Daffodil International University

Department of Computer Science and Engineering (CSE)

Course Outline

Course Code:	CSE221			
Course Title:	Theory of Computing			
Program:	B.Sc. in CSE			
Faculty:	Faculty of Science and Information Technology (FSIT)			
Semester:	Fall	**Year:**	2022	
Credit:	3	**Contact Hour:**	3	
Course Level:	Level-1, Term-3	**Prerequisite:**	CSE131	
Course Category:	Core Engineering			
Instructor Name:	Rashidul Hasan Hridoy			
Designation:	Lecturer			
Email:	rashidul.cse0394.c@diu.edu.bd			
Office Address:	Room-739, AB04, DIU, DSC			
Class Hours:	**Section**	**Class Day**	**Class Hours**	**Classroom**
Google Classroom Code:				

1. Course Rationale

The course is intended to teach the students the basic techniques that underlie the practice of Compiler Construction. The course will introduce the theory and tools that can be standard employed in order to perform syntax-directed translation of a high-level programming language into an executable code. These techniques can also be employed in wider areas of application, whenever we need a syntax-directed analysis of symbolic expressions and languages and their translation into a lower-level description. They have multiple applications for man-machine interaction, including verification and program analysis.

1.1. Course Objective

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

1.2. Course Outcomes (CO's)

CO1	**Able to learn a variety of issues in the mathematical development of computer science theory, particularly finite representations for languages and machines.**
CO2	**Efficienproblemsem can be solved on a model of computation.**
CO3	**Apply relation and function to solve a problem of NFA & DFA.**
CO4	**The model Turing Machine is implemented to analyze and use to prove result.**

1.4. CO-PO Mapping

PO's CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	√											
CO2		√										
CO3			√									
CO4				√								

1.5. CO Assessment Scheme

Assessment Task	**CO's**					**Mark (Total=100)**
	CO1	**CO2**	**CO3**	**CO4**	**CO5**	
Attendance	--	--	--	--	--	7
Class Test (CT1, CT2, CT3)	--	--	--	--	--	15
Assignment	--	--	--	--	--	5
Presentation	--	--	--	--	--	8
Midterm Examination						25
Semester Final Examination						40
Total Mark						100

2. Strategies and approaches to learning

2.1. Teaching and Learning Activities (TLA)

TLA1	Lectures twice a week using multimedia of different topics.
TLA2	Active discussion in class regarding efficient solving of the computation problems.
TLA3	Group discussion and presentation regarding diverse problems and corresponding lectures.
TLA4	Evaluation of class performances to reach each student in a class for every topic.

3. Course Schedule and Structure

3.1. Textbook

1. Theory of Automata, Formal Languages and Computation By S.P. Eugene Xavier.

3.2. Reference Book

1. Introduction To Automata Theory, Language and Computation Authors: John E. Hopcroft Jeffery Ullman.
2. Compiler construction, Principles and Practice, By Kenneth C Louden.
3. Basics of Compiler Design by Torben

3.3. Course Plan/Lesson Plan

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
1	Les. 1	Contribution of theory of computing to computer science.	TLA1	S.P. Eugene Xavier	CO1
	Les. 2	Importance of theory of computing in computer science.	TLA1, TLA3	S.P. Eugene Xavier	CO1
2	Les. 3	Strings, Alphabets and Language Graphs and Trees	TLA1, TLA2, TLA3	S.P. Eugene Xavier	CO1
	Les. 4	Set Notation Relations	TLA1, TLA4	S.P. Eugene Xavier	CO1
	Class Test – 1				
3	Les. 5	Finite State Systems	TLA1, TLA3	S.P. Eugene Xavier	CO1
	Les. 6	Basic Definitions / Finite Automata Nondeterministic Finite Automata	TLA1, TLA4	S.P. Eugene Xavier	CO1
4	Les. 7	Conversion of DFA and NFA The Equivalence of DFA'S and NFA'S	TLA1, TLA2, TLA3	S.P. Eugene Xavier	CO1
	Les. 8	Finite Automata with Epsilon-Moves	TLA1, TLA4	S.P. Eugene Xavier	CO1
5					
	Les. 9	Review Class			
	Class Test – 2				
6	Les. 10	Regular Expressions Finite Automata and Regular Expressions	TLA1, TLA2	S.P. Eugene Xavier	CO1
	Les. 11	Applications of Regular Expressions Algebraic Laws for Regular Expressions	TLA2, TLA3	S.P. Eugene Xavier	CO1, CO2, CO3
7	Les. 12	Simplification of Context-Free Grammars (Useless Symbols)	TLA1, TLA2, TLA3	S.P. Eugene Xavier	CO1
	Les. 13	Derivation Left and Right most derivation	TLA2, TLA4	S.P. Eugene Xavier	CO1, CO2
8	Les. 14	Review Class			
	Class Test-2				

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
9	Midterm Examination				
10					
	Les. 14	Discuss and illustrate the rules for eliminating Left Recursion.	TLA1, TLA3	S.P. Eugene Xavier	CO1
	Les. 16	Discuss the techniques to do Left Factoring.	TLA2, TLA3	S.P. Eugene Xavier	CO2, CO3
11,12	Les. 17	Discuss and illustrate Kernel item, Non Kernel Item.	TLA1, TLA3	S.P. Eugene Xavier	CO1
	Les. 18	Discuss about Augmented grammar.	TLA1, TLA2, TLA3	S.P. Eugene Xavier	CO2, CO3
	Les. 19	Discuss about Canonical Table.	TLA1, TLA2, TLA3	S.P. Eugene Xavier	CO2, CO3
13	Les. 20	Discuss about Machine independent code optimization.	TLA1, TLA3	S.P. Eugene Xavier	CO1
	Les. 21	Discuss and illustrate the techniques of code optimization.	TLA1, TLA3	S.P. Eugene Xavier	CO1
14	Presentation and Assignment				
15	Review Class and Class Test-3				
16	Final Examination				

4. Assessment Methods

4.1. Grading System

Numerical Grade	Letter Grade	Grade Point
80-100	A+	4.00
75-79	A	3.75
70-74	A-	3.50
65-69	B+	3.25
60-64	B	3.00
55-59	B-	2.75
50-54	C+	2.50
45-49	C	2.25
40-44	D	2.00
Less than 40	F	0.00

Criteria	Marks Distribution (Theory)
Class Attendance	7%
Assignment	5%
Presentation	8%
Class Test	15%
Mid-Term	25%
Semester Final	40%
TOTAL	**100%**

Additional Support for Students

- Student Portal:
  http://studentportal.diu.edu.bd/
- Academic Guidelines
  https://daffodilvarsity.edu.bd/article/academic-guidelines
- Rules and Regulations of DIU
  https://daffodilvarsity.edu.bd/article/rules-and-regulation
- Career Development Center:
  https://cdc.daffodilvarsity.edu.bd/
- For general queries:
  http://daffodilvarsity.edu.bd/

6. Appendix-I
   Consider (a) - (l) as PO1 - PO12 respectively
   https://drive.google.com/file/d/16Bhc2bdaYo3v__FvGrfUD4tjuT0kfT6c/view?usp=sharing