Course Specifications

Course Title:	Compiler Design
Course Code:	**501454-3**
Program:	**Bachelor in Computer Science**
Department:	**Department of Computer Science**
College:	**College of Computers and Information Technology**
Institution:	**Taif University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credit Hours	

2. Course type

a.	University	☐	College	☐	Department	**x**	Others	☐
b.		Required	☐		Elective	**x**		

3. Level/year at which this course is offered: 14th level/5

4. Pre-requisites for this course (if any)**:**
501324-3

5. Co-requisites for this course (if any)**:**
None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	3	60%
2	**Blended**		
3	**E-learning**	2	20%
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	
3	**Tutorial**	10
4	**Others** (specify) Mini project	10
	Total	50

B. Course Objectives and Learning Outcomes

1. Course Description

Introduce the theory and techniques for compiler design. Topics include basic concepts of compiler, compiler components, regular expressions and finite state automata for lexical analysis, formal grammars for construction of parser, symbol tables handling, syntax-directed translation, error checking, and intermediate code generation.

2. Course Main Objective

Students at the end of this course are able to:
- Describe the basic concepts in compiling.
- Explain the concepts and principles of compiler design.
- Demonstrate how to analyze a source program.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define the role of language processors, and the different stages used in developing compilers.	K1
2	**Skills :**	
2.1	Use regular expressions and finite state automata in lexical analysis.	S1
2.2	Use formal grammars and data structures in the construction of parser.	S1
2.3	Perform the operations of semantic analysis and build a code generator in compiler design.	S2
3	**Values:**	
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Course Overview and Introduction of Compiler	3
2	Role of language processors, different stages used in developing compilers, Structure of Compiler	6
3	Lexical Analysis (Regular Expression, Finite State Automata, Regular Expression)	9
4	Context Free Grammar	12
5	Introduction to Parsing – bottom up and top down	12
6	Symbol Table	5
7	Intermediate Representation	3
Total		50

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Define the role of language processors, and the different stages used in developing compilers.	Lectures/Tutorial	**Direct Assessment Tool** Quizzes / Homework/Exercise/ Exams **Indirect Assessment Tool** Course Exit Survey
2.0	**Skills**		
2.1	Use regular expressions and finite state automata in lexical analysis.	Lectures/Tutorial	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Indirect Assessment Tool Course Exit Survey
2.2	Use formal grammars and data structures in the construction of parser.	Lectures/Tutorial Project	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
2.3	Perform the operations of semantic analysis and build a code generator in compiler design.	Lectures/Tutorial Project	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
3.0	**Values**		
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2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Project	Week 9	10%
2	Quizzes	Week 3, 4 & 7	20%
3	Mid-Term	Week 5	30%
4	Final Examination	Week 10	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
- 6 hours per week in pre-determined office hours
- Consultation by appointment (as needed)
- Through emails
- Through BlackBoard Learn

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Alfred, V. Aho, Monica, S. Lam, Ravi Sethi, Jefry, D. Ullman. Compilers: Principles, Techniques, and Tools. Pearson Education Limited, 2012, ISBN-13: 978-0321486813

	ISBN-10: 0321486811
Essential References Materials	• D. Grune, H.E. Bal, C.J.H. Jacobs, K.G. Langendoen, Modern Compiler Design, 2012, Springer, ISBN-13: 978-1461446989 • ISBN-10: 1461446988
Electronic Materials	• https://onlinecourses.nptel.ac.in/noc19_cs01/preview • https://www.classcentral.com/course/udacity-compilers-theory-and-practice-8572 • https://www.udemy.com/introduction-to-compiler-construction-and-design/
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classroom with 25 chairs • Lab with 15 PCs and required software tools
Technology Resources (AV, data show, Smart Board, software, etc.)	• Video projector / data show • White board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	• Students	• Course survey
Effectiveness of assessment	• Students	• Course survey
Extent of course learning outcomes	• Faculty members	• Direct Method CLOs assessment
Quality of learning resources	• Students • Faculty members	• Course survey • Feedback from Faculty members

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	CS council
Reference No.	Meeting #12
Date	23-10-1443

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