



CS 4504/W03 – Parallel and Distributed Computing Spring 2024

SYLLABUS

Course & Faculty Information

Bobin Deng

Assistant Professor

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Home page: <https://ksuweb.kennesaw.edu/~bdeng2/>

Office: J-356

Office Hours: Tue 3:30 pm-5:30pm; Email, Microsoft Teams or by appointment

Class Location and Meeting Times:

Time: Asynchronous Online

Location: D2L

Course Communication and Office Hours- Students can ask questions by sending messages to the instructor via the course management system (i.e., D2L). Students can also meet with the instructor during the office hours or at a scheduled date and time.

Electronic Communications - The University provides all KSU students with an 'official' email account with the address 'students.kennesaw.edu.' As a result of federal laws protecting educational information and other data, **this is the sole email account you should use to communicate with your instructor or other University officials.**

Required Texts or Other Resources –

An Introduction to Parallel Programming. Peter S. Pacheco, ISBN: 978-0-12-374260-5

Distributed Systems 3rd edition. M. van Steen and A.S. Tanenbaum ISBN-13: 978-1543057386

Course Description, Credit hours, and Prerequisites

CS 4504: Parallel and Distributed Computing

3 Class Hours 0 Laboratory Hours 3 Credit Hours

This course covers various aspects of parallel and distributed processing and algorithm design with an emphasis on programming. Topics include essentials of operating systems, network protocols for process communication, and synchronization; Shared-memory vs. message-passing architectures; Computation models and Performance metrics; Parallel/distributed algorithm design - basic techniques; Parallel/distributed programming techniques and issues:

partitioning, load balancing, synchronization, scheduling, message overheads, etc. Programming will focus on using API's for parallel or distributed applications (e.g., MPI, OpenMP, Pthreads).

Prerequisites: CS 3502

Course Learning Outcomes

At the end of the course students will be able to:

1. Apply problem solving (analysis, design, and development) skills to distributed and parallel computing applications
2. Identify and decompose complex systems into its components parts
3. Integrate OS and programming language concepts to solve/implement the (parallel and distributed) components of the systems
4. Develop suites of networking protocols for implementing the communicating components
5. Evaluate or validate their implementations via simulations and/or realistic projects using PDC platforms or IDEs such as MPI or Pthreads.

NOTE: The listed course learning objectives above are “officially” approved ones (i.e., KSU Curriculum), during the consolidation of university. It is likely that these objectives will be reviewed in future.

Teaching Philosophy and Instruction Methods

As computer science and technology are becoming the backbone of today's world and developing so rapidly, a successful education comes from not only providing students with solid knowledge and existing skills, but also teaching them the thinking of solving new problems and passion to explore the unknown. First, interest is the best teacher for everyone, and I will seek to make the courses interesting and motivate the students engaging in learning. Second, I will not only teach the fundamental concepts and basic knowledge, but also work with my students on the cutting-edge problems and explore the connections between these issues with what we learnt. Last and most importantly, my goal is to guide students to help them develop the ability to find problems, conduct research, design solutions and collaborate with others.

Course Content, Evaluation and Grading Policies

Week	Topic	Reading	Assignment Due
1	Introduction	Ch 1	
2	Overview of Parallel and Distributed Programming	Ch 2	
3	Process		
4	Thread		
5	Lock		
6	Pthread	Ch 4	
7	Lab1		Pthread Project
8	Mid exam		

9	MPI	Ch 3	
10	Holidays / Breaks		
11	Lab2		MPI Project
12	OpenMP	Ch 5	
13	Lab3		
14	Distributed system I		OpenMP Project
15	Distributed system II		
16	Review		
17	Final exam		

Disclaimer: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

Grading Scale and Course Policies

Project, and exams will be given numerical scores. These scores will be averaged at the end of the semester using the following weighting:

Item	Points, percentage or measurement
Homework/Project	50%
Mid Exam	20%
Final Exam	30%

Student Outcomes/Program Outcomes

SLO	P1	P2	P3	E1	E2
LO 1				x	x
LO 2				x	x
LO 3					x
LO 4		x			
LO 5	x		x		

Homework Submission

Copying or paraphrasing codes from other sources or other students will be considered a violation of the Student Code of Conduct. Due dates for homework assignments will be specified on the homework themselves. **No late submission is accepted.**

Letter grades will be determined by ranking the numerical averages of all students in the class. Cut-off points for grades will depend on the performance of the class as a whole; however, they will be no higher than 90 (A), 80 (B), 70 (C), and 60 (D).

Your final weight average will be used to determine your final letter grade using the table below:

Grade	Points, percentage or measurement
A	90-100
B	80-89
C	70-79
D	60-69
F	0-60

Course Policies

Attendance Policy

You are expected to check D2L at least twice per week.

Quiz/Exam Policy: Quiz/Exam Policy

Quiz/Exams will be given throughout the semester. Students who are late to class on a day when an exam is administered will not be given extra time to complete the exam. Makeup exams **WILL NOT** be given. For online students, please read <http://www.kennesaw.edu/dlc/virtualexam/>.

Electronic Devices and Classroom Behavior Policy

In order to minimize the level of distraction, all beepers and cellular phones must be on quiet mode during class meeting times. Students who wish to use a computer/PDA for note taking need prior approval of the instructor since key clicks and other noises can distract other students. Recording of lectures by any method requires prior approval of the instructor. Students using a laptop in class should not check their email, browse the web, or in other way detract from the focus of the class.

Students are reminded to conduct themselves in accordance with the Student Code of Conduct ([KSU Student Code of Conduct, Section III](#)), as published in the Undergraduate and Graduate Catalogs. Every KSU student is responsible for upholding the provision. Students who are in violation of KSU policy will be asked to leave the classroom and may be subject to disciplinary action by the University.

Tutoring

The College of Computing and Software Engineering offers some tutoring services for certain courses. If this applies to your course, you may want to include this resource for your students. Tutoring info can be found here: <http://ccse.kennesaw.edu/ccselabs/ccse-tutoring.php>

Course Delivery

KSU may shift the method of course delivery at any time during the semester in compliance with University System of Georgia health and safety guidelines. In this case, alternate teaching modalities that may be adopted include hyflex, hybrid, synchronous online, or asynchronous online instruction.

COVID-19 illness

If you are feeling ill, please stay home and contact your health professional. In addition, please email your instructor to say you are missing class due to illness. Signs of COVID-19 illness include, but are not limited to, the following:

- Cough
- Fever of 100.4 or higher
- Runny nose or new sinus congestion
- Shortness of breath or difficulty breathing

- Chills
- Sore Throat
- New loss of taste and/or smell

COVID-19 vaccines are a critical tool in “Protecting the Nest.” If you have not already, you are strongly encouraged to get vaccinated immediately to advance the health and safety of our campus community. As an enrolled KSU student, you are eligible to receive the vaccine on campus. Please call (470) 578-6644 to schedule your vaccination appointment or you may walk into one of our student health clinics.

For more information regarding COVID-19 (including testing, vaccines, extended illness procedures and accommodations), see KSU’s official [Covid-19 website](#).

Face Coverings

Based on guidance from the University System of Georgia (USG), all vaccinated and unvaccinated individuals are encouraged to wear a face covering while inside campus facilities. Unvaccinated individuals are also strongly encouraged to continue to socially distance while inside campus facilities, when possible.

Course Withdrawal

See below for commentary on withdrawals from the 2021-2022 Catalog:

Students may withdraw from one or more courses up to one week prior to the last day of class. To withdraw from classes completely or partially at KSU, a student must withdraw online at www.kennesaw.edu, under Owl Express, Registration and Student Records. Students who officially withdraw from courses before mid-semester will receive a "W" in those courses and receive no credit. They will not, however, suffer any academic penalty. Students who officially withdraw after mid-semester one week prior to the last day of class will receive a "WF," which will be counted as an "F" in the calculation of their grade point average. Exact withdrawal dates will be published in the official academic calendar and are subject to approval by the Board of Regents.

For attendance verification, faculty may assign "non-attendance" or submit a grade of W or WF for students who stop attending class and do not officially withdraw along with the last day of known attendance.

The only exceptions to these withdrawal regulations will be for instances involving unusual circumstances that are fully documented.

Students will receive refunds only when they withdraw from all their classes and only by the schedule outlined in the University System refund policy.

Grade Appeals and Student Complaints

See below for commentary on withdrawals from the 2020-2021 Catalog:

Grade appeal will follow the level of the course. Students' rights to grade appeals are defined in the university catalog. A key element in the grade appeal procedure is the faculty member's responsibility to publish a specific grading policy for each of his/her classes. Specifically, the grade appeal procedure states: "Each faculty member must specify his/her grading policy, at the first of the semester. He/she may change his/her grading policy for cause after that time, but he/she must do so uniformly, with ample notification to students, if at all possible."

Note that failure to publish the grading policy would mean that a faculty member would have great difficulty in sustaining his/her assigned grade if a student appealed with anything but a frivolous or irresponsible basis for his/her charge. The grading policy should be quite specific and should be distributed to each class in written form. Some departments may also require faculty members to file grading policy statements in the departmental office. Because the student can submit a

grade appeal to the Department Chair within 20 business days after the first day of classes of the next academic term after the academic term in which the final grade was awarded to the student (see Grade Appeals Procedure, section B), it is strongly recommended that instructors retain any student papers, tests, projects, or other materials not returned to the student for 70 days after the end of a semester or if an appeal is filed until the appeal is resolved. Refer to the following section for specific grade appeal procedures.

Students can find more details regarding the appeal process here:

<http://catalog.kennesaw.edu/>

Academic Integrity

Every KSU student is responsible for upholding all provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. The Code of Conduct includes the following:

- Section II of the Student Code of Conduct addresses the University's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the University Judiciary Program, which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement.
- Students involved in off-campus activities shall not act in a disorderly or disruptive fashion, nor shall they conduct any dangerous activity. ○ Students involved in off-campus activities shall not take, damage or destroy or attempt to take, damage or destroy property of another.

Frequently students will be provided with "take-home" exams or exercises. It is the student's responsibility to ensure they fully understand to what extent they may collaborate or discuss content with other students. No exam work may be performed with the assistance of others or outside material unless specifically instructed as permissible. If an exam or assignment is designated "no outside assistance" this includes, but is not limited to, peers, books, publications, the Internet and the WWW. If a student is instructed to provide citations for sources, proper use of citation support is expected. Additional information can be found at the following locations:

- <http://www.apa.org/journals/webref.html> ○ <http://bailiwick.lib.uiowa.edu/journalism/cite.html> ○ <http://www.indiana.edu/~wts/wts/plagiarism.html> ○ <http://www.virtualsalt.com/antiplag.htm>

Campus Policies

Confidentiality and Privacy Statement (FERPA):

Kennesaw State University adheres to the Family Educational Rights & Privacy Act of 1974 - FERPA. See the following link for more information:

http://usg.edu/information_technology_handbook/section9/tech/9.5_privacy_and_security

University - Student Rights & Responsibilities:

Students at Kennesaw State University are entitled to an environment that is conducive to learning and individual growth. To this end, students enrolling at Kennesaw State University assume a responsibility to abide by the policies and regulations expressed in this section. By doing so, students may fulfill their responsibilities and enjoy the exercise of their own rights while also respecting the rights of others.

<http://catalog.kennesaw.edu/content.php?catoid=27&navoid=2263>

Ethics Statement:

All students are responsible for knowing the information, policies and procedures outlined in the Kennesaw State University Codes of Conduct. The KSU Codes of Conduct include: the general Student Code of Conduct, the Residential Code of Conduct, and the Code of Academic Integrity. Kennesaw State University reserves the right to make changes to this code as necessary and once those changes are posted online, they are in effect. Students are encouraged to check online for the updated versions of all policies.

<http://scai.kennesaw.edu/codes.php>

Sexual Misconduct Policy:

Kennesaw State University is committed to providing programs, activities, and educational environment free from all forms of sex discrimination. For more information click here. KSU issues this statement of policy to inform the community of the University's comprehensive plan addressing sexual misconduct, educational programs, and procedures that address sexual assault, domestic violence, dating violence, and stalking, whether the incident occurs on or off campus. This policy generally covers faculty, students, and staff of the University, as well as third parties. Third parties include but are not limited to guests, vendors, contractors, retirees, and alumni.

<http://scai.kennesaw.edu/procedures/sexual-misconduct.php>

Course Accessibility Statement (ADA Statement):

<http://catalog.kennesaw.edu/content.php?catoid=27&navoid=2263&hl=FERPA&returnto=search#ADA>

Additional Student Resources

For CCSE Student resources:

<http://ccse.kennesaw.edu/student-resources.php>

KSU Service Desk:

The KSU Service Desk is your portal to getting assistance or access to University IT Services. Students call: 470-5783555 or email studenthelpdesk@kennesaw.edu

For Academic Advising information and to schedule appointments:

<http://ccse.kennesaw.edu/advising/index.php>

Links to frequently used and helpful services:

<http://www.kennesaw.edu/myksu/>

Department of Career Planning & Development

<https://careers.kennesaw.edu>

Counseling and Psychological Services <https://counseling.kennesaw.edu>

Center for Health Promotion and Wellness <https://wellness.kennesaw.edu>

Student Health Services

<https://studenthealth.kennesaw.edu>