
The Module Form

CO1005 Data Structures and Development Environments

Credits: 20 **Convenor:** Dr T Ridge **Semester:** 2nd

Prerequisites: *Essential: CO1003*

Assessment: *Coursework: 100%*

Lectures: 30 hours

Surgeries: 10 hours

Laboratories: 20 hours

Classtests: 3 hours

Private Study: 90 hours

Subject Knowledge

Aims This module teaches advanced features of the Java language which require sophisticated design techniques and algorithms. Suitable program development environments are also taught.

Learning Outcomes Students should be able to demonstrate an understanding of the fundamental types of structured and dynamic data structure, their specification as abstract data types, and their implementation in Java. Students should be able to demonstrate an understanding of some of the main algorithms for processing dynamic datatypes, and to be able to write Java programs using these algorithms. Students should be able to analyse the behaviour of Java programs with the help of exceptions and structural testing. Students should be able to demonstrate an understanding of the programming and runtime environment of Java.

Methods Class sessions, recommended textbook, worksheets, feedback from markers and extensive web support.

Assessment Marked coursework, written examination, class tests, automated feedback.

Skills

Aims Students should be able to produce written work in a number of different formats; analyse problems, formulate strategies to solve them, design a plan, carry out the required research, implement and evaluate the solution; recognise the need for information, and then locate and access that information.

Learning Outcomes On successful completion of the module students should be able to:

- work with integrated development environments (IDEs).
- understand the design and implementation of object oriented data structures in Java.
- understand the development and implementation of suitable solution strategies for Java based applications.
- design and implement Java programs to satisfy problems of moderate complexity.

Methods Class sessions, worksheets with feedback from markers, Linux, Java 1.6, JRE plugin for web browser, Xemacs, JDE, CourseMarker, JUnit, Eclipse.

Assessment Marked coursework, class tests, written examination.

Explanation of Prerequisites Since its purpose is to lead the student on to more advanced programming concepts, the module assumes that CO1003, Program Design, has already been taken.

Course Description The purpose of the module CO1005 is to take the student beyond the elementary parts of the Java language as covered in CO1003, introducing advanced features of the language which require sophisticated design and development tools, techniques and algorithms. In particular, students would learn powerful features of Object oriented programming, complex data structures, exception handling techniques, methodologies and algorithms for sorting and searching over data structures. Additionally basic techniques for debugging and packaging java applications would be introduced.

Detailed Syllabus Inheritance, abstract classes and interfaces, stacks, linked lists, queues, trees. Abstract data types and their implementation in Java. Algorithms to handle structured data objects: arrays; sorting and searching, recursion. Basic exception handling. Testing, JUnit, structural testing; Java environments, command line compilation and linking. Debugger, tool support. Integrated Development Environments.

Reading List

- [A] C. Thomas Wu, *A Comprehensive Introduction to Object-Oriented Programming with Java*, McGraw-Hill.
- [A] David A Watt, Deryck F Brown, *An Introduction to Abstract Data Types, Data Structures, and Algorithms*, John Wiley and Sons.
- [A] Kathy Walrath, Mary Campione, Alison Huml, *The Java Tutorial: A Short Course on the Basics (Java Series) (Paperback)*, Prentice Hall PTR.
Also available online at:
<http://java.sun.com/docs/books/tutorial/index.html>
- [B] Michael T. Goodrich and Roberto Tamassia , *Data Structures and Algorithms in Java (4th edition)*, John Wiley and Sons.
- [B] Isaac Rabinovitch, Sharon Zakhour, Scott Hommel, Jacob Royal and Thomas Risser, *The Java Tutorial, Fourth Edition*, Prentice Hall, Fourth edition, 672 pages.
- [B] W. J. Collins, *Data Structures and the Java Collections Framework; ISBN: 0071114076*, McGraw-Hill.
- [C] Robert Sedgewick, *Algorithms in Java, Parts 1-4, 3rd Edition*, Addison-Wesley.
- [C] U. Manber, *Introduction to Algorithms: a Creative Approach*, Addison-Wesley.

Resources Departmental web page, text book web site, study guide, worksheets, handouts, lecture rooms computer projection facilities and OHPs, past examination papers.

Module Evaluation Course questionnaires, course review.

General Information

1 General Timetable The module starts on Thursday January 18, 2018. The first session is at 09:00.

The weekly pattern is:

Types of session:

LEC - lecture; CC - computation class; SUR - surgery; TST - test

Time and type	Weeks (or week)	Room	Week 26?
Tue 12:00 13:00 LEC	27-36	ATT LT1	
Thu 09:00 10:00 LEC	26-35	ATT LT1	X
Thu 13:00 15:00 CC1	26-35	CW 301	X
Thu 15:00 17:00 CC2	26-35	CW 301	X
Thu 17:00 18:00 SUR	27-35	ATT LT1	
Fri 10:00 11:00 LEC	26-28,30-31,33-34	ATT LT1	X
Fri 10:00 11:00 TST	29	ATT LT1	
Fri 10:00 11:00 TST	32	ATT LT1	
Fri 10:00 11:00 TST	35	ATT LT1	

Students attend one of either CC1 or CC2

In the above table, weeks are "CMIS" weeks, which start as follows:

Date	CMIS week	Module week
15/01/2018	26	1
22/01/2018	27	2
29/01/2018	28	3
05/02/2018	29	4
12/02/2018	30	5
19/02/2018	31	6
26/02/2018	32	7
05/03/2018	33	8
12/03/2018	34	9
19/03/2018	35	10
26/03/2018	36	11

The module homepage can be found from <https://campus.cs.le.ac.uk/teaching/resources/C01005/>. It should contain the most up-to-date information.

2 Surgeries Surgeries give you an opportunity to ask questions about all aspects of the module and develop your skills on how to approach the problem in the assessed work. Students must attend surgeries.

Surgeries are as timetabled above.

3 Laboratories Lab sessions give you the opportunity to develop your programming skills and get guidance on all aspects of the assessed work. Students must attend one of the two sessions below. The

class will be divided into two groups. Allocation of the groups will be made available in the first few sessions of the module.

Labs are on Thursday at 13:00 (group CC1) and 15:00 (group CC2) in CW 301.

4 Problem Classes There are no problem classes for this module.

5 Coursework There will be three class tests. Each test must be completed individually. We aim to provide feedback within two weeks of submission (10 working days).

The weights are as follows:

Coursework	Weighting
CW1	20%
CW2	30%
CW3	40%

The class tests are on Friday. See timetable above for further details.

Class tests count for 90% of the overall module mark. In addition, 10% of the module mark will be awarded for engagement with the labs. This will be assessed by looking at lab submissions from students, and marking each lab on a pass/fail basis. To pass a lab, a student must show significant engagement with the material during the lab session itself. To demonstrate this, the student uploads the log of their session (the log is produced by the “feedback machine”). Details will be given in the first lecture, and the process will be trialled in the first lab.

Coursework accounts for 100% of the total module mark; hence this module is a *coursework only module*. Coursework includes all worksheets, problemsheets, tests and so on.

You should appreciate that coursework is the sole component of the formal assessment on this module. In particular, failure to attempt a worksheet has two consequences: first, you will find it much more difficult to understand the material, and second, you will have to score higher on the remaining pieces of coursework than would otherwise have been the case in order to pass the module.

Normally, in order to *complete* the assessment on this module you need to have participated in over 50% of weighted coursework. Students who do not satisfy this rule will be deemed as not having completed the assessment on the module.

Moreover, note that, for an absence in a class test or a non submission of a major piece of coursework such as a mini project, a self certification alone is not sufficient. You need to provide a medical note or other appropriate evidence. Your absence would then be given due consideration. If no evidence is provided, you will receive a mark of 0. Overall, this missed assessment will not count towards the 50% weighted coursework that you must participate in.

6 Feedback The University Policy on the Return of Marked Work promises that you will receive marks and/or feedback on your coursework within **21 calendar days**.

<http://www2.le.ac.uk/offices/sas2/quality/student-feedback/return-of-marked-work>

The Department of Informatics will always strive to meet this 21 calendar day deadline, and *in many cases we will return marks and feedback within 10 working days*. Please also see Section 10.

When the marking has been completed, you will receive feedback, which includes the grade that you gained for the coursework and information to help you improve. The department has a standardised way to give feedback, which is a short document entitled *Coursework Feedback* which will be made available

for every assessed piece of coursework. These documents will detail how and when feedback for the coursework was or will be given. They will be available as pdf files on the module's resources website.

Improvements to the module from last year include . . .

This module is continually being refined. Details of recent changes can be found on the module webpage. If there is anything that you feel can be improved, please contact the convener as early as possible.

7 Module Assessment The module mark is the coursework mark. You require 40% to pass the module.

Note that assessment arrangements and calculations are likely to be different if you are resitting.

The reassessment for this module will be in the form of a single written examination.

8 Attendance at Surgeries and Problem Classes The nature of your academic obligations varies from course to course. In the case of all the Informatics modules offered by the Department of Informatics, the obligations include attendance at all surgeries, problem classes and laboratories. The surgeries, problem class sessions and/or supervised laboratories offered on these modules make a vital contribution to the learning process needed if you are to pass the module. Experience has shown that students who fail to attend these sessions do significantly worse than those who do attend. It has therefore been decided (see 3.3 of Policy on Attendance at Timetabled Teaching Events

www2.le.ac.uk/offices/sas2/regulations/documents/policy-for-attendance-at-timetabled-teaching-events)

that attendance at all surgeries, problem classes and laboratories is a **requirement of this module**. Registers of attendance in addition to University monitoring may be kept. The department can decide that students who do not attend **may have their registration withdrawn**.

In the event that you miss a surgery, problem class or laboratory due to illness or other such reasons, it is essential that you inform the module convener (you must also read Sections 12 and 12) so that this fact can be recorded. If you are having problems, you should discuss them with the module convener and/or your personal tutor (or other members of staff as appropriate).

9 Students with Specific Learning Difficulties and Long Term Conditions The *AccessAbility Centre* of the University offers services and support for students with dyslexia, and other specific learning difficulties, disabilities and long term conditions. Each academic department has an *AccessAbility Tutor*. In Informatics this role is performed by the Welfare Tutor, *Dr Fer-Jan de Vries*. He is the person within the department who you can talk to about any disability-related issues. You can find more details in the Student Handbook in the *Personal Support for Students* section. Assessment in Informatics can take many forms. You may have been provided with an *Assessed Work Cover Sheet* by the AccessAbility Centre which you should attach to your written assessments so that your work can be properly assessed by the module convenors. You might also require special arrangements for class tests and oral assessments (such as additional time, quiet rooms or handouts in specific formats) in which case you should discuss your needs with the AccessAbility tutor at least 7 days prior to such assessment for appropriate arrangements to be made.

10 Late Submission of Course Work Please note that every assessed/summative or formative coursework (worksheet/problemsheet/etc) in the Department of Informatics has a deadline for submission. We need you to meet these deadlines, since it is in your interest that we keep to the prearranged timetable for the marking and return of coursework so that you receive constructive feedback on your progress in good time. *Remember that the University policy is for all feedback to be issued within 21 calendar days of the coursework submission date. In Informatics we aim to better this wherever possible, but remember that quality marking and feedback does take time.*

In Section 5 we specify the submission and return dates for individual courseworks, and hence a *turnaround time in working days* for marking and feedback.

The following rules apply in regard of late submission of coursework.

Turnaround of More Than 10 Working Days

We adopt the standard University Rules of Assessment:

- www2.le.ac.uk/offices/sas2/regulations/documents/senatereg7-assessment.pdf
- www.le.ac.uk/sas/assessments/late-submission.

Roughly speaking, you may submit after the submission date, but *you will immediately lose 10% (of the maximum mark available, even if only a minute late), and a further 5% for each further whole day late*. Thus it is still *essential that you submit your coursework in time* in order to ensure you have obtained the best mark possible.

Turnaround of 10 Working Days or Less

- The submission deadline stated is a **strict deadline**, there will be **no late submissions** and work handed in late will receive **no marks**.

We adopt this policy to show fairness to all students. On the occasions where we return coursework within 10 working days, there are often tight schedules that markers have to work to and you **must** make sure that you submit your coursework by the due date. The strict date also allows the possibility for early general feedback before marked work is returned. The processes do **not** allow for late submissions.

In the event of your being unable to do coursework because of illness or other bona fide reason, allowance will be made provided that a medical certificate or other adequate documentary evidence is produced (see Sections 12 and 12). For coursework only modules, note also the 50% rule concerning the completion of coursework in Section 5.

In view of the importance of handing in work on time, you need to make a conscious effort to organise your time effectively. Note in particular that when we allocate, say, three weeks for a piece of coursework, we mean that it will take you three weeks (allocating the correct proportion of your time to the module) to carry out the work. You will not be able to meet the deadline if you spend two and a half weeks on something else and then try to do all the work in the last three days.

11 Plagiarism The issue of plagiarism is very important. You **MUST** read the University's statement and the departmental regulations concerning plagiarism. These can be found in the University Regulations at

www.le.ac.uk/sas/assessments/plagiarism

and in the Student Handbook in the *Referencing and Academic Integrity* section.

The University regards plagiarism and collusion as very serious offences and so they are subject to strict penalties. The penalties that departments are authorised to apply are defined in the Regulations governing student discipline, see

www.le.ac.uk/senate-regulation11

12 Mitigating Circumstances Please note that the way in which MCFs are submitted will change during 2017/18 and you will receive information about this later on. This text is for guidance only; definite information appears on University web pages.

The University considers a mitigating circumstance to be a recognisably serious or significant event, affecting your health or personal life which is beyond your control, which results in you being unable to attend, complete, or submit an assessment on time.

It is **your** responsibility to inform your department(s) of any matters (whether of an academic, personal, medical or other nature) which may be relevant to your academic performance, and to supply substantiating evidence, for example, a medical certificate. Such information **must be submitted promptly** (see details below).

In general terms, the presentation of medical or other special circumstances does not of itself guarantee that academic concessions will be granted. Cases are considered on their merits in the light of the extent to which the adverse circumstances might reasonably be deemed to have affected your performance or justified a failure to meet deadlines.

For further information see the Student Handbook and also

<http://www.le.ac.uk/sas/regulations/mitigation>

The Informatics Department expects you to report on your illness or other mitigating circumstances via our *online form*¹ at

<https://campus.cs.le.ac.uk/MCF/>

You must provide the Department with a medical certificate as well if the illness has serious consequences.

In more detail:

- Students who suffer a minor illness that leads to absences from classes or labs must self-certify their illness using the online form as soon as they are fit to do so, no later than five working days after return to the University.
- Students who suffer an substantial illness
 - that prevents them from doing a class test or handing in a coursework, or
 - which might be a contributory factor in a failure to meet course deadlines or to perform up to expectations in any academic assignment, or
 - that leads to an absence during an exam, or
 - has a duration of more than seven days

should seek medical advice, submit a medical certificate to the Departmental Office, and also fill in the above online form as soon as they are fit to do so, no later than five working days after return to the University.

Note that an MCF for missed class tests or mini-projects normally needs to be supported by a medical certificate: see Section 5.

Note some further regulations:

- Students are responsible for collecting medical certificates from the Victoria Park Health Centre and supplying a copy to the Office of the Department.

¹Until a new University system begins operation.

- Students registered with other general practices should ensure that their medical certificates are similarly distributed.
- **In order for your Board of Examiners and Mitigating Circumstances Panels to approve mitigating circumstances submitted during the year, and in particular any mitigating circumstances that occur during the examination periods, all relevant information/forms must be submitted by 12 noon of the Friday one week after the end of the January and Midsummer examination periods or by 12 noon of the Wednesday following the end of the September examination period.**
- Appeals against degree classification and appeals against termination of course may be disallowed if the appeal is based on mitigating circumstances which the appeals panel believes should have been communicated earlier to the department concerned.