SYSTEM SOFTWARE AND COMPILERS
(Effective from the academic year 2018 -2019)
SEMESTER – VI

Course Code	**18CS61**	**CIE Marks**	40
Number of Contact Hours/Week	3:2:0	**SEE Marks**	60
Total Number of Contact Hours	50	**Exam Hours**	03

CREDITS –4

Course Learning Objectives: This course (18CS61) will enable students to:

- Define System Software.
- Familiarize with source file, object file and executable file structures and libraries
- Describe the front-end and back-end phases of compiler and their importance to students

Module 1	**Contact Hours**
Introduction to System Software, Machine Architecture of SIC and SIC/XE. **Assemblers:** Basic assembler functions, machine dependent assembler features, machine independent assembler features, assembler design options. Basic Loader Functions **Text book 1: Chapter 1: 1.1,1.2,1.3.1,1.3.2, Chapter2 : 2.1 to 2.4, Chapter 3 ,3.1** **RBT: L1, L2, L3**	10
Module 2	
Introduction: Language Processors, The structure of a compiler, The evaluation of programming languages, The science of building compiler, Applications of compiler technology. **Lexical Analysis:** The role of lexical analyzer, Input buffering, Specifications of token, recognition of tokens. **Text book 2:Chapter 1 1.1-1.5 Chapter 3: 3.1 – 3.4** **RBT: L1, L2, L3**	10
Module 3	
Syntax Analysis: Introduction, Context Free Grammars, Writing a grammar, Top Down Parsers, Bottom-Up Parsers **Text book 2: Chapter 4 4.1, 4.2 4.3 4.4 4.5** **RBT: L1, L2, L3**	10
Module 4	
Lex and Yacc –The Simplest Lex Program, Grammars, Parser-Lexer Communication, A YACC Parser, The Rules Section, Running LEX and YACC, LEX and Hand- Written Lexers, Using LEX - Regular Expression, Examples of Regular Expressions, A Word Counting Program, Using YACC – Grammars, Recursive Rules, Shift/Reduce Parsing, What YACC Cannot Parse, A YACC Parser - The Definition Section, The Rules Section, The LEXER, Compiling and Running a Simple Parser, Arithmetic Expressions and Ambiguity. **Text book 3: Chapter 1,2 and 3.** **RBT: L1, L2, L3**	10
Module 5	
Syntax Directed Translation, Intermediate code generation, Code generation **Text book 2: Chapter 5.1, 5.2, 5.3, 6.1, 6.2, 8.1, 8.2** **RBT: L1, L2, L3**	10

Course Outcomes: The student will be able to :

- Explain system software
- Design and develop lexical analyzers, parsers and code generators
- Utilize lex and yacc tools for implementing different concepts of system software

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

1. System Software by Leland. L. Beck, D Manjula, 3rd edition, 2012
2. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman , Compilers-Principles, Techniques and Tools, Pearson, 2nd edition, 2007
3. Doug Brown, John Levine, Tony Mason, lex & yacc, O'Reilly Media, October 2012.

Reference Books:

1. Systems programming – Srimanta Pal , Oxford university press, 2016
2. System programming and Compiler Design, K C Louden, Cengage Learning
3. System software and operating system by D. M. Dhamdhere TMG
4. Compiler Design, K Muneeswaran, Oxford University Press 2013.