

IST 334 Programming Languages¹

Course Syllabus – Spring 2015 (TR 11:00 am–12:15 pm PH 200)

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Office hours: 12:30 – 3:30 pm TR by appointment.

Course Description: Evaluation of the specification, syntax, semantics, compilation, and software development issues surrounding the development of programming languages. Students are introduced to imperative and functional languages; logic, object-oriented approaches. (PR: IST 236 Data Structures.)

Required Text, Additional Reading, and Other Materials: Modern Programming Languages: A Practical Introduction, Adam B. Webber, 2003. ISBN: 1887902767. A full set of slides for each chapter, some source code and useful links to free language systems are available at <http://www.webber-labs.com/mpl.html>.

Recommended Materials: Students will use Standard ML, Java and SWI-Prolog programming languages in this course. The links to Standard ML and SWI-Prolog can be found at the textbook home page. Java Standard Edition (Java SE) can be downloaded from <http://www.oracle.com/technetwork/java/javase/downloads/index.html>. Eclipse is recommended as Java IDE.

Course Student Learning Outcomes and Assessment Measures:

| <i>Course student learning outcomes: Students will</i> | <i>How practiced in this course</i> | <i>How assessed in this course</i> |
|---|---|--|
| Analyze the syntax, semantics, type handling, coercion rules, scoping rules, naming rules, and exception handling of several programming languages. | discussion, hands-on, in-class presentation | 6 to 8 assignments and 3 exams |
| Interpret BNF, syntax diagrams, parse trees, context-free grammars and other forms to syntax and semantics of a programming language. | discussion, hands-on, in-class presentation | 2 to 3 assignments and 2 exams |
| Perceive the differences between imperative, object-oriented, functional, and declarative languages. | discussion, hands-on, in-class presentation | 6 to 8 assignments and 3 exams |
| Recognize the types of applications where imperative, object-oriented, functional, and declarative languages will be best suited. | discussion, hands-on, in-class presentation | 6 to 8 assignments and 3 exams |
| Demonstrate the strengths and weaknesses of different programming languages. | discussion, hands-on, in-class presentation | 6 to 8 assignments and 3 exams |

This course is designed to develop critical thinking with respect to the workings of computer programming languages. The student will learn not only from the traditional textbook reading but also tryout through a number of hands-on exercises using three programming languages ML, Java and Prolog which are very different from one another in terms of how to solve real-world problems. In the end, the student will appreciate the diversity in the problem-solving philosophies and methodologies of the world of computer programming languages.

Course Requirements and Grading:

¹Last modified: Tuesday 13th January, 2015 12:30

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|-------------|---|
| Attendance | 5% deduction from the overall grade for each absence beyond the third absence |
| Assignments | 50% of the overall from 6 to 8 assignments, equally weighted |
| Exams | 50% of the overall from 3 exams, equally weighted |

Final letter grades are determined based on the following grading scale:

| | | | | |
|----------|----------|----------|----------|----------|
| [0,60) | [60,70) | [70,80) | [80,90) | [90,∞) |
| <i>F</i> | <i>D</i> | <i>C</i> | <i>B</i> | <i>A</i> |

Late assignments will be penalized at the rate of 10% per day, up to two days (including weekends) after the due date.

There will be no make-up chances for missed exams and assignments unless a proper action has been taken for an Excused Absence².

The instructor reserves the right to change these values depending on the overall class performance and/or extenuating circumstances.

Attendance Policy: Attendance and participation are required in class. For each absence beyond the third absence, 5% will be deducted from the student's overall grade. If a student is absent, it is his or her responsibility to find out what he or she missed, e.g. announcements, assignments, etc. The instructor will assume no responsibility in this regard.

Course Outline: (subject to changes)

| <i>Week of</i> | | <i>Topics</i> | <i>Assignments due</i> |
|----------------|------|--|------------------------|
| 1 | 1/12 | Syllabus; Ch 1 Introduction | |
| 2 | 1/19 | Ch 2 Syntax | |
| 3 | 1/26 | Ch 3 Semantics | HW 1 |
| 4 | 2/2 | Ch 4 Language Systems | |
| 5 | 2/9 | <i>Exam (Thursday), Ch 1–4</i> | HW 2 |
| 6 | 2/16 | Ch 5 ML | |
| 7 | 2/23 | Ch 6 Types; Ch 7 ML Patterns/Nested Function | HW 3 |
| 8 | 3/2 | Ch 8 Polymorphism | |
| 9 | 3/9 | Ch 13 Java; <i>Exam (Thursday), Ch 5–8</i> | HW 4 |
| 10 | 3/16 | <i>Spring break</i> | |
| 11 | 3/23 | | |
| 12 | 3/30 | Ch 15 Java Interfaces and Generics | |
| 13 | 4/6 | Ch 18 Parameters | HW 5 |
| 14 | 4/13 | Ch 19 Prolog | |
| 15 | 4/20 | 20 Procedural View; <i>Exam (Thursday), Ch 13, 15, 18–19</i> | |
| 16 | 4/27 | Ch 22 Prolog Numeric Computation | HW 6 |

Class preparation: Preparation is necessary for learning. For this class, reading the textbook chapters before coming to class is an absolute necessity. If necessary, quizzes will be given to ensure your interest in reading the textbook. Keep in mind that this course is not about programming but about how programming languages work. Students need to gain understanding first before putting things in practice. It is a fair assumption that all the suggested readings will be covered by exams.

²Defined in the Undergraduate Catalog.

Contact: Students are encouraged to visit with me. Most problems can be resolved more efficiently and effectively by personal visit. In particular, it may not be the best way to send an e-mail on the due day of an assignment asking a help for the assignment.

Should e-mails are preferred, students should use the e-mail address of the instructor at the beginning of this syllabus. Only the e-mails sent to this account will be responded.

The subject line of any e-mails sent to the instructor should start with “[IST334]”. Otherwise, the e-mails may not be responded properly in a timely manner. Emails sent after hours or weekend will be replied the next school day.

A useful information on how students can forward their Marshall emails to an address of their choosing can be found at <http://www.marshall.edu/muonline/e-mail/>.

University policies: By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802.

Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment