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**CS 428: Computer Graphics (Fall 2009)**

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**Instructor:** Djamel Bouchaffra, Associate Professor of Computer Science

**Class Time:** Tuesday and Thursday from 2:00 to 3:20 pm, Room: 136 Carver Hall

**Office Hours:** 133 Carver Hall  
Tuesday and Thursday from 11 am to 2:00 pm.  
Wednesday from 2 to 3 pm.

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**Website:** <http://www.djamel-bouchaffra.info>

**Textbook:** Leen Ammeraal and Kang Zhang, *Computer Graphics for Java Programmers*, 2<sup>nd</sup> Edition, John Wiley, © 2007, ISBN 978-0-470-03160-5

**Course Description:**

We begin this course by covering elementary concepts such as lines, coordinates, pixels, and polygons in chapter 1. The notion of vectors, inner product, vector product, distance between a point and a line and other applied geometrical properties are introduced in chapter 2. Geometric transformations such as translation, rotation, and inverse are laid out in chapter 3. Some basic algorithms such as Bézier curves, and B-spline curve fitting are presented in chapter 4. Perspective transformations are the object of chapter 5. We address in chapter 6, and chapter 7 the notions of hidden lines and hidden faces elimination, respectively. We will conclude in chapter 8 by introducing the concept of fractals including Mandelbrot and Julia sets.

**Link to course materials (slides hand-out, homework assignments, tasks schedule...):**

<http://www.djamel-bouchaffra.info>

**Objectives:**

By the end of the semester, students enrolled in this course should be able to:

- A. Understand the nature of discreteness of displayed graphics on computer screen such as the notion of pixel
- B. Grasp the concept of vector, determinant, polygons, and triangulation of polygons
- C. Perform 3D rotations
- D. Be familiar with well-known graphics algorithms such as clipping lines and polygons, and drawing smooth curves
- E. Compute perspective images of a point, hidden line elimination, and hidden face elimination
- F. Understand and draw self-similar curves modeled by Fractal geometry.

**Class Topics Schedule (TENTATIVE!):**

<b>Date</b>	<b>Topics</b>	<b>Assignments &amp; Exams</b>
Week 1 (08/18):	No Class	
Week 2 (08/25):	Elementary Concepts (Chapter 1)	
Week 3 (09/01):	Elementary Concepts (Chapter 1) Applied Geometry (Chapter 2)	
Week 4 (09/08):	Applied Geometry (Chapter 2)	
Week 5 (09/15):	Geometrical Transformations (Chapter 3)	Homework 1 assigned on Thursday 09/17
Week 6 (09/22):	<b><i>No class on Tuesday Sept. 22<sup>nd</sup>: Founder's Day</i></b> Geometrical Transformations (Chapter 3)	Homework 1 due on Thursday 09/24
Week 7 (09/29):	Some Classic Algorithms (Chapter 4)	
Week 8 (10/06):	Class Exercises / Lab on Tuesday	<b>Mid-Term Exam (Thursday 10/08)</b>
Week 9 (10/13):	Some Classic Algorithms (Chapter 4)	Programming assigned on Tuesday 10/13 Homework 2 assigned on Tuesday 10/13
Week 10 (10/20):	Perspective (Chapter 5)	
Week 11 (10/27):	Hidden-Line Elimination (Chapter 6)	Homework 2 due on Thursday 10/29
Week 12 (11/03):	Hidden-Line Elimination (Chapter 6) Hidden-Face Elimination (Chapter 7)	Written Report due on Tuesday 11/03
Week 13 (11/10):	Hidden-Face Elimination (Chapter 7)	Oral Presentations (11/12)
Week 14 (11/17):	Fractals (Chapter 8)	
Week 15 (11/24):	<b><i>No class on Thursday (Thanksgiving)</i></b>	Programming Presentations (11/24)
Week 16 (12/1):	Class Exercises / Lab (Last Day of Class on Tuesday 12/01)	
<b>Final Exam on Tuesday December 8<sup>th</sup> from 10:30 am to 12:30 pm</b>		

**Grading:**

- Final Exam (20%) (1 page of notes permitted)
- Mid-Term Exam (15%) (1 page of notes permitted)
- Programming Assignment (30%)
- Written/Oral Presentation (10%)
- Homework (25%)

**Grading Scale:**

**A:** 90-100   **B:** 80-89   **C:** 70-79   **D:** 60-69   **F:** below 60

**Plagiarism or cheating on any test or exam results in a course grade of F, and expulsion from the classroom.**

**Instructions Regarding Assignments**

- NO LATE assignments will be accepted. Assignments should be submitted on the date and time due.
- Plagiarized assignments will result in a grade of "F".
- **Programming Assignment:**
  - Each student will be assigned a group.
  - The programming task is assigned to the whole group. It should be demonstrated in the class on the due date. The group will have ten minutes to explain briefly the code using a Powerpoint presentation and show some input/output data. Graphical user interfaces are recommended but not a must.
  - A CD containing the Powerpoint presentation as well as the source code and the results should be turned in to the instructor.
- **Written/Oral Reports:**  
The reports should be well-written and an electronic version (attached document within an E-mail) should be sent to the instructor one week earlier to the presentation of the work. The students are divided into groups of two. Each student is within the same group chosen in programming assignments. An oral presentation of the report's contents is required. Each student will have 10 minutes of oral presentation.

**Policies:**

All rules and regulations stipulated in the GSU Student Handbook will apply. In addition:

- Everyone is expected to conduct himself/herself in a mature and responsible manner. No eating or drinking during class. Men should remove hats.
- Class attendance is a privilege and a duty. Everyone is expected to arrive on time and remain for the entire class period. Failure to do so is considered an absence.
- Attendance will be recorded each class period. The attendance record will be routed to the registers office immediately by computer. Be on time since being late is counted as absent. The roll is used by financial aid to determine your qualifications for refunds and/or financial aid.
- It is the responsibility of a student who misses a class to find out what was missed and cover the missed work.
- **CELL PHONES MUST BE TURNED OFF** in the classrooms and faculty offices.
- **NO MAKEUP TESTS WILL BE GIVEN.** A student who knows in advance that he/she will be absent from a test with a University excuse (due to, e.g., band, athletics, or other university-related event) may petition to take the test early. No test is given after the scheduled date. A schedule of

your extracurricular activity and verification (document signed by the sponsor) of your participation must be submitted to me by the close of registration.

- No work for extra credit will be assigned on an individual basis during or after the semester.
- Group discussions and study groups outside the classroom are strongly encouraged.
- Cheating of any kind is a very serious matter and will result in an "F" grade in the course.
- During a test the students will sit in alternate rows. Cell phones must be turned off and put away.
- Do not ask questions during a test. If you find a question ambiguous, you should write a note to that effect and proceed using your best judgment. Student whose first language is not English may ask for clarification of a word or phrase.
- During a test nobody may leave the room and return to work on the test. A student, who arrives after the first completed test has been submitted, will not be able to take the test.

### **Security of Exams**

During exam periods all students will be required to show a valid University ID.

### **Additional Instructions:**

- All tests are given in the assigned classroom. The test content will be representative of all classroom lectures and lab assignments.
- No student is exempt from taking the final examination.
- Please inform the instructor as early as possible if you are a graduating senior.
- Students participating in University sponsored extra curricula activities, e.g., band, football, track. etc., should submit a signed verification from the activity's director by the end of the third week of classes. Written notification of a scheduled event that conflicts with a test date should be given to the instructor at least a week before the test date so that the test can be rescheduled. The rescheduled test should be taken prior to the scheduled date or no later than three days after that date.

### **Computer Laboratories:**

You are at risk of forfeiting, your account's use (either temporarily or permanently) if you violate any of the following:

- NO eating or drinking in any computer labs. Drink and food containers are not to be used into the laboratory.
- Cell phones must NOT be used in lab. Turn sound off or put in vibrate mode. Exit the lab your cell phone.
- Use earphones for audio output. Audio mode should not be used without earphones.
- No loud talking/group discussions in labs. Use vacant classrooms for group or team discussions.
- DO NOT allow anyone to use your password to access your computer account.
- DO NOT sit on desk or tabletops. Use the chairs for seating'
- Place backpacks and other storage/packaging items on the floor near your workstation.

### **Computer Accounts**

Each student will be assigned a computer account, which is valid for one semester. During the semester you will be able to save your files on the department file server. You may want to purchase a 3 1/2" double-sided, high-density diskette, onto which you can copy your files at the end of the semester, as the files on the server will be deleted before the beginning of the next semester.

The students in CS 428 should use the lab in Carver Hall 277 for their assignments. You may also use the computers in Carver Hall 133. If you have a Java compiler at home, please let the instructor know that you wish to do your assignment on your own computer; you are still required to attend the lab sections to learn to use the computers in the lab.

**Lab rules must be obeyed!**

### **Resolution of Concerns or Problems**

If you have any concerns or problems regarding any aspect of this course, please discuss it first with the instructor and then, if necessary, with the department head.

### **Disabilities Statement**

If you need accommodation in this class/setting/facility related to a disability, please inform the instructor of the course as soon as possible.