and your discipline, why it matters to Missouri S&T, and why it matters to future employers. Include a statement on your syllabus about the Honor Code developed and endorsed by the Missouri S&T Student Council: the Honor Code can be found at this link: <http://stuco.mst.edu/about/honor.shtml>. Encourage students to read and reflect upon the Honor code and its emphasis on HONESTY and RESPECT. Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism or sabotage (<http://registrar.mst.edu/academicregs/index.html>). Additional guidance for faculty, including the University's Academic Dishonesty Procedures, is available on-line at <http://ugs.mst.edu>. Other informational resources for students regarding ethics and integrity can be found online at <http://ugs.mst.edu/academicintegrity/studentresources-ai>.

**Student Services:** There are many services on campus that can help students who are having difficulties. Please contact your instructors via email if you should become sick. Upload your work on canvas before the due date. Do not wait for the last minute when internet may crash. Below are a few helpful links to useful resources.

**S&Tconnect (S&Tconnect tab in <https://canvas.mst.edu>):** S&Tconnect provides an enhanced system that allows students to request appointments with their instructors and advisors via the S&Tconnect calendar, which syncs with the faculty or staff member's Outlook Exchange calendar. S&Tconnect will also facilitate better communication overall to help build student academic success and increase student retention. S&Tconnect Early Alert has replaced the Academic Alert system used by Missouri S&T. If training is needed, please contact Rachel Morris at [rachelm@mst.edu](mailto:rachelm@mst.edu) or 341-7600.

**Disability Support Services (<http://dss.mst.edu>):** Any student inquiring about academic accommodations because of a disability should be referred to Disability Support Services so that appropriate and reasonable accommodative services can be determined and recommended. Disability Support Services is located in 204 Norwood Hall. Their phone number is 341-4211 and their email is [dss@mst.edu](mailto:dss@mst.edu). Instructors may consider including the following statement on their course syllabus as a means of informing students about the services offered: *"If you have a documented disability and anticipate needing accommodations in this course, you are strongly encouraged to meet with me early in the semester. You will need to request that the Disability Services staff send a letter to me verifying your disability and specifying the accommodation you will need before I can arrange your accommodation."*

**LEAD Learning Assistance (<http://lead.mst.edu>):** The Learning Enhancement Across Disciplines Program (LEAD) sponsors free learning assistance in a wide range of courses for students who wish to increase their understanding, improve their skills, and validate their mastery of concepts and content in order to achieve their full potential. LEAD assistance starts no later than the third week of classes. Check out the online schedule at <http://lead.mst.edu/assist>, using zoom buttons to enlarge the view. Look to see what courses you are taking have collaborative LEAD learning centers (bottom half of schedule) and/or Individualized LEAD tutoring (top half of the schedule). For more information, contact the LEAD office at 341-7276 or email [lead@mst.edu](mailto:lead@mst.edu).

**The Burns & McDonnell Student Success Center:** The Student Success Center is a centralized location designed for students to visit and feel comfortable about utilizing the campus resources available. The Student Success Center was developed as a campus wide initiative to foster a sense of responsibility and self-directedness to all S&T students by providing peer mentors, caring staff, and approachable faculty and administrators who are student centered and supportive of student success. Visit the B&MSSC at 198 Toomey Hall; 573-341-7596; [success@mst.edu](mailto:success@mst.edu); facebook: [www.facebook.com/SandTssc](http://www.facebook.com/SandTssc); web: <http://studentsuccess.mst.edu>. If you have any questions about the information listed above, please contact the Office of Undergraduate Studies at 573-341-7276.

**Title IX:** Missouri University of Science and Technology is committed to the safety and well-being of all members of its community. US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Furthermore, in accordance with Title IX guidelines from the US Office of Civil Rights, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Title IX Coordinator, any notice of sexual harassment, abuse, and/or violence (including personal relational abuse, relational/domestic violence, and stalking) disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T's Title IX Coordinator is Chief Diversity Officer Neil Outar. Contact him ([naoutar@mst.edu](mailto:naoutar@mst.edu); (573)341-6038; 203 Centennial Hall) to report Title IX violations. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and

faculty, please visit <http://titleix.mst.edu>.