IST 526: Tools and Visualizations for Human-Computer Interaction
(Subject to Change)

Instructor
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Course Description
This course will focus on current issues in the new field of information visualization. The purpose of this course is to help students understand cognitive, behavioral, and technical issues concerning information visualization. Note that this course is a working seminar, devoted not only to learning existing theories, but also to developing theories and ideas of our own for current issues in information visualization.

The current title does not accurately reflect the contents of the course. The title is based on a similar course proposed for undergraduate students, which focuses on providing students with practical experience in information visualization and teaching technical skills. This graduate-level course, however, surveys theoretical foundations of information visualization, and examines current issues in this area.

Texts and Readings

Optional: Readings in Information Visualization: Using Vision to Think, Stuart Card, Jock Mackinlay, & Ben Shneiderman (Eds), 1999, Morgan Kauffmann. (Many readings in this course are research papers collected in this book. Most of these readings, however, can be obtained through ACM and IEEE digital libraries on campus. For those not in this book, I will provide copies on the course website.)

Class Format
The class uses the seminar format. In the first week, the instructor will do the course introduction. After, each class will have two students to lead the discussions each week. These two students will first present main points of readings and raise a few questions for class discussions.

Assignment, Project, and Term Paper
Each week, students will be required to write a one-page reaction paper. Totally 10 reaction papers are required. Reaction papers must be handed on paper at the beginning of class.
Students are required to do a term-long group project. Three to five students work as a
group to design a tool to support the visualization of and user interaction with a data set.
This data set should be real. Students are encouraged to find data from their own research
or from a client (e.g., faculty members in Penn State). The group members are expected
to contribute to the projects equally with appropriate talents.

The group project will lay the foundation for the final term paper. This course is open to
both master students and doctoral students. Doctoral students are required to write a
paper that addresses a specific theoretical issue in the project, with an in-depth literature
review, a research design, an evaluation plan, and future work. The paper should be 15-
20 pages. For master students, the final paper could be either a research paper similar
what doctoral students do or a report on group projects. The report should include such
components as introduction, related work, design, and implementation details. The report
should be 15-20 pages.

Individual assignments must be completed independently. Students are encouraged to
form study groups and to learn from peer students. Standards of professional. Penn State's
policy regarding Academic Integrity must be followed.

**Grades**
Reaction paper 50%: 5% each
Term paper/report 50%: 10% for each milestone report, 10% for the final presentation, and
20% for the final paper/report.

A=90-100
B=80-89
C=70-79
D=60-69
F=59 and below

**Weekly Schedule and Readings**
Week 1: Course Introduction; Foundation: What is information visualization about?
Week 2: Cognitive foundations of information visualization
Week 3: Technical foundations of information visualization: 3D and 2D visualization
development tools
Week 4: Data - 1D + 2D + Multi Dimension
Week 5: Data - Graph + Network + Hierarchy
Week 6: Data - Categorical data, time serial (dynamic data), documents
Week 7: Visually Guided Tasks - General Issues
Week 8: Discussion: Class Project and InfoVis/VAST/Vis Papers
Week 9: Information Workspace and Navigation
Week 10: Information Retrieval Interaction
Week 11: Animation and Virtual Environment
Week 12: Evaluation of Visualization Design
Week 13: New Research Frontiers: Collaborative information visualization, visual
analytics, knowledge visualization, etc.
Week 14: Project presentation

**Attendance Policy**
Attending class is required. If you cannot come, please let the instructor know beforehand. You will be expected to engage in class discussion actively. I encourage you to read various resources, such as information technology trade press or technology section in newspaper, to know the current hot issues and try to think about what roles database technology may play. You are also encouraged to use weblogs, or blogs, to keep personal journals of your readings and share your journals with others. Your class participation will count 5% of your final course grade. Class participation includes class attendance and active involvement in the class activity.

**Academic Integrity**
Individual assignments must be completed independently. Students are strongly encouraged to form study groups and to learn from peer students. However, discussion on homework questions in study group should be limited to general approaches to solutions. Specific answers should never be discussed. Penn State's policy regarding Academic Integrity must be followed.

**Americans with Disabilities Act**
IST welcomes persons with disabilities to all of its classes, programs, and events. If you need accommodations, or have questions about access to buildings where IST activities are held, please contact us in advance of your participation or visit. If you need assistance during a class, program, or event, please contact the member of our staff or faculty in charge. Access to IST courses should be arranged by contacting the Office of Human Resources, 332 Information Sciences and Technology Building, (814) 865-8949.