Theory of Programming Languages

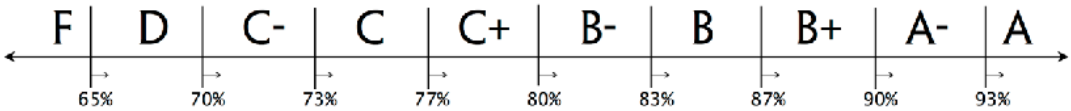
CMPT 331 • SPRING 2024

Background

When and where	Wednesdays at 8AM and Fridays at 11AM in Hancock 1021
Required Text	*Concepts of Programming Languages*, by Robert W. Sebesta, any recent edition Published by Addison Wesley
Web site	http://www.labouseur.com/courses/tpl
Instructor	Alan G. Labouseur Hancock 3***007*** Alan.Labouseur@Marist.edu *Office hours are posted.*

Grades

Letter Grades



You can earn up to 1000 points, broken down as follows:

Programming In The Past	10.0%	150 points	[1, 2]
Fun with Lambda Calculus	10.0%	100 points	[1, 2, 5]
Functional Programming	10.0%	150 points	[1, 2]
Mid-term Exam	25.0%	200 points	[1, 2, 5]
Final exam	25.0%	250 points	[1]
Language Design Project	15.0%	100 points	[1]
Attendance & Participation	2.5%	25 points - for quality and quantity	[1]
Laziness & Whining	2.5%	25 points - for not (lazy or whining)	[1]

Themes, Objectives, and Assessment

Assessment methods include assignments, quizzes, exams, discussions, presentations, peer review, and projects.

[References] refer to Department of Computing Technology Goals available at http://www.labouseur.com/courses/goals.pdf

In this course I hope that you will . . .

- learn about and practice programming language criticism based on four domain-independent categories and use this knowledge and practice to better understand today's software development environment. [1, 2]
- explore the concepts of many historical programming languages and their impact on the languages of today, remembering that those who forget the mistakes of history are doomed to repeat them. [1, 2]
- avail yourself of the opportunity to develop small programs in many historical programming languages. [1, 2]
- engage in the philosophy of programming languages. [1, 2]
- evolve critical debugging skills by developing programs in many languages. [1, 2]
- enhance your continuing education skills, realizing that capable problem solvers never stop learning. Additionally, preparation and presentation of the projects, as well as participation in class discussions and assignments, requires at least a little research, so there's that to look forward to. [1, 2, 5]
- have fun with programming. [1, 2]

Materials used in connection with the course may be subject to copyright protection.

Theory of Programming Languages

CMPT 331 • SPRING 2024

Schedule

#	Wed	Fri	Chapters	Topics	Due Friday
0	17-Jan	19-Jan	1	Introduction • Criteria for programming language evaluation Issues and tradeoffs in prog. language design • Compiler Phases	—
1	24-Jan	26-Jan	2	A brief history of programming languages	—
2	31-Jan	2-Feb	2	A ~~brief~~ history of programming languages	—
3	7-Feb	9-Feb	3	Describing syntax • Fruit flies • Chomsky • Grammars • Sheep Derivations • Parse trees • Grammar ambiguity	—
4	14-Feb	~~16-Feb~~	3 4	Lex & Parse • Beginning semantics • The need for context-sensitive grammars • Attribute grammars • Operational Semantics	—
5	21-Feb	23-Feb	4	Axiomatic Semantics	*Programming In The Past*
6	28-Feb	1-Mar	4	Axiomatic Semantics	—
7	6-Mar	8-Mar	—	**Mid-term Exam** — part I **in HC 2023**; part II in HC 1021 Study sheet permitted; some restrictions apply.	—
8	~~13-Mar~~	~~15-Mar~~	—	*Spring Break*	—
9	20-Mar	22-Mar	15	Lambda Calculus, part λf x . (f x)	—
A	27-Mar	~~29-Mar~~	15	Lambda Calculus, part λf x . (f (f x)) *Easter Break*	—
B	3-Apr	5-Apr	15	Lambda Calculus, part λf x . (f (f x)) Functional programming with LISP, ML, and Erlang	Fun with λ Calculus
C	10-Apr	12-Apr	15 16	More functional programming with Erlang Logic programming with Prolog	—
D	17-Apr	19-Apr	5, 6 —	A tour through the final Language Design project Static and Dynamic type • Type Systems	*Functional Programming*
E	24-Apr	26-Apr	— 9, 10, 13	Scope and Type checking Subprograms • Parameter passing • Concurrency • Threads	—
F	1-May	3-May	—	Review for the Final Exam - come to class with questions Show off your awesome new language designs.	*Language Design Project*
∞	8-May		all of it	**Final Exam** at 8AM **in HC 2023** Study sheet permitted; some restrictions apply.	

Materials used in connection with the course may be subject to copyright protection.