

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
HYDERABAD CAMPUS
SECOND SEMESTER 2013 – 2014
Course Handout (Part II)

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No: CS F363 / IS F342
Course Title: Compiler Construction / COMPILER DESIGN
Instructor-in-charge: Dr. Aruna Malapati (arunam@hyderabad.bits-pilani.ac.in)

1. Objective

The course treats compiler construction/ design for imperative programming languages. This includes lexical, syntactical, and semantic analysis as well as static program analysis, optimization, and code generation.

2. Scope

This course provides all necessary theoretical knowledge required to implement a compiler from scratch, which forms the practical part of the lecture. This course will then proceed to provide tools and techniques for implementing such features as part of a compiler. Students will also participate in small teams in building a compiler for a language of their choice through programming assignments.

3.a. Text Book

T1. Aho, Sethi and Ullman. Compilers Principles, Techniques, and Tools.
Pearson Education. Low Price Edition. Second Edition

3.b. Reference Books

R1. Andrew Appel, Modern Compiler Implementation in Java.
Cambridge University Press. (Foundation Books, New Delhi.) Rev. Ed. 2000.

4. Course Plan

4.a. Modules and Learning Objectives

Module	Title	Learning Objective(s)
C1	Introduction to Compilers	To understand the context and use of a compiler.
C2	Front End of a Compiler	To understand the implementation of a front end of a compiler - scanning, parsing and semantic analysis.
C3	Back End of a Compiler	To understand the implementation of a back end of a compiler - Activation Records, Code Generation and Register allocation.
C4	Special aspects of compilers and runtime	To understand some special aspects of compilers and runtime such as code optimization, garbage collection, and scheduling of instructions.

4.b. Lecture Schedule

Sl No	Topic	Learning Objective	No of Lectures	Module	Reading
1.	Description of compiler phases	Introduction to Course. Structure and Components of a compiler.	2	C1	T1 Ch1(1.2)
2.	Lexical Analysis & LEX	Tokens, Lexer functionality, Lexical Analyzer Tool	4	C2	T1 Ch. 3
3.	Symbol Table	Data Structures for symbol table organization	1		T1 Ch 2 2.7
4.	Syntax Analysis	Parsing, Parser Generator functionality	1	C2	T1 Ch. 4
		Grammar Transformations for different types of parsers	1		Notes
		Top Down Parser / LL(1) parser LL(1) Grammar LL(1) Parse algorithm Computing first and follow sets	4		T1 Ch4 (4.4)
		Bottom Up parsers - SLR,LR(k),LALR	8		T1 Ch4 (4.5)
5.	Syntax Analysis Tool	YACC and any other tools available	1		
6.	Syntax Directed Translation	Inherited and Synthesized Attributes	4	C2	T1 Ch. 5
7.	Intermediate Code Generation	3AC, Syntax Trees, Translation of Expressions, Type Checking, Control Flow	5	C3	T1 Ch. 6
8.	Code Optimization	Basic blocks, Flow graphs, DAG	1	C4	T1 Ch. 8.4,8.5.1
		Function Preserving Transformations	3		T1 Ch. 8.5
		Loop optimizations	2		
		Global data flow analysis	2	C4	T1 Ch. 8.5
9.	Code Generation	Basic Blocks and Traces, Issues in code generation, Approach to code generation	2	C3	T1 Ch. 8
Total number of classes Planned			41		

5. Evaluation Scheme

5.a. Major Components

Component	Mode	Duration	Date	Weightage
Quiz	Closed Book	*	To be announced in class	5%
Assignments	Lab (Take Home)	*	To be announced in class	20%
Test 1	Closed Book	60mins	24/2/2014 8.00 - 9.00 AM	20%
Test 2	Closed Book	60mins	28/3/2014 8.00 - 9.00 AM	20%
Comprehensive	Partly Open Book *	3 hours	09/05/2014 AN	35%

*Prescribed Text book, References and only Hand-Written Notes Permitted.

5.b. Timeliness

- Assignments are to be completed in time with no postponements.
- Submissions 24 hours from deadline will have a penalty of 2 Marks per day.

6. Notices: All notices related to the course will be displayed on the **CSIS Notice Board**, and / or course website. Make ups shall be granted on prior permission and only to genuine cases.

7. Chamber Consultation: Mon 4.00-5.00PM B-226

Instructor-in-charge
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