

# Sirindhorn International Institute of Technology Thammasat University

Midterm Exam: Semester 1, 2012

**Course Title:** ITS323 Introduction to Data Communications

**Instructor:** Steven Gordon

**Date/Time:** Tuesday 14 August 2012; 13:30–16:30

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## Instructions:

- This examination paper has 15 pages (including this page).
- Conditions of Examination: Closed book; No dictionary; Non-programmable calculator is allowed
- Students are not allowed to be out of the exam room during examination. Going to the restroom may result in score deduction.
- Students are not allowed to have communication devices (e.g. mobile phone) in their possession.
- Write your name, student ID, section, and seat number clearly on the front page of the exam, and on any separate sheets (if they exist).
- Assume bits are ordered from left to right. For example, for the data 00001111, the first (1st) bit is 0 and the last (8th) bit is 1.
- Assume the speed of transmission is  $3 \times 10^8$  m/s
- Free space propagation path loss:

$$\frac{P_t}{P_r} = \frac{(4\pi d)^2}{G_t G_r \lambda^2}$$

- Antenna gain for parabolic antenna with effective area  $A_e$ :

$$G = \frac{4\pi A_e}{\lambda^2}$$

- Nyquist capacity:

$$C = 2B \log_2(M)$$

- Shannon capacity:

$$C = B \log_2(1 + SNR)$$

## ITS323 Midterm Exam Hints - 2012

- 7 questions
- 90 marks total
- Question 1: fill in the blanks
- Questions 2 to 7: general questions with multiple parts (calculations, descriptions, etc.)
- Show calculations. Partial marks will often be awarded if you have the correct approach, but the wrong final answer.
- You may use the back of a page to continue your answer if you need space. But be sure to make it clear that you have continued onto the back, e.g. write “Answered continued on back”.
- Mark your final answer clearly. If you write multiple different values and I cannot easily distinguish which one is your final answer, then it will be marked incorrect.
- Topics covered: up to and including Signal Encoding Techniques (the last topic covered in lecture before midterm)
- Use quizzes and past exams for practice and as an indicator of types of questions.