



SYLLABUS   
College of computing and software engineering  
Department of computer science

CS 6025/01/W01: OPERATING SYSTEMS  
Summer 2022

# Course Information

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Class meeting time: *M 2:00 PM - 4:45 PM/Online*

Modality: Hybrid - 50% Online

Location: J-110 Marietta / D2L

# Instructor Information

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Name: Kun Suo, Ph.D.

Email: ksuo@kennesaw.edu (D2L email system)   
Office Location: J-318

Office phone: 4705782524

Office Hours: W 1:00-2:00 PM, or virtually at D2L, or by appointments  
Preferred method of communication: Email or MS teams

# Course Description

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*The course covers Operating Systems topics including memory and process management for high performance computing and architectures, advanced threading/concurrency, and distributed architectures*

*and computing. The course provides in-depth study of operating systems with emphasis on performance modeling with simulation and reading research papers on the various advanced topics of operating systems. Discussion of grid computing and cloud computing, virtualization, and hypervisors, scheduling for real-time, symmetric multiprocessing and hardware multithreading, effects, and control of hardware caches. The course includes a research project.*

*Prerequisites: CS 5020*

*Concurrent Prerequisite: CS 5040*

*Credit Hours: 3-0-3*

# Course Materials

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Required Texts:

* Operating Systems: Three Easy Pieces, <http://pages.cs.wisc.edu/~remzi/OSTEP/>, Remzi H. Arpaci Dusseau and Andrea C. Arpaci Dusseau, ISBN-13: 978-1985086593

Recommended Texts:

* Advanced Concepts in Operating Systems. Mukesh Singhal and Niranjan G. Shivaratri. ISBN: 0-07-057572-x. McGraw-Hill, 2004. Reference.
* Distributed Systems: Principles and Paradigms. A. S. Tanenbaum and M. van Steen. Prentice Hall Sec. Ed. 2007. Reference.
* Several recent papers on advanced topics on operating Systems, such as Concurrency and Distributed Systems.

Technology requirements:

* Any high-level programming languages (**Webcam with microphone; D2L is used for all course materials and work submission**)

# Learning Outcomes

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Upon the completion of the course, students should be able to

1. Describe the structure and dynamic behavior of various types of systems

2. Design the conceptual models in UML for most of the properties of systems

3. Implement several types of performance models using simulation techniques.

4. Read and analyze research papers on advanced topics of operating systems

# 5. Develop a research project and paper on some advanced topic of operating systems. Course Requirements and Assignments

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*List of each assignment in as much detail as possible. Include course requirements such as participation and/or attendance.*

# Evaluation and Grading Policies

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The final grade will be assessed based on students’ progress and findings as follows:

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| --- | --- |
| Item | Points, percentage or measurement |
| Attendance | 5% |
| Homework | 10% |
| Projects | 35% |
| Midterm exam | 20% |
| Final exam | 30% |

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

# Course Policies

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The grade for individual work is based on the following rubrics:

Rubrics for Grading Test/Quiz Questions

1. Does the answer demonstrate an appropriate or acceptable level of understanding and knowledge about the concepts and principles related to the question/problem?
2. Does the answer show appropriate use of scientific/technical terms? (Instead of using

casual words)

1. Is the answer fairly or reasonably complete?
2. Is the answer clear and correctly written using good English grammar and spelling? Is the

answer well-structured? (A question might have two or more sub-questions).

1. Does the answer show an acceptable level of interpretation of the question/problem? (Did

the person demonstrates an acceptable level of reasoning about the question/problem?)

Rubrics for Assignments and Project/report content and structure

1. Does the report have a good general structure? (See ‘assign\_report.doc’)
2. Is the procedure or work done well documented?
3. Does the report content demonstrate good understanding and knowledge about the concepts and principles applied in the assignment?
4. Does the report content show appropriate use of scientific/technical terms?
5. Is the main discussion in the report fairly or reasonably complete?
6. Is the report clear and correctly written using good English grammar and spelling?
7. Does the report include relevant input and output data?

**Quiz/Exam Policy:**

For on-line quizzes and tests (and other coursework), the Honor System and Academic Integrity agreement applies. There will be 2 quizzes (covering from all modules) to assess learning after completing several topics. All quizzes are online with hard deadlines and no extension will be given. The lowest quiz mark will be dropped automatically.

There will be 2 exams from each of the modules assessing learning based on covered topics.

Tests are closed book. Failure to show at test time will mean no credit for the test. No make-up exams will be given except for university sanctioned absences.

Respondus LockDown Browser and Respondus Monitor (WebCam) will be utilized for exams. You may

need to install and test a Web camera and microphone prior to beginning the semester before Tests. All

exams are closed-book and closed-note. No inside or outside resources or communications are permitted on any exam. Please practice with the lockdown browser test (non-graded) before taking any major exam. D2L will instruct you with the steps required to install and activate both options (watch the following video, if necessary, https://www.respondus.com/products/lockdown-browser/student-movie.shtml) for each exam.

Students must not use their cell phones, tablets, other devices, etc., during exams. If such case is identified that they send you a snapshot of their screen during (or after) an exam, the instructor is positioned to give a zero for the exam (or exercise your cheating policy) because of using their phones. Students making notes in writing of any issues during an exam/quiz should immediately shred them out.

The two exams will be given during a set day and time slot for all students. They are synchronized

exams and if you cannot take them at the specified date and time, please notify the instructor at least

one week ahead. The exams will be conducted via Respondus lockdown browser with a webcam for

self-proctored. So a webcam is required in this course.

Before each exam, during the environment check step, students are required to show 360 degree view

of the test environment along with the desk/table used for taking the test. You will remove other

computers, phones, and dual monitors from the test desk/table, only the laptop (or desktop) used for

the test. Students are required to show their IDs as well.

**Assignment Policy**

There are six assignments handed over throughout the term and students will be given sufficient

amount of time to complete them with resources. Assignments are intended for completing on individual

basis. Students are highly encouraged to submit assignment by due date to avoid penalties in marks.

Late assignments will receive penalty based on the formula, penalty = (number of days late)3, and must

be submitted via the late submission dropbox in D2L for partial credits.

**Make-up Policy**

Students must directly communicate with the instructor before any targeted due dates

for prior arrangement. No make-ups will be given after due dates.

**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.

**Covid-19 Policy**

Reminder

1. While in the corridors, students should keep to the right whenever possible. Observing this “rule of the road” will enable students to keep a maximum distance from one another as they pass in the hallway
2. Students should avoid congregating in the corridors and wait for their classes outside of buildings

whenever possible (i.e., not clustering outside the classroom doors).

1. Students should enter the classroom one at a time with social distancing.
2. Classes taught in odd-numbered rooms be released 5 minutes early
3. At the end of class, instructors should dismiss students one group at a time in the case of one

doorway, or two groups in the case of two doorways. An exit group might consist of a row of

students, a small learning group or whatever grouping makes sense depending on the

classroom arrangement. Students should exit through the doorways one at a time to practice social

distancing.

1. In a fire or other emergency, faculty and students should disregard the social distancing conventions

and make their way to the exits as quickly and calmly as possible

1. Remind students to wear masks when they are in the building, including when in hallways and in

classrooms.

**Face Masks in the classroom**

As mandated by the University System of Georgia, the university requires the use of face masks in the

classroom and in KSU buildings to protect you, your classmates, and instructors. Per the University System

of Georgia, anyone not using a face covering when required will be asked to wear one or must leave the

area. Repeated refusal to comply with the requirement may result in discipline through the applicable

conduct code.

Reasonable accommodations may be made for those who are unable to wear a face covering for

documented health reasons. Please contact Student Disability Services at sds@kennesaw.edu for student

accommodation requests.

**Shifting Modalities**

Please note that the university reserves the right to shift teaching modalities at any time during the semester,

if health and safety guidelines require it to do so. Some teaching modalities that may be used are F2F,

Hyflex, Hybrid, or online, both synchronous and asynchronous instruction.

**Staying Home When Sick**

If you are ill, please stay home and contact your health professional. In that case, please email the instructor

to say you are missing class due to illness. Signs of 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

**Seating Plans**

Students will sit in the same seat for every F2F class so that the instructor can use a seating plan for contact

tracing if a student contracts Covid-19.

# Department or College Policies

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Students are expected to be aware that the Computer Science department has certain policies in

place that governs practices within the department including:

1. All requests for course overloads must be made through the College advising office and with the

approval of the Program coordinator and department chair. The instructor of any course is not

permitted to authorize course overloads.

2. All requests for prerequisite bypasses must be made through the College advising office and with

the approval of the Program coordinator and department chair. The instructor of any course is not

permitted to authorize course overwrites.

3. All students are encouraged to register their current choice of major using the department major

change process. Students who are not recorded under their intended major may find that they may

be limited from registering for courses they require to complete their intended program of study.

# Institutional Policies

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Please visit each of the following links for Institutional policies.

Federal, BOR, & KSU Course Syllabus Policies:

<https://curriculum.kennesaw.edu/resources/federal_bor_ksu_student_policies.php>

Student Resources:

<https://curriculum.kennesaw.edu/resources/ksu_student_resources_for_course_syllabus.php>

Academic Integrity Statement:

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

# KSU Student Resources

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# This link contains information on help and resources available to students:

# <https://curriculum.kennesaw.edu/resources/ksu_student_resources_for_course_syllabus.php>

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: 470-578-3555 or email [studenthelpdesk@kennesaw.edu](mailto:studenthelpdesk@kennesaw.edu)

Information and links to Resources for Graduate Students: <http://graduate.kennesaw.edu/students/>

Links to frequently used and helpful services: <http://www.kennesaw.edu/myksu/>

# Course Schedule

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*Course Topics and Outline: Subject to change and more details*

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| --- | --- | --- | --- | --- |
| Week/Date | Topic | Chapters | Assignment | Project |
| 1 | Introduction and OS overview | 1,2 |  |  |
| 2 | Processes | 4, 5 |  |  |
| 3 | Thread | 26, 27 |  |  |
| 4 | System call | 5 |  | Project 1 |
| 5 | IPC and IRQ | 29, 30, 31 |  |  |
| 6 | CPU scheduling | 7, 10 |  |  |
| 7 | Deadlock and Pthread | 28, 29, 30, 31 | HW1 | Project 2 |
| 8 | Mid-term exam |  |  |  |
| 9 | Memory | 13, 14, 15, 16 |  |  |
| 10 | Page design and implementation | 18, 19, 20, 21, 22 |  | Project 3 |
| 11 | File system | 39, 40 |  |  |
| 12 | Storage | 37, 41, 42, 43, 44 |  |  |
| 13 | I/O | 36 |  |  |
| 14 | Virtualization and Cloud | 23 | HW2 | Project 4 |
| 15 | Conclusion | 11, 24, 34, 51 |  |  |
| 16 | Final exam |  |  |  |