CS 4280 **COURSE OUTLINE**
Program Translation **Fall 2017**

1 Instructor Details

INSTRUCTOR:	M. W. Schulte	313 ESH
	URL: www.cs.umsl.edu/∼schulte/cs3010/	
	e-mail: schulte@cs.umsl.edu	(314) 516-5239
	hours: M 1900-2000	or by arrangement
	T 1600-1700	
	W 1000-1050	
	Th 1400-1500	

Cheating (z.B., projects or exams which I think are too close for coincidence) will be rewarded by at least removal of all points for that project or exam by all involved.
Discussion with other students on the project is fine; copying is not.
All exams are closed-book, closed-notes, closed-friends, open-mind exams.

4 Projects	10% each
Short homework	5%
Midterm	25%
Final	30%

The midterm is expected about 25 Sep (plus/minus a week)
The Final is on M 11 Dec at 1230-1430

2 Course Details

CATALOG DESCRIPTION:

CMP SCI 4280 Program Translation: 3 semester hours Prerequisites: CMP SCI 2700, CMP SCI 2750, CMP SCI 3130, and CMP SCI 4250. Focuses on methods, techniques, and mechanisms used to create the abstraction from high level programming to machine level execution. This course also requires an individual, semester long project.

TEXT (optional): "Modern Compiler Implementation in C", Andrew W. Appel and Maia Ginsberg, Cambridge University Press 2004, ISBN-13 978-0521607650
(This is more for the case where you want a different view; I won't refer to it or require it.)

TOPICS covered in the course include:

- Proper programming standards
- Proper program modularization, internal vs. external linkage, header files
- Building a larger project from components
- The need for program translation, constraints, tradeoffs

- Chomsky hierarchy of languages
- Algorithms and properties for regular and context free languages
- Generation vs. interpretation
- BNF notation, standard and extended
- Ambiguity, precedence and associativity
- Top-down vs. bottom-up compilers
- Modular and reconfigurable compilers, front end vs. back end
- Interpretive compilers (Java or Pascal)
- Cross vs. host translation
- Bootstrapping
- Improving compiler and target properties

COURSE SCHEDULE

WEEK	**CHAPTER**	**TOPICS**
1	1	Intro; Language Levels and Associated Processors; Passes; Compilers vs Interpreters
2	2	**Scanning**: Regular Expressions, FSM, flex
3	3.1-2	**Parsing**: Top-down vs. Bottom-up; Recursive Descent
4	3.3	LR parsing
5	4	Bison
6		Midterm
	5	**Context Analysis**: Scopes; Symbol Tables
7	5	Symbol Tables; Type Checking
8	5	Type Checking
9	6	**Run-Time Organization**: Data Representation; Static Storage
10	6	Stack Storage; Heap Storage
11	9	**Code Generation**: Semantic Specifications; Code Templates
12	–	Variables; Control Structures; Functions
13	8.2, 11	**Optimization**: Basic Blocks; Local Optimizations
14	18	Global Optimizations
15	–	Left-over; review

We will use the standard 10% grading scale: 90% and above gives A, 8% and above B, 70% and above C, 60% and above D, else F.

Other course information

For many courses, you can find sample projects, sample tests and/or study guides, and additional relevant material, under the Computer Science Students organization on mygateway.umsl.edu.

3 UMSL Course Policies

1. Participation (expectations)

   - It is vitally important that our classroom environment promote the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions whether in class or online. Please speak with me before recording any class activity. It is a violation of University of Missouri policy to distribute such recordings without my authorization and the permission of others who are recorded.
   - Turn off beepers, cell phones, and other devices during class. Adherence to the Student Conduct Code is expected.
   - I am committed to insuring a positive learning environment by respecting that University policy (p. 66): `http://www.umsl.edu/~studentplanner/index.html`.
   - Your success in this course will heavily depend on your ability to communicate, engage and participate in all course activities. Successful completion of this course requires that a student keep up with all assignments, quizzes, projects and tests.
   - If you are unable to participate in the scheduled class activities, you must notify the instructor within the week of that class module. An unexcused failure to engage or participate with the class will be counted as an absence; unexcused absences may result in failure. The instructor reserves the right to make judgment to accept and/or make-up assignments missed because of failed participation in the course activities.

2. Academic Integrity/Plagiarism

   - Students are responsible for being attentive to and observant of campus policies about academic honesty as stated in the University's Student Conduct Code (p. 60): `http://www.umsl.edu/~studentplanner/index.html`
   - To avoid accusations of academic dishonesty, please submit all written work to the Turnitin system before finalizing what you submit for evaluation. Check information about The Writing Center @UMSL that is linked to MyGateway Home.
   - Plagiarism is the use of another person's words or ideas without crediting that person. Plagiarism and cheating will not be tolerated and may lead to failure on an assignment, in the class, and dismissal from the University. View this campus policy at:
     `http://www.umsl.edu/services/academic/policy/academic-dishonesty.html`

3. Mandatory Reporting:
   Under Title IX, all UMSL faculty, staff, and administrators (with limited exception) are obligated to report any incidents of sexual harassment, sexual misconduct, sexual assault, or gender discrimination to the Student Affairs office and/or other University

officials. This ensures that all parties are protected from further abuses and that victim(s) are supported by trained counselors and professionals. Note: There are several offices at UMSL (e.g., Counseling Services, Health Services, Community Psychological Service, Center for Trauma Recovery, and Student Social Services) whose staff are exempt from Title IX mandated reporting, when the information is learned in the course of a confidential communication.

4. Access, Disability and Communication

   - Students who have a health condition or disability, which may require accommodations in order to participate effectively in this course, should contact the Disability Access Services Office. Information about your disability is confidential.
     - 144 Millennium Student Center
     - Phone: (314) 516-6554
     - Website: `http://www.umsl.edu/services/disabled/`
   - If you have difficulty communicating in English with the instructor of this course, contact the Office of International Students and Scholar Services:
     - Phone: (314) 516-5229
     - Email: iss@umsl.edu
     - Website: `http://www.umsl.edu/~intelstu/index.html`

5. Student Support and Services

   - Technical Support
     - My Gateway (Blackboard): If you have problems logging into your online course, or an issue within the course site, please contact the Technology Support Center:
       * Phone: (314) 516-6034
       * Email: helpdesk@umsl.edu
       * Website: `http://www.umsl.edu/technology/tsc/`
     - Wimba: If you have any questions regarding Wimba Classroom and Wimba Voice Tools, contact the Faculty Resource Center:
       * Phone: (314) 516-6704
       * Email: frc@umsl.edu
       * Website: `http://www.umsl.edu/technology/frc/`

       Outside normal office hours, you may also contact Wimba for 24/7 assistance:
       * Phone: (866) 350-4978
       * Email: technicalsupport@wimba.com
   - Academic Support

  - The Online Writing Lab: At our My Gateway site, students can send their papers to our tutors, who will read them and send them back with suggestions. Students can also access SafeAssign, which identifies quoted material in their essays.
    * Visit the online Writing Lab page on MyGateway to submit drafts online.
    * We try to respond within 48 hours, but it may take longer, so allow ample time.
  - NetTutor: Online tutoring in many subjects is now available through NetTutor. In your courses on MyGateway, click on Tools and select NetTutor to log in.
- Student Services: The Student Retention Services office offers assistance tailored to specific student needs.
  - 225 Millennium Student Center
  - Phone: (314) 516-5300
  - Email: umslsrs@umsl.edu
  - Website: `http://www.umsl.edu/services/srs/`
- Departmental Tutoring
  - The department offers tutoring for up to Cmp Sci 3130, and occasionally for other courses
  - Check MyGateway organization CSTutoring.