Xi'an Jiaotong-Liverpool University

西交利物浦大学

School of Artificial Intelligence
and Advanced Computing

MODULE HANDBOOK

DTS102TC
Programming With C++/R

Module Leader: Huakang Li

First Part of Semester 2

2020-2021

SECTION A: Basic Information

❑ **Brief Introduction to the Module**

This module will focuses on the main modes of thinking about computer programming. It includes the basics of basic computer composition, data types, storage structures, computational logic, function calls and wrappers, and data input and output knowledge. The module also contains extensive practical programming content, mainly in C++ and R programming languages, to train students in practical skills.

The module content will enable students to develop their computational logic thinking and practical programming skills. This module is to provide students with a solid foundation of knowledge for their future practical work in Big Data area.

❑ **Key Module Information**

Module name: Programming with C++/R

Module code: DTS102TC

Credit value: 5

Semester in which the module is taught: First Part of Semester 2, 2020-2021

Pre-requisites needed for the module: NA

Programmes on which the module is shared: BEng Data Science and Big Data Technology

❑ **Delivery Schedule (subject to changes of timetable setting from Registry)**

Lectures	
Time (Week 1 – Week 5)	**Teaching mode: onsite/online**
Mon. 4-6:30pm	**Mon. SC169 / Tue. SB102**
	https://learningmall.xjtlu.edu.cn/
Tue. 5-7:30 pm	**course/view.php?id=1388**
Labs	
Time (Week 1 – Week 5)	**Teaching mode: onsite**
Mon. 11-1pm for Class Group 1/D1	**PB310**
Thu. 4-7pm for Class Group 1/D2	
Tue. 1-3pm for Class Group 2/D1	**PB310**
Fri. 2-5pm for Class Group 2/D2	

Wed. 11-1pm for Class Group 3/D1	PB310
Fri. 5-8pm for Class Group 3/D2	
Seminar	
Time (Week 6)	**Teaching mode: online/onsite**
Wed. 9-11am	**SA164 / SB230**
	https://learningmall.xjtlu.edu.cn/
Wed. 11-1pm	**course/view.php?id=1388**

❑ **Module Leader and Contact Details**

Name: Huakang Li

Brief Biography: Dr. Li received his PhD in Computer Science and Technology from Aizu University, Japan. He currently focuses on research in the field of artificial intelligence and knowledge engineering, and has been awarded more than ten research projects and published dozens of international journal and conference paper. He has good teaching experience in data structures, algorithm design and information retrieval.

Email address: Huakang.li@xjtlu.edu.cn

Office telephone number: 0086-512-81888752

Room number and office hours: SC540C, Monday 2:00 pm - 4:00 pm, by appointment online

Preferred means of contact: E-mail

SECTION B: What you can expect from the module

❑ **Educational Aims of the Module**

This module aims to introduce concepts and principles of problem solving using the computer, and to produce software design in a language-independent manner. It also enables students to write and test C++/R programmes that match a software design, and give students experience and confidence in the use of a high level programming language to implement algorithms.

❑ **Learning Outcomes**

A. Demonstrate knowledge and understanding of basic principles of C++ programming language.

B. Demonstrate knowledge and understanding of basic software development process.

C. Develop software development skills covering program design, coding, testing, debugging and executing.

D. Demonstrate understanding of the principles of object oriented programming.

E. Demonstrate knowledge and understanding of basic principles of R programming language.

❑ **Assessment Details**

There will be two components of assessments:

Initial Assessment

Sequence	Method	Assessment Type (EXAM or CW)[2]	Learning outcomes assessed (use codes under Learning Outcomes)	Week	% of Final Mark	Resit(Y/N/S)[3]
001	Assessment 1 (Group)	CW	A, B, C, D	6	50	S
002	Assessment 2	CW	ALL	8	50	S

- Coursework assignment 1 (50%): submission deadline 6th April 2021
- Coursework assignment 2 (50%): submission deadline 19th April 2021

Resit Assessment

Sequence	Assessment Type (EXAM or CW)	Learning outcomes assessed (use codes under Learning Outcomes)	Duration	Week	% of Final Mark
R001	CW	ALL			100

The resit assessment [exam] will assess all of the learning outcomes of the module, and will be weighted as 100% of the final module mark. Other components of the assessment, regardless of whether or not the student passed or failed, will not be included in the calculation of the final module mark, following resit assessment.

❑ **Methods of Learning and Teaching**

The teaching philosophy of the module follows very much the philosophy of Syntegrative Education. This has meant that the teaching delivery pattern, which follows more intensive block teaching, allows more meaningful contribution from industry partners. This philosophy is carried through also in terms of assessment, with reduction on the use of exams and increase in coursework, especially problem-based assessments that are project focused. The delivery pattern provides space in the semester for students to concentrate on completing the assessments.

This module will be delivered through a combination of formal lectures, seminars and supervised computer laboratory sessions.

The concepts introduced during the lecture are illustrated using step-by-step analysis of example code, complete case studies and live programming tutorials. Each week the students have to solve a set of exercises during the laboratory classes and submit the completed work electronically.

The students are assisted during the practical laboratory classes by demonstrators.

❑ **Syllabus & Teaching Plan**

Syllabus:

Topics will typically include:
- Introduction to C++
- Flow of Control
- Functions
- Classes & Objects
- Arrays & Pointes
- Friend & Inheritance
- Polymorphism
- R language syntax and control & data structures
- Data import/export & Functions
- Graphics & R Package

Teaching Plan:

Week Number and/or Date	Lecture/Seminar/ Field Trip/Other	Topic/Theme/Title	Pre-reading
Week 1 Monday	Lecture 1	Introduction to C++	Ch1.1, 1.2, 1.3 Ch2.1, 2.3, 2.4~2.8
Week 1 Tuesday	Lecture 2	Flow of Control	Ch3.2~3.9 Ch5.2~5.6
Week 2 Monday	Lecture 3	Functions	Ch4.3~4.6 Ch6.2~6.8

Week 2 Tuesday	Lecture 4	Classes & Objects	Ch9.2~9.6 Ch10.2~10.6
Week 3 Monday	Lecture 5	Arrays & Pointes	Ch7.2~7.7 Ch11.2~11.5
Week 3 Tuesday	Lecture 6	Friend & Inheritance	Ch14.7~14.9 Ch15.2~15.5
Week 4 Monday	Lecture 7	Polymorphism	Ch15.6~15.9 Ch16.4~16.7
Week 4 Tuesday	Lecture 8	R language syntax and control & data structures	R for Beginners
Week 5 Monday	Lecture 9	Data import/export & Functions	Ch13.1~13.9
Week 5 Tuesday	Lecture 10	Graphics & R Package	Ch24.2~24.6 R Ch13.1~13.3

❑ **Practical Schedule**

Week **Number and/or Date**	Practical	Topic/Theme/Title
Week 1 D1	Lab 1	C++ Tutorial C++ Elementary Programming
Week 1 D2	Lab 2	C++ Selection C++ Loops
Week 2 D1	Lab 3	C++ Characters C++ Function
Week 2 D2	Lab 4	C++ Class C++ Objects
Week 3 D1	Lab 5	C++ Array C++ Points
Week 3 D2	Lab 6	C++ Friends C++ Inheritance
Week 4 D1	Lab 7	C++ Polymorphism C++ Exception
Week 4 D2	Lab 8	R Tutorial
Week 5 D1	Lab 9	C++ Input C++ Output
Week 5 D2	Lab 10	C++ Graph R Package

❑ **Seminar Schedule**

Week **Number and/or Date**	Time	Topic/Theme/Title	Lecturer/Instructor
Week 6 D1	9:00-11:00 am	Question and Answer Session	Huakang Li
Week 6 D2	11:00-1:00 pm	Question and Answer Session	Huakang Li

❑ **Reading Materials**

Optional textbook is a book in print that students can choose to purchase or not.

Title	Author	ISBN/Publisher
Introduction to Programming With C++	Y. Daniel Liang	9780273793243/Pearson

Reference Textbooks

Title	Author	ISBN/Publisher
C++ FROM THE BEGINNING	J. SKANSHOLM	9780201721683 /WEST
C++ HOW TO PROGRAM	PAUL DEITEL, HARVEY M. DEITEL	9780136117261 /PRENTICE HALL
STARTING OUT WITH C++ FROM CONTROL STRUCTURES THROUGH OBJECTS	TONY GADDIS	9781292119427 /PEARSON

SECTION C: Additional Information

❑ **Student Attendance**
Students who are able to be on campus are reminded of the Academic Policy requiring no less than 80% attendance at classes. Failure to observe this requirement may lead to failure or exclusion from resit or retake examinations.

❑ **Student Feedback**
The University is keen to elicit student feedback to make improvements for each module in every session. It is the University policy that the preferred way of achieving this is by means of an Online Module Evaluation Questionnaire Survey. Students will be invited to complete the questionnaire survey for this module at the end of the semester.

You are strongly advised to read the policies mentioned below very carefully, which will help you better perform in your academic studies. All the policies and regulations related to your academic study can be found in 'Student Academic Services' section under the heading "Policies and Regulations" on [**E-bridge**](#)**.**

❑ **Plagiarism, Cheating, and Fabrication of Data.**

Offences of this type can result in attendance at a University-level committee and penalties being imposed. You need to be familiar with the rules. Please see the "Academic Integrity Policy" available on e-Bridge in the 'Student Academic Services' section under the heading 'Policies and Regulations'.

❑ **Rules of submission for assessed coursework**

The University has detailed rules and procedures governing the submission of assessed coursework. You need to be familiar with them. Details can be found in the "Code of Practice for Assessment" available on e-Bridge in the 'Student Academic Services' section under the heading 'Policies and Regulations'.

❑ **Late Submission of Assessed Coursework**

The University attaches penalties to the late submission of assessed coursework. You need to be familiar with the University's rules. Details can be found in the "Code of Practice for Assessment" available on e-Bridge in the 'Student Academic Services' section under the heading 'Policies and Regulations'.

❑ **Mitigating Circumstances**

The University is able to take into account mitigating circumstances, such as illness or personal circumstances which may have adversely affected student performance on a module. It is the student's responsibility to keep their Academic Advisor, Programme Director, or Dean of School informed of illness and other factors affecting their progress during the year and especially during the examination period. Students who believe that their performance on an examination or assessed coursework may have been impaired by illness, or other exceptional circumstances should follow the procedures set out in the "Mitigating Circumstances Policy", which can be found on e-Bridge in the 'Student Academic Services' section under the heading 'Policies and Regulations'.

❑ **Learning Mall Online**

Copies of lecture notes and other materials are available electronically through Learning Mall Online, the University's virtual learning environment at: [Learning Mall @ XJTLU](#).