THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Project: Design, Development, and Documentation of System Software

CSE 3903

Credit Hours:
4.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture

Course Description:
Intensive group project involving design, development, and documentation of system software including an assembler and a linking loader; communication skills emphasized; builds programming maturity.

Prerequisites and Co-requisites:
Prereq: 2231; and 2321; and 2421 or 3430, or 2451 and ECE 2560; and enrollment in CSE, CIS, ECE, or Data Analytics major.

Course Goals / Objectives:

- Be competent with using and implementing each component of the the assemble-link-load-relocate-execute process
- Be competent with using bit manipulation of integers and ascii characters to be able to emulate a simple computer that handles both integer and character I/O
- Be competent with writing, organizational, and presentation skills
- Be competent with analyzing the intended audience for a written document and writing an audience profile
- Be familiar with making engineering decisions involving tradeoffs
- Be familiar with writing a relocating linking loader
- Be familiar with subroutine linkage at the assembly level and with using different addressing modes
- Be familiar with emulating in software, the fetch-decode-execute cycle of a CPU
- Be familiar with using macros, including recursive and nested macros
- Be familiar with software testing strategies including black-box versus white-box, unit testing, integration testing, top-down versus bottom-up testing, and construction and implementation of a test plan
- Be familiar with defining the purpose (persuade, inform, etc.) of a written document and select the appropriate rhetorical devices.
- Be familiar with writing several pieces of documentation that have different purposes and to use appropriate organization to tie them together.
- Be familiar with group project organization techniques including conducting group meetings, recording minutes, and tracking project progress.
- Be familiar with using one structured approach to large software design to carry out a large group project.
- Be exposed to issues in systems programming as opposed to applications programming
- Be exposed to memory management issues including caching and virtual memory
- Be exposed to one-pass macro processing techniques

Course Topics:

- Architecture
- Software engineering
- Technical writing
- System software
- Assemblers: algorithm, pseudo operations, expressions
- Searching and sorting
- Tools: makefiles, CVS, lex and yacc
- Linking and loading
- Macro processors
- Compilers: tokenizing, parsing, code generation

Designation:

Required
Elective