CS 630 Empirical Methods in Software Engineering and Computer Science
Fall 2018
3 credit hours

Class time: Tuesday & Thursday 11:00 am – 12:15 pm  
Instructor: Dr. Katerina Goseva-Popstojanova  
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Office hours: Tuesday & Thursday – 12:30 pm to 1:30 pm or by appointment

Prerequisites: An undergraduate level knowledge of software engineering, probability, and statistics is assumed.

Course Materials:
- Papers published in journals and conference proceedings

Method of instruction: Lecture

Course Description and Objectives: This course will address the main topics in research and practice-based empirical studies in software engineering and computer science. It will describe in details the scientific process and guidelines for empirical research, particularly addressing different methods such as surveys, case studies, and experiments. The course will also cover statistical techniques commonly applied in empirical investigations. Multiple means of evaluation will be used, including application of methods discussed in class and planning and (partially) executing an empirical study. An important part of the class is the individual learning through critical analysis and evaluation of a number of published research studies.

Course Topics:
- The role of empirical studies in software engineering and computer science [1 week]
- Empirical methods such as surveys, case studies, and experiments [3 weeks]
- Types of validity: conclusion, construct, internal, and external validity [1 week]
- Data collection methods such as interviews, questionnaire, observations, and measurements [1 week]
- Qualitative and quantitative data analysis methods [7 weeks]
- Student presentations of their term projects [2 weeks]

Learning Outcomes: Upon successful completion of CS 630, students will be able to
- Demonstrate knowledge of the main empirical methods: surveys, case studies, and experiments
- Apply different qualitative and quantitative data analysis methods
- Critically analyze and evaluate empirical papers
- Plan and conduct empirical studies and analyze, interpret, and report the results.

RULES OF OPERATION

Homework assignments: Homework assignments will be due in the beginning of the class on the scheduled dates. As a part of the homework assignments students will be required to critically analyze several published papers presenting empirical studies.

Term project: Each student will choose one research hypothesis, describe its motivation, and design and (partially) conduct an empirical investigation which implements the methods discussed in class. The rigor of the approach taken will be given particular consideration in the grading process. Each student will give in-class presentation of the term project. These presentations will be scheduled for the last several weeks of the semester.

Late assignments will not be allowed.
Exams: There will be a midterm exam. Make-up exam will be given only by prior arrangement and only under truly extraordinary circumstances. Consistent with WVU guidelines, students absent from regularly scheduled examinations because of authorized University activities will have the opportunity to take them at an alternate time.

Grading: Semester grades will be computed as follows
- Homework assignments 35%
- Midterm exam 25%
- Project 30%
- Presentation 10%

Grades will generally be A = 90 – 100%, B = 80 - 89%, C = 70 - 79%, D = 60 - 69%, and F = 0 – 59%. ‘+’ and ‘-’ grade may be reported if the score is near boundary.

Attendance: Students are expected to regularly attend the lectures. Students are responsible for all material covered in the course, keeping track of assignments and examination dates. Students are required to attend the in-class discussions of homework assignments. Each unexcused absence from these classes will result in deducting 20% from the student’s homework score. Students are also required to attend the term project presentations. Each unexcused absence from the term project presentation classes will result in up to 5 points being deducted from the student’s average course score.

Communication: All course material, assignments, announcements, etc. will be provided using the eCampus features. Please check eCampus and your e-mail regularly.

Academic Policies and Syllabus Statements (including the Academic Integrity Statement and Inclusivity Statement) can be found at https://tlcommons.wvu.edu/qualitymatters/syllabus-policies-and-statements.