HKUSTx: ELEC1200.2x A System View of Communications: From Signals to Packets (Part 2)

Course Updates & News

DECEMBER 4, 2015

Reminder on Final Exam Deadline

Please be reminded that the Final Exam is due on **Monday 7 Dec 2015 23:30 (GMT+8)**. No score will be given to any submission done after the specified date and time.

Also, kindly note that you are responsible for checking the time difference between Hong Kong and your current local time. You may click on **Course Info** to check the current time in Hong Kong.

Please send us any questions and/or requests for clarification, through email: hkustx.elec1200.2x@gmail.com. Good luck!

Warm regards,
Bert and Song

DECEMBER 1, 2015

Typo in Final Exam: Section 1 Question 1

A typo in Section 1 Question 1 was reported and corrected. All occurrences of "Hamming" should be "Huffman".

DECEMBER 1, 2015

MATLAB files for final exam
The MATALB files used by the final exam code are **now** available on edX from the MATLAB download page.

DECEMBER 1, 2015

Final Exam Release

Dear students,

The Final Exam is now ready. You may access the exam in the **Final Exam** folder.

The exam consists of 18 multiple choice (single or multiple correct answers) and fill-in-the-blank questions and 4 MATLAB questions, 48 total points. Read the instructions carefully and submit your completed final exam on or before **Monday 7 Dec 2015 23:30 (GMT+8)**. No score will be given to any submission after the specified date and time.

Please send us any questions and/or requests for clarification, through email: hkustx.elec1200.2x@gmail.com. Good luck!

Warm regards,
Bert and Song

NOVEMBER 27, 2015

Reminder on Week 5 Quiz and Lab Exercise Due Date

Please be reminded that the Quiz and Lab Exercises are due on **Monday 30 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Also, kindly note that you are responsible for checking the time difference between Hong Kong and your current local time. You may click on **Course Info** to check the current time in Hong Kong.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

NOVEMBER 26, 2015

Final Exam Details

Dear students,

The final exam will be released on **Tuesday 1 Dec 2015 9:00 (GMT+8)**. You will be able to access the final exam in the **Final Exam** folder. The final exam contributes 50% to your course grade. It will consist of four equally weighted parts:

- Lossless source coding and entropy
- Frequency domain, Fourier Series/Transform and Filtering
- Modulation/Demodulation
- Digital communication protocols (BPSK/QPSK)

Each part will contain a mixture of multiple choice and fill in the blank questions, and a MATLAB-based problem.

You can start answering the final exam, when it is ready, at your own convenience. The exam is designed to be completed in three hours. The final exam must be completed by **Monday 7 Dec 2015 23:30 (GMT+8)**. Take note that you are responsible for checking the time difference between Hong Kong and your current local time, and factoring in the effect of potential Internet or connection difficulties.

Also note that once the final exam is ready, the New Post function on the Discussion page will be disabled. Thus, you will not be able to post anything, but you can still read previous discussion posts. The Discussion page will be open for new posts immediately after the final exam closes. All technical problems and/or questions related to final exam access must be sent to hkustx.elec1200.2x@gmail.com. We will try to respond to your questions as soon as possible.

You must follow the honor code to complete the exam based on your own independent effort. Good luck!

Warm regards,
Bert and Song

NOVEMBER 24, 2015

Week 5 Content Rollout

Dear students,

The Week 5 Lecture and Lab Demo videos are now ready. In Week 5, we will study how we can improve the efficiency of our communication system, and study strategies for transmitting digital data over wireless communication systems. We will conclude with a review of the material we have studied in this course. By the end of this week, you should be able to:

- Understand how digital data can be transmitted wirelessly using binary phase shift keying
- Understand how quadrature phase shift keying can be used to double the rate information sent over the same channel

- Interpret eye and constellation diagrams as indicators of the performance of a digital communication channel

You may access the weekly content on the **Courseware** page.

In order to assess your learning progress, Quiz and Lab Exercises are provided between topics. We encourage you to finish viewing all the related lecture and demo videos before completing this part. You are expected to complete the Quiz and Lab Exercises on or before **Monday 30 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

NOVEMBER 23, 2015

Extended Due Date for Week 4 Lab Exercise

We identified a server issue which previously affected the execution environment of the MATLAB grader. We decided to extend the submission due date of lab exercises for 1 day. **Week 4 Lab Exercises** are therefore due on **Tuesday 24 Nov 2015 23:30 (GMT+8)**. The number of submission attempts are also reset.

Please also be reminded that the Week 4 Quiz Exercises remain to be due on **Monday 23 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Also, kindly note that you are responsible for checking the time difference between Hong Kong and your current local time. You may click on **Course Info** to check the current time in Hong Kong.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

NOVEMBER 17, 2015

Week 4 Content Rollout

Dear students,

The Week 4 Lecture and Lab Demo videos are now ready. In Week 4, you will learn about how wireless communication systems can share a common channel using a technique known as frequency division multiplexing. By the end of this week, you should be able to:

- Understand the concept of frequency division multiplexing
- Understand how modulation and demodulation can be used to shift signals from one part of the frequency spectrum to another
- Analyze modulation and demodulation using sine waves and complex exponentials
- Understand the effect of frequency and phase mismatches between the transmitter and receiver

You may access the weekly content on the **Courseware** page.

In order to assess your learning progress, Quiz and Lab Exercises are provided between topics. We encourage you to finish viewing all the related lecture and demo videos before completing this part. You are expected to complete the Quiz and Lab Exercises on or before **Monday 23 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

NOVEMBER 13, 2015

Reminder on Week 3 Quiz and Lab Exercise Due Date

Please be reminded that the Quiz and Lab Exercises are due on **Monday 16 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Also, kindly note that you are responsible for checking the time difference between Hong Kong and your current local time. You may click on Course Info to check the current time in Hong Kong.

Please post any questions and/or requests for clarification, on the Discussion page.

Warm regards,
Bert and Song

NOVEMBER 10, 2015

Week 3 Content Rollout

Dear students,

The Week 3 Lecture and Lab Demo videos are now ready. In Week 3, you will use your understanding about the frequency domain to obtain additional insight into the operation of linear time invariant systems, by viewing it as a filter which passes or even amplifies some parts of the input and blocks others. We will also study an alternative representation of the frequency domain. By the end of this week, you should be able to:

- Understand the frequency response of a linear time invariant system
- Recognize different types of filters from their frequency response

- Predict the output of a filter given the Fourier coefficients of its input and its frequency response
- Understand the complex exponential
- Understand the relationship between the discrete Fourier series and the discrete Fourier Transform.

You may access the weekly content on the Courseware page.

In order to assess your learning progress, Quiz and Lab Exercises are provided between topics. We encourage you to finish viewing all the related lecture and demo videos before completing this part. You are expected to complete the Quiz and Lab Exercises on or before **Monday 16 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Please post any questions and/or requests for clarification, on the Discussion page.

Warm regards,
Bert and Song

NOVEMBER 6, 2015

Reminder on Week 2 Quiz and Lab Exercise Due Date

Please be reminded that the Quiz and Lab Exercises are due on **Monday 9 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Also, kindly note that you are responsible for checking the time difference between Hong Kong and your current local time. You may click on **Course Info** to check the current time in Hong Kong.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

NOVEMBER 3, 2015

Week 2 Content Rollout

Dear students,

The Week 2 Lecture and Lab Demo videos are now ready. In Week 2, you will be introduced to the idea of the frequency domain. This concept will be important in understanding one way in which we can share a channel as well as in giving us an alternative way of understanding the operation of a linear time invariant system. This week we will focus on how it can be used to understand the MP3 encoding we use to compress our music files. By the end of this week, you should be able to:

- Understand the parameters that control the shape of continuous and discrete time sinusoids
- Recognize that signals can be represented as sums of sinusoids.
- Reconstruct a signal given its Fourier coefficients
- Understand the key steps in MP3 encoding. You may access the weekly content on the **Courseware** page.

In order to assess your learning progress, Quiz and Lab Exercises are provided between topics.

We encourage you to finish viewing all the related lecture and demo videos before completing this part. You are expected to complete the Quiz and Lab Exercises on or before **Monday 9 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

OCTOBER 30, 2015

Reminder on Week 1 Quiz and Lab Exercise Due Date

Please be reminded that the Quiz and Lab Exercises should be completed on or before **Monday 2 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Also, kindly note that you are responsible for checking the time difference between Hong Kong and your current local time. You may click on **Course Info** to check the current time in Hong Kong.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

OCTOBER 27, 2015

Week 1 Content Rollout

Dear students,

The Week 1 Lecture and Lab Demo videos are now ready. In Week 1, you will be introduced to the overall structure of this part of the course, as well as the idea of source coding or compression. This week, we will pay particular attention to lossless compression. By the end of this week, you should be able to:

- Understand the difference between lossless and lossy source coding
- Calculate the entropy of a discrete random variable
- State the relationship between the entropy and the average code length
- Find a Huffman code for a set of symbols

You may access the weekly content on the **Courseware** page.

In order to assess your learning progress, Quiz and Lab Exercises are provided between topics. We encourage you to finish viewing all the related lecture and demo videos before completing this part. You are expected to complete the Quiz and Lab Exercises on or before **Monday 2 Nov 2015 23:30 (GMT+8)**. No score will be given to answers submitted after the specified date and time.

Please post any questions and/or requests for clarification, on the **Discussion** page.

Warm regards,
Bert and Song

OCTOBER 20, 2015

Welcome

Dear students,

Welcome to **A System View of Communications: From Signals to Packets (Part 2)**.

We are excited to have you in this course! This second in a series of three parts starts with a discussion of source coding, also known as compression. There are two types of compression: lossless and lossy. We start with a discussion of lossless compression and the idea of entropy. Before discussing the idea of lossy compression, we need to introduce the idea of the frequency domain analysis of signals. This enables us to understand the key steps in the MP3 encoding used for audio files. The frequency domain also allows us to get a better understanding of a linear time invariant system by interpreting its operation as a filtering process. In the final section of this part, we discuss how we can share a wireless channel by moving different signals in and out of different radio frequency ranges, via processes called modulation and demodulation. We discuss schemes for digital data transmission and how to make most effective use of the communication channel.

Once again, we have prepared substantive and engaging materials to boost your learning experience. To enable us to enhance your learning experience further, please let us know more about you and your needs by filling out the **pre-course survey**.

In preparation for the first week's lesson, you may want to look at the **course outline**, the **grading scheme** and information **about the instructors**. To access all of that information, click on the relevant buttons on top of the course site.

We are looking forward to a fun learning adventure!

Warm regards,
Bert and Song

OCTOBER 15, 2015

Dear students,

Thank you for signing up for **A System View of Communications: From Signals to Packets (Part 2)**.

In this part, you will continue to gain first-hand experience building a communication system. We will show you how multiple senders can share a channel, using a technique called frequency division multiplexing, which is commonly used in wireless communications. Along the way, we will introduce the idea of examining signals in the frequency domain, and how we can use this concept to understand compression algorithms, such as the MP3 standard we commonly use to compress music files. We will discuss how we can interpret the operation of a linear time invariant channel as a filter, and how filters are used in communication systems. We also discuss how we can make the most efficient use of our communication channel in order to transmit as much information as possible.

We will open the course site for you to fill out a pre-course survey and access some orientation information, such as the course outline, grading scheme, instructors' profile, etc. on **20 Oct 2015 9:00 (GMT+8)**. We will kick start the first week's lesson on **27 Oct 2015 9:00 (GMT+8)**.

We hope that you'll have an enjoyable learning experience with us.

Warm regards,
Bert and Song