



Department of Computer Science

College of Computing and Software Engineering

CS4632 Modeling and Simulation (Section 01)

Spring 2017 Course Syllabus

Instructor	<p>Dr. Jose M. Garrido, Professor of Computer Science</p> <p>Email: jgarrido@kennesaw.edu</p> <p>Phone (Office): 470-578-3652</p> <p>Office: J-316</p> <p>Office hours: MW 9:15 - 11:00am. Other hours on-line via D2L and/or by appointment.</p>
Course Design	<p>This course will be offered in a classroom delivery mode with lectures, assignments, assessments, and supporting resources.</p> <p>All lecture notes will be installed and available via KSU D2L Brightspace learning management system http://d2l.kennesaw.edu/.</p> <p>Student-centered Learning</p> <p>A variety of student-centered learning tools will complement individual student learning styles and help students become more versatile learners.</p>
Textbook & Resources	<ol style="list-style-type: none">1. <i>Object Oriented Simulation: A Modeling and Programming Perspective.</i> Garrido, José M. ISBN: 978-1-4419-0515-4. Springer, 2009. (Required)2. <i>Simulation with Arena.</i> W David Kelton, Randall P. Sadowski, and David T. Sturrock, 5th Ed., McGraw-Hill Higher Ed, 2007. ISBN: 13-978-0-07-352341-5. Recommended reference.3. <i>Discrete-Event System Simulation.</i> Banks, Jerry, John Carson and Barry Nelson. Prentice-Hall, 1995. ISBN 0-13-217449-9. Recommended reference.
Prerequisite	<p>CS 3304 Data Structure and CS3502 Operating Systems</p> <p>http://ccse.kennesaw.edu/cs/programs/bscs.php</p>

Course Description	<p>This course covers the modeling and simulation of the structure and behavior of real-world systems using object-oriented discrete-event simulation programming techniques.</p> <p>The course emphasizes the modeling and computer programming perspective of simulation; design and implementation of simulation models. The fundamental concepts of object-oriented simulation are introduced. Model implementation will require programming in an object-oriented simulation language such as OOSimL, or in a general purpose programming language (Java or C++).</p> <p>Students are expected to participate in class discussion, <u>reason about</u> problems, and exercise <u>initiative, creative and critical thinking</u> in their work. In addition to learning the principles and concepts of programming languages, students are expected to learn and use the appropriate <u>terminology</u> and to exercise <u>good writing</u> knowledge and skills</p> <p>For every major topic in the course, the student will learn the conceptual aspects from the course material, and then work in a practical project that involves design and implementation of a simulation model.</p> <p>A short report will be submitted for the every assignment in the first half of the course, and a longer report for the course project to be developed during the second half of the course.</p> <p>The KSU Writing Center helps students in all majors improve their writing. Experienced, friendly writing assistants help with topic development, revision, research, documentation, grammar, and more. For more information or to make an appointment, visit writingcenter.kennesaw.edu or stop by English Building, Room 242 (Kennesaw campus) or Building A, Room 184 (Marietta campus).</p>
---------------------------	---

Course Learning Outcomes	<p>After successful completion of this course, a student should be able to:</p> <ol style="list-style-type: none"> 1. Understand and be able to 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 simulation models with an object oriented simulation language 4. Implement simulation models using a commercial integrated software tool such as Arena 5. Carry out general discrete-event simulation runs and provide basic analysis of results 6. Write short reports on various mini-projects (assignments) 7. Develop a project on developing a simulation model for a selected application domain, or a research paper on some aspect of modeling and simulation
---------------------------------	--

Course Content	<p>Module 1: Introduction to Modeling and Simulation. Review of Object-Oriented Modeling and Programming. Using OOSim</p> <p>Module 2: Review of Object-Oriented Modeling and Programming. Techniques for Discrete-Event Simulation: Object orientation.</p> <p>Module 3: Single-server Simulation Models, case studies. Simulation with Multiple-Server Models, case studies.</p> <p>Module 4: Models with priorities. Review - Midterm exam. Models with Standard Resources, case studies.</p> <p>Module 5: Models with Detachable Resources, case studies. Advanced Process Interaction: synchronous cooperation, case studies.</p> <p>Module 6: Conditional Waiting, case studies. Models with Interrupts, case studies.</p> <p>Module 7: Overview of Basic Applied Probability Theory. Simulation Output Analysis: Overview</p> <p>Module 8: Emerging Topics Review</p>
Attendance:	<p>The Instructor expects your classroom attendance regularly 2-3 times per week. Grade performance is a demonstrated function of attendance, preparation, and participation. Students in this class should realize the nature of the course in which they are enrolled. Students are encouraged to visit the instructor on campus during office hours but this is not required. Students can interact with each other and with the instructor virtually, in D2L via email, chat session, online discussions, and instructor feedback.</p> <p>It is easy to fall behind in any course; it is up to the student to formalize a time to work on course materials and practice good <u>time management</u>. In order to ensure a student does not fall behind it is STRONGLY encouraged that students keep to the schedule suggested in this syllabus [basically one course module per 2 weeks during Fall and Spring semesters and four per week during a 4-week Summer semester].</p>

There is an activity and assignment due for every module. This is a way to keep the student focused and for the instructor to assess student progress. Students must make a concerted effort to maintain currency and not wait until the last minute to complete assignments. The course is designed to enhance student learning, but the student is ultimately responsible to ensure that the learning takes place.

Evaluation criteria explained:

- Students are expected to be active participants in each course activities. Full credit for participation will be extended to students who regularly participate in discussion, share ideas, and contribute relevant personal experiences.
- Examinations and quizzes will consist of essay (short and long answers), open-ended questions, technological comprehension that cover in the lecture material, and assigned readings.
- Students will be given guidance on the amount of collaboration permitted for every assignment.

Exams:

There will be two (2) primary examinations (cumulative): Midterm & Final examination. The content will come from the text and other material presented in lecture sessions as well as the homework assignments. Note that material presented in PowerPoint lectures will supplement the assigned reading. There will be no make-up examinations. It is the student's responsibility to arrange for an excused absence before the exam. A grade of zero will be assigned for all exams missed without an excused absence. If an emergency arises on the day of a midterm, and the instructor deems that the absence is excused, then the weight of the final exam may be increased to replace the midterm.

<http://registrar.kennesaw.edu/calendars/>

Quizzes:

There will be six (6) quizzes. The duration for each quiz will be from 20-25 minutes. The content will come from the text and other material presented in lecture sessions as well as the homework assignments. Note that material presented in PowerPoint lectures will supplement the assigned reading. There will be no make-up quizzes. It is the student's responsibility to arrange for an excused absence before the quiz. A grade of zero will be assigned for all quizzes missed without an excused absence.

Assignments:

Assignments are due throughout the term. Each of these assignments is weighted as noted in the assessment section below. You lose a portion of the 20% of your score if you turn in a homework assignment late, and late presentation/project/assignments will only be accepted up to one week after

the due date! Late works / assignments / projects are not accepted!

Note: Any assignments, and project, past the due dates are points off (above restriction) and/or will not be accepted.

Assignments are due throughout the term and must be submitted through D2L by 11:59pm on designated due date for each assignment. Each assignment is weighted as noted in the assessment section below.

You lose a percentage of your score if you turn in a homework assignment late, and late assignments will only be accepted up to one week after the due date!

1	Assignment	Each student expected to complete each assignment. There will be four assignments related to chapter(s) within modules. Please refer to D2L Learning Modules and/or D2L Dropbox.
2	Project Individual and/or group Project	You can work on this project as individual or as a group of 2-3 students. The project for this term is to implement the Pascal program with three different languages: Java, Ada, and Python. (You can download any free software to use for these programming languages). Note: (If you work as a group, please make sure each person submit the project in their own dropbox as long as student's names are listed on the project.)

Student Course Evaluation:

A standard questionnaire (described below) will be administered during the last two weeks of the semester in all courses. Additional questions developed by the college or instructor(s) may be included as well. It is important that each student provide meaningful feedback to the instructor(s) so that changes can be made in the course to continually improve its effectiveness. We value student feedback about the course, our teaching styles, and course materials, so as to improve our teaching and you're learning. At a minimum, the following two questions will be asked:

1. Identify the aspects of the course that most contributed to your learning (include examples of specific materials, exercises and/or the faculty member's approach to teaching and mentoring), and
2. Identify the aspects of the course; if any that might be improved (include examples of specific materials, exercises and/or the faculty member's approach to teaching and mentoring).

Assessment Grades

Assignments	20%
Quizzes	20%
Project	20%
Midterm exam	20%
Final exam	20%

All the detailed grades are in [D2L](#) - Weekly reports and final project

Grading Scale:

Grade	Percentage	Points
A	90% - 100%	
B	80% - 89%	
C	70% - 79%	
D	60% - 69%	
F	59% or below	

Withdrawal Policy:

The last day to withdraw without academic penalty is [shown on the course schedule](#). Ceasing to attend course via D2L or oral notice thereof DOES NOT constitute official withdrawal from the course. Students who simply stop participating course weekly via D2L without officially withdrawing usually are assigned failing grades. Students wishing to withdraw after the scheduled change period (add/drop) must obtain and complete a withdrawal form from the Academic Services Department in the Registrar's Office.

Incomplete Policy:

I— The grade of “I” denotes an incomplete grade for the course, and will be awarded only when the student has done satisfactory work up to the last two weeks of the semester, but for nonacademic reasons beyond his/her control is unable to meet the full requirements of the course. A grade of “I” must be removed (by completing the course requirements) within one calendar year from the end of the semester in which the “I” was originally assigned.

<http://www.kennesaw.edu/foreignlanguage/facultyinfo/IncompletePolicy.html>

Enrollment Policy:

Only those students who are enrolled in the online course may visit the lectures, receive assignments, take quizzes and exams, and receive a grade for the course via D2L. If a student is administratively

withdrawn from this course, they will not be permitted to participate in any online course activities nor will they receive any grade for the course.

Diversity Statement:

All courses offered by the Computer Science department will adhere to the KSU policy that prohibits discrimination on the basis of race, religion, color, sex, age, disability, national origin, or sexual orientation.

Disability Statement:

Any student with a documented disability needing academic adjustments is requested to notify the instructor as early in the semester as possible, and must do so before the mid-term exam. Verification from KSU disabled Student Support Services is required. All discussions will remain confidential.

http://www.kennesaw.edu/stu_dev/dsss/dsss.html

Student Email and Web Account Access:

KSU is moving towards a central authentication server that will allow one username and password to be used by all KSU users to access an increasing variety of applications (email, D2L etc.) This unified network identification is referred to as your "NetID". The new source for university-provided email and web space for students will be located at students.kennesaw.edu All students will have access to this system once they have established their NetID.

How to Activate your NetID:

To activate your NetID go to <http://netid.kennesaw.edu> and click on "Sign up Now!" link. You will be asked to provide information to verify your identity and set your password. This password will only be for NETID enabled applications.

How to Look Up a NetID:

After you have activated your NetID, you can look up other users by logging into

<http://netid.kennesaw.edu> and clicking on Directory Search.

How to Send Email:
For student email, your NetID in combination with the new email address would look like

<http://uits.kennesaw.edu/support/newstudents.php>

Web Address:

For student web address, your NETID in combination with the new server address would look like

<http://uits.kennesaw.edu/support/newstudents.php> .

If you have problems please call the Service Desk at ext. 6999 or e-mail service@kennesaw.edu.

Acquiring Final Grades:

In an effort to better utilize our technology resources, Kennesaw State University has instituted the reporting of end of term grades by phone. This is in addition to the web version of grades, which has been in effect for several terms. All current semester term students may call 770-420-4315 and select Option Number 4 to secure their end of term grades. With this new development, printed grade reports will not be mailed at the end of the term. Students needing verification of grades or enrollment should request an official transcript or enrollment verification through the Office of the Registrar.

Any student with a documented disability needing academic adjustments is requested to notify the instructor as early in the semester as possible, and must do so before the mid-term exam. Verification from KSU disabled Student Support Services is required. All discussions will remain confidential.

Academic Integrity Statement:

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

Communication Etiquette

Communication Tool	Recommendations
Communication	Classroom interaction and use the course D2L e-mail to communicate
Instructor Response Time	Questions submitted to the instructor via D2L email. Weekends may take longer. All the assignments will be graded and provide feedback within a week. Please check your course progress on " <i>D2l home page</i> ," " <i>Grade Tab</i> ."
Emergencies	In the case of an emergency, use the email or phone number that is listed in the syllabus and on the home page.
Communication in General	Please use the instructor's university email account listed on the Home page and in the syllabus.
Communication with each other and the instructor	We want everyone to experience a positive experience in this class. Be sure when you have chats, or other types of discussions (such as with labs), that you always are respectful of each other. The instructor will always be respectful of

	each of you.
--	--------------

CS4632 Schedule and Topic Coverage (tentative):

The course is organized into eight modules, each one with duration of two weeks.

Week	Lecture Topic	Reference
1	Introduction to Modeling and Simulation	Chap 1
2	Review of Object-Oriented Modeling and Programming. Using OOSimL	Chap 1: Chap 4-10
3	Review of Object-Oriented Modeling and Programming	Chap 11-18
4	Techniques for Discrete-Event Simulation: Object orientation.	Chap 20
5	Single-server Simulation Models, case studies	Chap 20
6	Simulation with Multiple-Server Models, case studies	Chap 21
7	Models with priorities.	Chap 22
8	Models with Standard Resources, case studies. Review - Midterm exam	Chap 23
9	Models with Detachable Resources, case studies	Chap 24
10	Advanced Process Interaction: synchronous cooperation, case studies	Chap 25
11	Conditional Waiting, case studies	Chap 26
12	Models with Interrupts, case studies	Chap 27
13	Overview of Basic Applied Probability Theory	Chap 28
14	Simulation Output Analysis: Overview Project: progress report Demo/Presentation	Chap 29
15	Emerging Topics; Review	
15	Review - Final Exam/Project	

