HKUST Course Syllabus Outline: ELEC 300U (= ELEC 121)

Course Code: ELEC 300U

Course Title: A System View of Communications: From Signals to Packets

Course Description:

For Year 0 engineering students, this course covers basic communication concepts through system level design. With a simple functional wireless communication system, students will be exposed to basic engineering tools used and tradeoffs encountered in the design of communication systems. This course is very important to year 0 as it is designed to arouse their interest to engineering through hands-on experiments enabling them to understand communication systems through modular design techniques.

Course Description in Academic Calendar:

Have you ever wondered what technologies go into your mobile phone or a WiFi hotspot? Through hands on work with a simple but fully functional wireless communication system, you will understand the basic engineering tools used and tradeoffs encountered in the design of these systems. This course is centered on weekly laboratories, each designed to introduce an important concept in the design of these systems. The course is divided into three major sections dealing with issues at three levels of abstraction: volt-by-volt (analog), bit-by-bit (digital), and packet-by-packet (network architecture).

Prerequisite: AL Pure Mathematics, AL/AS Applied Mathematics, or AS Mathematics and Statistics; (For students without AL Pure Mathematics) MATH021/MATH022/MATH023/ MATH024 or equivalent background knowledge.

Course Learning Outcomes:

On successful completion of this course, students will be able to

- **CLO1 Understand** the practical context of the concepts that they will study in more theoretical details in other advanced classes.
- **CLO2** Identify typical problems and tradeoffs encountered in electronic and computer engineering systems.
- CLO3 Analyze simple approaches to deal with ECE problems and tradeoffs.
- **CLO4** Use software tools, such as MATLAB, to investigate ECE problems and simulate tradeoffs in validating analysis, as well as to handle cases not amenable to manual analysis.
- **CLO5** Gain working and learning experience in a cooperative setting on real hardware where simplified assumptions used in theoretical analysis may be violated, and gain an understanding of the benefits and limitations of such analysis.

Teaching Approach:

Traditionally, labs are designed to supplement materials learned in lecture. This course is a lab-centered course in which learning is expected to mainly take place inside the lab by working on a team with real equipment and signals, rather than problem sets. The lectures and tutorials are designed to support and help students prepare for the labs, rather than the other way around. The lab sessions are supported by two one-hour lectures and a tutorial that introduce the concepts for the next laboratory, as well as reviewing and expanding the concepts learned in the previous laboratory.

Lecture:	Delivered by the instructor on key concepts.
Tutorial:	Proctored by teaching assistants in reinforcing learned materials.
Labs:	Students experiment with electronic instruments and CAD tools.

Assessment Schemes:

Pre-lab exercises	15%
Post-lab interviews	20%
Homework	15%
1 Midterm exam (two hours)	25%
1 Final exam (two hours)	25%

Student Learning Resources:

Textbook: L. E. Frenzel, *Principles of Electronic Communication Systems*, Third Edition, McGraw Hill, 2008.

Course Schedule:

2 1-hours lectures per week1 1-hour tutorial per week1 3-hour lab per week

Teaching Staff Contact Details:

Course website: http://course.ee.ust.hk/elec300u/

Instructors:Professor Amine Bermak (eebermak@ece.ust.hk)
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Academic Honesty

http://www.ust.hk/vpaao/integrity/

Learning Environment

http://www.ust.hk/vpaao/conduct/good_learning_experience.pps/

Appendix:

ECE Program Learning Outcomes:

Consistent with the mission of the institution, the ECE Department's undergraduate program outcomes are to ensure its graduates possess:

- **PLO1** An ability to apply knowledge of mathematics, science and Electronic and Computer Engineering.
- **PLO2** An ability to use current techniques, skills, and engineering tools necessary for solving Electronic and Computer Engineering problems.
- **PLO3** An ability to identify and analyze problems, and to design efficient and economical Electronic and Computer Engineering systems subject to practical constraints.
- PLO4 An ability to communicate and function in a multi-disciplinary environment.
- **PLO5** An ability to understand and adhere to professional practices and ethical responsibilities.
- **PLO6** An understanding of contemporary global, economic, environmental, and societal issues, and the corresponding role and impact of Electronic and Computer engineers.
- **PLO7** A recognition of the need for, and the ability to engage in, life-long learning.