CPS 4745-01/Fall 2020 **Visualization Design and Development**

Instructor: Dr. Ching-yu (Austin) Huang **Website**: http://www.kean.edu/~chuang
Email: chuang@kean.edu
Office Hours: https://huang.youcanbook.me/ Tuesday - Thursday: 9:30–10:30 am; 3:30 – 4:30 pm
Class: **Monday**, **Wednesday** (**11 - 12:15 pm**), synchronized ONLINE using Blackboard Live Session
Prerequisites: **CPS 3740 and MATH 2526. Students without prerequisite(s) must withdraw from the class.**

Unit		Date	Topic	Reading	Notes	#
	Mon	8/31/20	**School starts on Sept 1**			
1	Wed	9/2/20	Overview + Visualization Introduction, and online visualization tool		Create DB account, tools and environment	1
	Mon	9/7/20	**Labor Day**		**School closed**	
	Wed	9/9/20	3-tier, Web, HTML, PHP, **project design**		**Start P1**	2
2	Mon	9/14/20	HTML 5, DOM, CSS, menu, JavaScript	Ch 2, 3	**Study 1 assignment**	3
	Wed	9/16/20	HTML form, inputs, CGI, file upload, Unix	Ch 3		4
3	Mon	9/21/20	PHP MySQL, error handling, authentication			5
	Wed	9/23/20	Google Maps, Charts, jQuery, click event	Ch 3		6
4	Mon	9/28/20	**Google Analytics (add into your project)**, Data in visualization, format, visual effects, performance	Ch 1		7
	Wed	9/30/20	**Midterm exam**		**Midterm exam**	8
5	Mon	10/5/20	Review midterm answers, JS event, intro to Ajax	Ch 3		9
	Wed	10/7/20	HTML, Google Chart, JS debugging – **present study 1**			10
6	Mon	10/12/20	jQuery, event, Ajax & callback – **present study 1**			11
	Wed	10/14/20	Debug PHP MySQL, Ajax & callback – **present study 1**			12
7	Mon	10/19/20	Canvas, SVG, Integration of frontend and backend		**Start P 2**	13
	Wed	10/21/20	Visualization and analysis in MS-Excel and Tableau		**P1 due on 10/25**	14
8	Mon	10/26/20	**Project 1 presentation and discussion**		**Study 2 assignment**	15
	Wed	10/28/20	**Project 1 presentation and discussion**			16
9	Mon	11/2/20	Dynamic, interactive and real-time online visualization, concepts & techniques, concerns, SQL in Tableau			17
	Wed	11/4/20	Email & PHP, Ajax, automation, preference, APIs			18
10	Mon	11/9/20	Intro to D3.js, binding and drawing data	Ch 5		19
	Wed	11/11/20	Visual analytics & mining			20
	Wed	11/11/20	**Last day to withdraw with 'W' grade**		**0% refund**	
11	Mon	11/16/20	D3.js interactive design – **present study 2**	Ch 6 - 13		21
	Wed	11/18/20	D3.js interactive design – **present study 2**	Ch 6 - 13		22
12	Mon	11/23/20	D3.js interactive design – **present study 2**	Ch 6 - 13		23
	Wed	11/25/20	D3.js Geomapping – **present study 2**	Ch 14		24
13	Mon	11/30/20	Python, Pandas, matplotlib and geopandas in Python			25
	Wed	12/2/20	Data mining & visualization using Python MySQL		**P2 due on 12/5**	26
14	Mon	12/7/20	**Project 2 presentation and discussion**			27
	Wed	12/9/20	**Project 2 presentation and discussion**		**Monday schedule**	28
15	Mon	12/14/20	**Project 2 presentation and discussion (graduate)**			29
	Wed	12/16/20	Summary of Visual Design, Dev and Analytics			30

Late revision: 8/20/2020

CPS 4745-01/Fall 2020 **Class and Policy Information** **Dr. Huang**

- **Content**: This course focus on software design and development to represent data in visual formats from various data sources. Students will learn how to develop applications and present information from the database in an understandable and effective methods in charts, graphs, dashboards and dynamic web pages. Students will do hands-on projects and compare their results with popular visualization software.
- **Textbook**: Interactive Data Visualization for the Web, 2nd Edition. Scott Murray, O'Reilly Press, 2017. *(Online)* Code examples available on GitHub. ISBN-10: 9781491921289, ISBN-13: 978-1491921289
- **References:** See the first day slides.
- **Objectives**: Upon completion of this course, students will be able to:
  A. Explain the key techniques and theory used in visualization, including data models, graphical perception and techniques for visual encoding and interaction.
  B. Present information in an understandable, effective, and aesthetic manner, for the purposes of explaining ideas and analyzing data.
  C. Utilize popular API and software to visualize data
  D. Design visual tools that allows user to visualize and interact with data from the database.
- **Course grading:** **1** Midterm (200 pts), **2** studies (2x100 pts), discussions (15x10 pts), **2** projects & demo (200, 250 pts)

Class Policies:

- **This is a hands-on course. Students are required to bring personal laptop every class.**
- Instructional Methods: lecture with slides, student presentations, class discussions and exercises, and project creations.
- **A**: >=940, **A-**: 939-890, **B+**: 889-840, **B**: 839-800, **B-**: 799-760, **C+**: 759-720, **C**: 719-680, **D**: 679-640, **F**: below 640 (C or better is needed for CS and IT majors.)
- It is students' responsibilities to verify all the scores posted on **the class website** that is announced on the first day of the class.
- **Assignments should be used MySQL connecting through a Linux server that is announced on the first day of the class.**
- Mid-Term Progress information will be provided to students by the instructor via KeanWise.
- No late work will be accepted without permission in advance from the instructor. Late work is penalized.
- No make-up exams are provided without documentation of medical or family emergency. Please arrange your schedule for the next 16 weeks to arrive in class on time and prepared.
- Attendance and participation are required.
- All work turned in under your name must be your own. **No credit will be given for an assignment or homework that is copied – in part or in total – from another person**.
- Exam policy: During class examinations, if a student leaves the classroom for any reason during the exam time, **the exam must be turned in before the student departs, concluding the exam for that student**. The student cannot resume the exam on return later. You may not make or take a phone call, text or access the internet during class or a test.
- **Classes may not be audio or digitally captured**, unless permission has been granted by the instructor for that specific class.
- **Public posting of course materials from this class is prohibited**. Materials presented in the classroom are for the personal use of registered students during the semester only. Homework, programs, and other classwork should not be shared, distributed or publicized in any way, for the protection of other students and in respect of the intellectual property rights of the faculty and copyright owners.

Important University Policies and Information:

- The Kean Academic **Calendar** can be found online at https://www.kean.edu/offices/registrars-office/academic-calendar
- **Tutoring and learning Support services**: http://www.kean.edu/content/tutoring-services
- Students should review the **Student Code of Conduct**, as it discusses expectations of appropriate conduct in the classroom: https://www.kean.edu/KU/Code-of-Conduct
- Students are responsible to review and understand the University Academic Integrity Policy available via the following link: https://www.kean.edu/academic-integrity
- Read Kean **Students Rights and Responsibilities** at https://www.kean.edu/offices/disability-services/rights-and-responsibilities
- Register for the university's **emergency notification system** at https://www.kean.edu/offices/university-police-0/campus-alert
- Students must have a **valid Kean email account**. You can request one at https://www.kean.edu/~ocisweb/forms.htm
- **Title IX**: Title IX of the Education Amendments of 1972 (Title IX) prohibit discrimination on the basis of sex in education programs or activities. Sexual harassment in any form will not be tolerated at Kean University. Sexual harassment by students should be reported to the Office of Affirmative Action Programs, Office of the Vice President for Student Affairs or the Office of Community Standards and Student Conduct immediately. Information about the University's Sexual Misconduct Policy may be found at the following: https://www.kean.edu/offices/policies/sexual-misconduct-policy
- **Americans with Disabilities Statement & Non-Discrimination Statement:**
  Kean University is an affirmative action, equal opportunity institution. Students with documented disabilities who may need special instructional accommodations or who may need special arrangements in the event of an evacuation should notify the instructor as soon as possible, no later than the second week of the term. Students may contact the Office of Disability Services in Downs Hall Room 122 or call 908-737-4910 to discuss special needs.
- **Kean University Non-Discrimination Policy Statement:**
  Kean University is an affirmative action, equal opportunity institution.

Syllabus Updates: **Instructor reserve the right to change the syllabus at any time throughout the semester**. All changes will be announced in class and a new syllabus will be electronically available to all students. If you are enrolled in this class past the add/drop date you are subjected to all rules in this syllabus.