

CMSE 462 Functional and Logic Programming

Department: Computer Engineering

Instructor Information

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Assistant Information

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Meeting times and places

Tuesday 14:30 at CMPE129
Friday 10:30 at CMPE127
Monday 14:30 at CMPE238 (Lab)

Program Name: Computer Engineering

Program Code: 25

Course Code	Credits	Year/Semester
CMSE 462	4	2019-2020 Fall

Required Course Elective Course (click on and check the appropriate box)

Prerequisite(s):

CMPE 318 Programming Languages

Catalog Description

This course is about the two main declarative programming paradigms, namely functional and logic. Prolog will be taught as a representative of the Logic programming paradigm, and ML will be the language used to demonstrate the functional paradigm.

Course Web Page

<https://staff.emu.edu.tr/zekibayram/en/teaching/cmse462-cmpe462>

Textbook(s)

Programming in Haskell
Graham Hutton, University of Nottingham
Cambridge University Press, 2007

Learn Prolog Now

by Patrick Blackburn (Author), Johan Bos (Author), Kristina Striegnitz (Author)
College Publications (June 15, 2006)
ISBN-10: 1904987176

Indicative Basic Reading List

None.

**Topics Covered and Class Schedule
(4 hours of lectures per week)**

- Week 1** Introduction to functional programming
- Week 2** Types and Classes
- Week 3** Defining Functions
- Week 4** List Comprehensions
- Week 5** Recursive Functions
- Week 6** Higher Order Functions
- Week 7** Lazy Evaluation
- Week 8** Introduction to Logic Programming and Prolog
- Week 9** Unification, proof search
- Week 10** Recursive definitions in Prolog
- Week 11** Lists
- Week 12** Arithmetic
- Week 13** Cuts and Negation
- Week 14** Database Manipulation

Lab Schedule

- Weeks 3-4** Currying, lists, pattern matching, lambda expressions
- Weeks 5-6** List manipulation, arithmetic operations
- Weeks 6-7** User defined data types: Trees
- Weeks 8-9** Prolog: simple database of relationships
- Weeks 11-12** Prolog: list manipulation, arithmetic operations

Course Learning Outcomes

Upon successful completion of the course, students are expected to have the following competencies:

1. Show the internal representation of a list in Haskell or Prolog (k1,k2)
2. Determine the type of a Haskell expression (k1,k2)
3. Determine the value of a Haskell expression, given certain function definitions (k1,k2)
4. Write recursive Haskell functions for manipulating lists (a2,a3)
5. Use list comprehensions in Haskell (k1,k2)
6. Write higher order Haskell functions (a1,a2,a3,c2)
7. Define types in Haskell (a2,e2)
8. Find the unifier of two Prolog terms (k1,k2)
9. Write Prolog predicates for implementing arithmetic operations (a1,a2,a3,c2)
10. Write Prolog predicates for manipulating lists (a1,a2,a3,c2)
11. Write Prolog predicates involving the "cut" operator (k1,k2)
12. Use higher order logical predicates, such as "call" (k1,k2)
13. Write Prolog predicates involving database operations (k1,k2)

The contribution of each course learning outcome to student outcomes is specified in parenthesis. The student outcomes are available at <https://abet.emu.edu.tr/en>

Assessment	Method	How Many	Percentage
	Midterm Exam(s)	1	42%
	Final Examination	1	42%
	Attendance	--	4%
	Assignments	6	12%
<p>Computation of the attendance grade: $4 * (\text{number of days attended} / \text{number of days attendance taken})$. Attendance will start to be taken once the add-drop period has ended.</p>			
<p>Policy on makeups: For eligibility to take a makeup exam, the student should bring a doctor's report within 3 working days of the missed exam.</p>			
<p>Policy on the NG grade: If you miss two exams with no valid excuse, you will be given the NG grade.</p>			
<p>Policy on missed labs: There will be no makeup for missed labs. If you cannot attend a lab for some reason, you should contact the assistant <i>beforehand</i> so that you can present your work in advance.</p>			
<p>Prepared by: Assoc. Prof. Dr. Zeki Bayram</p>		<p>Date Prepared: 23 September 2019</p>	