Bachelor of Science in Computer Science

SCS 1305 – Computer Systems

Introduction to the Course

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UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

Teaching Staff & Instructors

- This course will be delivered by two Senior Staff members.

Dr. Ajantha Atukorale
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Dr. Kasun Gunawardena
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Who am I

I am Ajantha Atukorale

- Did my undergraduate @ University of Colombo (’91- ’95)
- Joined the Academic staff as a Demonstrator/ Temp. Assistant Lecturer in ’96 and Became a Lecturer in 1997
- Went for my PhD in 1997 and returned to Sri Lanka in 2001
- Became a Senior Lecturer in 2002
- Subject Lecturer for Computer Systems (YR 1), ~~Computer Networks I (YR 2), Network & System Administration (YR 3)~~
- Director /UCSC
- Research Interests: Artificial Neural Networks, Pattern Recognition, Computer Networks, Big Data Analytics

Introduction – Computer Systems

- This course is built to obtain an **overall knowledge** of the integral part of the **computer system**, to provide knowledge to **analyze the performance of a computer system**.
- Furthermore, this course lay the foundation to do further **advance studies** in aspects of **computer architecture** and **operating systems**.

Intended Learning Outcomes

Upon completion of this course, students will be able to do the following:

- **LO1** - Be able to describe the **basic operations** of a computer
- **LO2** - Be able to design **simple logic circuits**
- **LO3** - Be able to describe components of **Central Processing Unit** (CPU) with CPU **cycle** and its use to **execute instructions** in a computer
- **LO4** - Be able to describe **memory hierarchy**, use of **cache** and **virtual memory** with mapping schemes and memory measuring **performance in a computer**

Syllabus

Section 1: (Delivered by Dr. Ajantha Atukorale)

Data Representation and Computer Arithmetic (3 Weeks)

- History of computer systems
- Data representation
- Numbering systems
- Binary notations
- Positive/Negative number representation
- Floating point number representation

Syllabus

Section 2: (Delivered by Dr. Kasun Gunawardana)

Basic logic circuit design (4 Weeks)

- Logic Operations
  - Basic logic operators and logic gates
  - Boolean algebra
- Logic Circuit Design
  - Basic circuit design
  - Combinational logic
  - Sequential logic

Syllabus

Section 3: (Delivered by Dr. Kasun Gunewardana)

Inner workings of the CPU (4 Weeks)

- Components of a CPU
- Specifications (Data bus, Address bus, Internal registers)
- Instruction set architecture
- Fetch and execution cycle

Syllabus

Section 4: (Delivered by Dr. Kasun Gunawardana)

Memory Components and Organization (4 Weeks)

- Types of primary memory
- The memory hierarchy
- Cache memory and mapping schemes
  - Virtual memory
  - paging and segmentation
  - address translation
  - memory fragmentation
- Measuring memory performance

Rubric

- Examination 70%
- Continuous Assessments 30%

Recommended Books

- Principles of Computer Hardware – Alan Clements
- The Essential of Computer Organization & Architecture – Linda Null and Julia Lobur
- Upgrading and Repairing PC's – Scott Muller
- Computer Organization and Architecture - William Stallings

Next: History of Computer Systems