



44-525 Theory and Implementation of Programming Languages Course Syllabus – Fall 2015

Instructor Tanmay Bhowmik, Ph.D. <u>Email:</u> bhowmik@nwmissouri.edu <u>Phone:</u> 660-562-1103 <u>Office:</u> Colden Hall 2305 <u>Office Hours:</u> Tuesday 8:30am-10:30am, 3:30pm-4:30pm Wednesday 9:00am-10:00am Thursday 8:30am-10:30am, 3:30pm-4:30pm	Course Location and Time Colden Hall 3300 T Th 2:00pm – 3:15pm Course Website You should have access to the eCompanion page for this course. In case the regular site is down, go to www.northwestOnline.org
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Course Description: This course covers the syntax and semantics of programming languages, the translation process, and features of procedural, functional, and object-oriented languages.

Prerequisite: 44-242 (Data Structures) with a grade of C or better.

Course Objectives: Upon successful completion of this course, students will understand

- Basic concepts of programming language syntax and semantics
- Basic theory that underlies language specification and recognition
- Fundamentals of programming language implementation
- The commonly used programming language paradigms

Textbooks: No textbooks are required. All course materials will be available on the course web site.

Software: Students must have access to

- Microsoft Word and PowerPoint
- Java SE 8
- JFLAP (available as a free download at <http://www.iflap.org/>)
- Python 3.4.x (available as a free download at <http://www.python.org/>)

Announcements and e-Mail: Announcements are communicated via the **Announcements** page on the course website and your Northwest Missouri State University e-mail account. It is your responsibility to check each of these sources daily. E-mails **must** include the course number (44-525) and be signed. I do not reply to unsigned e-mails.

Professionalism: Students are expected to behave in a professional manner in their dealings with each other, the teaching assistants, and the instructor.

Personal Electronic Devices: Laptops and other electronic devices should be used in a responsible manner that does not interfere with the lecture or other students' ability to learn. Cellular phones, pagers, Walkmans, Gameboys, mp3 players, PSP's, and other electronic devices that produce auditory stimuli should be turned off or silenced during the classes. No calculators, cell phones, or other electronic devices can be used during exams, unless explicitly allowed by the instructor.

Use of Publicly-Available PCs: All code that you store on a hard drive in a public lab or classroom must be moved to your student storage or a flash drive when you leave the PC. Hard drive space is not intended for private storage.

Academic Honesty: The policy stated in the Northwest Missouri State University Undergraduate Catalog will be followed. The *CSIS Academic Integrity Policy* available at <http://www.nwmissouri.edu/mathcsis/about.htm> clearly explains those types of behavior that would be considered academic dishonesty. It is also posted on the course website. You are responsible for reading this document and abiding by the guidelines described therein. **Read the student agreement, sign it by typing in your name and the date in the locations specified. Then drop it in the Student Agreement dropbox by 11:59 p.m. on Tuesday, September 8. This is REQUIRED. If the document is not submitted by the due date, five points will be deducted from your total points in the course.**

Projects

- You may discuss projects with other students in the class, but **you MUST create and submit your own source files. SUBMITTING A FILE COPIED FROM ANOTHER STUDENT CONSTITUTES ACADEMIC DISHONESTY.**
- Projects must be submitted to the dropbox on Northwest Online by 11:59 p.m. on the due date. **Projects submitted late will receive no credit.**

Disability Accommodations: Students in this course who need disability accommodations/modifications should present a copy of their official Northwest accommodation letter from the LAP/S Committee to the instructor during private office hours as early in the term as possible. Additional information can be found at <http://www.nwmissouri.edu/swd/index.htm>

Statement of Non-Discrimination: Northwest Missouri State University does not discriminate on the basis of race, color, creed, religion, national origin, sex, age, or handicap in admission or access to, or treatment or employment in, its programs and activities. Any person having inquiries concerning Northwest Missouri State University's compliance with the regulations implementing Equal Employment Opportunity Commission (EEOC) and Americans with Disabilities Act (ADA) guidelines is directed to contact the President's Office, Northwest Missouri State University, 800 University Drive, Maryville, MO 64468-6001, (660) 562-1110. Any person may also contact the Assistant Secretary for Civil Rights, U.S. Department of Education, regarding the institution's compliance with the regulations implementing EEOC and ADA guidelines.

Attendance: You are expected to attend all class meetings, arrive on time, and actively participate in all activities during class. The CSIS attendance policy is posted on the course website. You are responsible for reading this document and abiding by the guidelines described

therein. **If you miss more than 3 classes, you need to meet the graduate program director Dr. Douglas Hawley and discuss your absence.**

Exam Policies: Dates and other details will appear in course announcements. Tentative dates are given in the detailed calendar (see the end of the syllabus).

Occasionally students miss examinations. Sometimes the student knows about these absences in advance, and sometimes they happen unexpectedly.

- If you know in advance that you will be absent during an exam, then you must meet with the instructor **and** the graduate program director Dr. Douglas Hawley before the date of the exam and discuss the cause of absence. If the cause seems reasonable (e.g., legitimate emergency, medical, and university approved absences), then the absence will be excused and arrangements will be made for a make-up exam. Note that documentation is required to support the cause.
- If you miss an exam unexpectedly and wish to have the absence considered excused, then you must meet with the instructor **and** the graduate program director Dr. Douglas Hawley at the earliest opportunity possible after the absence, and provide documentation to support your claim that the absence should be considered excused. If the absence is excused, arrangements for a make-up exam will be made for you.
- Exams missed with an excused absence will be dealt with on an individual basis.
- **Make-up exams will be considered only for excused absences, and for that you will need to provide valid documentations (as mentioned above).**

For unexcused absences from examinations, you will unfortunately receive a *score of zero* points.

The contacts for our graduate program director Dr. Douglas Hawley is as follows.

Dr. Douglas Hawley
Email: hawley@nwmissouri.edu
Office: 2260 Colden Hall
Phone: 660.562.1200

All exams are closed book, closed notes, unless explicitly noted in writing by the instructor.

No calculators, cell phones, or other electronic devices can be used during exams, unless explicitly allowed by the instructor.

Grade of Incomplete (I): Following Northwest Missouri State University policy, incomplete grades may only be given in extreme circumstances, such as illness, death in a student's immediate family, or similar circumstances beyond a student's control, and the student was unable to complete a small portion of the course work.

Northwest Online Helpdesk for eCollege and eConferencing Software

Hours: 24/7/365

E-mail: helpdesk@northwestonline.org

Phone: 877.740.2213

Northwest Missouri State University Helpdesk for general questions on campus computer, software, and networking

Hours: Monday-Thursday 8-9; Friday 8-5

E-mail: helpdesk@nwmissouri.edu

Phone: 660.562.1634

Grading Policy

Component
3 Exams @ 100 pts each
Final Exam 100 pts
7 Projects @ 10 pts each
6 Quizzes @ 10 pts each

Your score on each component will be posted in the online gradebook as soon as that component has been graded. You are responsible for checking the gradebook at least once a week to ensure that your grades are properly posted. ***If there is an error in grading, you must bring that to the attention of the class assistant or instructor within two weeks of the time the grade is posted.***

To satisfy the university policy that graduate students in 500-level courses must have requirements beyond those of the undergraduate students, a different grading scale is used for undergraduate and graduate students.

Grading Scale – UNDERGRADUATES		Grading Scale – GRADUATES	
Percent Range	Grade	Percent Range	Grade
88-100%	A	90-100%	A
>= 78% and < 88%	B	>= 80% and < 90%	B
>= 70% and < 78%	C	>= 70% and < 80%	C
>= 60% and < 70%	D	>= 60% and < 70%	D
below 60%	F	below 60%	F

Throughout the semester, a student will be graded for 530 points in total. Therefore, after the final exam, if the total point of an undergraduate student is 470, then the corresponding final grade is: $(470/530)*100 = 88.68\%$, which is an A. Whereas, for a graduate student, the corresponding final grade is a B.

Disclaimer: The course instructor reserves the right to adjust this syllabus upon subsequent consideration of student performance, schedule constraints, unexpected semester events, and other such situations. If changes are required, they will be posted on course web site.

Course Outline

For exam dates and project due dates, check the announcements on the course web site.

Unit	Topics
1	Introduction, Overview of a Compiler
2	Alphabets, Languages, Regular Expressions
3	Finite Automata, JFLAP
4	Lexical Analysis
5	Context-free Grammars, Derivations, Parse Trees, Pushdown Automata, Parsing
6	Compilers, Virtual Machines, Native Code
7	An Example Compiler
8	Bindings, Scope, Memory Allocation
9	Streams, Map-Reduce
10	Python

Important Dates

Mon, Aug 31: Classes begin

Mon, Sep 7: Labor Day Holiday--No class

Mon, Oct 19: Midterm grade due by 10:00 am

Fri, Oct 23: Walk-out Day--No class

Wed, Nov 25 to Fri, Nov 27: Thanksgiving Break--No class

Visit <http://www.nwmissouri.edu/academics/calendar.htm> for more information.

Final Exam Date and Time

Monday, Dec 14, 7:00pm – 900pm

Venue: Regular Classroom

Visit <http://www.nwmissouri.edu/registrar/finals.htm> for more information.

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Detailed Course Calendar (Fall 2015)

All dates are **tentative** except the final exam date. **The instructor may adjust the schedule as the semester progresses.**

Week	Class Dates	Events	Topics
1	Tuesday, Sep 1		Introduction
	Thursday, Sep 3		Overview of a Compiler
2	Tuesday, Sep 8		Alphabets
	Thursday, Sep 10	Quiz – 1	Languages Regular Expressions
3	Tuesday, Sep 15		Finite Automata JFLAP
	Thursday, Sep 17	Quiz – 2	
4	Tuesday, Sep 22	Due – Project 01 (by 11:59 pm)	
	Thursday, Sep 24	Exam 1	
5	Tuesday, Sep 29		Lexical Analysis
	Thursday, Oct 1		
6	Tuesday, Oct 6	Quiz – 3	Context-free Grammars Derivations
	Thursday, Oct 8	Due – Project 02 (by 11:59 pm)	
7	Tuesday, Oct 13		Parse Trees Pushdown Automata Parsing
	Thursday, Oct 15	Quiz – 4	Compilers Virtual Machines Native Code
8	Tuesday, Oct 20	Due – Project 03 (by 11:59 pm)	An Example Compiler
	Thursday, Oct 22		
9	Tuesday, Oct 27	Due – Project 04 (by 11:59 pm)	
	Thursday, Oct 29	Exam 2	
10	Tuesday, Nov 3		Bindings Scope
	Thursday, Nov 5		Memory Allocation
11	Tuesday, Nov 10	Due – Project 05 (by 11:59 pm)	Streams
	Thursday, Nov 12	Quiz – 5	Map-Reduce
12	Tuesday, Nov 17		Python
	Thursday, Nov 19	Quiz – 6	
13	Tuesday, Nov 24	Exam 3 Due – Project 06 (by 11:59 pm)	
	Thursday, Nov 26	Thanksgiving Break – No class	
14	Tuesday, Dec 1		
	Thursday, Dec 3		
15	Tuesday, Dec 8		
	Thursday, Dec 10	Due – Project 07 (by 11:59 pm)	
Final Exam	Monday, Dec 14 7 pm to 9 pm	Final Exam in CH 3300	