
COMPUTER NETWORKS in Fall 2020 (CS3015)

Course Code	CS3015	Professor(s)	Antonio Kung
Prerequisites	None	Office Number	
Class Schedule	MW: 09:00-10:35 in Q-704	Office Hours	By appointment
Credits	4	Email	akung@aup.edu
Semester	Fall 2020	Office Tel. Ext.	+336 80 78 48 78

Course Description

The course explains through an architecture perspective the principles and practice of computer networking, with emphasis on the Internet and on pervasive computing. The following topics will be covered: structure and components of distributed systems, layered ISO/OSI architectures, protocols, local Area Networks, wide area networking issues including routing, flow control. Some advanced topics will also be covered such as the internet of things, systems of system, security and privacy, as well as related standards

Course Learning Outcomes

learn about networking and distributed systems

learn the fundamental topics of data communication networks, principles of operations, and performance analyses.

They will learn how Internet based technologies (e.g. TCP/IP, sockets, http, P2P) and Pervasive computing technologies (e.g. UPnP) relate to these fundamental topics

General Education

Course Outline

provisional schedule

<u>Lecture 1</u>	Wed 23rd Sept	• Introduction to course. Review of Syllabus. • Introduction to computer networks (Chapter 1)
<u>Lecture 2</u>	Mon 28th Sept	• Local area networks, personal area networks, metro networks, wide area networks (Chapter 1) • Protocol layers (Chapter 1)
<u>Lecture 3</u>	Wed 30th Sept	• Service/primitives in a layer (Chapter 1) • Reference models (Chapter 1) • Internet and mobile networks (Chapter 1)
<u>Lecture 4</u>	Mon 5th Oct	• Wireless local area networks, RFID and sensor networks (Chapter 1) • The Physical layer. Theoretical basis for communication (Chapter 2) • Guide transmission media: Cable, Coax, Fiber. (Chapter 2)
<u>Lecture 5</u>	Wed 7th Oct	• Wireless transmission media: electromagnetic spectrum, microwave, light, satellites (Chapter 2)
<u>Lecture 6</u>	Mon 12th Oct	• Digital modulation and multiplexing, baseband transmission (Chapter 2) • Frequency division multiplex, Time division multiplexing (Chapter 2)
<u>Lecture 7</u>	Wed 14th Oct	• Code division multiplex (Chapter 2) • The public switched telephone network, fiber to the home and multiplexing (Chapter 2)
<u>Lecture 8</u>	Mon 19th Oct	• Mobile networks. 2G, 3G, 4G (Chapter 2) • Cable, ADSL (Chapter 2) • The data link layer. Frames (Chapter 3)
<u>Lecture 9</u>	Wed 21st Oct	• The data link layer. Error control, Flow control, Error correction (Chapter 3) • Hamming distance, Hamming code, error-correcting codes (Chapter 3) • Parity bits, Checks sums, Cyclic redundancy codes (Chapter 3)
<u>Lecture 10</u>	Mon 26th Oct	• Elementary data protocols, sliding windows, PPP, ALOHA (Chapter 3)
<u>Lecture 11</u>	Wen 28th Oct	• MAC sublayer: channel allocation layer, from ALOHA and token rings (Chapter 4) • Collisions and contention (Chapter 4) • Hidden terminals (Chapter 4) • Ethernet (Chapter 4)
<u>Lecture 12</u>	Mon 2nd Nov	• Mid-term examination
<u>Lecture 13</u>	Wed 4th Nov	• Wireless lans, 802.11, 802.16, Bluetooth (Chapter 4)
<u>Lecture 14</u>	Mon 9th Nov	• RFID (Chapter 4) • Data link layer switching – bridges, repeaters, hubs, gateways (Chapter 4)
<u>Lecture 15</u>	Mon 16th Nov	• Network layer: routing algorithms – shortest path algorithms, flooding, distance vector routing, link state routing, hierarchical routing (Chapter 5)
<u>Lecture 16</u>	Wed 18th Nov	• Network layer: congestion control, admission control, packet shedding, quality of service, traffic shaping (Chapter 5)

<u>Lecture 17</u>	Mon 23rd Nov	• Network layer: packets, packet scheduling, internet tunneling, packet fragmentation (Chapter 5) • Network layer : IP addresses, mobile IPO.
<u>Lecture 18</u>	Wed 25th Nov	• Transport layer: Berkeley sockets, error control and (Chapter 6) • Transport layer: congestion control (Chapter 6)
<u>Lecture 19</u>	Mon 30th Nov	• Transport layer: UDP, Remote procedure call, real-t (Chapter 6) • Transport layer: TCP, performance management (C
<u>Lecture 20</u>	Wed 2nd Dec	• Application layer: DNS, Electronic mail, Static web (• Application layer: Dynamic web, http, mobile web (C • Application layer: Streaming audio and video, real-t conferencing (Chapter 7)
<u>Lecture 21</u>	Mon 7th Dec	• Application layer: Peer-to-peer networks (Chapter 7) • Introduction to security: Cryptography, Symmetric-K Public-Key Algorithms, Digital Signatures, Managen Keys (Chapter 8)
<u>Lecture 22</u>	Wed 9th Dec	• Application layer: DNS, Electronic mail, Static web (• Application layer: Dynamic web, http, mobile web (C • Application layer: Streaming audio and video, real-t conferencing (Chapter 7)
<u>Additional topics</u>		• Introduction to security: Communication Security, A Protocols ,Email Security, Web Security, Social Issu • Introduction to the Internet of Things, system of syst • Standardisation
• Final Exam (21 Dec 15.00)		

Textbooks

This course doesn't have any textbook.

Attendance Policy

Students studying at The American University of Paris are expected to attend ALL scheduled classes, and in case of absence, should contact their professors to explain the situation. It is the student's responsibility to be aware of any specific attendance policy that a faculty member might have set in the course syllabus. The French Department, for example, has its own attendance policy, and students are responsible for compliance. Academic Affairs will excuse an absence for students' participation in study trips related to their courses.

Attendance at all exams is mandatory.

IN ALL CASES OF MISSED COURSE MEETINGS, THE RESPONSIBILITY FOR COMMUNICATION WITH THE PROFESSOR, AND FOR ARRANGING TO MAKE UP MISSED WORK, RESTS SOLELY WITH THE STUDENT.

Whether an absence is excused or not is ALWAYS up to the discretion of the professor or the department. Unexcused absences can result in a low or failing participation grade. In the case of excessive absences, it is up to the professor or the department to decide if the student will receive an "F" for the course. An instructor may recommend that a student withdraw, if absences have made it impossible to continue in the course at a satisfactory level.

Students must be mindful of this policy when making their travel arrangements, and especially during the Drop/Add and Exam Periods.

Grading Policy

Homework assignments 30%

Mid-term examination 20%

Class participation 15%

Final examination 20%

Project presentation 15%

Other
