ECE 875, Computer Sys in Data Analytics, Fall, 2025

(Advanced Computer Systems and Techniques for Data Analytics)

- Instructor: Abu Asaduzzaman (DRZ)
- Department: Electrical and Computer Engineering (ECE)
- Office Location: 303 Wallace Hall (WH) building
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- Preferred Method of Contact: In person during student/office hours or via email
- Student/Office Hours: Tuesday & Thursday 2:00-3:30 PM
- Classroom, Day/Time: 261JB, Tuesday & Thursday 12:30-1:45 PM
- Prerequisites: ECE 694 or instructor's consent
- Teaching Assistant (TA): Grading – TBD
- TA Contacts: Grading – tbd@shockers.wichita.edu

How to use this syllabus

This syllabus provides you with information specific to this course, and it also provides information about important university policies. This document should be viewed as a course overview; it is not a contract and is subject to change as the semester evolves.

Student Office Hours

My student office hours are listed on page one of the course syllabus. Please utilize this time to meet with me for course-related discussions: asking for extra help, seeking further clarification of material presented in class, and follow up on aspects of the class they are interested in. These hours are not required for the course but are available to help support you on your path to success.

Course Description

Studies modern computer systems and their roles in data science and computational methodologies. Explores issues for efficient processing of big data to make effective decisions. Reviews alternative computing technologies and the future of computing performance. Special attention is given to the following scholarly team activities: technical reading, writing, and presentation.

Definition of a Credit Hour

Success in this 3-credit-hour course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction and preparation/studying or course related activities for a total of 135 hours.

Measurable Student Learning Outcomes

After passing this course, students will be able to:

- an ability to identify, formulate, and solve complex engineering problems using advanced principles [*Similar to Engineering Accreditation Commission (EAC) Student Outcome (SO)-1 for undergraduate (UG) programs.*]
- an ability to communicate technical information effectively in academic and professional settings [*Similar to EAC UG SO-3.*]
- an understanding of ethical, professional, and global responsibilities in advanced engineering practice [*Similar to EAC UG SO-4.*]

Required Texts/Readings Textbook

Please talk to the instructor before buying books for this course.

Textbook: None.

Reference Book: “COMPUTER ARCHITECTURE: A Quantitative Approach,” John L. Hennessy and David A. Patterson, Morgan Kaufmann, 6th edition, 2017.

Reference Book: “Modern Systems Analysis and Design,” Joseph Valacich and Joey George, Pearson, 9th edition, 2020.

Other Readings

Handouts on computer systems, data analytics, machine learning, and related research articles/presentations will be made available via WSU Blackboard.

Handouts on technical/research reading, writing, and presentation will be made available via WSU Blackboard.

Handouts on “The Future of COMPUTING PERFORMANCE: Game Over or Next Level?” will be made available via WSU Blackboard.

Other Equipment/Materials/Proctored Exams

If needed, students will be provided information about computing servers and service supports so that they can work on programming assignments and projects. More information will be provided during class lectures as may require.

Class Protocol, Conduct, and Decorum

In this course, all students are expected to contribute to a learning environment that is respectful and conducive to the free exchange of ideas. Respect for one another's identities, perspectives, and contributions is essential to our academic community.

Students are expected to engage with peers, instructors, and course material in a manner that reflects professionalism and mutual respect. This includes:

- Using respectful language at all times.
- Listening actively and allowing others to speak without interruption.
- Engaging in dialogue that values differing viewpoints without personal attacks or derogatory remarks.

Unprofessional conduct, e.g. off topic activities, may affect your grades or even your academic career. Be respectful at all times. Students demonstrating confrontational, disruptive, or threatening behavior may be asked to leave the classroom immediately and may not be allowed to return to the classroom for the remainder of the class period. Consequences of this behavior may also include (and are not limited to): Suspension from class for a minimum of one additional class period and report or referral to the WSU police department, Student Conduct and the WSU Care Team.

Inclement Weather Event and/or Emergency Event

In the event of an Inclement Weather Event and/or an Emergency Event, the University shall take all reasonable measures to protect the health and safety of students, faculty, and staff. Should such an event occur, the University may implement a temporary adjustment to its class and/or operations, including late start and moving class instruction and Non-Critical Campus Operations to remote delivery, when possible.

Contact Policy

Although you may attempt to reach me by phone, email communication is always preferred. Feel free to email me any questions or concerns following these guidelines:

- Always use the course name in the subject line of the email
- Remember to sign your name.
- **Always** email me from your WSU email address. Email sent from personal email servers like Gmail, Yahoo, etc., have a tendency to end up in my spam folder, and I never see them. You may also email me through Blackboard via the Email My Instructor tab. I also offer an Ask My Instructor forum on Blackboard which allows common questions to be seen and responded to publicly.
- You should NOT contact me for tech support.
    - Any technical problems involving your computer, or issues regarding file uploading or sharing, should go through the Blackboard Support. You can contact them at 316-978-3909. You can also fill out a request for help form at their website: https://wichita.edu/BbSupport
    - However, if you have a problem with access or uploading assignments, you

should let me know before your assignment is due. You will also have to accompany this notification with the file in question, so I can verify that it is completed by the due date/time.

Response Time

To Email and Discussion Forum Questions:

As soon as possible within 24 hours. If you do not receive reply to your email within 24 hours, please re-send me the email, probably the email did not arrive to my Inbox.

Feedback on Assignments:

As soon as possible after the due date (including the late submission date/time). Answer key will be discussed in lecture sessions and/or shared via Blackboard.

Academic Integrity

Students at Wichita State University are expected to uphold high academic standards. WSU will not tolerate a lack of academic integrity. Students are responsible for knowing and following the Student Academic Integrity Policy 2.17 (https://www.wichita.edu/about/policy/ch_02/ch2_17.php).

When the faculty member determines sanctions are warranted for violations of academic integrity, regardless of severity, the faculty member must report the infraction to the Office of Student Conduct and Community Standards. If you need more information about the process or wish to appeal a decision, please visit https://www.wichita.edu/about/student_conduct/ai.php

Unauthorized Use of Generative AI

Please note in particular that *Unauthorized Use or Possession of Materials or Resources* (Policy 2.17, item IV.B.2) includes unauthorized use of generative AI like ChatGPT or GPT4. In this course, all use of generative AI is prohibited except as may be specified in assignment instructions. Any student suspected of unauthorized use of generative AI may be asked to demonstrate their mastery of the assignment learning outcomes in an alternate format, such as a verbal interview or an additional problem set, before a determination is made as to whether an academic integrity violation report is warranted.

Sexual Harassment, Discrimination and Retaliation

Wichita State University is committed to creating a safe and healthy environment for all of our community members. This includes the elimination of sexual misconduct, relationship violence, and stalking within the University community. These incidents may interfere with or limit an individual's ability to benefit from or fully participate in the University's educational programs.

Students are asked to immediately report incidents to the University Police Department, (316) 978-3450 or students may contact the Title IX Coordinator at (316) 978-5177 or submit a report to the Office of Civil Rights, Title IX & ADA Compliance at Office of Civil Rights, Title IX & ADA Compliance (CTAC) Report Form (maxient.com).

Students may also report incidents to an instructor, faculty or staff member, who are required by law to notify the Title IX Coordinator. If a student wishes to keep the information confidential, the student may speak with staff members of the Counseling and Psychological Services (316) 978-3440 or Student Health Services (316) 978-3620.

Sexual assault prevention training is required of all students, faculty and staff. These training, in addition to being highly interactive and engaging, are based in research around the best practices for healthy communities. Students will need to complete this training in the fall semester before being able to enroll for the spring. For more information regarding the training, visit the CTAC website at: https://www.wichita.edu/administration/ctac/training.php.

Students with Disabilities

A disability is something that affects a major life activity. These life activities include but are not limited to, learning, walking, breathing, hearing, and seeing, in addition to many other physical, sensory functions, and psychological disabilities.

If you are a student with a disability or believe you might have a disability, which requires accommodations, please contact the Office of Student Accommodations and Testing (OSAT) at https://www.wichita.edu/services/accommodations/index.php to discuss reasonable and appropriate accommodations and eligibility requirements. It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability OSAT will review your concerns and determine, with you, what academic accommodations are necessary and appropriate for you. For example, adaptions of teaching methods, class materials or testing may be made on a case-by-case basis if warranted, as required by the Americans with Disabilities Act (ADA). All information and documentation of your disability is confidential and will not be released by OSAT without your written permission.

The Office of Student Accommodations and Testing (OSAT) is located in the Shocker Success Center, room 118, (316) 978-3309 (voice/tty) (316-854-3032 videophone). Students seeking an accommodation must complete the online application at: https://hunter.accessiblelearning.com/Wichita/ApplicationStudent.aspx.

Prohibition of Discrimination

Wichita State University is committed to being a welcoming campus for all students, staff and faculty. Wichita State University Policy 3.06 / Sexual Harassment, Discrimination and Retaliation for Employees, Students and Visitors prohibits discrimination on the basis of federal and state protected categories. Retaliation against an individual filing or cooperating in a complaint process is also prohibited.

Students from all diverse backgrounds and perspectives are welcome in this course and the diversity that students bring to this course should be viewed as a resource, strength, and benefit. All materials and activities are presented with the intent to be respectful of all students regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, or culture. Please let me know ways to improve

the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

Complaints or concerns related to alleged discrimination may be directed to the Office of Civil Rights, Title IX & ADA Compliance (CTAC), Wichita State University, 316-978-3187, ctac@wichita.edu.

Names & Pronouns

Wichita State University recognizes that its students may identify themselves by names within the campus community that are different from their legal names. A student's name within the community may be either their legal name or a chosen first/middle name used with their legal last name. A student's chosen name and pronouns should be respected by all in the classroom.

For information about chosen name, students should visit www.wichita.edu/name. To provide preferred pronouns, click on "View and Update Personal Information" link in the Student Tools channel on the myWSU Home tab. Use the "Edit" buttons to update information.

Syllabus Policies and Student Resources

All students should familiarize themselves with the course-related policies and student resources that can be found at: www.wichita.edu/syllabuspolicies

These include:

- Important Academic Dates
- Video and Audio recording
- Shocker Alert System
- Intellectual Property
- CARE Team
- Counseling and Prevention Services
- The Office of the Student Advocate
- Academic Appeals
- Student Health Services
- Heskett Center and Campus Recreation
- First Generation Students
- Tobacco Free Campus

Grading Scale

WSU uses a +/- grading scale for final grades and to calculate grade point averages. In this class, grades are assigned according to the following chart. (Other classes might assign grades differently: Be sure to understand the different grading scales in all of your classes.)

Points/Percentage	Letter Grade	Grade Points	Interpretation
93 and up	A	4.00	A range denotes excellent performance
90 – less than 93	A-	3.70	
87 – less than 90	B+	3.30	
83 – less than 87	B	3.00	B range denotes good performance
80 – less than 83	B-	2.70	
77 – less than 80	C+	2.30	
73 – less than 76	C	2.00	C range denotes satisfactory performance
70 – less than 73	C-	1.70	
67 – less than 70	D+	1.30	
63 – less than 67	D	1.00	D range denotes unsatisfactory performance
60 – less than 63	D-	0.70	
0 – less than 60	F	0.00	

Assignments

List of grading assignments/components and values toward final grades are shown below. Homework assignments and their due dates will be announced in class and/or made available via Blackboard. Similarly, the due dates for Project and Exam will be announced in class / Blackboard. Note that assignments and their points may be changed if required.

Grading Assignments/Components	Values
Pop Quiz (random, individual)	15%
Homework (five of six, take home, individual)	15%
Project **Proposal** defense & write-up (~ Week 5, teamwork)	5%
Project related **Articles** presentation (~ Week 10, individual)	5%
Project **Presentation** (~ Week 15, teamwork)	10%
Project **Report** (~ Week-15, teamwork)	15%
Exam (cumulative, Week 16, 65-minute, individual)	35%

Late Assignments

For homework assignments, late submissions will not be accepted after five days from the original due date/time. Homework scores will not be considered for letter grades. Exceptions include documented emergency situations and prior consents.

Missed Tests and Labs/Projects

Makeup for missed tests (Quiz and Exam) and Labs/Projects) will be given only when there is a genuine reason, with clear proof. It is students' responsibility to provide the proof; if the reason for missing a test is illness, a doctor's note will be required. Students should contact the instructor before any makeup test.

Extra Credit

Extra credits are possible as/if needed. Depending on class performance after Week 10, if required, extra credit assignments and their due dates will be determined.

Tentative Brief List of Topics to Cover

Introduction and Motivation

- What/How/Why: Modern Computer Systems? Data Analysis?

Course Project

- Technical Reading, Technical Writing, and Technical Presentation
- Teamwork: **Proposal** (defense and write-up)
- Individual: Project related **Article** presentation
- Teamwork: **Presentation** and **Report**

Modern Computer Systems

- Processors, Processes, Parallelism (ILP, PLP, DLP, TLP, etc.)
- Memory Hierarchy: Cache, Primary, and Secondary Memory
- Performance and Power Analysis

Computational Data Analytics

- Parallel/Distributed Systems: Computations for Big Data
- Computers for Calculated Decision-Making
- Computers for Artificial Intelligence (AI) / Machine Learning (ML)

Selected Research Articles

- Advanced Computing Infrastructure to Support Science and Engineering
- The Future of COMPUTING PERFORMANCE
- Model and Simulate Computer Systems

Tentative Schedule for 16-Week Classes

Week Tue	Note	Important topics/readings, assignments, due dates, and reminders are listed here so that you can organize your time and academic work.
W-01 08/19		ECE 875: Computers in Data Analytics; Syllabus; K-probe; Project: Components, Groups, Grading; HW-1 discussion;
W-02 08/26	HW-1	Conventional/Modern Computer Systems; HW-1 (due via Blackboard); Project: Topics; Proposal due on Week 6;
W-03 09/02	HW-2	Technical Reading, Writing, and Presenting; Parallelism; HW-2 (due Bb);
W-04	09/09	Parallelism for Improving Computing Performance;
W-05 09/16	Project	**Proposal defense** presentation: Teamwork, in-class; **Proposal write-up** with literature review: One / group, Blackboard;
W-06 09/23	Update	Project: Technical reading, writing, and presentation; Parallel/Distributed Systems: Multithreading;
W-07 09/30	HW-3	Cache-Memory: Parameters, Mapping, Design; HW-3 (due Bb); Cache-Memory (cont'd);
W-08 10/07	Mid-Pt HW-4	Cache-Memory: Performance/Power Analysis; HW-4 (due Bb); Computer System Simulation;
NA	Spr-Brk	03/11-03/17 (Spring Break) No Class;
W-09	10/14	Cache-Memory (cont'd): Performance/Power Analysis;
W-10 10/21	Project	Project related **Article** presentation: Individual; Each student in a group presents at least three articles;
W-11 10/28	Update	Data Analysis: Calculated Decision-Making; Selected Articles: Performance and/or Power Evaluation;
W-12 11/04	HW-5	Selected Articles: Performance and/or Power Evaluation; HW-5 (due Bb); Project: Report (format), Presentation (slides);
W-13 11/11	HW-6	Selected Topics: The Future of Computing Performance; HW-6 (due Bb); Selected Topics;
W-14	11/18	Selected: Adv. Comp. Infrastructure to Support Sci. & Eng.;
W-15 11/25	Project	Project **Presentation**: Team-work, PowerPoint slides; Final **Report**: Team-work, via Blackboard on Friday;
W-16 12/02	Exam	Exam discussion; Exam (class test, 65 minutes / 65 points, Closed book);
Finals		None!
Note 1: A date in Column 1 indicates the Tuesday of that week. Here, 12/02 is the Tuesday of Week 16. Note 2: All quiz tests are pop quizzes.		

Teaching Assistants

Grading TA:

TBD <tbd@shockers.wichita.edu>
Office Hours/Room: TBD

The Grading TA is not allowed to solve problems. The TA should grade test papers and provide feedback to students for any missing points. If students have any questions regarding assignments, they should immediately contact the course instructor.

Laboratory Information

There is no teaching/research lab associated with this course; however, we will provide support so that you can perform the programming assignments. Students on this course may need to access Beoshock, the HPC cluster at WSU, for their programming needs. Information about Beoshock (such as how to log in and how to run parallel programs) will be provided via lectures. If needed, we may meet in the Computer Architecture and Parallel Programming Laboratory (CAPPLab) in 312 Wallace Hall for additional help.

Concealed Carry Policy

The Kansas Legislature has legalized concealed carry-on public university campuses. Guns must be out of view, concealed either on the body of the carrier, or backpack, purse or bag that remains under the immediate control of the carrier.

Gun owners must familiarize themselves with WSU policy 11.19 / Weapons on University Property and the Kansas Board of Regent's weapons policy. If you believe that there has been a violation of these policies, please contact the University Police Department at (316) 978-3450.

University Policies and Procedures

The Wichita State University Policies and Procedures Manual can be found at: https://www.wichita.edu/about/policy/.

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1) *July 17, 2025; prepared/updated for Fall 2025 term; DRZ*
2) *August 5, 2025; updated date and room information; DRZ*
3) *August 10, 2025; updated per the new standard syllabus template; DRZ*

Wichita State News

Photo: File

Asaduzzamanâ€™s Computer Architecture and Parallel Program Laboratory (CAPPLab), WSU lab, has been named a GPU (graphics processing unit) Research Center by NVIDIA, the world leader in visual computing. *Wichita State University front/landing page on November 09, 2015.*

Abu Asaduzzaman standing in front of the Aurora Exascale Supercomputer at Argonne National Laboratory on July 31, 2025.