CS350 Principles of Programming Languages (2017-18 Sem I)

Course Objectives: At the end of the course students should

1. know what is functional programming, know basic features of Haskell and how to use them.

2. be able to write Haskell programs to solve moderate size problems.

3. basics of programming with dependent types and Agda.

4. know some advanced/current research topics.

Topics to be covered:

Part I Programming in Haskell

Introduction to functional programming, Haskell environment and some examples.

Types and classes

Defining functions, lambda notation

List comprehensions, recursive functions

Higher order functions

Declaring types and classes and examples

Interactive programming

Basics of category theory (functors and natural transformations)

Effectful programming, functors and monads

Monadic programming

Genericity

Lazy evaluation

Reasoning about functional programs

Part II

Dependent types, theory and practice

Software development in a dependently typed language

Miscellaneous including some advanced topics, depending of time

(Parts I and II, will comprise roughly 60% and 40% of the course, respectively).

Evaluation: Midsem 20 %, assignment/quizzes 20 %, student presentations 20 %, endsem 40 %.

Course withdrawal policy: As per institute rules.

Office time: Mon 4-5 PM or by appointment.

References:

1. Programming in Haskell by G. Hutton. Second edition, Cambridge University Press. (Text book)
2. Verified Functional Programming in Agda by Aaron Stump. Acm Books. 2016.