



Faculty of Computer Studies

M150 B: Data, Computing and Information (Part B)

Course Guide

M150B: Data, computing and information (Part B)

Credit Points/ Credit Hours 15/4

Prerequisite:

M150A

Short Description:

This course introduces students to the concepts of Programming using JavaScript. Software development and management of complexity are emphasized. Students are also introduced to computer system security. Students learn about the software development cycle, including user requirements analysis, software design, coding and testing. They learn also about modular programming. Students are introduced to sensational computing, data hiding, cryptography and computer security.

Aims:

The course aims to:

- introduce the student to fundamentals of programming using JavaScript
- challenge students with the dilemma of privacy versus openness;
- provide a foundation for future study;
- foster a sense that computers can be used creatively as well as mechanically;
- develop a sense of the joy of enquiry.

Learning Outcomes:

The Learning Outcomes of this course are given below.

A. Knowledge and understanding:

After studying the course, the student will be able to:

- A1. Describe the basic composition of a simple computing system
- A2. Analyze, design and implement simple and modular software solutions
- A3. Deal with large amounts of unstructured data
- A4. Appropriately interpret, represent, and use information
- A5. Deal with natural ways of interacting with computers such as speech – and pattern recognition
- A6. Characterize secure computer systems

B. Cognitive skills:

After studying the course, the student will be able to:

- B1. Analyze a small computer program in terms of its inputs, programming structures and outputs
- B2. Analyze a simple problem in terms of the necessary operations that are required to develop a program
- B3. Modify part of a computer program to incorporate specified operations on given data by choosing appropriate program structures

C. Key skills:

After studying the course, the student will be able to:

- C1. Read and understand a simple computer program
- C2. Break down complex problems into small manageable modules
- C3. Recognize computer security breaches and suggest cryptographic solutions

D. Practical and/or professional skills:

After studying the course, the student will be able to:

- D1. Discuss the legal and ethical issues surrounding data acquisition, privacy, accuracy, surveillance, and the use of cryptography (and its possible compromise by legislation)
- D2. Demonstrate basic skills to enable him to progress to more advanced level studies at the AOU or any other university

Course Structure

The M150B course includes a total of 8 units study from following 2 blocks:

Block 2 The computer: processing data

Block 2 is an introduction to computer programming. It is very practical, and involves lots of exercises and activities using your computer. This block teaches the elements of programming in JavaScript. It concludes with a look at the techniques of developing software.

The following units from this block are included in the study:

- Unit 9 Managing complexity through modularity
- Unit 10 Software development

Block 3 from data to information

Once data has been captured, stored and processed on the computer it becomes potentially useful information. In this block we look at some of the ways in which we as humans interact with and make use of this information. The block starts with a general introduction to the way in which the computer can allow us to process data so that we can make more sense of the world around us. It then moves on to consider how the computer provides us with a whole range of non-textual ways of handling data and presenting information. The final unit of the course attempts to pull all the themes of the course together, looking at what has been achieved by our development and use of computers. We look at what they do well, what they cannot do, and at what perhaps they should not be expected to do.

The following units from this block are included in the study:

Unit 11 Computing in the wild

Unit 12 Interacting with information

Unit 13 Sensational computing

Unit 14 Hiding data: an introduction to security

Unit 15 Too many secrets?

Unit 16 Realistic expectations!

Table of Contents:

Unit 9: Managing complexity through modularity

1 Introduction

2 Separate code modules

3 Function libraries

4 Programming with function libraries

5 Objects in JavaScript.

6 Unit summary.

Unit 10: Software development

1 Introduction

2 Software development in context.

3 What do you require of your software?

4 Designing your software.

5 Detailing your designs, implementing your software.

6 Testing your software.

7 Debugging your software

8 Unit summary.

Unit 11 Computing in the wild

1 Introduction

2 What is wildness?.

3 The four dimensions of reach

- 4 Human and computer agents.
- 5 Taking control.
- 6 Unit summary.

Unit 12: Interacting with information

- 1 An introduction to human–computer interaction.
- 2 Interacting with computers
- 3 User interface essentials
- 4 Visual representations of data
- 5 Designing for the web
- 6 Unit summary.

Unit 13 Sensational computing

- 1 Introduction
- 2 The digital divide
- 3 Speech audio interfaces.
- 4 Non-speech sound.
- 5 Handwriting recognition
- 6 Tangible computing and gesture computing.
- 7 Ubiquitous computing.
- 8 Unit summary.

Unit 14 Hiding data: an introduction to security

Unit 15: Too many secrets?

- 1 Introduction
- 2 How private is private?
- 3 Invading privacy.
- 4 Owning and controlling information.
- 5 Attempting total control.
- 6 Privacy and access: a final word
- 7 Unit summary.

Unit 16: Realistic expectations

- 1 Introduction
- 2 The digital computer – the success story of the twentieth century?
- 3 Reactions to the rise of ICT
- 4 What can go wrong with computers and computer applications?
- 5 What computers cannot do
- 6 What computers should not do
- 7 Ethics and computing
- 8 Where now?

Assessment:

The assessment for the M150B course consists of the following 3 components:

- Tutor-marked assignments: 2 TMAs
- Quiz/Mid-term Assessment: 1 MTA
- Final Exam: 1 Final Exam

Grade Distribution:

The percentage grade distribution for the above 3 components is as follows:

- Tutor-marked assignments: 35%
- Quiz/MTA: 15%
- Final Exam: 50%

Course Calendar (indicative version):

There are 2 Tutor Marked Assignments, 1 Midterm Assessment and 1 Final Exam associated with this course. Course result is determined on the basis of student's scores in TMAs, Midterm Assessment and the Final Exam. To be sure of passing the course the student needs to score at least 40% (at least 20% in TMA and Quiz/MTA and at least 20% in the final exam) in the above 3 components and achieve an overall average score of 50%.

| Study week | Course text | Other components /notes | Practical activities | Assignments / Assessments |
|--|---|-------------------------|----------------------|------------------------------|
| Block 2 The computer: processing data | | | | |
| 1 | 9. Managing complexity through modularity | | | |
| 3 | 10. Software development | | | |
| Block 3: INFORMATION | | | | |
| 5 | 11. Computing in the wild | | | |
| 7 | 12. Visualizing information | | | TMA01 due date Quiz / MTA |
| 9 | 13. Sensational computing | | | |
| 11 | 14. Hiding data | | | |

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|----|----------------------------|--|--|----------------|
| 13 | 15. Too many secrets? | | | |
| 15 | 16. Realistic expectations | | | TMA02 due date |
| 16 | Final Exam | | | |