



Course Specification

— (Bachelor)

Course Title: **Compiler Design**

Course Code: **501454-3**

Program: **Bachelor of Computer Science**

Department: **Department of Computer Science**

College: **College of Computers and Information Technology**

Institution: **Taif University**

Version: **1**

Last Revision Date: **1-2-2024**



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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

A. University College Department Track Others
 B. Required Elective

3. Level/year at which this course is offered: (9th Level/5)

4. Course general 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.

5. Pre-requirements for this course (if any):

501324-3

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

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.

2. Teaching mode (mark all that apply)



No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	67%
2	E-learning	1	33%
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 	0	0
4	Distance learning	0	0

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	15
5.	Others (specify)	
Total		15

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Ability to define the role of language processors, and the different stages used in developing compilers.	K1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
1.2				
1.3				
2.0	Skills			
2.1	Ability to use regular expressions and finite state automata in lexical analysis.	S1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.2	Ability to use formal grammars and data structures in the construction of parser.	S1	Lectures Tutorials Project	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.3	Ability to perform the operations of semantic analysis and build a code generator in compiler design.	S2	Lectures Tutorials Project	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.4				
3.0	Values, autonomy, and responsibility			
3.1				
3.2				

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	3
3.	Lexical Analysis (Regular Expression, Finite State Automata, Regular Expression)	9
4.	Context Free Grammar	6
5.	Introduction to Parsing – bottom up and top down	12
6.	Syntax-directed translation	6
7.	Symbol Table	3
8.	Intermediate presentation	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Attendance	Every Class	0%
2.	Project	Week 12	10%
3.	Quizzes	Week 3, 5 & 9	20%
4.	Final Labs Exam	-	0%
5.	Mid-Term	Week 7	30%
6.	Final Examination	Week 16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> 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
Supportive References	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with 25 chairs Lab with 15 PCs and required software tools
Technology equipment (projector, smart board, software)	Video projector / data show White board
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	<ul style="list-style-type: none"> Students Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
Effectiveness of Students assessment	<ul style="list-style-type: none"> Students Faculty members Coordinator 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members



Assessment Areas/Issues	Assessor	Assessment Methods
	<ul style="list-style-type: none"> Council Curriculum Committees 	<ul style="list-style-type: none"> Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
Quality of learning resources	<ul style="list-style-type: none"> Students Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
The extent to which CLOs have been achieved	<ul style="list-style-type: none"> Students Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CS council
REFERENCE NO.	Meeting #11
DATE	07/03/2024

