INFORMATION VISUALIZATION E583/Z637 (3 Credits) & IVMOOC Syllabus

Spring 2018

Spring 2018, materials released each Tuesday at 6:00am, all graded activities are submitted by next Monday.

Visual Insights Talk Series Presentations are hosted every Monday from 4:15-5:30 pm, Luddy Hall 1019. Attendance required for students enrolled in E583 Information Visualization - Class 33548.

INSTRUCTORS

Dr. Katy Börner (http://info.ils.indiana.edu/~katy)

Michael Ginda (http://cns.iu.edu/current_team/bio/michael_ginda.html)

COURSE RATIONALE

This course aims to improve data visualization literacy—the expertise and skills needed to read and make data visualizations. It teaches theoretical foundations and advanced tools that help turn data into insights.

COURSE DESCRIPTION

The visual representation of information requires a deep understanding of human perceptual and cognitive capabilities, data mining and visualization algorithms, interface and interaction design, as well as creativity. Data—such as twitter, books or social networks—is typically non-spatial and needs to be mapped into a physical space that represents relationships contained in the information faithfully and efficiently. If done successfully, data visualizations combine human and machine intelligence to solve tasks that neither could accomplish alone.

This course provides an overview about the state-of-the-art in information visualization. It teaches the process of producing effective temporal, geospatial, topical, and network visualizations. Students get the chance to use tools such as Tableau, D3.js, OpenRefine, Gephi, and Plot.ly. Students have the opportunity to collaborate on real-world projects for a variety of clients.

Specifically, the course covers:

- visualization frameworks that guide development,
- data analysis algorithms that enable extraction of structures and trends in data,
- major visualization and interaction techniques,
- discussions of systems that drive research and development, and
- trends, opportunities, and challenges in the field.

LEARNING OBJECTIVES

The course objective is to provide students with a working knowledge of how to effectively visualize abstract information and hands-on experience in the application of this knowledge to specific domains, different tasks and diverse, possibly non-technical users. It is a graduate-level course that utilizes a combination of lectures, hands-on demonstrations, (online) discussions, and projects. The course requires about 8 hours of work each week. Students are expected to process weekly materials, to complete self-tests and homework, to actively participate in the (online) discussion, and to work in teams on the final client project.

PREREQUISITES

There are no prerequisites. Students from any area of scholarly endeavor are welcome to enroll.

RESOURCES

Readings are readily available through the IU Libraries or on the web. Any specialized materials will be available through Canvas (http://canvas.iu.edu).

PLAGIARISM

Plagiarism is defined as presenting someone else's work, including the work of other students, as one's own. Any ideas or materials taken from another source, for either written or oral use, must be fully acknowledged, unless the information is common knowledge. What is considered "common knowledge" may differ from course to course.

A student must give credit to the originality of others and acknowledge indebtedness whenever:

- directly quoting another person's actual words, both oral and written;
- using another person's ideas, opinions, or theories;
- paraphrasing the words, ideas, opinions, or theories of others, both oral and written;
- borrowing facts, statistics, or illustrative material; or
- offering materials assembled or collected by others in the form of projects or collections

Academic and personal misconduct by students in this class are dealt with according to the http://studentcode.iu.edu. Sanctions for plagiarism can include a grade of F for the assignment in question and/or for the course and must include a report to the Dean of Students Office.

LATE HAND-IN POLICY

Late hand-ins or incomplete hand-ins are allowed only because of an unforeseen emergency that is preceded by diligent work, not for a pattern of weak performance. No individual student will be allowed to do extra work to raise the final grade or to make up missing work. All grades become final one week after the material is returned. Make sure to submit work on time and confirm that programs/webpages work.

STATEMENT FOR STUDENTS WITH DISABILITIES

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides reasonable accommodation for their disabilities. If you believe that you have a disability requiring an accommodation, please contact IU Disability Services for Students (http://www.indiana.edu/~ada/resources_IUB.html).

SCHEDULE OF VISUAL INSIGHTS TALK SERIES & Tours

- January 8: Katy BornerJanuary 8: Katy Borner
- January 16: Visualization in R with Olga Dr. Scrivner (Tuesday)
- January 22: GIS Visualization and Mapping with Theresa Quill
- January 29: VOS Viewer with Dr. Ludo Waltman
- February 5: Tour of the Lilly Library
- February 12: Gephi with Michael Ginda
- February 19: Dynamic visualizations with Bruce Herr
- February 26: Tour Advanced Visualization Lab at CiB

- March 5: Cinector with Andreas Bueckle
- March 19: Presentation of Project Plans @ Wells Library Scholars Commons
- March 26: Matt Hutchenson on Guild
- April 2: Paul Macklin on Scientific Visualizations
- April 9: Kevin Purcell on Shiny
- April 16: Whitney Yu
- April 23: **Presentation of Final Client Projects @ Cyberinfrastructure Building**

GRADING

Final grade is based on Homework Assignments and Quizzes (10%), Class Participation (10%), Midterm (20%), Final Exam (30%), and Client Project (30%).

- Homework Assignments: Administered during the first seven weeks of the course; results are graded automatically.
- Assessment Quizzes: Administered during the first seven weeks of the course; results are graded automatically. Students may attempt these assignments multiple times, the higher score is kept.
- Class Participation: Tracks engagement throughout the course such as assignment/project submissions, quizzes, peer reviews, and student discussions; results are graded automatically.
- Midterm and Final Exam: Test knowledge and expertise gained from theory and hands-on sessions; results are graded automatically.
- Client Project: Team work tests ability to apply new expertise and skills to real-world visualization project; results are reviewed by peers, clients, and instructors.

ILS Definitions of Letter Grades:

- A 4.0 [95 to 100 points] Outstanding achievement. Student performance demonstrates full command of the course materials and evinces a high level of originality and/or creativity that far surpasses course expectations.
- 7 [90 to 94.5] Excellent achievement. Student performance demonstrates thorough knowledge of the course materials and exceeds course expectations by completing all requirements in a superior manner.
- B+ 3.3 [87 to 89.5] Very good work. Student performance demonstrates above-average comprehension of the course materials and exceeds course expectations on all tasks as defined in the course syllabus.
- B 3.0 [84 to 86.5] Student performance meets designated course expectations and demonstrates understanding of the course materials at an acceptable level.
- B- 2.7 [80 to 83.5] Marginal work. Student performance demonstrates incomplete understanding of course materials.
- C+ 2.3/C 2.0 [77 to 79.5] Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course materials.
- 7 / D+ 1.3 / D 1.0 / D- 0.7 Unacceptable work. Coursework performed at this level will not count toward the MLS or MIS degree. For the course to count toward the degree, the student must repeat the course with a passing grade.
- F 0.0 Failing. Student may continue in program only with permission of the Dean.

RESOURCES

- *Visual Insights*: Located in both the Herman B. Wells Library and the Swain Hall Library at call # QA76.9.I52 B67 2014. A copy of this book will be on reserve in the Wells Library. In addition, an eBook version can be accessed at: http://site.ebrary.com/lib/iub/detail.action?docID=10829849. However, it can only be viewed one person at a time.
- *Atlas of Science*: Located on the 2nd floor of the Wells Library in the Government Information section with the call # Q177.B67 2010. A copy of this book will be on reserve in the Wells Library.
- *Atlas of Knowledge:* Currently this book is on reserve in the Wells Library and this is the only means of accessibility at this time.

COURSE TIMELINE:

Date	Details	
Mon Jan 8, 2018	Prequestionnaire	12am
	Week 1 - Visualization Framework and & Workflow Design	12am
	Visual Insights Talk Series - Dr. Katy Borner	4:15pm to 5:30pm
Sun Jan 14, 2018	Visualization Framework & Workflow Design	due by 8pm
	Visualization Framework & Workflow Design - Homework	due by 8pm
	Visualization Framework & Workflow Design - Homework Discussion	due by 8pm
Mon Jan 15, 2018	Week 2 - "When" Temporal Data	12am
Tue Jan 16, 2018	Visual Insights Talk Series - Dr. Olga Scrivner	4:15pm to 5:30pm
Fri Jan 19, 2018	Pre-Questionnaire	due by 8pm
Sun Jan 21, 2018	'When': Temporal Data	due by 8pm

Date	Details	
	'When': Temporal Data - Homework	due by 8pm
	'When': Temporal Data - Homework Discussion	due by 8pm
Mon Jan 22, 2018	Week 3 - "Where" Geospatial Data	12am
	Visual Insights Talk Series - GIS visualizations with Theresa Quill	4:15pm to 5:30pm
Sun Jan 28, 2018	'Where': Geospatial Data	due by 8pm
	'Where': Geospatial Data - Homework	due by 8pm
	'Where': Geospatial Data - Homework Discussion	due by 8pm
Mon Jan 29, 2018	Week 4 - "What" Topical Data	12am
	Visual Insights Talk Series - VOSViewer with Dr. Ludo Waltman	4:15pm to 5:30pm
Sun Feb 4, 2018	'What': Topical Data	due by 8pm
	'What': Topical Data - Homework	due by 8pm
	'What': Topical Data - Homework Discussion	due by 8pm
Mon Feb 5, 2018	Client Project Descriptions Made Available	12am
	Midterm Opens	12am
	Week 5 - "With Whom" Trees	12am
	Presentation on Lilly Library's Atlas and Map Collection	4:15pm to 5:30pm

Date	Details	
Sun Feb 11, 2018	'With Whom': Trees	due by 8pm
	'With Whom': Trees - Homework	due by 8pm
	Midterm Exam	due by 8pm
Mon Feb 12, 2018	Week 6 - "With Whom" Networks	12am
	Visual Insights Talk Series - Gephi with Michael Ginda	4:15pm to 5:30pm
	'With Whom': Trees - Homework Discussion	due by 8pm
Sun Feb 18, 2018	'With Whom': Networks	due by 8pm
	'With Whom': Networks - Homework	due by 8pm
	'With Whom': Networks - Homework Discussion	due by 8pm
Mon Feb 19, 2018	Form Client Project Teams	12am
	Week 7 - Dynamic Visualizations & Deployments	12am
	Visual Insights Talk Series - Dynamic Visualizations with Bruce Herr	4:15pm to 5:30pm
Sun Feb 25, 2018	Client Project Selection	due by 8pm
	Dynamic Visualizations & Deployment	due by 8pm
Mon Feb 26, 2018	Final Exam Opens	12am
	Tour of the Advanced Visualization Lab at the Cyberinfrastructure Building	4:15pm to 5:30pm

Date	Details	
Fri Mar 2, 2018	Course Participation - Theory and Hands-on Portion of course	due by 8pm
Sun Mar 4, 2018	Final Exam	due by 8pm
Mon Mar 5, 2018	User and Task Analysis	12am
	Visual Insights Talk Series - Cinector demonstration with Andreas Bueckle	4:15pm to 5:30pm
Mon Mar 12, 2018	SPRING BREAK	12am
Sun Mar 18, 2018	Project Presentations - Residential Students Only	due by 8pm
	User and Task Analysis - Submission	due by 8pm
Mon Mar 19, 2018	Presentation of Project Plans and Work on Projects	12am
	Client Project Presentation of Project Plans @ Wells Library Scholars Commons	10am to 12:15pm
Sun Mar 25, 2018	Presentation of Project Plans - Submission	due by 8pm
Mon Mar 26, 2018	Intermediate Project Results	12am
	Visual Insights Talk Series - Guild with Matt Huchenson	4:15pm to 5:30pm
Sun Apr 1, 2018	Intermediate Project Results - Submission	due by 8pm
Mon Apr 2, 2018	Peer Feedback Opens	12am
	Visual Insights Talk Series - Paul Macklin	4:15pm to 5:30pm
Sun Apr 8, 2018	Peer Feedback - Submission	due by 8pm

Date	Details	
Mon Apr 9, 2018	Finalize Client Projects based on Instructor Feedback and Peer Reviews	12am
	Visual Insights Talk Series - Kevin Purcell on Shiny	4pm to 5pm
Mon Apr 16, 2018	Visual Insights Talk Series - Whitney Yu	4:15pm to 5:30pm
Sun Apr 22, 2018	Submit Final Project Results - Submission	due by 8pm
Mon Apr 23, 2018	Post-Questionnaire	12am