Information and Communication Technology

Curriculum Framework

2nd Consultation Seminar, June 2005

ICT Curriculum Aims

- Provide students with a body of essential knowledge, concepts and applications of information, communication and computer systems.

- Equip students with problem-solving and communication skills, and encourage them to think critically and creatively.

- Develop students into competent, effective, discriminating, ethical and confident users of ICT, so as to support their life-long learning.

ICT Learning Objectives

- Know and understand the range and organization of computer systems, and the inter-relationship among hardware, software and data;

- Use a range of applications software effectively, ethically and with discrimination to support information processing and problem solving;

- Understand the methods of analysing problems, the planning and implementation of solutions using ICT, and practice in applying these methods;

- Realise the social, ethical and legal issues pertaining to the use of ICT; and

- Develop responsible attitudes towards the use of ICT and value themselves as productive participants in the development of ICT.

Curriculum Framework of ICT

The Compulsory Part (165 hours)			
A. Information Processing	(64 hours)	B. Computer System Fundamentals	(25 hours)
C. Internet and its Applications	(28 hours)	D. Basic Programming Concepts	(20 hours)
E. Social Implications	(28 hours)		

+

The Elective Part (75 hours) (Choose one)			
A. Databases	B. Data Communications and Networking	C. Multimedia Production and Web Development	D. Software Development

+

School-based Assessment (30 hours)

Major changes on Compulsory/Elective Parts since 1ˢᵗ Consultation

- Survey result showing e-Commerce was the least favoured option.
- Suggestions to subsume the essential components of e-Commerce into various topics in the Compulsory Part such as *Internet and its Applications* and *Social Implications*.

➡ e-Commerce is deleted from the Elective Part,
Essential components subsume in the Compulsory Part –
Internet and its Applications and *Social Implications*

- Views that Databases is too difficult for average students.
- Controversial on whether Databases should be a compulsory topic studied by all students or an option.

➡ Databases is removed from the Compulsory Part
Databases is offered as an option in the Elective Part

Curriculum Framework of ICT

Module / Option	Suggested time allocation (hours)
The Compulsory Part	**165**
A. Information Processing	64
B. Computer System Fundamentals	25
C. Internet and its Applications	28
D. Basic Programming Concepts	20
E. Social Implications	28
The Elective Part (Choose one)	**75**
A. Databases	75
B. Data Communications and Networking	75
C. Multimedia Production and Web Development	75
D. Software Development	75
School Based Assessment	**30**
Total Curriculum Time	**270 hours**

Order and Organisation of Modules/Options

- The order of the modules and options is arbitrary and immaterial.

- The organisation of individual module or option represents one possible way of organising the curriculum content.

- Teachers may structure and design teaching schemes according to their school situations, student needs, interests and abilities.

The Compulsory Part

They are fundamental topics on ICT which

- can withstand time and the rapid development of technologies.

  (eg. algorithm in Basic Programming Concepts)

- can provide students a solid foundation and broad study of ICT.

- incorporate and revise topics from the revised ASCA (*Office and Internet Applications*), the revised ALCS (*Computer Organization*) and CIT (*Basic Programming Concepts* and *Social Implications*).
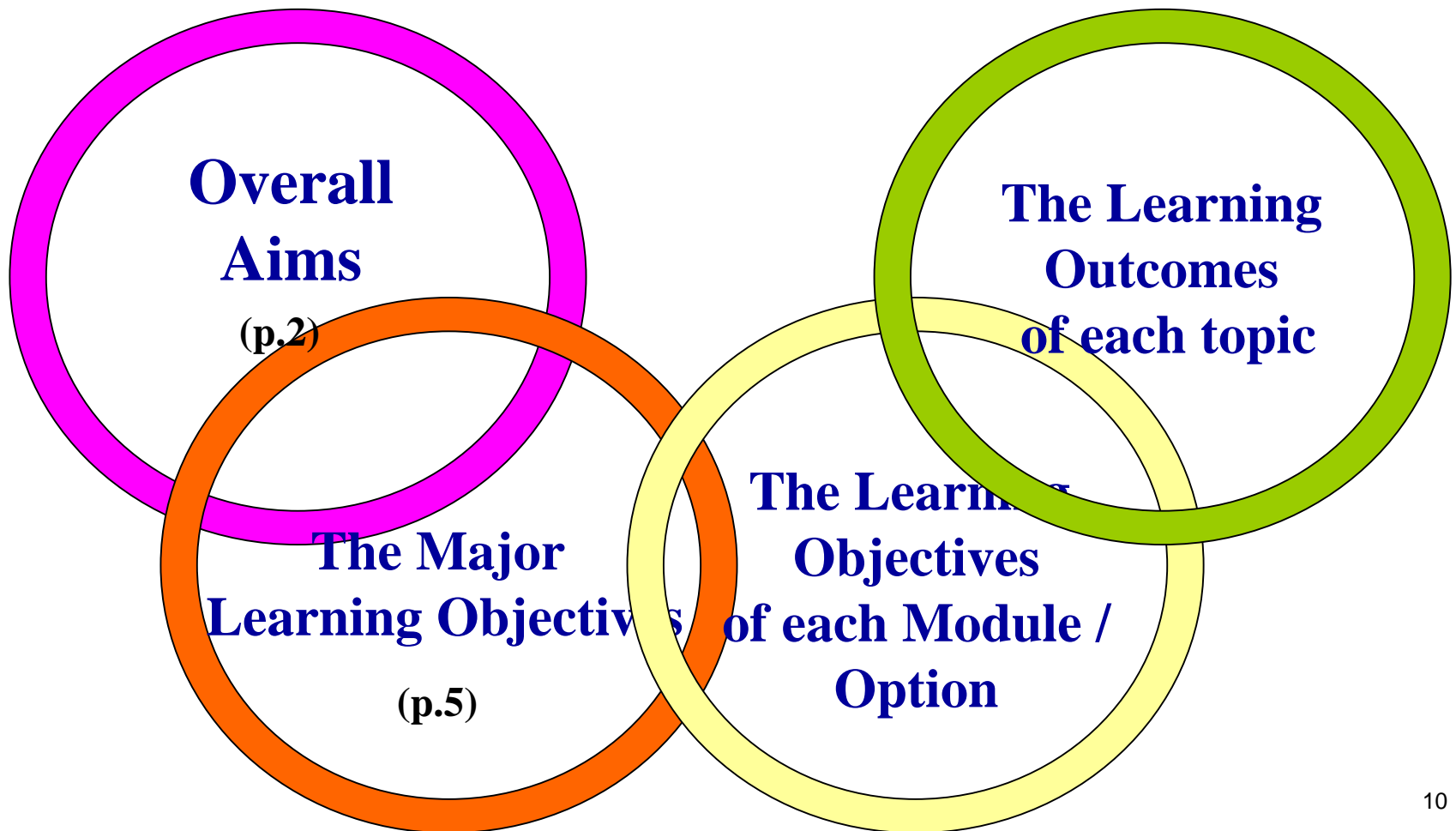
The Elective Part

They are the specialized and extended areas of ICT which

- are designed for students to pursue further studies in tertiary education or joining workforce upon completion of the course.

- provide students in-depth study of an option of their own choice *(eg. Software Development).*

- incorporate and revise topics from the revised ASCA *(Databases* and *SOHO Networking),* the revised ALCS *(Systems Development* and *Programming)* and CIT *(Multimedia Production)*

The Presentation and the Coherence of the Curriculum

Overall Aims

(p.2)

The Learning Outcomes of each topic

The Major Learning Objectives

(p.5)

The Learning Objectives of each Module / Option

The Compulsory Part

E.   Social Implications

Topics	Suggested time allocation (hours)
Equity of Access	2
Work Issues	2
Intellectual Property	9
Security on the Internet	15
Total	28

E.   Social Implications

Have you heard about these news lately?

- Internet gamers steal "points" and "tools" from others
- Fraud cases involving fake emails and websites
- Controversy in sharing movies and songs using Bit Torrent technology
- Teenagers hospitalized after playing on-line games continuous for 10 hours
- …

Issues that need to be addressed in the society, perhaps, most effective through education.

E.   Social Implications

We believe our students need to

- Understand equity issues relating to the access of ICT.
- **Understand health hazards** and recognise preventive measures in using ICT.
- **Understand major issues regarding intellectual property and privacy**.
- **Aware the potential threats on the Internet** and demonstrate measures to reduce the threats.
- Appreciate the need to use ICT safely, sensibly, legally and ethically.

E.   Social Implications

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- Understand equity issues relating to the access of ICT.
- Understand health hazards and recognise preventive measures in using ICT.
- Understand major issues regarding intellectual property and privacy.
- Aware the potential threats on the Internet and demonstrate measures to reduce the threats.
- Appreciate the need to use ICT safely, sensibly, legally and ethically.

E.   Social Implications

Understand health hazards

- Identify health hazards associated with the use of computer … (p.23)

Recognise preventive measures

- … propose good ergonomic practices when using computers. (p.23)

E. Social Implications

Aware the potential threats on the Internet

- Know, from users' perspective, possibly security threats on network s and the Internet. (p.24)
- Discuss the possible privacy threats… (p.24)

Demonstrate measures to reduce the threats

- Examine ways to reduce IP theft… (p.24)
- Demonstrate the control of automatic intrusion using built-in security functions of a browser. (p.24)

Revisit: ICT Curriculum Aims

- Provide students with a body of essential knowledge, concepts and applications of information, communication and computer systems.

- Equip students with problem-solving and communication skills, and encourage them to think critically and creatively.

- Develop students into competent, effective, discriminating, ethical and confident users of ICT, so as to support their life-long learning.

17

The Elective Part

A.   Databases

Topics	Suggested time allocation (hours)
Introduction to Database	**8**
Relational Database	**28**
Introduction to Database Design Methodology	**18**
Database Security, Integrity and Data Privacy	**13**
Database Applications, Development and Society	**8**
Total	**75**

A.   Databases

- Contents adopted and revised from Databases module of AS Computer Application Curriculum to be implemented from Sep 2005

A. Databases

- Additional contents (1)
  - Include "Database Security, Integrity and Data Privacy" topic to further achieve ICT curriculum aims

  - "Discuss the importance of data privacy and develop proper attitudes to be an ethical user of database to respect data privacy. (p.28)"

Revisit: ICT Curriculum Aims

- develop students into competent, effective, discriminating, ethical and confident users of information and communication technologies, so as to support their life-long learning.

A. Databases

- Additional contents (2)
  - Include "Database Applications, Development and Society" topic to let students aware of database development and its impact on society to further achieve ICT curriculum aims
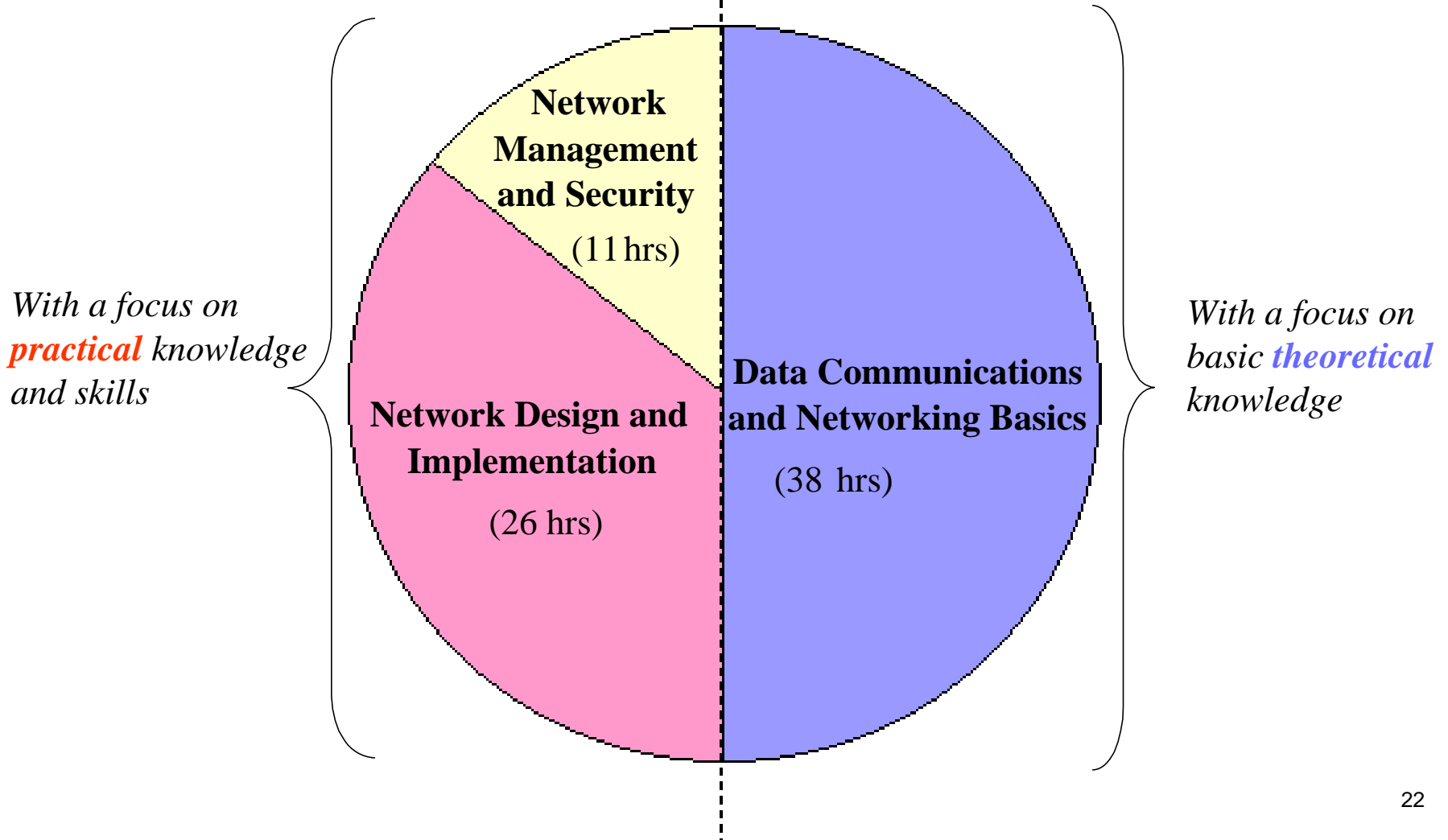
Revisit: ICT Curriculum Aims

- provide students with a body of essential knowledge, concepts and applications of information, communication and computer systems

The Elective Part
B. Data Communications and Networking

Time allocation: 75 hrs

With a focus on
practical knowledge
and skills

Network Management and Security

(11 hrs)

Network Design and Implementation

(26 hrs)

Data Communications and Networking Basics

(38 hrs)

With a focus on
basic **theoretical**
knowledge

B. *Data Communications and Networking*

COMPUTER NETWORKS ARE EVERYWHERE !

Networking is used in every aspects of life – school, office, home, café... It has already become an essential infrastructure of every modern society.

B. Data Communications and Networking

We believe our students need to

- *know the basic concepts and technologies behind data communications and networking;*
- *be able to identify and describe the functions of components involved in Ethernet and wireless networks;*
- *be able to describe the uses and applications of a network;*
- be able to design and implement a simple network;
- be able to assess the performance of a network and implement measures to improve it;
- *know the importance of network security* and be able to propose measures to improve it; and
- observe and appreciate the latest developments and the future trends of networking technology.

B.   *Data Communications and Networking*

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- know the basic concepts and technologies behind data communications and networking;
- be able to identify and describe the functions of components involved in Ethernet and wireless networks;
- be able to describe the uses and applications of a network;
- *be able to design and implement a simple network;*
- *be able to assess the performance of a network and implement measures to improve it;*
- know the importance of network security and *be able to propose measures to improve it; and*
- *observe and appreciate the latest developments and the future trends of networking technology.*

B.   *Data Communications and Networking*

Know the importance of network security

Describe the potential risks caused by the common network security threats… (p.34)

Propose measures to improve it

Propose effective measures to improve network security… (p.34)

B.   *Data Communications and Networking*

Comparsion between ICT and Revised ASCA (Networking)

ICT	Revised ASCA
Data Communications and Networking Basics	SOHO Networking Basics
Network Design and Implementation	SOHO Network Design and Implementation
Network Management and Security	SOHO Network Management and Security

B. *Data Communications and Networking*

New topics on Communication Technology have been added.

Rationales:

Communication Technology is important (recall the 1st aim of ICT Curriculum). It is the advancement in Communication Technology that makes the frequent and widespread of information possible.

It is the high-order thinking and knowledge involved in the topics that distinguish the subject from skill-based training courses.

B. Data Communications and Networking

New topics under 'Basic concepts of data communications'
Communication models
Data encoding
Transimission media
Error detection methods
Asynchronous and synchronous transmission
Multiple access techniques

New topics under 'Networking technologies'
TCP/IP protocol suites
Mobile cellular system design

New topics under 'Network applications'
Mobile computing applications
Roles in networking environment

The Elective Part

C. Multimedia Production and Web Development

Topics	Suggested time allocation (hours)
Multimedia Production • Multimedia Applications • Basic Concepts and Use of Different Multimedia Elements	24
Design Factors for Presenting Information on the Internet	6
Web Development • Website Development using Web Authoring Tool • Enhance the Dynamics and Interactive Features of Web Pages - Client-Side Scripting	45
Total	75

C. *Multimedia Production and Web Development*

Why do we learn to write web pages?

We need to distribute information / make our products known to the world.

a. i. Multimedia Applications (p. 36)

What do we need to know to write web page?

We need the basic concepts, technologies and tools.

ii. Basic Concepts and Use of Different Multimedia Elements (p.36)

Revisit: ICT Curriculum Aims

Provide students with essential knowledge, concepts and applications of information, communication and computer systems.

To help students to create effective web pages:

Good Design ➡ Informational and Interesting

b. **Design Factors for Presenting Information on the Internet (6 hours)**

- Recognise the essential factors to be considered in their design strategy during the planning stage.

   With the demonstration of some sampled websites, students should understand factors such as audience awareness, content purpose, web site structure, … etc.

It's easy to teach someone how to create a web page but it's difficult to teach them how to design a effective web page.

➡ Learn good design by looking at bad design

Revisit: ICT Curriculum Aims

Equip students with problem-solving and communication skills, and encourage them to think critically and creatively.

To help students to create effective web pages:
Advanced tools / scripting

c. i. Website Development using Web Authoring Tool (p.37)

Construct web pages using Web Authoring Tool.

Students should be able to use links, anchors, lists, tables, frames, Mailto and Fill-out Forms in constructing the web page. ...

ii. Enhance the Dynamics and Interactive Features of Web Pages - Client-Side Scripting

Create dynamic menus upon user selection.

Students should be able to create a 2 level interdependent select list, pull down menu and click-to-expand menu.

Validate and manipulate input data.

Students should be able to check text data, numeric data, required input, length of input, manipulate radio and check box and valid values for all input data. …

Revisit: ICT Curriculum Aims

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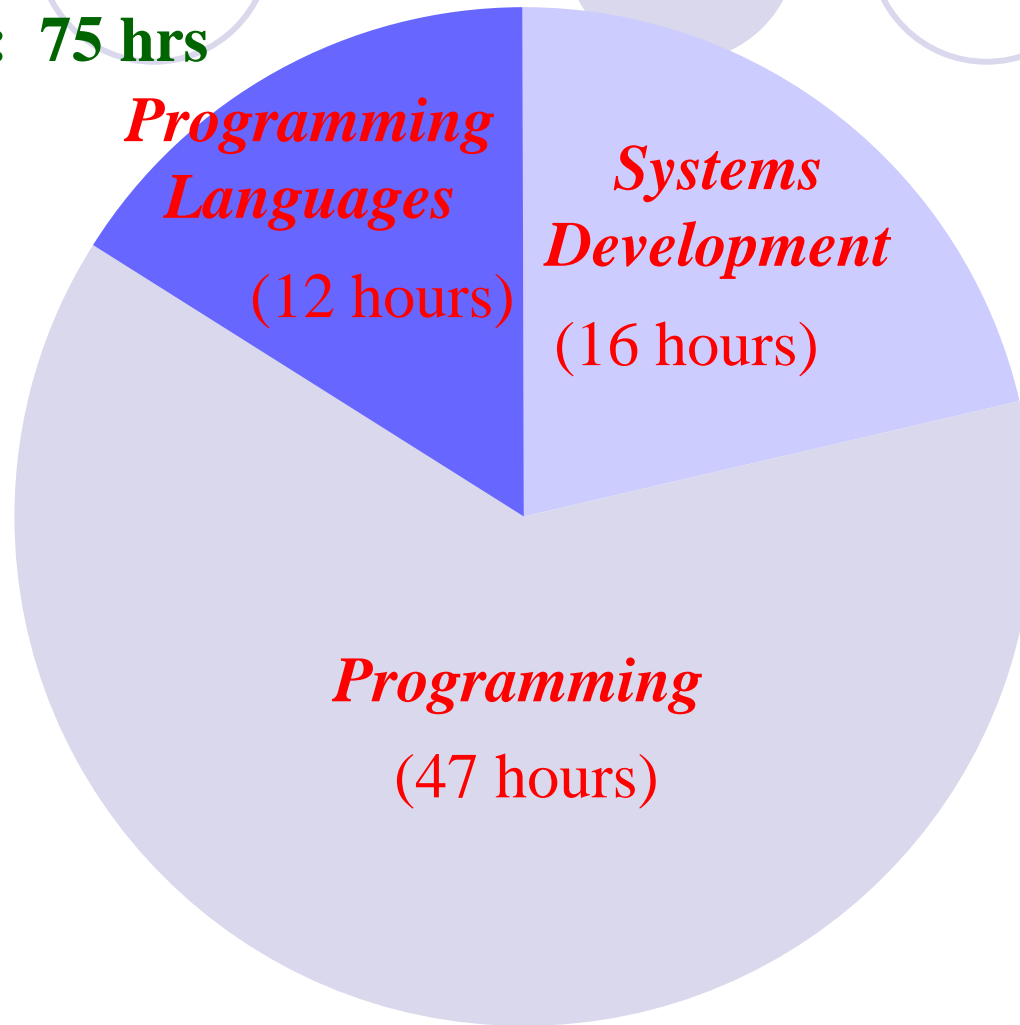
D. Software Development

Three-fold Aim

- To introduce students programming concepts, programming languages and concepts of systems development

- To develop problem-solving skills through algorithm design and programming

- To improve students' logical thinking and critical thinking skills

D. Software Development

Time allocation: 75 hrs

Programming Languages

(12 hours)

Systems Development

(16 hours)

Programming

(47 hours)

D. Software Development

We believe our students need to

- Define and analyse problems;
- Identify the steps involved in writing a program for problem solving;
- Realise the importance of good programming skills and develop good programming styles;
- Apply structured programming and simple constructs to program writing;
- Recognise the importance of algorithms, think and formulate critically appropriate algorithms to solve problems;
- Demonstrate creativity in designing and developing computer programs;
- Debug the errors, and ensure that the programs are executable as expected;

D. Software Development

We believe our students need to

- Prepare program documentation to summarise the design and to improve the readability of a computer program;
- Illustrate different programming paradigms with appropriate programming languages;
- Discuss the choice of different languages for **meeting different needs**;
- Recognise the importance of a systematic approach to software development;
- Apply concepts underlying software development in a systematic way; and
- Describe the phases, activities and methodologies involved in systems development.

D. Software Development

Programming

(ICT Vs CIT) Added	
Data representation	User-defined data types
Global variables and local variables	Insertion sort and merge sort
Algorithm by means of flowcharts or block diagrams	Lists, linear linked list, stacks and queues in terms of arrays
Parameters passing	

D. Software Development

Programming

(ICT Vs Revised ALCS)

- Tree
- Recursion

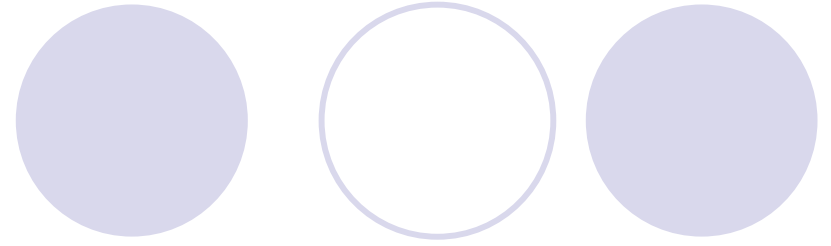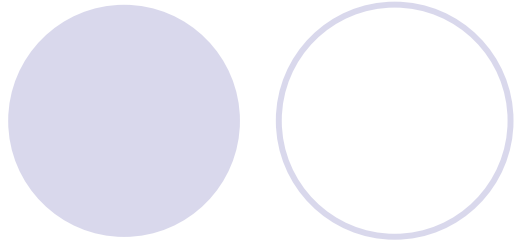# D. **Software Development**

Programming Language

(ICT Vs CIT) Added

- Language translators and compilers

D. **Software Development**

Systems Development

(ICT Vs Revised ALCS) Added

- The personnel

Thank you!