



SWE 5XX Resilient Software Development and Evaluation

SWE 5XX
(SPRING 2020)



Instructor: Mahdi Fazeli (mahdi.fazeli@boun.edu.tr)
Lecture Hours: TBA
Office Hours: TBA
Lab Assistant: TBA

Précis:

The ever-increasing use of computing systems in today's human life specially in safety critical applications such as health, commerce, transportation, utilities, and national security makes it extremely important to develop dependable computer systems. Reliability is not only a serious concern for safety critical systems, but also it has become an important factor for non-safety critical applications such as game consoles, and consumer electronics. This is because, the frequent failures in a non-safety critical applications, due to high vulnerability of today's microelectronic devices, erode a manufacturer's reputation and greatly diminish widespread acceptability of new devices. This course covers comprehensively the design and evaluation of resilient softwares as the main part of a computer system. This course will help immensely students and practitioners in the field of computer engineering and computer science in learning how to design reliable and evaluate resilient softwares.

Assessment:

- **Final Exam:** 25%
- **Midterm Exam:** 20%
- **Quiz:** 10%
- **Class attendance and class activity:** 10%
- **Assignments & Projects:** 35%
 - Bonus points for outstanding projects

Text Book:

1. Schagaev, Igor, and Thomas Kaegi-Trachsel. *Software design for resilient computer systems*. Springer International Publishing, Second Edition, 2020.
2. Pullum, Laura L. *Software fault tolerance techniques and implementation*. Artech House, 2001.

Course Topics

1. Background
2. Data Hardening Techniques
3. Control Flow Hardening
4. Structuring Redundancy for Software Fault Tolerance
5. Design Methods, Programming Techniques, and Issues
6. Design Diverse Software Fault Tolerance Techniques
7. Data Diverse Software Fault Tolerance Techniques
8. Software Based Fault Injection for reliability evaluation