THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Reverse Engineering and Malware Analysis

CSE 5477.02

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate

Course Components:
Lecture
Lab

Course Description:
This course will give students an overview of cutting edge reverse engineering techniques as well as software security and defense practices. Programming experience in C required.

Prerequisites and Co-requisites:
Prereq: 2431, 5431, or Grad standing. Prereq or concur: 5471 or ECE 5561.

Course Goals / Objectives:
- Master Reverse Engineering tools and techniques
- Be familiar with taxonomy of malware
- Be competent in common reverse engineering techniques
- Be competent in common anti-reverse engineering techniques such as obfuscation
- Be exposed to advance techniques like machine learning (ML) security and artifact intelligence (AI) assisted reverse engineering

Course Topics:

- Reverse engineering tools (e.g., disassemblers, decompilers, debugging, emulation, virtual machine monitor)
- Taxonomy of malware
- Static analysis techniques: control-flow analysis and data-dependency analysis
- Static analysis techniques: value-set analysis and backward slicing
- Dynamic analysis techniques: tainting
- Dynamic analysis techniques: fuzzing
- Dynamic analysis techniques: symbolic execution and concolic execution
- Introduction to anti-static analysis techniques (e.g., obfuscation, shell, polymorphic)
- Introduction to anti-dynamic analysis techniques (e.g., anti-debugger, detecting virtual machines, detecting analysis tools)
- Advance topics: Machine Learning security
- Advance topics: Video Game Security
- Advance topics: AI for malware analysis (e.g., classification)

Designation:
Elective