Dept. of Electronics and Electrical Communications

Faculty of Engineering – Cairo University

جامعة القاهرة

قسم هندسة الإلكترونيات و الاتصالات الكهربية
كلية الهندسة ـ جامعة القاهرة
الجيزة ـ القاهرة ـ جمهورية مصر العربية

Reading List for the PhD Comprehensive Exam
Communications Specialization
(Academic Year 2011 – 2012)

Part I: Satellite Communications

Responsible Faculty: Dr. Salwa EL-RAMLY (Professor of Communications at Ain Shmas University)

Book Title: Satellite Communications
By Robert M. Gagliardi
Publisher: Van Nostrand, 2nd Edition

The required Chapters are:
Chapter1: Introduction, Orbiting Satellites, Satellite frequency bands, Satellite multiple- access formats
Chapter3: The satellite channel: Electromagnetic field propagation, Antennas, Atmospheric losses, Receiver noise, Carrier to noise ratios, Satellite link analysis, Dual polarization, Spot beams in satellite downlinks
Chapter 9: On board Processing: On-board processing subsystems, baseband digital decoding, data reclocking, routing and multiplexing, TDM-FDM conversion On board remodulation, on board baseband processing with beam hopping, multiple spot beaming, photonic on board processing
Chapter 10: Satellite Crosslinks: The crosslink system, Crosslink power budget, coherent and non-coherent communications at EHF, Autotracking, Autotrack loop analysis.

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Part II: Digital Communications

Responsible Faculty: Dr. Emad AL-HUSSAINI (Professor of Communications at Cairo University)

Book Title: Digital Communications
By J. Proakis and M. Salehi
Publisher: McGraw-Hill, 2008

The required Chapters are:4, 9, 10, 13, 16. Covered topics are:

- Derivation of the optimum receiver through AWGN. Therefore, derivation of the BER of different modulation schemes.
- Digital communications through band-limited channels. Equalizers: zero-mean, least mean square and decision feedback equalizers. Blind equalizers: Godard, high order statistics and ML equalizers.
- Digital communications over fading channels. Channel characteristics. Diversity techniques for different modulation schemes and derivations of the BER.
- Multiple access techniques description and derivations of their channel capacities. Multiuser CDMA detection. Derivation of optimum and suboptimum receivers employing CDMA techniques.

Part III: Signal Theory

Responsible Faculty: Dr. Hazem TAWFIK (Professor of Communications at Cairo University)

Book Title: Signals and Systems
By A. V. Oppenheim, A,S, Willsky, S.H. Nawab
Publisher: Prentice Hall International Edition, 2nd Edition (1997)
Chapters: 2, 3, 4, 5, 6, 7, 10

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Part IV: Coding Theory

Responsible Faculty: Dr. Magdy EL-SOUDANI (Professor of Communications at Cairo University)

Book Title: Error Control Coding: Fundamentals and Applications

By Shu Lin <http://www.abebooks.com/author/Shu+Lin/2250670/> ; Daniel J. Costello <http://www.abebooks.com/author/Daniel+J.+Costello/2040819/>
Publisher: Prentice Hall, 2004

The required chapters are:
Chapter 6: Binary BCH Codes
Chapter 10: Reliability-Based Soft Decision Decoding Algorithm for Linear Block Codes
Chapter 12: Optimum Decoding of Convolutional Codes
Chapter 16: Turbo Coding
I assumed that the PhD candidates have prior knowledge about Error Correcting codes.

Part V: Subject Selected by Adviser

Responsible Faculty: The head of the advising committee of the student.