Introduction to Computer Graphics:
Course Organization and Survey

William H. Hsu
Department of Computing and Information Sciences, KSU

KSOL course page: http://bit.ly/h0z24i
Course web site: http://www.kddresearch.org/Courses/CIS636
Instructor home page: http://www.cis.ksu.edu/~bhsu

Reading for Next Class:
Syllabus and Introductory Handouts
CIS 636 & CIS 638 students: CIS Basics 1 slides

Course Policies

Letter Grades
- 90%+: A, 80%-89%: B, 70%-79%: C, 60%-69%: D, 59% or lower: F
- 55% or lower: F, with no grade
- Cutoffs may be more lenient, but a) never higher and b) seldom much lower.

Grading Policy
- Final exam: 18% each (in-class, with notes); final (open-book): 25%
- Machine problems, problem sets (6 of 10): 16%, labs: 7%; term project: 20%
- Reviews: paper critiques (3): 4%; peer review: 2%
- Class participation: 6% (HW, Q&A)

Late Homework Policy
- Allowed only in case of medical exigency
- All other late homework: see drop policy

Attendance Policy
- Absence due to travel or personal reasons: e-mail CIS736TA-L in advance
- See instructor, Office of the Dean of Student Life as needed

Honor System Policy: http://www.ksu.edu/honor/
- On plagiarism: cite sources, use quotes if verbatim, includes textbooks
- OK to discuss work, but turn in your own work only.
- When in doubt, ask instructor.

Course Administration

Course Policies:

Class Web Page: www.kddresearch.org/Courses/CIS636
Instructor E-Mail Addresses – Best Way to Reach Instructor:
SHIDBTA-L@listserv.ksu.edu (always use this to reach instructor and TA)
SHOCIS-L@listserv.ksu.edu (password: “736” for Advanced CG)
Instructor: William Hsu, Nichols 324C
Google Voice (cell/office/home): +1 785 236 8247; office: +1 785 532 7965
IM: MsNIM-L@conversational.im
Office hours: after class Mon/Wed/Fri; Tue AM; other times by appointment

Graduate Teaching Assistant: To Be Announced
- Office location: Nichols 124 (CIS Visualization Lab) & Nichols 218
- Office hours: to be announced on class web board

Grading Policy: Overview
- Letter Grades
- Grades on project: 45%
- Homework: 23% (5 written, 5 programming, drop lowest 2); 7 labs
- Term project: 20%
- Paper/pair reviews and class participation: 12% (Q&A)

Class Resources

Course Content Management System (CMS): K-State Online (KSOL)
- Official course page: http://bit.ly/h0z24i
- Mirror: http://www.kddresearch.org/Courses/CIS636
- Lecture notes (MS PowerPoint 97-2010, PDF)
- Homeworks (MS Word 97-2010, PDF)
- Labs and homework solutions (MS PowerPoint 97-2010, PDF)
- Class announcements (students’ responsibility) and grade postings

Course Notes On KSOL and Public Mirror
- Exam questions and solutions (MS PowerPoint, PDF)
- Dated research announcements (seminars, conferences, calls for papers)

LISTSERV Web Archive
- Official course list: http://listserv.ksu.edu/archives/cis636-l.html
- Storrs group list: http://listserv.ksu.edu/archives/cis636-l.html
- Storrs group list: http://listserv.ksu.edu/archives/cis636-l.html

Textbook

Required Textbook

Recommended References

Background Expected

Both Courses
- Strong proficiencies in C/C++ or strong proficiency in Java and ability to learn
- Strongly recommended: matrix theory or linear algebra (e.g., Math 551)
- At least 120 hours for semester (up to 150 depending on term project)
- Angel’s OpenGL: A Primer recommended

CIS 636 Introduction to Computer Graphics
- Fresh background in precalculus: Algebra 1-2, Analytic Geometry
- Linear algebra basics: matrices, linear bases, vector spaces
- Watch background lectures
- CIS 736 Computer Graphics
- Recommended: first course in graphics (background lectures as needed)
- OpenGL experience helps
- Read up on shaders and shading languages
- Watch advanced topics lectures; see list before choosing project topic

Background Expected
- Both Courses
- Strong proficiencies in C/C++ or strong proficiency in Java and ability to learn
- Strongly recommended: matrix theory or linear algebra (e.g., Math 551)
- At least 120 hours for semester (up to 150 depending on term project)
- Angel’s OpenGL: A Primer recommended
- CIS 636 Introduction to Computer Graphics
- Fresh background in precalculus: Algebra 1-2, Analytic Geometry
- Linear algebra basics: matrices, linear bases, vector spaces
- Watch background lectures
- CIS 736 Computer Graphics
- Recommended: first course in graphics (background lectures as needed)
- OpenGL experience helps
- Read up on shaders and shading languages
- Watch advanced topics lectures; see list before choosing project topic
Project Topics for CIS 536/636

Computer Graphics Basics (10)

2. OpenGL Primer 1 of 3: Basic Primitives and 3-D – Weeks 2-3
3. Detailed Introduction to Projections and 3-D Viewing – Week 3
4. Fixed-Function Graphics Pipeline – Weeks 3-4
5. Rasterizing Lines, Polygons, Circles, Ellipses and Clipping – Week 4
6. Lighting and Shading – Week 5
7. OpenGL Primer 2 of 3: Boundaries (Meshes), Transformations – Weeks 5-6
8. Texture Mapping – Week 6
9. OpenGL Primer 3 of 3: Shading and Texturing, VBOs – Weeks 6-7
10. Visible Surface Determination – Week 8

Recommended Background Reading for CIS 636

Shared Lectures with CIS 736 (Computer Graphics)

Regular in-class lectures (30) and labs (7)
Guidelines for paper reviews – Week 6
Preparing term project presentations, CG demos – Weeks 11-12

Math Review for CIS 536 / 636

Overview: First Month (Weeks 2-5 of Course)

Review of mathematical foundations of CG: analytic geometry, linear algebra
Line and polygon rendering
Matrix transformations
Graphical interfaces

Line and Polygon Rendering (Week 3)

Basic line drawing and 2-D clipping
Bresenham’s algorithm
Follow-up: 3-D clipping, z-buffering (painter’s algorithm)

Matrix Transformations (Week 4)

Application of linear transformations to rendering
Basic operations: translation, rotation, scaling, shearing,
Follow-up: review of standard graphics libraries (starting with OpenGL)

Weeks 5 - 6: More OpenGL and Direct3D

Graphical Interfaces

Brief overview
Survey of windowing environments (SDL in OpenGL, Direct3D)

References and Outside Reading


Andy vanDam’s Lectures @ Brown: http://bit.ly/cWUxBz

OpenGL Tutorials (GameDev aka Nehe): http://nehe.gamedev.net

Andy vanDam’s Lectures @ Brown: http://bit.ly/VRUsBz