

Department of Computer Science and Engineering  
National Institute of Technology Calicut

Tentative Course Details: Winter 2012

**CS 4047 COMPUTER GRAPHICS**

(The instructor reserves the right to adjust the syllabus when required)

**Course:**

No: CS 4047  
Title: COMPUTER GRAPHICS  
Time Slots: H and H+  
Room: ELHC 302

**Instructor:**

Name: Sarang Sukumar A  
Office: MB 209 Faculty Room, Main Block.  
Office Hours: By appointment  
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**Course Objective:**

- To introduce the students to the basic principles and techniques of computer graphics.

**References:**

- E. S. Angel, Interactive Computer Graphics, A top-down approach with OpenGL, (5e), Pearson Education, 2009.
- D. Hearn and M. P. Baker, Computer Graphics with OpenGL, (3/e), Prentice Hall, 2003.
- Ralf Steinmetz & Klara Nahrstedt, Multimedia: Computing, Communications and Applications, Pearson Education.
- Koegel Buford J. F., Multimedia System, Addison Wesley.

**Evaluations:**

Mid-Term Exam I : 15%  
Mid-Term Exam II: 15%  
Quizzes : 20%  
Final Exam : 50%

## TENTATIVE COURSE SCHEDULE

Week 1	<b>Introduction to computer graphics</b> - Graphics Hardware - overview of GPU architecture, basic raster graphics algorithms for drawing 2D primitives - scan converting lines - circles - generating characters.
Week 2	<b>Coordinate Systems</b> - representations, homogenous coordinates, object, camera, world, and screen coordinate system, changing coordinate systems.
Week 3	<b>Transformations</b> - affine transformations, translation, rotation, scaling in homogenous coordinates, matrix representations.
Week 4	<b>Viewing and Projections</b> - orthographic and perspective projection, camera positioning, Hidden Surface Removal - its importance in rendering, z buffer algorithm.
Week 5	Clipping, Data Structures for efficient implementation of the transformations and projections.
Week 6	<b>TEST1</b>
Week 7	<b>Lighting and Shading</b> - light sources, normal computation, reflection models, flat and smooth shading.
Week 8	Introduction to Textures and Mapping - Rendering Techniques.
Week 9	<b>Geometric Modeling</b> - Data structures - tree representations, hierarchical models, scene graphs.
Week 10	Particle systems and representations-introduction to modeling and solving dynamics based on physics.
Week 11	Introduction to Curves Surfaces (Bezier, splines) and Meshes - structured and unstructured.
Week 12	<b>TEST2</b>
Week 13	<b>Introduction to multimedia</b> - media and data streams - properties of a multimedia system - data stream characteristics - information units .
Week 14	Multimedia hardware - platforms - memory and storage devices - input and output devices - communication devices - multimedia software - multimedia software tools - multimedia authoring tools.
Week 15	Multimedia building blocks - audio - basic sound concepts - music - speech - MIDI versus digital audio - audio file formats - sound for the web - images and graphics - basic concepts.
Week 16	Computer image processing - video and animation - basic concepts - animation techniques - animation for the web.

### Grading Policy:

- Grading will be relative.
- Even though the grading will be relative here is a tentative marks to grade conversion formula:  
90-100: S; 80-89: A; 70-79: B; 60-69: C; 50-59: D; 40-49: E; <40: F.
- Absence without prior written permission from the instructor will be equivalent to zero marks in the corresponding exam.
- There will be no makeup exams except in case of genuine reasons. In the event of such exceptional cases, the student must discuss the matter with the instructor and must get written permission before the date of exam. Normally the corresponding weightage of the exam will be added to other exams.
- All issues regarding valuation of exams and assignments must be resolved within one week after the marks are announced.

### Standard of Conduct:

Each student is expected to adhere to high standards of ethical conduct, especially those related to cheating and plagiarism. Any submitted work **MUST BE** an individual effort. Any academic dishonesty will result in zero marks in the corresponding exam or assignment and will be reported to the department council for further action. (Refer to department policy on academic integrity: [http://cse.nitc.ac.in/sites/default/\\_les/Academic-Integrity.pdf](http://cse.nitc.ac.in/sites/default/_les/Academic-Integrity.pdf))