



**CSCI 480 Research Seminar:
Social Networks, Clouds, and Game Theory
SEMESTER (Fall 2017)**

PROFESSOR/CLASS INFORMATION

Dr. Shieu-Hong Lin

(Course) Title: Research Seminar

Term: Fall, 2017

Location: Busn 210

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Class Website: <http://csci.biola.edu/csci480SC>

Course Code/#: CSCI 480

Class Days/Time: MW 12:00-1:15pm

Credit Hours/Units: 3

Office Location: Grove 8

Meetings with Professor: Make Appt via Email

Admin Assistant: Jerrienne Smith, x4741

COURSE ALIGNMENT WITH PROGRAM LEARNING OUTCOMES

CSCI 480 Research Seminar: Social Networks, Clouds, and Game Theory. This upper-division course is an elective course for computer science juniors and seniors. Successful completion of this course (see next section) will prepare students to demonstrate a developing proficiency toward the accomplishment of PLO: analysis, modeling and problem solving.

COURSE OBJECTIVES AND STUDENT LEARNING OUTCOMES

By the completion of this course including class participation, class assignments (referred to as "Tasks"), class readings and group interaction, the following objectives and learning outcomes will be assessed and demonstrated:

IDEA Objective #4: Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course (Essential emphasis).

STUDENT LEARNING OUTCOMES The learner will demonstrate that he or she has satisfactorily fulfilled IDEA Objective #4 by being able to:

- develop Python programs for exploring social networks such as Twitters and Facebook,
- demonstrate an in-depth understanding of foundational data structures and programming features provided by the Python programming languages, and
- analyze models of social networks and the underlying dynamics from the perspective of graphs and game theory in computer science.

TEXTBOOKS

- D. Easley and J. Kleinberg. *Networks, Crowds, and Markets*, Addison Wesley, 2010.
Note: A freely available online version of the book is provided by the authors at <https://www.cs.cornell.edu/home/kleinber/networks-book/>
- M. Russell. *Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, Google+, GitHub, and More*, 2nd Ed., O'Reilly Media, 2013. **(Required)**
Note: See the list of all example programs in the book at
- Python 2 tutorials at <https://docs.python.org/2/tutorial/>
- B. Lubanovic. *Introducing Python: Modern Computing in Simple Packages*, O'Reilly Media, 2014. **(Optional, on Python 3)**

LEARNING TASKS (Assignments) & ASSESSMENT (Grading)

Task 1: Discussions and quizzes

Weight: 20%

Description: The student needs to respond to discussion assignments regarding (i) his/her thoughts on subjects in the readings and (ii) his/her experiences regarding lab experiments related to the project. Occasionally we'll have quizzes to check the understanding of very basic concepts.

Task 2: Weekly progress reports

Weight: 20%

Date: Wednesday of the week

Description: Each week, the student is expected to submit a report on (i) the amount of time spent in reading, experiments, and coding together with (ii) notes with sufficient details on reading, experiments, and coding. The lowest 2 scores on the reports will be dropped from the evaluation.

Assessment: Up to 3 points for each report according to the rubrics below.

- (i) Record of time spent:** The report **will get 0 points if there is no record of the amount of time spent** in reading, experiments, and coding.
- (ii) Notes on reading, experiments, and coding:** For reading, the student needs to write done a few paragraphs as evidence of and reflection on new concepts he/she has learned through the reading this week. For experiments and coding, the student needs to describe the **experiments and coding** he/she has done this week and the **results** he/she got.
 - 3 points (Good): The notes solidly reflect reading, experiments, and coding done, consistent with the amount of time spent in the work.
 - 2 points (Insufficient): More details should be provided in the notes to better reflect the amount of time spent in the work.
 - 1 point (Inadequate): A lot more details should be provided in the notes to better reflect the amount of time spent in the work.
 - 0 point (Unacceptable): There is no report on the amount of time spent. Or the notes are far too sketchy to reflect anything about time spent in the work.

Task 3: Time spent on reading, experiments, and coding

Weight: 30% **Date:** End of Semester

Description: The student is expected to spend at least 50 hours in **reading, experiments, and coding** in total by the end of the semester.

Assessment: The student reports the cumulated hours reported in all the submitted progress report together. Each hour is counted toward 0.6% of the total weight of the class.

Task 4: Project

Weight: 30% **Date:** End of the semester

Description: For the project, the student needs to come up with his/her own idea of a simple practical application for mining the social networks using computer programs automatically, devise a framework for implementing the application using Python and/or other technologies explored this semester, and try to implement a prototype to demonstrate the feasibility of the idea.

Assessment: The student needs to submit a project report on the proposed application of mining the social networks using computer programs automatically. The report should describe the application, the framework for implementing the application using Python and/or other technologies, and the final status of the partial prototype he/she is able to implement. The following are the rubrics for evaluating the project in scale of 0 to 5.

- 0: No submission of the final project report.
- 1: Only the idea of an application is proposed.
- 2: Both the idea of the application and the implementation framework are well presented.
- 3: In addition to 2 above, a prototype with significant coding is implemented, but the prototype is not functional to demonstrate anything about the idea.
- 4: In addition to 2 above, a prototype with significant coding is implemented. The prototype is not fully functional but it can demonstrate some limited aspect about the idea.
- 5: In addition to 2 above, a prototype with significant coding is implemented. The prototype is fully functional and it can well demonstrate the idea.

CLASS INFORMATION

1. Late policy:

No submission acceptable after the submission link on Canvas is closed: All submissions should be done through the Biola Canvas system. The submission link on Canvas may remain open for 2 more days after the due date. However, no submission will be accepted after the submission link on Canvas is closed, except for extremely exceptional situations such as a serious disabling health problem with evidence from the doctors.

2. Computation of Final Grade:

Discussions and quizzes	20%
Weekly Reports on reading, experiments, and coding	20 %
Reading, experiments, and coding	30%
Project	30 %
Total	100%

5. Final grades will be awarded on the following point system:

A	90%
A-	86%
B+	82%
B	78%
B-	74%
C+	70%
C	66%
C-	62%
D+	58%
D	54%
D-	50% to pass class

GENERAL INFORMATION

Tentative Schedule on *Mining the Social Web*

- Week 1 Installation Setup
- Weeks 2-4 Chapter 1: Twitter
- Weeks 5-6 Chapter 2: Facebook
- Weeks 7-8 Chapter 3: LinkedIn
- Weeks 9-10 Formation of ideas and the implementation framework
- Weeks 11-12 Chapter 4: Google +
- Weeks 13-14 Chapter 5: Mining Web Pages
- Week 15 Wrapping up the project

Tentative Schedule on Topics in *Networks, Crowds, and Markets*

- Week 1 Basics of Graphs
- Week 2 Strong and Weak Ties
- Week 3 Networks in Their Surrounding Contexts
- Week 4 Positive and Negative Relationships
- Week 5 Review
- Week 6 The Structure of the Web
- Week 7 Link Analysis and Web Search
- Week 8 Review
- Week 9 Network Effects
- Week 10 Power Laws and Rich-Get-Richer Phenomena
- Week 11 Cascading Behavior in Networks
- Week 12 The Small-World Phenomenon
- Week 13 Review
- Week 14 Games
- Week 15 Modeling Network Traffic using Game Theory