General Information:
Time: Tuesday, Thursday 12:30pm-1:45pm
Room: MSB 376
Instructor: Ye Zhao, Professor, Office: MSB 220 Email: zhao@cs.kent.edu
Office Hours: Tue and Thu 11:00am-12:00pm and by appointment
Web: http://www.cs.kent.edu/~zhao/scivis19

Goal:
A group of visualization techniques are discovered and widely used in a variety of science fields including medical, engineering, geography, CS, transportation and more. This course presents introductory topics on data visualizations in multiple fields. Students will also have the opportunity to implement visualization techniques of selected topics.

Prerequisite:
You must have completed the course: CS 4/57101 Computer Graphics or equal. If not, you will need the permission from the instructor.
Basic mathematics is necessary such as vectors, matrix operations, derivatives, and basic trigonometry.

Programming:
This class is relatively programming intensive. So please be prepared for extensive work on programming projects, including coding and debugging. You might need to conduct extra efforts and working load if your programming skills need to be trained and improved.

Programming skills in C/C++ and java/javascript are required. This is an advanced class and we will not teach basic programming skills. OpenGL will be briefly introduced on class.

Topics:
Topics covered will include (may be changed):
Introduction to visualization
Graphics and visualization system
  Structure and pipeline
  Programming language
  Graphics hardware and software model
Visual perception
  Eye model and basic perception concept
  Color system
Data model
  1D, 2D and 3D data
  Scalar and vector field
  Data acquisition techniques
2D data
  Histogram Image processing basics
  Vector field and flow visualization
3D volume data
  Spatial transformation
  Ray-casting
  Transfer function
  Illumination and shading
  Isovalue, isosurfaces and surface visualization
GIS data
  Positional data
Trajectory data
Systems and Applications

**Grading:**

1) **Class participation:** 10%; It will be checked occasionally and randomly. If you got sick/have reasonable excuses, please let me know early by emails.

2) **Reading and presentation:** 20%; Almost each class I will give reading materials of technical papers. Each student will be required to give a presentation of one selected technical paper during the semester.

3) **Paper examinations:** 40%; Two paper-based exams will be given during the semester. You will be asked to answer questions of general knowledge we studied on class and on your readings.

4) **Projects:** 30%; Programming projects will be evaluated by your project design, work load, and results.

**Text:** No single textbook covers all the material of this course. We will make class notes and papers available instead. We recommend the textbooks below partly related to our topics for your reference:

Helen Wright, Introduction to Scientific Visualization, Springer, 2006
Colin Ware, Information Visualization: Perception for Design, Morgan-Kaufman, 1999

**Technical paper resources:** you can access papers through KSU’s library portal of IEEE Xplore library.

Here are the links to find technical papers

IEEE TVCG: [https://www.computer.org/csdl/journal/tg](https://www.computer.org/csdl/journal/tg)
IEEE CG&A: [https://www.computer.org/csdl/magazines/cg](https://www.computer.org/csdl/magazines/cg)

**Registration**

The official registration deadline for this course is 09/04/19. University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashLine) prior to the deadline indicated. Registration errors must be corrected prior to the deadline. The last day to withdraw is 10/30/19.

**Academic Integrity:**

University policy 3342-3-01.8 deals with the problem of academic dishonesty, cheating, and plagiarism. None of these will be tolerated in this class. The sanctions provided in this policy will be used to deal with any violations. If you have any questions, please read the policy at [http://www.kent.edu/policyreg/chap3/3-01-8.cfm](http://www.kent.edu/policyreg/chap3/3-01-8.cfm) and/or ask.

**Students with Disabilities:**

University policy 3342-3-18 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Disability Services (contact 330-672-3391 or visit [www.kent.edu/sas](http://www.kent.edu/sas) for more information on registration procedures).