

Academic Org: Div of Computer Science & Engg – Subject: Courses offered by Fac of Eng

**Course:** ENGG5101      **Course ID:** 011149      **Eff Date:** 2024-07-01      **Crse Status:** Active      **Apprv. Status:** Approved      [New Course]  
Advanced Computer Architecture 高級計算機體系結構

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.

本科為介紹一些高級計算機體系結構之概觀及其基礎之設計原理。問題討論包括：(按比例)可調性及性能評價。並介紹一些基礎技術，例如：處理器及存儲器分級結構、超高速緩(沖)存儲器、共用存儲器及先進流水線技術。高性能向量處理機、多計算機及大量並行處理機之比較。詳述一些新穎的體系結構，如超長指令字(VLIW)，容錯系統及數據流機器。

建議：學生應曾修讀CENG3420或具備計算機組織的背景知識。

**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.

有關等級說明的資料，請參閱英文版本。

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.

有關等級說明的資料，請參閱英文版本。

C

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 Mechan & Auto Erg  
MPhil-PhD System Erg & Erg Mgt  
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:**

Essays	: 40%
Essay test or exam	: 20%
Others	: 20%
Presentation	: 20%

**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:**

1. Computer Architecture: A Quantitative Approach, 5th edition

**OFFERINGS**

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

**COMPONENTS**

LEC : Size=30; Final Exam=Y; Contact=2  
TUT : Size=30; Final Exam=N; Contact=1

**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

**Additional Information**

VTL-Onsite face-to-face hrs    0  
VTL-Online synch. hrs        0  
VTL-Online asynch. hrs       0

---

---

< E N D O F R E P O R T >