Advanced Computer Architecture

This course is designed to present an overview of some advanced computer architectures and their underlying design principles. Issues discussed will include scalability and performance evaluation. The underlying technologies such as processor and memory hierarchy, cache and shared memory, and advanced pipelining techniques will be presented. Examples of high performance vector processors, multicomputers and massive parallel processors will be compared. Some novel architectures such as VLIW, fault tolerant systems and data flow machines will also be elaborated.

Advisory: Students are expected to have taken CENG3420 or having background knowledge in computer organization.

Grade Descriptor:

A

EXCELLENT – exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

B

GOOD – good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.
FAIR – adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

D

MARGINAL – performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

F

FAILURE – performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

有關等級說明的資料，請參閱英文版本。

Equivalent Offering:
Units: 3 (Min) / 3 (Max) / 3 (Acad Progress)
Grading Basis: Graded
Repeat for Credit: N
Multiple Enroll: N
Course Attributes: MSc Computer Science, MPhil-PhD Computer Sci & Erg, MPhil-PhD Electronic Erg, MPhil-PhD Info Engineering, MPhil-PhD Mech & Auto Erg, MPhil-PhD System Erg & Erg Met, MPhil-PhD Information Engineering
MPhil-PhD Biomedical Engineering

Topics:

**COURSE OUTCOMES**

**Learning Outcomes:**

At the end of the course of studies, students will have acquired the ability to

1. Understand different processor architectures and system-level design processes
2. Understand the organization and operation of parallel computer systems
3. Understand memory hierarchy and its implication on system performance
4. Understand power and reliability of computer systems
5. Read and evaluate research papers

**Course Syllabus:**

This course is designed to present an overview of some advanced computer architectures and their underlying design principles. Issues discussed will include scalability and performance evaluation. The underlying technologies such as processor and memory hierarchy, cache and shared memory, and advanced pipelining techniques will be presented. Examples of high performance vector processors, multicomputers and massive parallel processors will be compared. Some novel architectures such as VLIW, fault tolerant systems and data flow machines will also be elaborated.

**Assessment Type:**

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<td>Others</td>
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**Feedback for Evaluation:**

1. Course evaluation and questionnaire
2. Question-and-answer sessions during class
3. Student consultation during office hours or online

**Required Readings:**

To be provided by course teacher.

**Recommended Readings:**


**OFFERINGS**

1. ENGG5101
   Acad Organization=CSEGV; Acad Career=RPG
COMPONENTS

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ENROLMENT REQUIREMENTS

1. ENGG5101

Enrollment Requirement Group:
For students in MSc Computer Science or MPhil-PhD programmes under Faculty of Engineering or UG Computer Science or UG Computer Engineering;
Exclusion: CENG5410

CAF

<END OF REPORT>