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**Department of Computer Science**

**College of Science**

**University of Salahaddin**

**Subject: Compiler Construction**

**Course Book – *Semester1 for 3-CS***

**Lecturer's name Dr. Shaimaa Awad Alayoubi**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Compiler** | |
| **2. Lecturer in charge** | **Dr.shaimaa Awad** | |
| **3. Department/ College** |  | |
| **4. Contact** | **e-mail:** [**shaimaa.alaubi@su.edu.krd**](mailto:shaimaa.alaubi@su.edu.krd)  **Tel:** | |
| **5. Time (in hours) per week** | **Theory: 2**  **Practical: 2** | |
| **6. Office hours** | **Tuesday 8:30-10:30** | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** |  | |
| **9. Keywords** | **Lexical,token.symbol table** | |
| **10. Course overview:**  Interaction involving humans are most effectively carried out through the medium of language. In computer program a programmer language serves as a mean of communication between the person with a problem and the computer used to help solve it. | | |
| **11. Course objective:**  This course will cover all principles, methods and examples of compiler system that used in computer and how that system works inside computer in order to make a translation from high level language to low level language (0,1) this language which is only understood by computer machine. | | |
| **12. Student's obligation** The course consists of two parts; a theoretical part and practical or applied part, part I (theory) will be depend on lectures in the hall to explain the basic concepts associated with the course by using the Power Point.  Part II (practical) which is associated with training on the use and establishment of databases will be applied in the computer lab. | | |
| **13. Forms of teaching**  Using power point and word documents showing by data show and white board. | | |
| **14. Assessment scheme**  27%The students are required to do at least two closed book exam at the mid of semester  13%The students are required to perform specified tasks in the lab and provide a small project at the end of course  ‌ | | |
| **15. Student learning outcome:**  The student will learn how the computer take the user program then making compilation process first then do running process step by step. | | |
| **16. Course Reading List and References‌:**  1- Principles of compiler design  Alfred V. Aho & Jeffrey D. Ullman  2- Basics of compiler design  Torben Egidius Mogensen  3- Compilers: principles, techniques, and tools  Alfred V. Aho & Jeffry D. Ullman | | |
| **17. The Topics:** | | **Lecturer's name** |
| Week 1: introduction with definition compiler, translator.  Week 2: the analysis and synthesis of compilation, the structure of compiler.  Week 3: symbol table management, types of errors, error detection and reporting.  Week4: Lexical analysis, introduction, token, Regular Expression, grammar language.  Week5: symbol table, input buffer.  Week6: a simple approach to the design of lexical analysis.  Week 7: examples of a simple approach to the design of lexical analysis, specification of tokens  Week8: string and language, quiz.  Week 9: operation on language, regular definitions  Week10: Finite Automata, NFA,DFA, examples, lexical generator.  Week11: deterministic finite automata (DFA).  Week 12: syntax analysis, context free grammar, parse tree and (left and right derivation), examples.  Week 13: writing grammar, ambiguity, examples  Week14: left recursion, left factoring.  Week 15: final exam | | Dr.Shaimaa |
| **18. Practical Topics** | |  |
| |  |  | | --- | --- | | **Week(s)** | **Lab** | | 1-2 | **Array structure** | | 3-4 | **String & string functions** | | 5-9 | **Tokenization** | | 10 | **Build Symbol Table** | | 11-14 | **Finish the Lexical phase** | | 15 | **Practical Exam** | | | Dr.Shaimaa |
| **19. Examinations:**  Q1: Explain the parts of compilation in a compiler.(2 marks)  Q2: What is the function of intermediate code generation phase? (1 mark)  Q3: How many types of errors in a compiler; explain? (2 marks) | | |