## COURSE SYLLABUS COSC 4316 Compiler Design and Construction (aka Language Translators) Dr. Tim McGuire 3 Semester Hours Spring Semester 2018

Section 01 – AB1-206, 1:00 – 1:50 p.m., MWF

Office: AB1-212G Office Hours: 10:00 – 11:30 a.m. MTWThF;. 12:30 -2:00 TTh; other times by arrangement Office Phone: (936) 294-1571 E-Mail: mcguire@shsu.edu Home Page: http://www.shsu.edu/~csc\_tjm

**Catalog Description**: This course deals with the design and implementation of assemblers, interpreters and compilers. Topics include symbol tables, lexical scanning, syntactic analysis, object code generation and storage allocation. Programming assignments will involve implementation of functional components of a translator.

Prerequisites: COSC 2329 and COSC 3319

**Methodology**: Lecture with outside laboratory assignments. The examinations will cover the material in the lectures, and will require that the student understand, apply, and extend that knowledge.

**Objectives:** This course will cover the theoretical and implementation aspects of language translators. Emphasis will be on the design and construction of compilers. There are several **substantial** programming assignments associated with this course.

- Compiler Design
- Lexical Analysis
- Syntax Analysis grammars, LL(1) parsers, LR(1) parsers
- Semantic Processing
- Code generation and optimization

## **SHSU ABET Student Outcomes:**

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

(k) An ability to apply design and development principles in the construction of software systems of varying complexity.

## Supplementary Textbook and Supplies:

- Compilers: Principles, Techniques, and Tools, Aho, Sethi, and Ullman, 1<sup>st</sup> or 2<sup>nd</sup> edition, Pearson, 1986/2006. (suggested resource – This book is affectionately referred to as "The Dragon Book.")
- Course notes supplied by instructor via Blackboard

**Grading:** There will be approximately 5 programming assignments, together worth 40% of your grade (not all weighted equally). Unless otherwise specified, these are to be **individual** efforts, meaning no sharing of code or discussion of problem solution allowed with anyone but me.

- 2 Midterm exams, each worth 15% of your grade
- The final exam, worth 30% of your grade, will be cumulative with the primary emphasis (50-75%) on the material not tested in the midterms. Both the final and midterms are closed book/notes. You must have a written excuse (doctor's note, for example) to miss an exam. I reserve the right to give oral makeup exams in lieu of written.
- It has been my experience that time is the biggest determiner of your final grade in this class. I suggest that you start assignments when I hand them out. They often take more time than you think.

Grading Scale: The following grade scale is used:

90	<	Α	<	100
80	<	B	<	90
70	<	С	<	80
60	<	D	<	70
0	<	F	<	60

Absences: See <a href="http://www.shsu.edu/syllabus/">http://www.shsu.edu/syllabus/</a>

Academic Integrity: See http://www.shsu.edu/syllabus/

Proper Classroom Demeanor: See <a href="http://www.shsu.edu/syllabus/">http://www.shsu.edu/syllabus/</a>

Americans with Disabilities Act: See <u>http://www.shsu.edu/syllabus/</u>

Visitors in the Classroom: See <u>http://www.shsu.edu/syllabus/</u>

**Tentative Course Schedule:** 

WEEK	TOPICS		
1	Introduction; Regular Languages		
2	Lexical Analysis – flex		
3	Syntax Analysis; Context free languages		
4	LL parsing		
5	LR parsing		
6	Syntax Directed Translation; bison		
7	Midterm, Symbol Tables		
8	Typechecking		
9	Intermediate Code Generation		
10	Runtime Environments		
11	Implementation details		
12	Code Generation		
13	Code Optimization		
14	Other topics/slippage		
15	Other topics		