

Syllabus

Logistics

- Time: Mon/Wed/Fri 12:20pm-1:10pm
- Location: E206 Westgate
- Instructor: **Dongwon Lee** (*dul13*). Office Hour: Mon 2-4pm @ E353 Westgate
- TA: **Stephanie Winkler** (*sxw96*). Office Hour: Wed 2-4pm @ E343 Westgate

Overview

As computer systems and information technologies rapidly advance, various abusive and fraudulent activities in cyber world proliferate as well. The examples of frauds include spam emails, malicious virus, junk conferences/journals, fake online reviews, manipulated Like preferences, fake news, and virtual phone numbers. As these fraudulent activities seriously undermine the eco system of entire information systems, it is critically important for students to be aware of popular online frauds in cyber world, and possible solutions toward the frauds.

In this course, therefore, we select a few representative examples of popular frauds in cyber world, understand the backbone technologies behind those frauds, and study various computational data-driven solutions toward the detection or prevention of such frauds. Compared to regular security classes, this class focus more on the intersection of data science and security—the so-called data-enabled or data-intensive security issues.

Following topics will be discussed:

- Introduction of Fraud Informatics
- Fake News
- Fake Online Reviews
- Manipulated Facebook Likes

- Fake Science
- Junk Conferences and Journals
- Spam Emails

Audience

As a special topic course of 4xx level, this course is designed for *advanced undergraduate* and *MS-level graduate students*. As the course covers a variety of real "fraud" cases and their detection/prevention solutions using data analytics techniques, following two skills will be especially useful in this course:

- Familiarity to at least one programming language such as Python or Java (e.g., **DS 120**, **IST 240**, or **CMPSC 311**)
- Some level of understanding on Machine Learning principles and tools (e.g., **DS 310** or **CMPSC 448**)

Please note that while we will review basic data science skills (to the extent needed for this course) in the beginning, we will NOT be able to teach students a programming language.

Throughout the semester, students need to READ a lot of research articles on fraud informatics, digest the methods used therein, understand the findings and implications, and write/present reviews.

Textbook

There is a NO required textbook for this course and materials will be mostly drawn from recent research literature, news articles, and social media. However, the following book is useful as a reference.

Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques: A Guide to Data Science for Fraud Detection, Bart Baesens, Veronique Van Vlasselaer, Wouter Verbeke,

2015

Grading Weights

- Class participation: 5%
- Reading and presentation: 20%

- Project #1 (individual): 20%
- Project #2 (team): 40%
- Project #3 (individual): 15%

Assignment Submission Policy

- Students can submit late with the penalty of 25% deduction for every 12 hours late (up to 2 days)
- After 2 days, no more late submission is allowed

Academic Integrity

According to the Penn State Principles and University Code of Conduct: Academic integrity is a basic guiding principle for all academic activity at Penn State University, allowing the pursuit of scholarly activity in an open, honest, and responsible manner. In according with the University's Code of Conduct, you must not engage in or tolerate academic dishonesty. This includes, but is not limited to cheating, plagiarism, fabrication of information or citations, facilitating acts of academic dishonesty by others, unauthorized possession of examinations, submitting work of another person, or work previously used without informing the instructor, or tampering with the academic work of other students. Any violation of academic integrity will be investigated, and where warranted, punitive action will be taken. For every incident when a penalty of any kind is assessed, a report must be filed.

Plagiarism (Cheating): Talking over your ideas and getting comments on your writing from friends are NOT examples of plagiarism. Taking someone else's words (published or not) and calling them your own IS plagiarism. Plagiarism has dire consequences, including flunking the paper in question, flunking the course, and university disciplinary action, depending on the circumstances of the office. The simplest way to avoid plagiarism is to document the sources of your information carefully.

Disability Access Statement

Americans with Disabilities Act: The School of Information Sciences and Technology 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 IST Building: (814) 865-8949.

Students with Disabilities: It is Penn State's policy to not discriminate against qualified students with documented disabilities in its educational programs. (You may refer to the Nondiscrimination Policy in the *Student Guide to University Policies and Rules*.) If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at <http://equity.psu.edu/ods/>.

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see documentation guidelines at <http://equity.psu.edu/ods/guidelines/documentation-guidelines>). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic

adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

Statement on Nondiscrimination & Harassment **(Policy AD42)**

The Pennsylvania State University is committed to the 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 state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity or veteran status. Discrimination or harassment against faculty, staff or students will not be tolerated at The Pennsylvania State University. You may direct inquiries to the Office of Multicultural Affairs, 332 Information Sciences and Technology Building, University Park, PA 16802; Tel 814-865-0077 or to the Office of Affirmative Action, 328 Boucke Building, University Park, PA 16802-5901; Tel 814-865-4700/V, 814-863-1150/TTY.

For reference to the full policy (Policy AD42: Statement on Nondiscrimination and Harassment): <http://guru.psu.edu/policies/AD42.html>