

## CS 7290 – Special Topics in IR and NLP

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### Overview

This course introduces students to the world of research and develops the necessary skills needed to participate in research tasks and/or adapt research ideas into practical applications. There are many types of oral and written technical presentations that are important for industry and academia. The ability to write good technical documents and present such material orally is also an important aspect of the course. Students will work on individual projects that use a combination of IR, NLP, and LLM techniques.

### Topics

- Oral and written presentations:
  - Why is presentation important in academia? Publish or perish.
  - Industry? Start-ups?
- What is research? What do researchers do? What are the methods for conducting research?
- How to read technical material: conference papers, surveys, methods, reports.
- How to write technical papers, reports, one-pagers, 2-pagers, project reviews.
- How to present technical content to different audiences for different purposes
  - Audiences: peers, teaching, pitching to your boss, selling to customers, selling to VCs, product teams
  - Purposes: proposals vs. final reports
- Productizing your research/ideas: from the research lab to products.
- How to communicate in engineering and product organizations.
- RAG, prompt engineering, recommender systems, knowledge graphs, search.

### Tentative Syllabus

Week 1 Topic: Introduction to the class, what to expect, presentations from Omar/Ken.

Week 2 Homework: [how to present](#). Class presentation and discussion.

Week 3 Topic: [Hamming on learn to learn](#), [Feynman](#).

Week 4 Project proposals. Class presentation and discussion.

Week 5 Topic: how to review a paper for a conference and journal.

Week 6 Homework: review 1 paper and discussion.

Week 7 Topic: conference paper presentation.

Week 8 Homework: conference paper presentation. Class presentation and discussion.

Week 9 Midpoint check-in

Week 10 Topic: Display of quantitative information, visual explanations.

Week 11 Topic: from research to product, 1-pagers, PR/FAQ (Amazon).

Week 12 Homework: industry documents and styles. Class presentation and discussion.

Week 13 Topic: Elevator pitch, VC presentation, post-mortems.

Week 14 Homework: Elevator pitch, VC presentation, posters

Week 14/15 Final presentations (research style)

Grade: Homework and class participation (30%), Individual project (70%). Individual project == proposal, midpoint check, poster, technical report, final presentation.