UNIVERSITY OF WALES, ABERYSTWYTH

Department of Computer Science

Service Modules
Level 1
1995-96

Contents

Computer Science Service Modules

Introduction

Outlined in this brochure are the Level 1 modules in Computer Science intended for students who are not specialising in Computer Science or Software Engineering.

These modules are:

- **CS10010** "Introduction to Computing"
- **CS10510** "Computer Packages for Analysing and Presenting Data"
- **CS10610** "Databases
- **CS10810** "Computing and Information"

We aim to provide useful and relevant courses for students whose main interests lie in other subjects. These modules equip students with an appreciation of, and an ability to work confidently with, computer technology, but do *not* lead forward to honours courses in this department.

With this objective in mind, the modules should be of interest both to those whose main interest is in another field, but who have a desire to become generally better acquainted with computing, and to those with a specific wish to learn techniques applicable to their field, such as database manipulation, spreadsheet use, wordprocessing and graphics.

Because of their introductory nature, none of these modules is available to students who have studied computing at A-level or equivalent or who have significant experience of using computers.

The modules make use of the College's IBM PC clones. As appropriate, these are used as workstations running applications packages, or as terminals to mainframes.

Combinations of these Modules

Provided there is sufficient demand, **CS10010** "Introduction to Computing" will be offered in both semesters. It requires no previous experience and provides an appropriate qualification for **CS10510** and **CS10810**. **CS10610** requires some limited previous experience of computing.

CS10610 "Computer Packages for Analysing and Presenting Data" will be offered in the first semester. **CS10510** "Databases" and **CS10810** "Computing and Information" will be offered in the second semester.

There are similarities between the modules **CS10610** "Databases" and **CS10810** "Computing and Information". They are, in fact, quite different in approach and background, the former being designed for students in the Sciences, the latter for students in the Arts and FESS. What similarities there are, however, preclude us from offering them jointly.

General Advice to Students

The practical work is very important; one cannot become proficient at using computers without practice. What is more, it is time consuming and cannot be done in a hurry, so it is most important for you to keep abreast of practical assignments as they are set.

It is expected that students will spend some of their own time, over and above that spent in the practical sessions, working on the assignments associated with these modules. The extent of this varies between the modules.

Most practical assignments will have more than one component. Often these are, to some extent, independent. You should beware of concentrating on one component to the exclusion of others since marks will be available for each component and a good overall mark cannot be achieved on the basis of only one.

The following recommendations should be carefully noted.

- Spread out the work load for practical assignments evenly throughout the time allotted. Leaving work to accumulate near a deadline usually means that there are insufficient computing resources available to complete the work on time.
- Come to the computer prepared with detailed plans of action.
- Use the published lists of available terminal rooms and the times at which they are available to plan your work schedule carefully.

Although zeal in one's studies is generally accounted a very good thing, there are dangers. Some students can become hooked on computing to the detriment of their studies in other subjects. If you find that you have a talent for computing and that you enjoy it, beware of spending a disproportionate amount of your time doing it. If you can complete the practical assignments well within the set time, spend the rest of the time working on your other subjects.

Additional Information

All students following modules in the Department should receive a copy of a departmental "Student Handbook". This should be read carefully and acted on. 1.2

Descriptions of Modules

The rest of this brochure provides details for each module.

CS10010 Introduction to Computing

General Description

This is a basic introduction to the use of computers, intended for students with no previous experience of computers. It is available to students in any faculty. Students who complete the course successfully will be able to use personal computers for word processing and will be familiar with files, directories, discs and printers. They will also be able to use the more common utility programs (e.g. the file manager) and have some familiarity with the ideas of spreadsheets and databases.

Commitment	Number of lectures	12
	Number of workshops	-
	Number of practicals	20 x 2 hours
Co-ordinator	Dr. John Hunt	
Other staff	Not yet known	
Pre-requisites	None	
Co-requisites	None	
Incompatibilities	Not available to students who have significant experience of using computers	
Assessment	Assessed coursework - 100%	
Timing	This module is offered in both Semester 1 and Semester 2	

Aims

This module provides an introduction to the use of computers by:

- introducing the range of computer equipment, its availability and capability and thereby encouraging an understanding of the principles *and*
- by developing skills which will both be of value outside the course and will give experience and insight to strengthen the broader understanding.

Consideration of the applicability of the technology to students' main disciplines will be encouraged. This module is not designed to develop an understanding of technical aspects of computing.

Objectives

On successful completion of the module, students should have an understanding of:

- what hardware components are found in typical computer systems and broadly what their functions are
- typical cost and performance characteristics of the range of technologies and products such as: processors, primary store, secondary store, displays, printers, pointing devices, and digitisers
- the range of software (from operation systems, file systems and display managers, through utility programs, language systems and general packages to highly specialised packages) and an outline of its value to the user
- the potential benefits of computer technology to academics, in particular in the areas of document production and of data storage and retrieval

- the costs and possible disadvantages of using the technology
- legal and ethical problems in using the technology.

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

- create and manage disc file systems under Microsoft Windows
- produce effective and well designed documents of significant complexity using a word-processor of reasonable sophistication
- create graphics (using bit-mapped and object based packages) and charts and include them in wordprocessed documents
- create and use simple spreadsheets
- create and use simple, single table databases
- use electronic mail
- use on-line services such as the CD-ROMS and OPACs
- evaluate and select appropriate equipment for a range of non-technical applications; this to include software and display, printing and storage devices

Syllabus

1. INTRODUCTION — 1 lecture
   Course organisation. Aims and Objectives.
2. SURVEY OF SOFTWARE — 2 lectures
   Operatings systems; user interfaces, utilities; applications programs; user written programs.
3. SURVEY OF HARDWARE — 2 lectures
4. GRAPHICS APPLICATIONS — 1 lecture
5. DATABASES — 2 lectures
6. SPREADSHEETS — 1 lecture
7. DATA PROTECTION LEGISLATION — 1 lecture
8. DOCUMENT PREPARATION — 1 lecture
9. ADVANCED APPLICATIONS — 1 lecture
10. MICROSOFT WINDOWS — 1 practical
    General use and manipulaton of Windows.
11. E-MAIL; FILES I. — 1 practical
    Creation, manipulation and maintenance of a directory structure.

12. WORD PROCESSOR 5 practicals
General use of Microsoft WORD.
13. FILES II 2 practicals
Revision of the use of directory structures following practical experience of them.
14. GRAPHICS 2 practicals
Bit mapped and object orientated graphics applications (Mircrosoft Paint and Draw).
15. SPREADSHEETS 2 practicals
A brief introduction to the potential of spreadsheets (using Microsoft Excel).
16. DATABASES 2 practicals
Experience of setting up a simple database; search and report generation.
17. ASSIGNMENTS 4 practicals
Time is allocated for the work on assignments.

Booklist

The following should be consulted for different approaches or for further information:

Nancy B. Stern and Robert A. Stern. *Computing in the Information Age*. John Wiley and Sons
1.2 Inc, New York, 1993.

CS10510 Computer Packages for Analysing and Presenting Data

General Description

This module is designed primarily for students in the Faculty of Science, but is also suitable for students studying Accounting or Economics.

Throughout, the emphasis is on the use of the computer system as a tool to facilitate the presentation and analysis of data gained, perhaps, by experiment or field-work.

On successful completion of the module students will be able to use a spreadsheet, a simple statistical package, and a graphics package.

Commitment	Number of lectures	24
	Number of workshops	0
	Number of practicals	10 x 2 hours
Co-ordinator	Dr. John Hunt	
Other staff	Not yet known	
Pre-requisites	A grade C or better in GCSE Mathematics (or equivalent). **CS10010** or equivalent knowledge and experience.	
Co-requisites	None	
Incompatibilities	Not available to students who have studied A-level Computing (or equivalent). **CS11010**	
Assessment	Assessed coursework - 50% Written exam - 50% To pass the module, both components must be passed. There will be three practical assignments (one on each package), and students will be required to keep a practical file. The best three of these four pieces of work will provide the coursework assessment.	
Timing	This module is offered only in Semester 2	

Aims

This module provides an introduction to three very different packages:

- a microcomputer spreadsheet package (Excel)
- a statistics package (Minitab on a mainframe)
- a mainframe graphics suite (Uniras)

Minitab is command driven, while the other two are menu driven, with a graphical user interface.

The philosophy of the course will be *to provide students with tools* that they can use elsewhere in their studies.

Objectives

On successful completion of this module, students should:

- be familiar with the way a variety of packages and their online help systems work, which should enable them to come to terms with a different package more easily;

- be aware of the capabilities of each of the packages taught.

With their own material, students should be able to:

- use **Excel** to set up (or modify) a spreadsheet to do totalling and other calculations; produce summaries and charts from the figures involved;
- explore a data set and use simple methods to analyse and present the information it contains using **Minitab;**
- use **Uniras** to produce and manipulate maps and graphs from data.

Syllabus

1. EXCEL — 8 lectures and 4 practicals
   overview of spreadsheets; entering and formatting information; formulae and functions; copying cell contents; manipulating a (large) spreadsheet; why spreadsheets?
2. MINITAB — 8 lectures and 3 practicals
   overview of the package; some MINITAB commands; use of HELP facility; input of data files; data manipulation and correction; exploratory data analysis.
3. UNIRAS — 8 lectures and 3 practicals
   introduction to the suite; archiving and printing; Unigraph: data organisation and input; data operators (including *slice* and *reshape*); graphs and groups; Unimap: interpolation; types of map; viewpoint.
4. DEBRIEFING
   Some lecture time each week will be devoted to a debriefing on the previous practical.

Booklist

1.5 Not appropriate.

CS10610 Databases

General Description

On successful completion of this module, students will be familiar with the ideas used in database packages for personal computers and be able to set up such a package to store and retrieve information of the type they will encounter in their studies.

Commitment	Number of lectures	24
	Number of workshops	0
	Number of practicals	10 x 2 hours
Co-ordinator	Dr. John Hunt	
Other staff	Not yet known	
Pre-requisites	A general knowledge of and experience with microcomputers, user filesystems and a graphical user interface.	
Co-requisites	None	
Incompatibilities	Not available to students who have A-level Computing (or equivalent). **CS11010**	
Assessment	Assessed coursework - 50% Written exam - 50% To pass the module, both components must be passed. There will be two practical assignments, and students will be required to keep a practical file. The best two of these three pieces of work will provide the coursework assessment.	
Timing	This module is offered only in Semester 1	

Aims

This module provides an introduction to the use of a relational database management system so that:

- students will be able to construct and use simple databases from (appropriate) material they encounter elsewhere in their studies
- students will get an appreciation of the ideas that lie behind the *relational* database paradigm

The philosophy of the course will be *to provide students with a tool* that they can use elsewhere in their studies. The practicals will be based on the microcomputer package *Microsoft Access.*

Objectives

On successful completion of this module, students should:

- be able to set up, interrogate, and produce well-designed forms and reports from, a single-table database;
- have an understanding of the reasons for using a multi-table database, and the issues involved in designing one;
- be able to set up and use a *simple* multi-table database, and know when to seek further assistance.

Syllabus

1. INTRODUCTION — 2 lectures
   The idea of a database; a simple and a more complex example; records; fields; objects.
2. TABLES AND FORMS — 7 lectures and 2 practicals
   The views of a table; field data types, properties; validation; indexes; Access form wizards; varieties of form available; the views of a form; controls; tab order; visual design; validation; indexing and primary keys; forms for data entry.
3. INTERROGATING A DATABASE — 4 lectures and 2 practicals
   Simple search; wildcards; filters and (select) queries; crosstab queries.
4. REPORTS — 3 lectures and 1 practical
   Access report wizards; varieties of report; the views of a report; controls.
5. MULTI-TABLE DATABASES — 8 lectures and 3 practicals
   Data redundancy, inconsistencies and anomalies; Entity-Relationship modeling; entities, attributes, relationships; many-to-many relationships; Domain Key Normal form; elementary SQL; implementation in Access; improving and modifying a database.
6. DEBRIEFING
   Some lecture time each week will be devoted to a debriefing on the previous practical. Two of the practical sessions will be allocated to work on the assignments, but students should expect to have to spend further time on their assignments.

Booklist

Students are likely to need ready access to the following:

David M Kroenke. *Database Processing - Fundamentals, Design, and Implementation*. Prentice Hall International Editions, 5th. edition, 1995. ISBN 0-13-320128-7.

1.4 John L. Viescas. *Running Mircrosoft Access*. Microsoft Press.

CS10810 Computing and Information

General Description

This module covers the role and impact of computing in the humanities. A range of techniques for storings, manipulating and accessing information on computers is examined. Skills in database management systems and other applications are developed.

Commitment	Number of lectures	24
	Number of workshops	0
	Number of practicals	10 x 2 hours
Co-ordinator	Dr. John Hunt	
Other staff	Not yet known	
Pre-requisites	None	
Co-requisites	**CS10010** unless already taken or the student has equivalent knowledge and experience.	
Incompatibilities	Not available to students who have taken A-level computing or equivalent.	
Assessment	Assessed coursework - 50% Written examination - 50%	
Timing	This module is offered only in Semester 2	

Aims

This course considers a variety of ways in which data and information are held, manipulated and accessed on computers. Their value and accessibility to workers in the humanities are considered. Some skills are developed.

Objectives

On successful completion of this module students should;

- have an improved understanding of well structured documents and how they can be a source of on-line information;
- understand the principles of hypertext and multimedia systems, the type and style of information that they can provide, the process of developing them and the problems of searching them;
- be able to design, implement and use a simple single table database using an microcomputer based DBMS;
- understand the importance of relational databases and the problems inherent in designing them;
- recognise the potential for automatic analysis of natural language;
- be aware of the general mechanisms for representing and manipulating knowledge on computers;

Syllabus

1. INTRODUCTION — 1 lecture
   What are data, information, knowledge?
2. ADVANCED WORD PROCESSING — 2 practicals
   Document structure and control of style; templates and styles in Microsoft Word.
3. COMMUNICATIONS SYSTEMS — 2 lectures
   Technologies and capacities of data communications; local and wide area networks.
4. HYPERTEXT AND MULTIMEDIA SYSTEMS — 2 lectures and 2 practicals
   Hypertext systems; facilities and examples. Consideration of handling various media on computer. Searching and retrieval in hypertext systems.
5. DATABASES — 6 lectures and 5 practicals
   Fields and tables. Data design. The importance of multi-table database; problems in designing them. Queries, forms and reports.
6. NATURAL LANGUAGE ANALYSIS — 1 lecture and 1 practical
   The problems of handling natural language. Analysis tools; spelling, grammar, style. Concordances and indices.
7. KNOWLEDGED BASED SYSTEMS — 4 lectures
   Brief history of AI. Expert systems; successes and limitations. Knowledge representation and manipulation.
8. CASE STUDIES — 8 lectures
   One major and several minor case studies will be used to examine the role of computer technology in a variety of real circumstance.

Booklist

The following should be consulted for different approaches or for further information:

David M Kroenke. *Database Processing - Fundamentals, Design, and Implementation*. Prentice Hall International Editions, 5th. edition, 1995. ISBN 0-13-320128-7.

Nancy B. Stern and Robert A. Stern. *Computing in the Information Age*. John Wiley and Sons
1.8 Inc, New York, 1993.