國立東華大學

課　　綱　Course Outline

資訊工程學系國際組

中文課程名稱 Course Name in Chinese	分散式系統				
英文課程名稱 Course Name in English	Distributed Systems				
科目代碼 Course Code	CSIEM0140	班 別 Degree	碩士班 Master’s		
修別 Type	選修 Elective	學分數 Credit(s)	3.0	時 數 Hour(s)	3.0
先修課程 Prerequisite	作業系統、計算機組織				

課程目標
Course Objectives

A distributed system is a collection of independent computers and related software that appears to its users as a single coherent system. In the Internet/Web/Mobile/Cloud/IoT era, almost all popular network-based applications or services can be considered as provided by distributed systems. It is one of the central knowledge that all computer science students must possess in order to be competitive in the fast changing world. The purposes of this course are to investigate the theories and practices underlying the design, construction and operation of distributed systems. In the lecture part, we will discuss fundamental principles such as distributed processes, addressing and naming, communication mechanisms, synchronization and coordination, replication and consistency, fault tolerance, distributed algorithms, transactions and concurrency control, security, mobile/pervasive computing, cloud services, big data processing, Internet of Things (IoT), etc.. Students are also required to conduct an independent study on selected topics and present papers in class. To gain hands-on experience on the design and construction of distributed system, students will also learn how to use proper tools for building distributed applications through lab, assignments and term project.

系教育目標
Dept.’s Education Objectives

1	探究學科知識，善用專業技能 Explore academic knowledge, utilize professional skills.
2	訓練評析思考，創新解決問題 Exercise analytical thinking, enhance creative problem solving skills.
3	學習團隊分工，強化溝通表達 Participate in teamwork, strengthen communication skills.

系專業能力 Basic Learning Outcomes		課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.’s Education Objectives
A	統合資工知識技術之能力 Ability to integrate knowledge and technologies of computer science and information engineering.	●
B	設計技術理論驗證實驗之能力 Ability to design and conduct science experiments and to validate hypotheses.	●
C	資訊軟硬體設計開發之能力 Ability to design and develop computer software and hardware.	●
D	團隊專案開發之能力 Ability to design and develop team projects.	●
E	批判性思考與創新研發之能力 Ability of analytical thinking, creative research planning, and innovative development.	●
圖示說明Illustration ：● 高度相關 Highly correlated ○中度相關 Moderately correlated		

課程大綱
Course Outline

The topics can be divided into several parts:
1.Foundations
2.Architectures and middlewares
3.Networking and internetworking
4.Distributed processes
5.Communication
6.Addressing and naming
7.Synchronization and coordination
8.Distributed algorithms and computation
9.Distributed programming and application development
10.Distributed file systems
11.Replication and consistency
12.Fault tolerance*
13.Security*
14.Distributed transactions and concurrency control*
15.Advanced Topics*
  －Service computing (Web services, SOA, microservices)
  －Mobile and ubiquitous computing
  －Grid, cloud, fog and edge Computing
  －Big data systems
  －Peer-to-peer systems
  －Wireless sensor networks(WSN)
  －Internet of Things(IoT)
  －Distributed data stream processing
  －Crowd computing
  －Social networks and computing
*: Topics to be covered when time permits. Visit the class Web page for detail information about the lecture schedule.

資源需求評估（師資專長之聘任、儀器設備的配合・・・等）

Resources Required (e.g. qualifications and expertise, instrument and equipment, etc.)
Need computer lab for the lab part of the course.
課程要求和教學方式之建議 Course Requirements and Suggested Teaching Methods
講授、討論與期末專題; Class lectures, case study and project
其他 Miscellaneous