Cleveland State University
Department of Electrical and Computer Engineering

CIS 335: Language Processors

Catalog Description: CIS 335 Language Processors (4-0-4)
Pre-requisite: CIS 265
Foundation of PC architecture and assembly language. Topics include machine language, hardware fundamentals, registers, numbering systems, data definition, and addressing modes. Fundamentals of systems programming including the implementation and use of assemblers, macro processors, linkers, loaders, and compilers. Examples of language processors are studied on various computers.

Textbook:

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Expected Outcomes: After taking this course, a student is expected to:
1. Understand the roles of the compiler, assembler, machine code, Linker, Loader, and macro processor.
2. Be familiar with the instruction set for 80x86 microprocessors
3. Be familiar with writing and debugging assembly programs.
4. Understand how an assembler works and how to build one.
5. Be exposed to compiler construction and context-free grammars.

Fulfillment of CS Program Objectives, Outcomes and Characteristics:

Objectives:
1. Graduates will apply the concepts of the discipline including analysis, design, and implementation of information and computing systems.
2. Graduates of will be employed in the computing profession, and will be engaged in life-long learning, understanding, and applying new ideas and technologies as the field evolves.
3. Graduates will be informed and involved members of their communities, and responsible engineering and computing professionals.

Outcomes:
1) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
2) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
3) An ability to function effectively on teams to accomplish a common goal
5) An ability to translate fundamental computing concepts to a variety of emerging technologies
6) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based
systems in a way that demonstrates comprehension of the tradeoffs involved in design choices

**Characteristics:**
(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(d) An ability to function effectively on teams to accomplish a common goal
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices

**Contribution of Course to Meeting the Professional Component:**
Math & Basic Science: 1 credit;
Engineering Topics: 2 credits;
General Education: 0 credit

**Prerequisites by Topic:**
Data structures and algorithms

**Topics:**
1. Assembly Language, Binary & Hexadecimal, Data representation 3
2. Architecture, CPU registers, address calculation 3
3. Assembly Language Fundamentals 2
4. Data Transfer Instructions, Addressing, and Arithmetic 3
5. Conditional Processing 3
6. Procedures and Interrupts 3
7. Advanced Procedures 3
8. High-Level Language Interface 2
9. SIC Architecture 3
10. Assemblers 7
11. Loaders and Linkers 3
12. Macro Processors 3
13. Compilers

Total

Computer Usage: Microsoft MASM, Linux gcc/g++, Java