University of Asia Pacific (UAP)
Department of Computer Science and Engineering (CSE)

Course Outline

Program:	Computer Science and Engineering (CSE)
Course Title:	Compiler Design Lab
Course Code:	CSE 430
Semester:	Spring 2025
Level:	8th semester
Credit Hour:	1.5
Name & Designation of Teacher:	MD. Abu Sayem (Lecturer) , Jayanto Dutta Plabon(Lecturer), Md. Shafayetul Haque (Lecturer)
Office/Room:	RH Tower- 5th Floor
Class Hours:	
Consultation Hours:	**11:00 am to 2:00 pm**
E-mail:	Md. Abu Sayem , Jayonto Dutta Plabon ,shafayat@uap-bd.edu
Mobile:	
Rationale:	Required course in the CSE program. The technology to build compilers which translate high-level programming languages has made the proliferation of computer use possible. The knowledge and skills in compiler construction are essential for computing professionals.
Pre-requisite (if any)**:**	None
Course Synopsis:	This course will cover the main aspects of the Compiler Designing. Student will learn how to use scanner and parser generator tools (e.g., Flex, Yacc, etc). Students will then learn the designing and implementation of lexical analyzer, symbol tables, parser, intermediate code generator and code generator.

Course Objectives: The objectives of this course are to:

1. **Teach** various aspects of Compiler Design.
2. **Teach** different phases of compiler and implement them.
3. **Demonstrate** how to use various compiler-construction tools.

Course Outcomes (CO) and their mapping with Program outcomes (PO) and Teaching-Learning Assessment methods:

CO No.	CO Statements: Upon successful completion of the course, students should be able to:	Corresponding POs (Appendix-1)	Bloom's taxonomy domain/level (Appendix-2)	Delivery methods and activities	Assessment Tools
CO1	**Describe** basic aspects of Compiler Design.	1	1/Understand	PPT presentation, Live lecture	Written online Quiz, short question, Oral Exam
CO2	**Implement** different phases of compiler for the purpose of complete generation of a compiler.	3	1/Apply	PPT presentation, Live lecture	Assignment with Viva, Online Presentation, Online test
CO3	**Use** various compiler-construction tools for compiler designing and constructing purpose.	5	2/Manipulation	Live lecture, Tutorial class	Assignment with Viva, Online test

Weighting COs with Assessment methods:

Assessment Type	% weight	CO1	CO2	CO3
Project (Implementation using coding)	30%		15%	15%
Assignment	10%	10%		
Classwork Performance, Viva	60%	10%	40%	10%
Total	100%	20%	55%	25%

Course Content Outline and mapping with COs

Weeks	Topics / Content	Course Outcome	Delivery methods and activities	Reading Materials
1-2	Class on Introduction to compiler, Basic issues, String Manipulation , Space and comment handling	CO1 CO2	PPT presentation, Live lecture	Slides, Books, reference links
3-4	Introduction to Lexical Analyzer, its implementation,	CO2	PPT presentation, Live lecture, Tutorial Class	Slides, Tutorial Video/PPT
5-6	Class on hashing and implementation of Symbol Table, Assignment on symbol table	CO2	PPT presentation, Live lecture	Slides, Books, reference links
7	**Mid-term Exam**			
8-9	Class on Syntax Analysis and implementation of LL(1) parser	CO1 CO2 CO3	PPT presentation, Live lecture, Tutorial class	Slides, Books, reference links
10	Introduction to Unix text processing tools- flex and necessary software setup	CO1 CO2 CO3	PPT presentation, Live lecture	Slides, Books, reference links
11	Building a lexical analyzer using flex	CO2 CO3	PPT presentation, Live lecture, Tutorial class	Slides, Books, reference links
12	Introduction to Unix text processing tools- bison and necessary software setup and implementing desktop calculator	CO1 CO2 CO3	PPT presentation, Live lecture, Tutorial class	Slides, Books, reference links
13	Class on Intermediate Code Generation (ICG) , Optimization techniques, Assignment	CO1 CO2 CO3	PPT presentation, Live lecture, Tutorial class	Slides, Books, reference links
14	**Final Exam**			

Minimum attendance: 60% class attendance is mandatory for a student in order to appear at the final examination.

Textbook: Compilers - Principles, Techniques, and Tools, Aho, Sethi, Ullman

Required References: Flex & Bison, John R. Levine
A Compact Guide to Lex & YACC, Thomas Niemann

Recommended References:

Grading System: As per the approved grading scale of University of Asia Pacific (Appendix-3).

Special Instructions: **Assignment**: **Unfinished** work should be submitted as assignment. **Additional** assignments may be given as needed. Copied home work will be graded as zero. Late submission will result a 50% deduction in score.

Student's responsibilities: Students must come to the class prepared for the course material covered in the previous class (es).
They must submit their assignments on time.

Prepared by (Course Teacher)	**Checked by** (Chairman, PSAC committee)	**Approved by** (Head of the Department)
Baivab Das		

Appendix-1:

Washington Accord Program Outcomes (PO) for engineering programs:

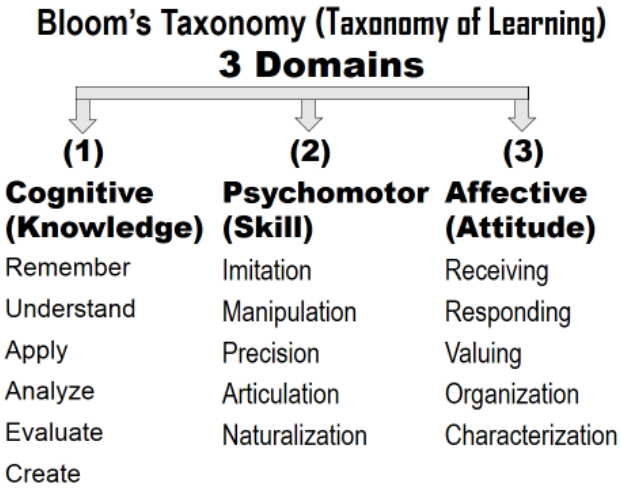
No.	PO	Differentiating Characteristic
1	Engineering Knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical
2	Problem Analysis	Complexity of analysis
3	Design/ development of solutions	Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified
4	Investigation	Breadth and depth of investigation and experimentation
5	Modern Tool Usage	Level of understanding of the appropriateness of the tool
6	The Engineer and Society	Level of knowledge and responsibility
7	Environment and Sustainability	Type of solutions.
8	Ethics	Understanding and level of practice
9	Individual and Team work	Role in and diversity of team
10	Communication	Level of communication according to type of activities performed
11	Project Management and Finance	Level of management required for differing types of activity
12	Lifelong learning	Preparation for and depth of Continuing learning.

Generic Skills (Detailed):

1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems;
2. **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.
4. **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
5. **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;
6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;

8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
11. **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one's own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship.

Appendix-2



Appendix-3
UAP Grading Policy:

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00