Course Title and Code	CS423- Systems Programming

I. Course Identification and General Information:

Course Title	Systems Programming	Course Code	CS423	Pre-requisite	CS 224
Department	Computer Science	Course Level	9	Credit Hours	(2+1) = 3

II. Course Description/Topics: The following course topics will be covered.

- Systems Programming Background – CISC and RISC machines.
- Implementation examples (VAX, Pentium Pro, UltraSparc, PowerPC, Cray T3E) and update using the Internet.
- Simplified Instructional Computer (SIC) and SIC Extended (SIC/XE).
- Assemblers for SIC.
- Assemblers for SIC/XE.
- Machine-independent assembler features (literals, symbol definitions, expressions), Control blocks and Control sections.
- One-pass and multi-pass assemblers. Implementation examples (MASM, SPARC, AIX).
- Basic loader functions, machine-dependent loader functions.
- Machine-independent loader features, Loader design options (bootstrap loader, Relative loader, Linking loader).
- Implementation examples (MS-DOS Linker, SunOS Linker, Cray MPP Linker) and update using the Internet.
- Macro processors, basic functions, machine-dependent features.
- Machine-independent features, Implementation examples (MASM macro processor, ANSI C macro Language, ELENA macro processor) and update using the Internet.

III. Course Outcomes: Summary of the main learning outcomes for students enrolled in the course.

- Basic systems programming concepts.
- Systems software and machine architecture.
- Design and implementation of assemblers, loaders and linkers, and macro processors.
- Machine-independent features of these software components.
- Existing implementation examples of these software components.

IV. Required Text:

- Leland Beck "An introduction to Systems programming", Addison Wesley, 1990.

V. References:

- Knuth, D. E., "The Art of Computer Programming, Vol. 3: Sorting and Searching." Addison-Wesley Publishing Co., Reading, Mass., 1976.
- Maciaszek, L. "Practical Software Engineering." Addison Wesley, 2005.
- Maciaszek, L."Requirements Analysis and System Design." Pearson Education, 2005.