Theory of Programming Languages

CMPT 331 • SPRING 2025

Background

When and where	Wednesdays at 8AM and Fridays at 11AM in Hancock 2005
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 Alan.Labouseur@Marist.edu
	Hancock 3**007** *Office hours are posted*.

Grades

Letter Grades

F	D	C-	C	C+	B-	B	B+	A-	A
	65%	70%	73%	77%	80%	83%	87%	90%	93%
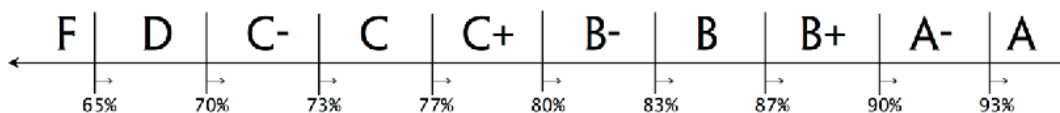
You can earn up to 1000 points, broken down as follows:

Programming In The Past	10.0%	100 points	[1, 2]
Fun with Lambda Calculus	10.0%	100 points	[1, 2]
Functional Programming	10.0%	100 points	[1, 2]
Exams 1, 2, and 3	50.0%	500 points (150 + 150 + 200)	[1, 2, 5]
Language Design Project	15.0%	150 points	[1, 2, 5]
Attendance & Participation	2.5%	25 points - for quality and quantity	[1, 2, 5]
Laziness & Whining	2.5%	25 points - for not (lazy or whining)	[1, 2, 5]

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]

THEORY OF PROGRAMMING LANGUAGES

CMPT 331 • SPRING 2025

─ Schedule ─

#	Wed	Fri	Chapters	Topics	Due Friday
0	22-Jan	24-Jan	1	Introduction · Criteria for programming language evaluation Issues and tradeoffs in prog. language design · Compiler Phases	—
1	29-Jan	31-Jan	2	A brief history of programming languages	—
2	5-Feb	7-Feb	2	A ~~brief~~ history of programming languages	—
3	12-Feb	14-Feb	3	Describing syntax · Fruit flies · Chomsky · Grammars · Sheep Derivations · Parse trees · Grammar ambiguity	—
4	19-Feb	21-Feb	3 4	Lex & Parse · Beginning semantics · The need for context-sensitive grammars · Attribute grammars · Operational Semantics	*Programming In The Past*
5	26-Feb	28-Feb	— 15	**Exam 1** in HC 2023 — *Study sheet permitted; some restrictions apply.* Lambda Calculus, part $\lambda f\, x\,.\,(f\,x)$	—
6	5-Mar	7-Mar	15	Lambda Calculus, part $\lambda f\, x\,.\,(f\,(f\,x))$ Lambda Calculus, part $\lambda f\, x\,.\,(f\,(f\,(f\,x)))$	—
7	12-Mar	14-Mar	15	Lambda Calculus, part $\lambda f\, x\,.\,(f\,(f\,(f\,(f\,x))))$ Functional programming with LISP, ML, and Erlang	—
8	~~19-Mar~~	~~21-Mar~~	—	*Spring Break*	—
9	26-Mar	28-Mar	16 —	More functional programming and some logic programming in Prolog **Exam 2** in DY 4005 — *Study sheet permitted; some restrictions apply.*	Fun with λ Calculus
A	~~2-Apr~~	~~4-Apr~~	—	*Alan's traveling*	—
B	~~9-Apr~~	11-Apr	— 4	*College-wide time-wasting day* Axiomatic Semantics	*Functional Programming*
C	16-Apr	~~18-Apr~~	4 —	Axiomatic Semantics *Easter Break*	—
D	23-Apr	25-Apr	4 5, 6	Axiomatic Semantics A tour through the final Language Design Project	
E	30-Apr	2-May	9, 10, 13	Static and Dynamic Type Systems · Scope and Type checking Subprograms · Parameter passing	—
F	7-May	9-May	9, 10, 13 —	Concurrency · Threads **Exam 3** in DY 4005 — *Study sheet permitted; some restrictions apply.*	*Language Design Project*
∞	14-May at 9ᴀᴍ		—	Final Class Wrap-up at 9ᴀᴍ in our usual room	