

# Before we start ...

- Grab the free handouts
  - Course syllabus
  - Slides

Srinidhi International Institute of Technology  
Thammasat University  
School of Information, Computer and Communication Technology

ECS332: Course Syllabus

Semester/Year: 1/2018

Course Title: Principles of Communications  
Instructor: Asst. Prof. Dr. Prapan Teetsompong  
Course Website: <http://www.sriiit.ac.th/department/eecs332/>  
Line Group: <http://www.sriiit.ac.th/eecs332/>

**Lectures**

- Wednesday 10:40-12:00 BHD 3215
- Friday 10:40-12:00 BHD 3215
- Thursday 14:40-16:00 BHD 3214  
(Tutorial/Make-up Shared with ECS331)

**Office Hours**  
See Calendar on the course website.

**Course Information**  
Prerequisite: ECS263 Signals and Systems  
Corequisite: ECS315 (Probability and Random Processes) or IP005 (Engineering Math II)

Assignments (HW)	5%
Class Discussion	5%
In-Class Exercises	10%
Midterm Examination	30%
Final Examination (comprehensive)	42%

Late assignments will be heavily penalized or rejected.  
• Cheating will not be tolerated

Textbook: J.C.K. & Bruce Carlson and Paul B. Crilly, Communication Systems: An Introduction to Signals and Noise in Electrical Communication, McGraw-Hill, 2010, 5th International edition, Call No. KS302.3 C3 2010, ISBN: 978-0-07-126682-0.

Page 1 of 3

Principles of Communications  
ECS 332

Asst. Prof. Dr. Prapan Teetsompong  
[prapan.teetsompong@sriiit.ac.th]

**Course Organization**

- Course Website: <http://www.sriiit.ac.th/department/eecs332/>
- Lectures:
  - Wednesday 10:40-12:00 BHD 3215
  - Friday 10:40-12:00 BHD 3215
  - Tutorial/Exercise/Make-up session:
    - Thursday 14:40-16:00 BHD 3214 (Shared with ECS 331)
- Textbook: Communication Systems: An Introduction to Signals and Noise in Electrical Communication, McGraw-Hill, 2010, 5th International edition, Call No. KS302.3 C3 2010, ISBN: 978-0-07-126682-0

**The Thursday Sessions**

- Standard EC332
- EC332-2 sessions will be used for EC332-1 tutorial/exercise days.
- Extra sessions during the course systems.
- Will be conducted in Thai and English.
- Proficiency in English is an essential skill.
- Proficiency in reading professional English (books and documents) is a must.

- Please join the ECS332
- Make sure that you have the lecture notes either via
  - buying the hardcopy from the copy center or
  - downloading a pdf copy from the course website



Srinidhi International Institute of Technology  
Thammasat University  
School of Information, Computer and Communication Technology

ECS332: 2018/1 Part I Dr. Prapan Teetsompong

1. Introduction to communication systems

1.1. Signal's magnitude [10]

The fundamental properties of communication systems are the production of signals and the way in which signals are processed and transmitted.

Definition 1.1: Figure 1.1 shows a communication system. In a message, bit or packet-level communication system.

(a) Information source produces a message

- Message may be interpreted as analog (continuous or digitized) signal.

(b) Transmitter converts the message to a digital signal and transmits it through a channel

(c) Channel: The channel is the set of physical devices used to convey the message from

- Channel impairments: degradation/distortion/noise.

Figure 1.1: Block diagram of a communication system. The message source produces a message, which is then converted into a digital signal by the transmitter. The signal is then transmitted through a channel, which may introduce impairments. The receiver then receives the signal and converts it back into a message.



# Principles of Communications

## ECS 332

**Asst. Prof. Dr. Prapun Suksompong**

(ผศ.ดร.ประพันธ์ สุขสมปอง)

[prapun@siit.tu.ac.th](mailto:prapun@siit.tu.ac.th)

**Introduction**



**Office Hours:**

BKD, 6th floor of Sirindhralai building

**Wednesday 14:30-15:30**

**Friday 14:30-15:30**

# Course Website

prapun.com



Asst. Prof. Dr. Prapun Suksompong (ผศ.ดร.ประพันธ์ สุขสมปอง) is currently an Asst. Prof. at Sirindhorn International Institute of Technology. He topped the Cornell ECE department in 2003 and got his Ph.D. in 2008.

Right after his graduation, he started his career as an Asst. Prof. with two other faculty members in the Wireless Communication Center (คณข ประเททอาจารย์) from Thammasat University.

Ajarn Prapun always highly values the teaching aspect and was awarded the IEEE Student Branch "for exemplary teaching in ECE" in 2017.

For more information, here is his CV. (Download pdf version)

## Teaching

- For 1/2018, he teaches
  - ECS315 (Probability and Random Processes)
  - ECS332 (Principles of Communications)
- For 3/2017, he taught
  - ICT Elementary for Embedded Systems (Fourier transform and principles)
- For 2/2017, he taught
  - ECS452 (Digital Communication Systems)
- For 1/2017, he taught
  - ECS315 (Probability and Random Processes)
  - ECS332 (Principles of Communications)

Current version



Earlier version



## ECS 332: Principles of Communications

### Synopsis

This course introduces the fundamental elements of analog and digital communication systems. The focus will be on the mathematical analysis of the signals and basic building blocks of communication systems. Performance of digital communication systems in the presence of noise will be discussed towards the end. The skills and knowledge gained from this class are essential for other advanced communication courses such as, data communications, computer network, digital communication systems, and mobile communication.

### Announcements

- Note that we also share the tutorial/make-up session with ECS315. See Google calendar below.
- This site can be accessed via [prapun.com/ecs332](http://prapun.com/ecs332)
- Welcome to ECS332! Feel free to look around this site.

### General Information

- **Instructor:** Asst. Prof. Dr. Prapun Suksompong ([prapun@sit.tu.ac.th](mailto:prapun@sit.tu.ac.th))
  - Office: BKD, 6th floor of Sirindhralai building
  - Office Hours: See Google calendar below.
- **Lectures:** See Google calendar below.
- **Course Syllabus**
- **Textbook:** [C&C] A. Bruce Carlson and Paul B. Crilly, Communication Systems: An Introduction to Signals and Noise in Electrical Communication, McGraw-Hill, 2010, 5th international edition.
  - Call No. TK5102.5 C3 2010. ISBN: 978-007-126332-0.
  - Companion Site
- **References**
  - Draft of the lecture notes

# Course Organization

- **Course Website:**

<http://www2.siit.tu.ac.th/prapun/ecs332/>

- **Lectures:**

- **Wednesday 10:40-12:00 BKD 3215**

- **Friday 10:40-12:00 BKD 3215**

- **Tutorial/Exercise/Make-up sessions:**

- **Thursday 14:40-16:00 BKD 3214 (Shared with ECS315)**

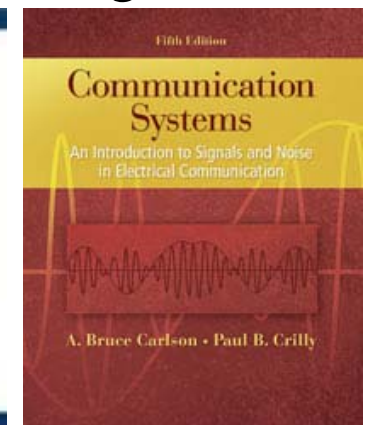
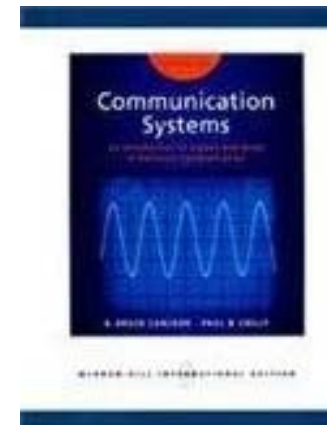
- **Textbook:** Communication Systems: An Introduction to Signals and Noise in Electrical Communication

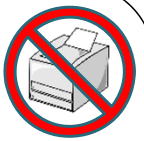
- By A. Bruce Carlson and Paul B. Crilly

- 5th International edition

- Call No. TK5102.5 C3 2010

- ISBN: 978-007-126332-0





# A. Bruce Carlson

- Was a professor and curriculum chairman of the electrical, computer and systems engineering department at Rensselaer Polytechnic Institute (RPI).
- Retired in 2002.



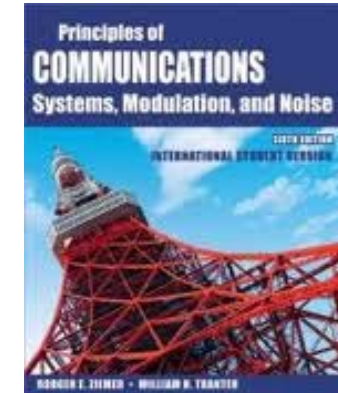
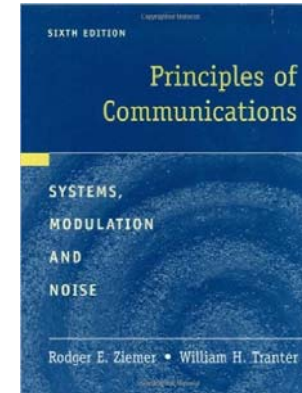
# The Thursday Sessions

- Shared with ECS315.
- The first 4-5 sessions will be used for ECS315 **tutorial/review** classes.
- Later, we will start using them as tutorial sessions.
  - Will be conducted **in Thai** to help those who have problem with English.
    - Hopefully, you will ask more questions as well.
- They can also be used for pre-announced make-up classes and in-class exercises as well.

# More references

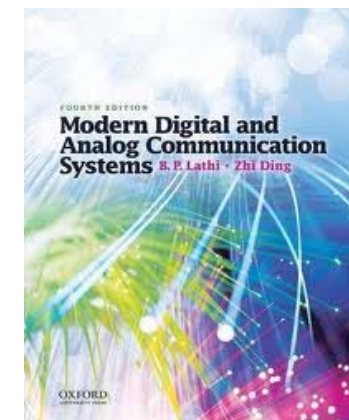
- Principles of Communications

- By Rodger E. **Ziemer** and William H. **Tranter**
- 6th International student edition
- ISBN 978-0-470-39878-4
- Library Call No. TK5105 Z54 2010
- Student Companion Site: <http://bit.ly/mN18kQ>



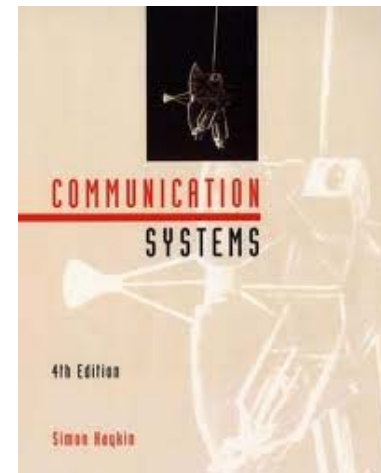
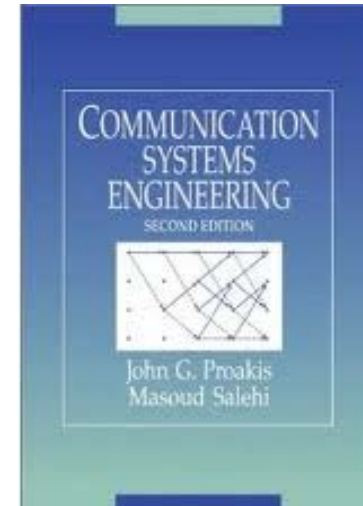
- Modern Digital and Analog Communication Systems

- By B.P. **Lathi** and Zhi **Ding**
- 4th Edition
- Library Call No. TK5101 L333 2009



# More references

- J. G. **Proakis** and M. **Salehi**,  
Communication Systems Engineering,  
2nd Edition, Prentice Hall, 2002. ISBN:  
0-13-095007-6
- S.S. **Haykin**, Communication Systems,  
4th Edition, John Wiley & Sons, 2001.  
Call Number: TK5101 H38 2001.

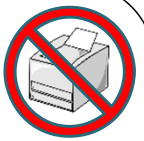




# Another Reference (in Thai)

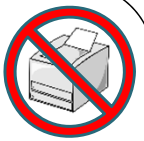


- สุวิทย์ นาคพิระยุทธ และคณะ
- หลักการไฟฟ้าสื่อสาร
- พิมพ์ครั้งที่ 3, 2558
- ISBN: 9789740333890
- หนังสือ หลักการไฟฟ้าสื่อสาร เล่มนี้กล่าวถึง ทฤษฎีการแปลงฟูเรียร์ (Fourier transform) ระบบเชิงเส้น สหสัมพันธ์ (Correlation) ความหนาแน่นสเปกตรัม (Spectral density) การมอดูเลตเชิงแอมพลิจูด (amplitude modulation) การมอดูเลตเชิงมุม (angle modulation) กระบวนการกลุ่ม (random process) สัญญาณรบกวน (noise) ทฤษฎีการซีกตัวอย่าง (sampling theory) การมอดูเลตโดยใช้พัลส์ (pulse modulation) การส่งผ่านพัลส์เบสแบนด์ (basenand pulse transmission) การมอดูเลตแบนด์พาส (digital passband transmission) และทฤษฎีข่าวสาร (information)
- เป็นผลจากความร่วมมือทางวิชาการของคณาจารย์จากหลายสถาบันการศึกษาที่มีชื่อเสียงของประเทศหลายแห่ง



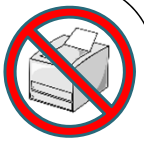
## Another Reference (in Thai)





# ECS 332: Course Outline

1. Introduction to communication systems
2. Frequency domain analysis (Fourier transform and its property)
3. Frequency-shifting (translation), Bandwidth
4. Modulation, , multiplexing, DSB-SC
5. Channel characteristics, distortion, multipath Fading
6. Fourier series and its applications in analyzing modulator and demodulator
7. Energy and power, instantaneous frequency
8. **MIDTERM: 5 Oct 2018 TIME 09:00 - 11:00**
9. Classical DSB-SC Modulators, Amplitude Modulation (AM), envelope detector, Quadrature Amplitude Modulation (QAM)
10. Suppressed-Sideband Amplitude Modulation, Vestigial-Sideband Modulation (VSB)
11. Angle modulation: FM and PM
12. Sampling
13. Reconstruction
14. Analog pulse modulation, inter-symbol Interference, and pulse shaping
15. Pulse Code Modulation (PCM)
16. Digital communication in the presence of noise
17. **FINAL: 13 Dec 2018 TIME 09:00 - 12:00**



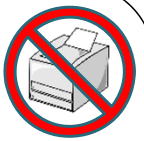
# Calendar

Tutorials / Make-up

M	T	W	R	F
13-Aug-18	14-Aug-18	15-Aug-18	16-Aug-18	17-Aug-18
20-Aug-18	21-Aug-18	22-Aug-18	23-Aug-18	24-Aug-18
27-Aug-18	28-Aug-18	29-Aug-18	30-Aug-18	31-Aug-18
3-Sep-18	4-Sep-18	5-Sep-18	6-Sep-18	7-Sep-18
10-Sep-18	11-Sep-18	12-Sep-18	13-Sep-18	14-Sep-18
17-Sep-18	18-Sep-18	19-Sep-18	20-Sep-18	21-Sep-18
24-Sep-18	25-Sep-18	26-Sep-18	27-Sep-18	28-Sep-18
1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	5-Oct-18
8-Oct-18	9-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18
15-Oct-18	16-Oct-18	17-Oct-18	18-Oct-18	19-Oct-18
22-Oct-18	23-Oct-18	24-Oct-18	25-Oct-18	26-Oct-18
29-Oct-18	30-Oct-18	31-Oct-18	1-Nov-18	2-Nov-18
5-Nov-18	6-Nov-18	7-Nov-18	8-Nov-18	9-Nov-18
12-Nov-18	13-Nov-18	14-Nov-18	15-Nov-18	16-Nov-18
19-Nov-18	20-Nov-18	21-Nov-18	22-Nov-18	23-Nov-18
26-Nov-18	27-Nov-18	28-Nov-18	29-Nov-18	30-Nov-18
3-Dec-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18
10-Dec-18	11-Dec-18	12-Dec-18	13-Dec-18	14-Dec-18

Lectures

Exams



# Grading System

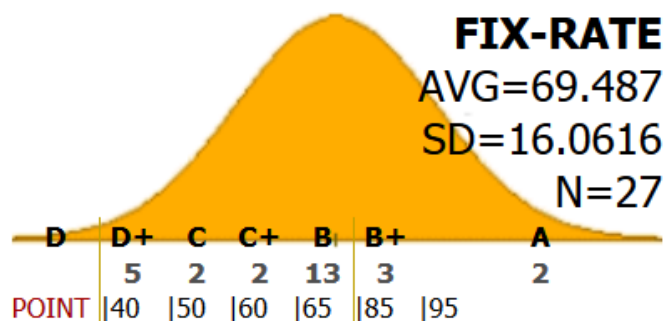
- Coursework will be weighted as follows:

Assignments	5%
Class Discussion	5%
In-Class Exercises	10%
Midterm Examination	35%
Final Examination (comprehensive)	45%

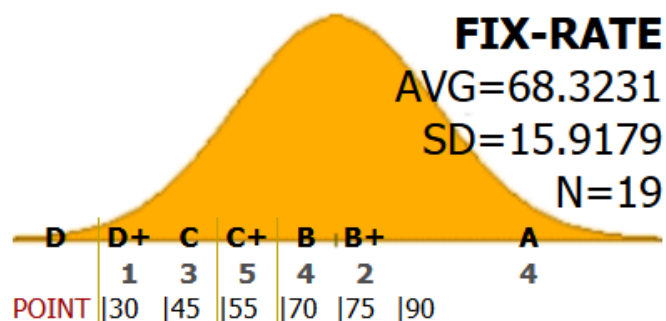
- Late HW submission will be rejected.



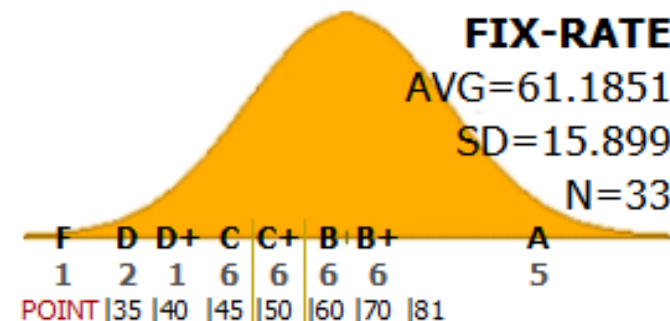
# Grading System: History



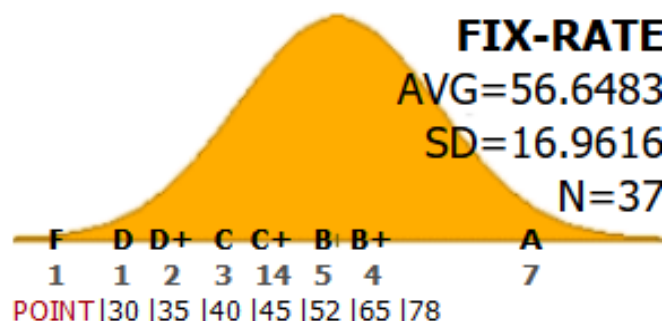
2011: CLASS GPA: 2.74



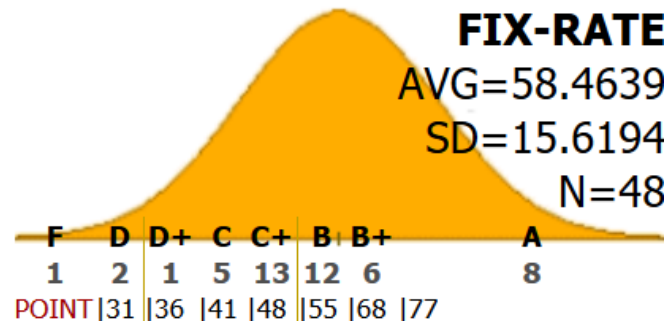
2012: CLASS GPA: 2.89



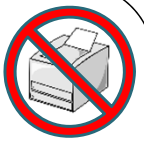
2015: CLASS GPA: 2.71



2016: CLASS GPA: 2.76



2017: CLASS GPA: 2.81



# Warning

- This class can be **difficult**.
  - Keep up with the lectures.
  - Make sure that you understand the concepts presented in the lecture before you go home.
- I will **evaluate** your understanding of the course **regularly** through
  - In-class exercises/activities
  - Exams

