INTRODUCTORY MODULES

04 21480

Introductory Module for Computing

Mr D Pycock, Dr CC Constantinou, Dr PA Smith, Dr P Gardner, Dr TN Arvanitis,  
Dr S Pammu and Dr M Spann

Aims and Objectives

RECOMMENDED BOOKS

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| ***BOOK*** | ***AUTHOR*** | ***PUBLISHER*** |
| Telecommunications Engineering (Ed. 3 Rev.) | Dunlop, J and Smith, D G | London: Chapman & Hall ISBN: 0 748 74044 9 £31.99 |
| Signals: the science of telecommunications | Pierce, J R and Noll, A M | Oxford: Scientific American Library  ISSN: 1040-3213-5026-0 |
| The Mathematical Theory of Communication | Shannon, C E and Warren, W | Chicago: University of Illinois Press  ISBN: 0 252 72548 4  ISBN: 0 252 72546 8 £10.99 - £33 |
| Indispensable Guide to C | Davies, P | Addison-Wesley  ISBN:0 201 62438 9 £15-£42 |
| Software Engineering | Pressman, R S | New York: McGraw-Hill  ISBN: 0 071 23840 9 £43-46 |
| JSP for Practical Program Design | Dudman, K E | London: UCL Press  ISBN: 1 857 28407 0 £12-21.99 |
| Visual C#: How to Program | (Harvey and Paul) Deitel & Associates Inc. | Pearson International Ed.  ISBN 0-13-204361-0  ~£25.00 |
| Simply C#: An Application Driven Tutorial Approach | (Harvey and Paul) Deitel & Associates Inc. | Pearson- Prentice Hall  ISBN 0-13-142641-9  ~£20.00 |
| UML Distilled: A Brief Guide to the Standard Object Modelling Language | Martin Fowler | Addison-Wesley Object Technology Series.  ISBN 0321193687 From £14.99 |

Aims:

* To explain the basic theoretical concepts in communications, computation and human-centred technology.
* To provide an introduction to requirements analysis for engineering and software design.
* To provide an introduction to selected key concepts object-oriented design.
* To refresh and introduce essential procedural programming skills using C.
* To introduce object-oriented programming techniques using the C# programming language.

Objectives:

After completion of this module, students should be able to explain concepts at a basic level, and solve simple problems on the following topics:

* Shannon’s theory of communication.
* Signal theory.
* Physical layer communications.
* Requirements analysis for design.
* Object-oriented design.
* Solve basic engineering problems in the C programming language using:

1. Pointers.
2. Strings.
3. Structured data types.
4. Static and dynamic arrays.
5. Passing by value and reference.

After completing the second part of this module students will:

* Have an overview of the .NET programming framework.
* Be familiar with developing programs using Visual Studio.NET
* Have a good basic grounding in the C# programming language and its syntax
* Have an understanding of the principles of object oriented programming.
* Be able to use some of the more advanced features of C# such as graphics programming, multi-threading, web forms and web services.
* To have an overview of the Windows Mobile operating system and be familiar with program development on mobile devices

Teaching Methods:

Part One – Introduction

28 hours lectures, 3 hours tutorials.

Part Two – Programming

28 x 1 hour lectures, 3 x 1 hour tutorials and 5 x 2 hour practical classes.

There will also be a revision class at the end of term.

Laboratory Work:

These are introductory laboratory and tutorial sessions where students will be shown how to use the editor and compiler to simple C programs and will learn how to construct progressively more complex object-oriented programmes using C#.

Private study:

Students are expected to supplement classroom periods and laboratory sessions. Assignments will be provided to enable you to do this in private study periods.

Assessment:

Written, unseen examination answering 2 questions from 3 in 1.5 hours (30%) and one assignment report related to object-oriented programming (70%).

Resit

Normally a written unseen examination of 1.5 hours answering 2 questions from 3 (30%) and a 7 hour laboratory exercise (70%).

Pre-requisites

It is expected that you have some previous knowledge in at least two of the following topics engineering mathematics, requirements analysis and C programming.

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Syllabus

Introductory Concepts

1. Shannon's Theory of Communication.
2. The Description of Signals: Fourier (Bandwidth), Sampling Theorem, Noise.
3. Interference; Modulation and Encoding.
4. Physical Communication Media, Switching Devices.
5. Software design methods for procedural programming, cohesion, coupling.

Procedural Programming (C):

1. Pointers.
2. Functions, passing by value and by reference.
3. Static and dynamic arrays.
4. Strings.
5. User defined data structures.

Requirements Analysis and Object-Oriented Design Concepts

1. Use-Case Analysis.
2. Objects and Classes.
3. Interaction diagrams.
4. Sequence diagrams.
5. Sates and statecharts.

Object-Oriented Programming (C#):

1. Introducing the .NET framework.
2. An introduction to C#.
3. Classes.
4. Inheritance and polymorphism.
5. Interfaces, delegate and callback functions.
6. Graphical user interfaces.
7. Graphics and multi-media.
8. Web forms and web controls.
9. Web services.