MEMORIAL UNIVERSITY OF NEWFOUNDLAND Department of Computer Science

Computer Science 1510 – Introduction to Programming for Scientific Computing Winter Semester 2017

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Note: There is a **Computer Science Student Help Centre** located in EN-2031C (864-4772). Please check the Computer Science home page www.mun.ca/computerscience for hours of operation each semester.

Course Website:

https://courses.cs.mun.ca/cs1510

Course Prerequisite:

Mathematics 1000.

Course Objectives:

This course introduces basic programming in the context of numerical methods with the goal of providing the foundation necessary to handle larger scientific programming projects. Numerical methods to solve selected problems from Physics, Chemistry, and Mathematics will be covered.

Course Outline:

- Computer terminology and fundamental concepts, problem solving, floating point arithmetic
- Programming in Fortran 2008
 - data types, expressions, I/O, formatted I/O, control statements, logical operators, arrays, subroutines
- Numerical methods to solve selected problems from Physics, Chemistry, and Mathematics.
- Programming in C
 - data types, expressions, I/O, formatted I/O, control statements, logical operators, arrays, subroutines

Textbook:

Walter S. Brainerd, Guide to Fortran 2008 Programming, Second edition, Springer, 2015, ISBN: 978-1-4471-6758-7 - OPTIONAL

Format:

 3 lectures and 2.5 lab hours per week.

 Lecture time:
 Slot 07 - MWF 2:00-2:50 pm

 Lecture room:
 EN-2006

 Lab time:
 Slot 42 - T 9:00-11:30 pm

 Lab room:
 CS-1019

Evaluation:

The final grade in the course will be determined as follows:Lab quizzes (8 out of 9)20%Assignments (7 out of 8)20%Midterm exam (Feb. 15)20%Final exam40%

Notes:

- Assignments will require programming in Fortran and C. Compilers for both of these programming languages are available on the computers in several labs on campus. See the **Accessing your LabNet Account On Campus** link on the course website for locations and schedules.
- Assignments are due at 11:59p.m. on the specified date (unless otherwise stated on the assignment or website), electronically through D2L Dropbox. (See following table.) No late assignments will be accepted. Be aware that the files you submit for evaluation should be uploaded on or before the due date and much before the cut off time, 11:59pm
 Newfoundland Time. Even if you are late by a few seconds you will not be allowed to submit your work; hence you should try to upload the files at least 15 minutes before the cut off time since your system clock is not synchronized with the CITL's system clock and the cutoff time is based on CITL's system clock. Please note that if your files have been correctly uploaded, you will get a confirmation receipt from the Dropbox tool. If you do not receive this receipt, please contact the CITL Support team (https://www.citl.mun.ca/support/). It is your responsibility to make sure that the correct files are actually uploaded, so please do check for the confirmation that your files have been uploaded.
- Assignments are to be done individually. See Section 6.12 of the 2016-2017 University Calendar (University Regulations) for information on Academic Misconduct.
- Labs begin on Tuesday, Jan. 10, 2017. See table at the end of this hand-out for lab dates. Note that there is no lab quiz for lab 0. The lab 1 quiz will cover material from labs 0 and 1.
- Attendance at all labs is required. Labs are to be completed during the assigned lab period. A quiz will be given at the end (last 30 minutes) of each lab period, focusing on the material introduced in that lab period.
- To access the course webpage use the following username and password: Username: cs1510 Password: fortran
- The lab instructor and instructional assistants are available to help students. See the **Instructional Staff Contact Information and Schedule** link on the course web page.
- If, for special circumstances (such as medical or bereavement) you miss a lab, lab quiz, assignment, or exam, notify your instructor, as soon as possible, providing any necessary documentation (if documentation is required). Failure to do this can result in a mark of 0% for that work. Please refer to the current University policy regarding medical notes and the information to be in them. For more information, please see the University Calendar University Regulations 6.7.5 and 6.15.6 or consult the Registrar's Office.
- The midterm exam will be given in the regular lecture period on Wednesday, Feb. 15, 2017. In the event of a university closure on the day of a test, the test will be given in the next class meeting.
- The lectures and displays (and all material) delivered or provided in COMP 1510 Introduction to Programming for Scientific Computing, by Dr. Sharene Bungay, including any visual or audio recording thereof, are subject to copyright owned by Dr. Sharene Bungay. It is prohibited to record or copy by any means, in any format, openly or surreptitiously, in whole or in part, in the absence of express written permission from Dr. Sharene Bungay any of the lectures, materials provided or published in any form during or from the course.
- **Supplementary Exams** University Calendar Faculty of Science 6.3 Regulations to Govern Supplementary Exams in the Departments of Biochemistry, Computer Science, Mathematics and Statistics, and Physics and Physical Oceanography.
- Any e-mail messages to the instructor should contain **[COMP1510]** in the subject line. For more timely response, please send your email to my **dchurchill@mun.ca** address rather than my D2L address.

Lab and Assignment Schedule:

Lab	Date (Slot 42)	Evaluation
0	January 10	No quiz
1	January 17	1
2	January 24	2
3	January 31	3
4	February 7	4
5	February 14	5
No lab	February 21	No quiz
6	February 28	6
7	March 7	7
8	March 14	8
9	March 21	9
No lab	March 28	No quiz
No lab	April 4	No quiz

Assignment	Due Date
1	Friday, January 20
2	Monday, January 30
3	Wednesday, February 8
4	Friday, February 17
5	Friday, March 3
6	Monday, March 13
7	Wednesday, March 22
8	Friday, March 31

Course Schedule:

Lecture	Date	Торіс
1	Jan. 6	Computer organization
2	Jan. 9	Computer number systems and representation
3	Jan. 11	Problem solving and flowcharts
4	Jan. 13	Introduction to programming, types of errors, data types
5	Jan. 16	Fortran: Variables, arithmetic operations, assignment
6	Jan. 18	Fortran: Input/output, formatted input/output
7	Jan. 20	Fortran: Selection
8	Jan. 23	Fortran: Repetition
9	Jan. 25	Fortran: Examples - selection and repetition
10	Jan. 27	Fortran: Functions
11	Jan. 30	Fortran: Subroutines
12	Feb. 1	Fortran: Scientific computing examples
13	Feb. 3	Fortran: Arrays
14	Feb. 6	Fortran: File input/output
15	Feb. 8	Fortran: Sorting, searching
16	Feb. 10	Fortran: Modules, recursion
17	Feb. 13	Fortran: Derived data types
	Feb. 15	MIDTERM EXAM
18	Feb. 17	Fortran: Allocatable arrays, other data types
	Feb. 20	Midterm Break - No lecture
	Feb. 22	Midterm Break - No lecture
	Feb. 24	Midterm Break - No lecture
19	Feb. 27	Fortran: Pointers
20	Mar. 1	Fortran: Linked lists
21	Mar. 3	Fortran: Examples
22	Mar. 6	Introduction to C programming
23	Mar. 8	C: Data types, arithmetic operations, input/output
24	Mar. 10	C: Selection, repetition
25	Mar. 13	C: Scientific computing examples
26	Mar. 15	C: Functions
27	Mar. 17	C: Arrays
28	Mar. 20	C: Pointers, arguments to main
29	Mar. 22	C: File input/output
30	Mar. 24	C: Dynamic memory allocation
31	Mar. 27	C: Strings, data structures
32	Mar. 29	C: Programming examples
33	Mar. 31	C: Pre-processor, Makefiles
34	Apr. 3	C: Programming examples
35	Apr. 5	C: Programming examples and Course review