

CSC9Y4 Programming Language Paradigms

Lecturers

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Prerequisites

CSC933 / CSC993

Credits

22 credits at SCQF level 9

Learning Outcomes

The student should know and understand:

- The principal programming language concepts and the way they are dealt with in the imperative, object-oriented, functional and logic language paradigms
- The underlying principles behind language design and see that superficially very different languages are often, in fact, very similar
- How modules and classes can be used to structure large programs and how they provide abstraction, information hiding and encapsulation
- The central role of data structures in language design
- The use, implementation and complexity of data structures and an appreciation of where each is appropriate
- How to employ simple formal grammars for sentence generation and parsing.

Transferable Skills

- Ability to plan work, to understand how tasks can be specified, to undertake independent creative activity and to bring it to a successful conclusion.
- Ability to organise and present technical material in written form.

Contents

- The imperative (procedural and object-oriented) language paradigm including: types, variables, declarations, expressions, statements, procedures, methods, parameter passing, modules and classes.
- Inheritance and dynamic binding in the object-oriented language paradigm.
- Storage allocation: run-time stack, heap storage and garbage collection.
- Data abstraction and libraries, iterators, the hiding of implementation detail in collections.
- Definition of syntax and semantics.
- The functional and logic language paradigms.
- Scripting languages and the impact of the Internet on language design.

Assessment

Laboratory Checkpoints (Data Structures and Prolog) 25%;

Investigation/report (Comparative Languages) 25%;

Examination 50%

Textbooks

Comparative Programming Languages, L B Wilson and R G Clark (3rd edition, updated by R G Clark), Addison Wesley, 2001. Strongly Recommended.

Requirements

In order to obtain a pass grade for the module you must

- Submit all items of assessed coursework
- Attend the examination.

If you fail to submit any item of assessed coursework you will be awarded no grade for the module as a whole. This rule may be relaxed for students who can show good cause for failure to submit. 'Good cause' may include illness (for which a medical certificate or other evidence will be required).

If you are unable to attend the exam, you must apply to the Student Programmes Office for a deferred exam. The University has established procedures for this: further information is available from the Student Programmes Office.

In addition, Regulation 14 of the University's First Degree Regulations sets out attendance rules for classes that have been defined by the Department as prescribed. In this module, the prescribed classes are the tutorials and practicals. Students should note that failure to attend classes (lectures, tutorials or practicals) severely jeopardises your chances of passing the module.

CSC9Y4 Schedule

Lectures: The first lecture will be on Thursday 17th February in 2A19 at 1200.

Day	Time	Room
Thursday	1200	2A19
Friday	1400	2B48

Note the schedule below. Lectures are not planned in every slot.

Tutorials

One tutorial per week.

Wednesday	0900	4B94
Thursday	1100	4B94
Friday	1200	4B94

You can sign up for a tutorial time for this module via WebCT.

Tutorials will commence on **Wednesday 23rd February**.

A problem sheet will be made available before the tutorial class and students are expected to attempt *all* problems before coming to the tutorial.

Practicals

One practical per week on Friday at 1100 in 2A15.

The first practical is on **Friday 25th February**. See the schedule below – practical classes do not run every week. A work sheet will be made available before the practical class and students are expected to attempt much of this before coming to the practical.

Assignment Details

Assessment is based on checkpoints (one in each practical session), and a comparative languages report, due at 4pm on **15th April 2011**.

Schedule

	PRACTICAL	TUTORIAL	LECTURE	LECTURE
	Fri 1100 (2A15)	Wed 0900/ Thur 1100/ Fri 1200	Thu 1200 (2A19)	Fri 1400 (2B48)
Week of Feb 14			CES (basics)	CES (procs)
Week of Feb 21	Prac 1 – lexical elements	Tut 1 - design	CES (types 1)	-
Week of Feb 28	Prac 2 - collections	Tut 2 - procs	CES (types 2)	-
Week of Mar 7	Prac 3 - collections	Tut 3 - generics	CES (references)	-
Week of Mar 14	Prac 4 - collections	Tut 4 - bindings	CES (parameter passing)	-
Week of Mar 21	Prac 5 - collections	Tut 5 - references	-	CES (syntax and semantics)
Week of Mar 28	mid semester	mid semester	mid semester	mid semester
Week of Apr 4	Prac 6 - Prolog	Tut 6 – syntax & semantics	LSS (prolog)	LSS (prolog)
Week of April 11	Prac 7 - Prolog	Tut 7 - prolog	LSS (scripting)	LSS (scripting)
Week of Apr 18	-	Tut 8 – prolog & scripting	LSS (scripting)	Good Friday
Week of Apr 25	-	Tut 9 - scripting	CES (fp)	Royal Wedding
Week of May 2	-	Tut 10 - fp	revision	-

Depending on progress, free slots (marked “-“) may have classes allocated later in the semester.