

## Subject Outline

UTS: Information Technology  
Autumn semester 2010; City  
Credit points: 6 cp

Recommended studies: general computer science/information systems/software engineering

Result type: Grade and marks

## Subject coordinator details

Professor Brian Henderson-Sellers  
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## Teaching staff

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## Subject description

This subject looks at the basic principles of object technology (including classes, types, interfaces, different forms of inheritance, responsibilities, design by contract, abstraction and polymorphism); object-oriented software development; detailed modelling with UML (metamodel and notation) including classes, objects, interfaces, relationships and use cases; advanced modelling (roles, responsibilities and stereotyping); and the use of UML in practice.

## Subject objectives

The objectives of the subject are to provide a solid grounding in object-oriented modelling using the UML (International Standard ISO/IEC 19501) as the notation and its application in practice. Specifically the objectives are as follows:

1. Provide the basic concepts of object technology and OO modelling
2. Provide an understanding of how modelling can be used in practice and where the Unified Modelling Language fits in practical modelling
3. Develop well-documented UML-based artefacts from the early phases of the development process for the case study.
4. Define system domain, system boundaries and system interfaces
5. Create a Model of the Problem Space and a Model of the Solution Space using an industrial CASE tool;
6. Demonstrate skills for successful participation in a small development team, including: distributing the development workload, resolving disputes, running meetings, and taking minutes.

## Contribution to graduate profile

The objectives of the subject are to provide a solid grounding in the UML and associated concepts together with the application of these concepts to modelling. Specifically:

1. Basic concepts of object technology
2. Basic understanding of UML; Advanced structural use of UML.
3. Advanced behavioural use of UML
4. Practical experience with UML

## Teaching and learning strategies

Each week's format will be a lecture-style presentation (approximately 2 hours) of the concepts of object-orientation, the Unified Modeling Language (UML) notation and supporting modelling techniques. A laboratory session will also be conducted every week (1 hour) in the labs in Building 10 using a commercial drawing tool (Visual Paradigm or Visio). During the laboratory (tutorial) session, students will work through a case study in groups. The detailed problem statement for the case study will be separately provided and "model answers" may also be discussed in the laboratory.

The subject will have one Mid-Term test of 90 minutes. Students will get feedback on their performance through this test. The schedule throughout the semester is provided later in this document.

## Content

(POOA is Practical Object Oriented Analysis; POOD is Practical Object Oriented Design; details of these books later in this outline; as also the actual sequence of presentation of topics).

1. Fundamental of Object Orientation & Relevance of the three modelling spaces (Problem, Solution and Background) to Object Orientation (POOA-Chapter 1; POOD-Chapter 1)
2. The Unified Modeling Language (UML) of the Object Management Group (POOA-Chapter 2; POOD-Chapter 1); Organizing your project using Packages (POOA-Chapter 3)
3. Advanced Class Definitions (POOD-Chapter 2); Extensibility mechanisms (POOA-Chapter 5)
4. Advanced Class Diagrams (POOD-Chapter 3; POOA-Chapter 6)
5. Interaction Modelling with Sequence Diagrams (POOD-Chapter 4; POOA- Chapter 7)
6. State Machine Diagrams to Model dynamic object states (POOA-Chapter 7; POOD-Chapter 5)
7. Actors and Use cases (POOA-Chapter 4); Use case diagram (POOA-Chapter 5)
8. Activity diagrams and process modeling (POOA-Chapter 5)
9. Implementation Diagrams – component and deployment diagrams (POOD Chapter 8)
10. Emerging technologies and OO Design (Advance Topics – POOD Chapter 10)

## Program

Week	Dates	Description	Notes
1	01 Mar	Lecture: Introduction to the Subject; Module 1	Fundamentals of Object Orientation & Relevance of the three modelling spaces (Problem, Solution and Background) to Object Orientation (POOA-Chapter 1; POOD-Chapter

1)

2	08 Mar	Lecture: Module 2	The Unified Modeling Language (UML) of the Object Management Group (POOA-Chapter 2; POOD-Chapter 1); Organizing your project using Packages (POOA-Chapter 3)
3	15 Mar	Lecture: Module 3	Advanced Class Definitions (POOD-Chapter 2); Extensibility mechanisms (POOA-Chapter 5)
4	22 Mar	Lecture: Module 4	Advanced Class Diagrams (POOD-Chapter 3; POOA-Chapter 6)
5	29 Mar	Lecture: Module 5	Interaction Modelling with Sequence Diagrams (POOD-Chapter 4; POOA-Chapter 7)
6	05 Apr	Lecture: Review of Modules; Practice	Format of the test discussed.
7	12 Apr	Mid-Term Test-90 mins, Closed book	
-	19 Apr	Non-Teaching Week	
-	26 Apr	Non-Teaching Week	
8	03 May	Lecture: Module 6	Actors and Use cases (POOA-Chapter 4)
9	10 May	Lecture: Module 6a; Module 7	Use case diagram (POOA-Chapter 5); Activity diagrams and process modeling (POOA-Chapter 5)

10	17 May	Lecture: Module 8	State Machine Diagrams to Model dynamic object states (POOA-Chapter 7; POOD-Chapter 5)
11	24 May	Lecture: Module 9	Implementation Diagrams – component and deployment diagrams (POOD Chapter 8)
12	31 May	Lecture: Module 10	Emerging technologies and OO Design (Advance Topics – POOD Chapter 10)
13	07 June	Lecture: Review opportunity	Final exam format discussed; Project report submitted.

### Additional information

Assumed knowledge - general computer science/information/systems/software engineering.

Pass mark is 50% overall with a mark of at least 50% on the project assignment.

Students are reminded of the principles laid down in the Faculty's Statement of Academic Integrity - Good Practice and Ethics in Informal Assessment found at; [wiki.it.uts.edu.au/start/Academic\\_Integrity](http://wiki.it.uts.edu.au/start/Academic_Integrity).

The University's rules regarding academic misconduct can be found at; [www.gsu.uts.edu.au/rules/16-2.html](http://www.gsu.uts.edu.au/rules/16-2.html)

Assignments in this Subject should be your own original work. The inclusion in assessable work of any material such as code, graphics or essay text obtained from other persons or sources without citation of the source is plagiarism and is a breach of University Rule 16.2.2.

Any collaboration with another person should be limited to those described in the "Acceptable Behaviour" section of the Statement of Academic Integrity. Similarly, any group work should be the result of collaboration only within the group. Any infringement by a student will be considered a breach of discipline and will be dealt with in accordance with the Rules and By-Laws of the University.

Students are not to give to or receive from any other persons copies of their assessable work in any form (hard copy or an electronic file). To do so is 'academic misconduct' and is a breach of University Rule 16.2.2. That is, assisting other students to cheat or to act dishonestly in a submitted assignment.

Accidental submission of another students work as your own is considered to be a breach of University Rule 16.2.2 in that you are acting dishonestly since you should not have a copy of another student's work.

The Faculty penalty for proven and serial misconduct of this nature is zero marks for the Subject. For more information go to;

[wiki.it.uts.edu.au/start/Academic\\_Integrity](http://wiki.it.uts.edu.au/start/Academic_Integrity) >.

## Standard of Individual Work

This is a postgraduate subject and a postgraduate standard of research, resourcefulness, originality and clarity is expected. You are expected to conceptualize the problem or issue, find relevant references for context, facts, theory and examples, come up with a point of view (not necessarily one sided) and support that point of view with argument and references. In some cases, the "point of view" will be a design proposal. Your presentations should be written as if they are addressing an audience, not attempting to satisfy course requirements.

While a novice to the topic, you are not expected to be able to assess fully the accuracy of your references, you should show evidence of some judgement. References (both paper and electronic) may be learned articles, monographs published by known publishers, trade articles, news articles, course notes or texts, or unsubstantiated personal opinion. Different references have different levels of validity. For example, an example from Company X saying that their product Y is far superior to any others should not be taken at face value. You always need to make some judgement of validity of sources before you use them. This responsibility can be partly left to the reader if you reference your sources well enough (i.e. if you tell the reader who said it, where and when, the reader can make a judgement themselves). Never include material in your work that you don't yourself understand. The proper way of referencing for this subject is the Harvard system (e.g. Henderson-Sellers, 2002). The unacknowledged use of the words or ideas of others in your work is known as plagiarism and is totally unacceptable to the University. Rumours of the practice of plagiarism damage the reputation of your degree and cause resentment among students who see that some people are gaining marks unfairly. In the long run, if you do not do your own work, you will not learn what you need to know for your profession and this will become apparent to your employers and damage your own career. If you are detected practicing plagiarism you will be reported to the Responsible Academic Officer (RAO). The Faculty penalty for proven misconduct of this nature is zero marks for the subject. The best way to avoid any temptation to plagiarism (and to do high standard work) is to develop a feeling of ownership for your work, to think "this is what I believe and I will justify it".

If you think you need help with your English, or feel unable to express yourself correctly in assignments, contact the English Language Study Skills Assistance (ELSSA) Centre, Level 18 Tower Building, Broadway, phone 9514-2327.

## Assessment

### Assessment item 1: Mid-session Test

**Objective(s):** 1 and 2

**Weighting:** 10%

**Task:** The mid-session test will examine the material presented in the class thus far covering objectives 1 and 2. The specific topics for the test will also be discussed in the class.

### Assessment item 2: Project Assignment

**Objective(s):** 4, 5 and 6

**Weighting:** 40%

**Due:** The deadline for the assignment is 6 p.m. in Week 13 i.e. June 10th. The written report should be handed to the lecturer in class by the stated deadline.

**Task:** The project work assignment is a group work assignment, which will give hands-on experience in developing an object-oriented model using UML.

**Further information:** Late work will receive the following penalty:  
2-15 minutes late – 10% penalty; more than 15 minutes late – 50% penalty. If the mark plus penalty results in a mark less than 50%, then the assignment mark will be set at 50%. The assessable assignment is to be undertaken in groups. It is anticipated that some part of the assignment work will generally be done out of lecture hours. Each project submission is to be accompanied by a statement, signed by all team members, stating the percentage contribution of each team member. For example, in an equally contributing team of five, all contributions would be labelled 20%. In the case of unequal contributions, the individual's mark will be weighted according to their relative effort and contribution.

If any group member has concerns regarding any intra-group conflicts, they must discuss this first with the lecturer and, failing that, the subject co-ordinator.

To gain an overall pass in the subject, a mark of at least 50% on the project assignment must be obtained.

**Assessment criteria:** The marks for the assignment report will be allocated as follows:

- 40% for the analysis and design document - mostly UML diagrams
- 40% for an explanation of the diagrams as documented plus some brief discussion of the process of deriving them
- 20% for a discussion of 'lessons learned' i.e. a critique of the UML (bad and good features)

### **Assessment item 3: Final examination**

**Objective(s):** 1-3

**Weighting:** 50%

**Task:** The final examination, covering all the material in the subject.

**Further information:** A supplementary examination will not be offered in this subject.

## Recommended texts

1. Practical Object Oriented Analysis, 2005, Unhelkar, B., Thomson/Cengage (POOA)
2. Practical Object Oriented Design, 2005, Unhelkar, B., Thomson/Cengage (POOD)  
(Use ISBN: '0170994422' for SHR PRAC OBJ ORIENTED ANALYSIS/DESIGN from Cengage) as both books together are available for considerably cheaper price than individual copies.

## Other resources

1. lecture slides available on UTS online
2. Subject co-ordinator homepage: <http://www-staff.it.uts.edu.a/~brian>
3. OPEN - <http://www.open.org.au>
4. COTAR - <http://www.cotar.uts.edu.au>
5. OMG - <http://www.omg.org>
6. [www.methodscience.com](http://www.methodscience.com)