UNIVERSITY OF CALIFORNIA, LOS ANGELES

CS M117 Computer Networks: The Physical Layer

Summer 2018

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TA (1A):	Arjun Lakshmipathy	3704 BH	Ph: 5-8659	arjun.lakshmipathy@cs.ucla.edu

Introduction

This course is a lab oriented course. It is designed to give basic knowledge of the principles of modern communications and networking through hands-on experience. The focus is on physical and media access layers of the network protocol stack. A series of lab experiments complements the class lectures. **No Midterms, No Finals.**

Not open for students with credit for course M171L.

Course Objectives

- To provide fundamental knowledge of the principles underlying wireless communication systems relevant to digital data communications.
- To provide hands-on experience by performing a series of laboratory experiments.
- To gain experience in preparing formal technical report and project based upon Special Wireless laboratory experiments (SWE).

Meeting Places and Times

Lecture	Tue/Thu	12:00-1:50 PM	**9436** MS
Lab 1A	**Wednesdays**	**12:00-1:50 PM**	**3704 BH**
Lab 1B	**Wednesdays**	**2:00-3:50 PM**	**3704 BH**

Office Hours (tentative)

R. Dzhanidze	11:00-11:50 am	Tue /Th	3704 / 3409
TA	11:00-11:50 am	Wednesdays	3704 BH

Newsgroup and Website

- https://ccle.ucla.edu/course/view/18Su-COMSCIM117-1
- ucla.classes.cs.m117 - available on CSnet and SEASnet news servers

Units

CS 117 is a **4 unit course.**

Workload (Weekly)

2 hours lecture
2 hours pre-laboratory homework
2 hours lab experiments
2 hours lab report and project
2 hours outside study
2 hours wireless experiments

Homework

HW (Pre-laboratory) assignments will be placed on the class CCLE. The HW should be typed and spell-checked (no hand-written HW will be accepted). HW should be written up independently, and any other students involved in HW discussion should be noted on the HW. **However, copying of HW will not be permitted** – only general ideas, which must be

credited. HW must be completed correctly (using equation editor) before the student can begin the experiment session. Each student should complete them at home before coming to the lab. HW should be left on the TA deck before the beginning of the corresponding due day. They will be evaluated (by the TA). If you have any questions, consult the TA and/or Professors during office hours.

Lab Report and Raw Data Sheets

The report and Raw Data Sheets (simplified report) should be typed (using equation editor) and spell-checked (no hand-written reports will be accepted). The graphs may be hand-drawn, but they should be neat and readable.

1 Report, and 1 Project should be presented in PPT slides and comply with the structural requirements (see posted recommendations).

Report : "Wireless Communications" based on Lab#1 & #2);

Lab Results and Raw Data Sheet

Please show your lab Raw Data to the TA before leaving the lab! After each lab experiments you must complete at home all calculations required by your Row Data Sheet. **RDS due** are **at the beginning** of the next lab.

Experiment Conduction

Each experiment will be conducted by a group of 3 to 4 students. Each group is expected to carry out the experiment independently; the TA and instructor will assist in the case of problems. During the experiment students should complete the notes - **RDS**. **Please show all of your data to the TA before leaving the lab**!

Specifications for the Group Projects based on Special Wireless Experiments (SWE) Labs:

Projects - As part of the course requirements, students will work on a project of their choice, relevant to the wireless topics covered in class. Suitable project topics will be posted on the course CCLE and presented in class during the first two weeks of course. A typical project consists of the implementation of an Android application involving communications (peer-to-peer or with Internet Server) and computing (on smart phone and Internet Server). Projects with other wireless devices are also allowed with instructor consent.

A term paper (project) describing the results of the implementation/experiment must be prepared and submitted at the end 8th week. A presentation describing the highlights of the project and preliminary results must be delivered to the class in the last week of classes.

Project team size: 2-5 (larger or smaller teams with instructor or TA consent)
Term paper length: 5-15 pages.

Report Turn-in and Late Reports

The report may be turned in either in person or left in the lab. All reports are **due at 10:00 am** on the date designated in the schedule. Penalties will apply for late reports (see the TA).

Lab Experiments:

Lab 1 - Data Transmission over 802.11b Wireless LAN (RDS 2)
Lab 2 - Bluetooth PAN **(Report based on Lab 2 &3)**
SWE - Labs for Project - (Special Wireless Experiments)

Grading			
Homework	**(2)**	**(HW)**	**5%**
Report	**(1)**	**(RP)**	**15%**
Project	**(1)**	**(PJ)**	**60%**
Quiz Test	**(1)**	**(QT)**	**15%**
RDS	**(1)**	**(RDS)**	**Pass, No Pass**
Final Grade Includes		**(FG)**	**100%**

Numerical score conversion to the letter grades

A+	A	A-	B+	B	B-
[100-96]	(96-93]	(93-90]	(90-86]	(86-83]	(83-80]

Lab Groups and Collaboration

Usually 3 to 4 students work in teams on the experiments. Collaboration in preparation and execution of the experiment is not only encouraged but required. Experiment report must be **entirely the work of each individual student**. A general rule is that partners may collaborate on all sections of the experiment report **except the ABSTRACT, and DISCUSSION.** Each student must do his/her own abstract. Sharing plots and tables is permissible between within a single group ONLY. **Plagiarism will not be tolerated in this class. Any student suspected of plagiarism will be investigated and potentially punished.**

Recommended References:

R Dzhanidze, M. Gerla, Course Notes and Handouts for CS M117. 2018.
Course Reader Materials, 1081 Westwood Blvd, 1st floor Los Angeles, CA 90024; Special needs Entrance / 1080 Broxton Av.-Main Entrance; (310) 443-3303

A.S. Tanenbaum, "Computer Networks", Prentice Hall, 2002, Fourth Edition, ISBN 0-13-066102-3

J. Schiller. "Mobile Communications", Second Edition. Addison-Wesley. 2003.

CS M117. The Schedule Summer 2018

	Lectures **Tuesday**. 12:00-1:50 pm **9436 BH**		**DIS** **A1: Wed. 10:00-11:50 pm** **B1: Wed. 12:00-1:50 pm** **3704 BH**	Lectures **Thursday**. 12:00-1:50 pm **9436 BH**
1	**Introduction to CS M117 class** **Lec.1. Modulation (Instr.)** Computer networks, (**Read. 1**) June 26th		No Meetings June **27th**	**Lec.2. Wireless Channels.** (Data Encoding, Analog to Digital Conversion). **Read. 2** **Intro to the projects** **June 28th**
2	**Lec.3. Wireless LAN (Instr.)** (Prelab HW1, due 07/11) **Project proposed by the TA** **July 3rd**		HOLLYDAY July **4th**	**L.4. BT PAN. (Instr.)** (Prelab HW2 due 07/18) **Project proposed by students** **July 5th**
3	**L.5. Cellular Communications** **Project Assignments. Teams formed** **July 10th**		**Lab # 1 (W. LAN)** **RDS* 1 due on 07/18** **July 11th**	**L.6. Ad-Hoc Communications** **Final Projects Clinic** **July 12th**
4	**L.7. ZigBee Communications** **Equipment order** **July 17th**		**Lab # 2 BT PAN** **REPORT due on 07/25** **July 18th**	**Discussion of the projects** **July 19th**
5	**SWE Discussion** **July 24th**		**Equipment handed out,** **July 25th**	**SWE*** **July 26th**
6	**SWE*** **For Project** **With tutor supervision** **PROJECTS** **Due 08/21--22-23**	**SWE*** **July 31st**	**SWE*** **August 1st**	**SWE*** August 2nd
7		**SWE*** **August 7th**	**SWE*** **August 8th**	**SWE*** **August 9th**
8		**L.8.Concluding** **August 14th**	**SWE*** **August 15th**	**Quiz Test** **August 16th**
9		**Project Presentation** **August 21st**	**Project Presentation** **August 22nd**	**Project Presentation** **August 23rd**

* **Laboratory experiment Raw Data Sheet (RDS)**
* **Special Wireless Experiments (SWE*)**
* **Prelab-Prelaboratory Home Work**
* Additional lab time may be scheduled by appointment with the TA.
* **No Midterms, No Finals**

- **Everyone must attend meetings in bold type.**