CSC 595

Fall 2020

Lecture 1
Course Overview
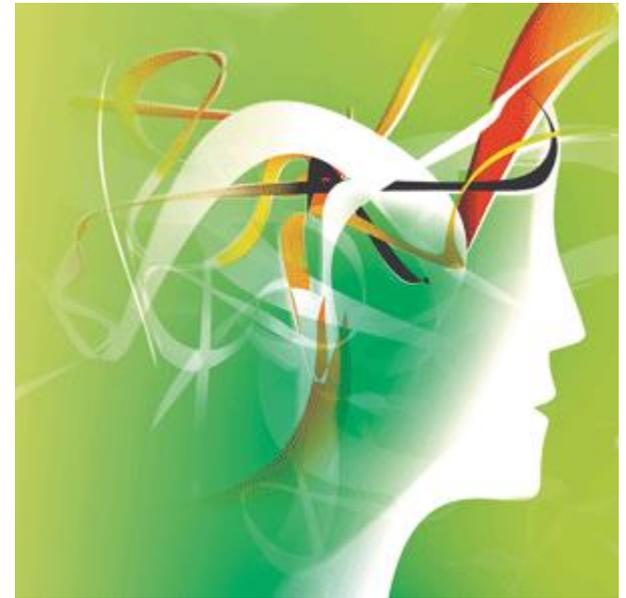
Topics

Goals of the Course

Activities

Course Trivia

Website
>   LMS

Meeting Place, Times and Days:
>   CSC 595, 11:00 – 12:50, Tuesday
>   Online (LMS or Zoom)

Instructor email: shammami@ksu.edu.sa

Office hours: Sunday, Wednesday 11:00 am by appointment

Goals of this Course

Overall, to learn how to do research in Computer Science

More specifically ….

- To learn how to conduct literature reviews including critically reading papers, assessing their results and summarizing the results in a written form

- To learn how to pose a researchable question

- What constitutes a chunk of research at the Masters level?

- To learn the difference between a project and a Thesis

- To learn how to write a publishable paper within the field of Computer Science. And, by extension, how to write a thesis proposal or project report

- To learn how to use statistics to support your work

Activities to Support the Goals

Research Activities

- Conduct a Literature Review

- Define a Research Question

- Write a Research Proposal

  (Previous steps feed into the Proposal)

- Analyze some data sets and learn to use statistical

  software If there is time and interest

- Presentation of your Proposal

Conduct a Literature Review

Reading papers relevant to a topic you are researching

What is a Literature Review?

And, why do you do one?

A Literature Review

Surveys and summarizes scholarly research on your topic. It should critically evaluate and explain why the chosen articles are significant in relation to your research topic

You use the results to better shape your research

Knowing what others have done allows you to find   the "gaps" in the knowledge where you can contribute

Come up with a Research Question

- What constitutes a "doable" chunk of research?

- No hard and fast rules for this

- Guided by time-frame and ambition of researcher

- If you have 3 – 5 years to complete your project, you do more, ask harder questions

- If you have 1 – 2 years, you ask a smaller question

- Ultimately, your advisor guides you on extent of your problem, but it should ideally be your idea
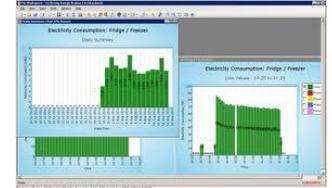
Masters vs. PhD
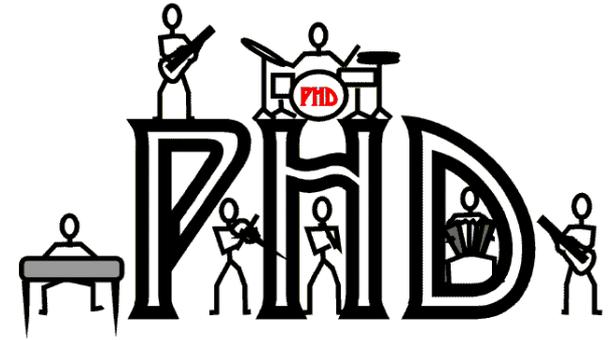
Masters degree

> **Thesis:** Learn to conduct research
>
>> Experiment, but doesn't have to be original, could reproduce
>>
>> someone else's work or extend it a small amount
>
> **Project:** Produce a significant piece of software or system

PhD

> Needs to be original.
>
> Assume already know how to do research.
>
> Add to body of knowledge in a significant way.
>
> Exactly how and what depends on your committee.

Research in CS

Computer Science Research is Diverse

- Designing and building new computer systems,

- Proving mathematical theorems,

- E-learning e-assessment gamification

- Writing computer software,

- Measuring performance of computer system, using analytical tools to assess a design,

- Or studying errors programmers make as they build a large software system

- Can also study users of systems as in Human Computer Interaction or Security Usability
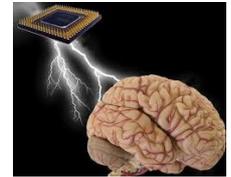
Research in CS

- **Researcher chooses activities** appropriate to answer

  questions that arise in research investigation,

- **New questions arise** as an investigation proceeds,

- **Research activities vary** from project to project and over time

  in a single project

- **Researcher should be prepared** to use a variety of

  approaches and tools

Define a Research Question

The hardest part of the Masters degree!!!

In this class ….

We will explore steps to help you define your question

A few of the questions you need to ask are on the next slide

Define a Research Question

- What PROBLEM you are trying to solve?

- **Or** what research QUESTION you are trying to answer?

- Why is this problem/question worth solving/asking? Who would care?

- How have other people tried to solve or answer it?

- What is your **NEW** approach to solving or answering this problem?

  - **Or** What improvement are you making to an existing solution?

Research Question

- Defining the right question helps you craft a solution

  - Doable

  - Of sufficient difficulty to constitute research or at least a different approach

  - Interested in answering the question or solving the problem

- Feeds into the Research Proposal

Write a Research Proposal

Steps to Accomplish This

- Review other's work, become familiar with your chosen "field"

  - Reading papers from journals, conferences, experts in the area

- Define, or refine your question or problem you want to solve

- Create your solution

- Write a proposal that presents your idea for solving the research question

Analyze Data sets with Statistical Software

For research problems, need to know how to analyze data

Computer science research doesn't always require statistical analysis

Depends on the problem

If collect data as part of an experiment, likely need to analyze data

Present Proposal
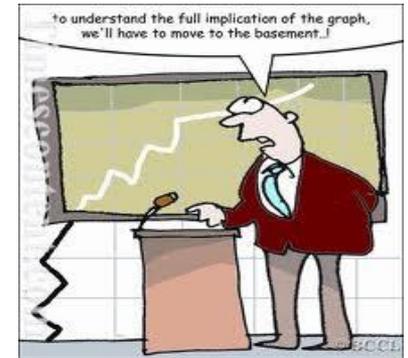
- Will have chance to do a presentation of your research topic

- Presentation skills are invaluable for everything you will do in

  the future

- Both non-academic job activities and academic

- If you can't present your ideas, in a way that is understandable,

  no-one will care about them

Next time,

Look at more CS Research

End