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

Teaching Team
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Course Information
Credits             3
Course              526
Location            TBD

Required Text
Information Visualization: Perception for Design, 2/e, Colin Ware, 2004, Morgan Kauffmann,
Additional readings are available in the course web site.

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.

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.

Weekly Schedule and Readings (Weekly readings must be done before coming to the class!)

Week 1: Course Introduction; Foundation: What is information visualization about?

Week 2: Cognitive foundations of information visualization
<<Project idea presentation and group forming: each student briefly presents project ideas and students with similar ideas form project groups.>>
<<Lottery picking for reading presentations.>>
- Chapter 3 - 8. Information Visualization: Perception for Design, Colin Ware.

Week 3: Technical foundations of information visualization: 3D and 2D visualization development tools
- Readings: please read this notes
- Guest Speaker: Wade Shumaker
Week 4: Data - 1D + 2D + Multi Dimension

<<Preliminary project proposal due>>


- 1D

- 2D

- Multi-Dimensional Data

Week 5: Data - Graph + Network + Hierarchy

- Graph & Network

- Hierarchy (tree)

Week 6: Data - Categorical data, time serial, documents
<<Revised project proposal due>>
• Categorical data
• Time series data
• Documents and texts (new: text cloud parallel http://vis.ist.psu.edu/VisWeek2009/vast/papers/collins.pdf)
  o TextArc

Week 7: Visually Guided Tasks - General Issues
• Corckburn et al., (2008) A Review of Overview+Detail, Zooming, and Focus+Context Interfaces
• Video: Power of 10. This official video site seems not working (downloading Flash Player does not help). As an alternative, you can try this Java animation. This Simpsons video is also fun.
  o London Geographically Accurate Tube Map vs. Schematized Map
  o Worldmapper Project

Week 8: Project discussion + Paper discussions (InfoVis/VAST/Vis papers, papers suggested by students)

Week 9: Information Workspace and Navigation

• Information Workspace

• Navigation

Week 10: Information Retrieval Interaction


Week 11: Animation and Virtual Environment

Forum (Proceedings Eurographics’95), 14(2), Post and Gbel eds., Blackwell, pg 349-360. (Color figures in the paper can be found here.)

**Week 12: Evaluation**
- CW appendix C

**Week 13: New frontiers**
- Collaborative information visualization
- Visualization on small devices
- Visual analytics
  - Executive Summary. in Thomas, J. J. and Cook, K. A. (Eds.) Illuminating the Path: The Research and Development Agenda for Visual Analytics
- Knowledge visualization

**Week 14: Project presentation**

**Grading Policy**

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<tr>
<td>Reaction papers</td>
<td>50% (5% each)</td>
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<td>Term project</td>
<td>50% (10% for each milestone report, 10% for final presentation, 20% for final report).</td>
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A  
90 and above
A-  
85-90
B+  
80-85
B   
75-80
B-  
70-75
C+  65-70
C   60-65
D   50-60
F   below 50

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.

Affirmative Action & Sexual Harassment
The Pennsylvania State University is committed to a policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by Commonwealth or Federal authorities. Penn State does not discriminate against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, gender, sexual orientation, or veteran status. Direct all inquiries to the Affirmative Action Office, 211 Willard Building.

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.

An Invitation to Students with Learning Disabilities
It is Penn State’s policy to not discriminate against qualified students with documented disabilities in its educational programs. If you have a disability-related need for modifications in your testing or learning situation, your instructor should be notified during the first week of classes so that your needs can be accommodated. You will be asked to present documentation from the Office of Disability Services (located in 116 Bouclé Building, 863-1807) that describes the nature of your disability and the
recommended remedy. You may refer to the Nondiscrimination Policy in the Student Guide to University Policies and Rules.