

Telecommunication, Signal and Image Processing

Random processes, fundamentals of probability and processes, random communications signals. Chapter 1 from Communication Systems (4th Ed.), S. Haykin, Wiley.

Modulation, analog and digital, baseband and carrier. Chapters 2-4 from Communication Systems (4th Ed.), S. Haykin, Wiley.

Signal space analysis. Chapter 5 from Communication Systems (4th Ed.), S. Haykin, Wiley.

Power and Control Systems

Power Electronics. Chapter 1, Chapter 7 (section 7-1 to 7-4), and Chapter 8 (section 8-1 to 8-4) from Power Electronics: Converters, Applications, and Design (2nd Ed.), N. Mohan, T.M. Undeland, and W.P. Robbins, Wiley.

Power Systems. Chapter 2 and Chapter 5 from Power System Analysis and Design, J. D. Glover, M. S. Sarma, and T. J. Overbye, Cengage Learning.

Control Systems. Chapter 2, Chapter 4, Chapter 5, and Chapter 8 from Modern Control Systems (12th Ed.), R.C. Dorf, and R.H. Bishop, Pearson.

Software Engineering

Databases. Chapters 1-15 from Database Systems: A Practical Approach to Design, Implementation and Management (6th Ed.), T. Connolly, and C. Begg, Pearson.

Data structures and algorithms. Chapters 2-5, 7, 9, 10 from Data Structures and Algorithm Analysis in Java, M.A. Weiss. Pearson.

Object-oriented design and design patterns. Chapters 1, 2, 4-6, 8-11 from Object oriented software engineering, practical development using UML and Java, T. Lethbridge, and R. Laganriere, McGraw-Hill.

Biomedical Engineering

Sensors and biopotential electrodes. Chapters 2, 5 from Medical Instrumentation: Application and Design (4th Ed.), J.G. Webster, Wiley.

Origin of biopotentials. Chapter 4 from Medical Instrumentation: Application and Design (4th Ed.), J.G. Webster, Wiley.

Biopotential amplifiers and signal processing. Chapters 3, 6 from Medical Instrumentation: Application and Design (4th Ed.), J.G. Webster, Wiley.

Medical Imaging Systems. Chapter 12 from Medical Instrumentation: Application and Design (4th Ed.), J.G. Webster, Wiley.

Circuits and Electronics

First and second order circuits. Chapters 7, 8 from Fundamentals of Electric Circuits (5th Ed.), C. Alexander, and M. Sadiku, McGraw-Hill.

Frequency response, Fourier and Laplace transforms. Chapters 14-17 from Fundamentals of Electric Circuits (5th Ed.), C. Alexander, and M. Sadiku, McGraw-Hill.

Two-port networks. Chapter 18 from Fundamentals of Electric Circuits (5th Ed.), C. Alexander, and M. Sadiku, McGraw-Hill.

Bipolar and MOS Transistor circuits. Chapter 7 from Microelectronic Circuits (7th Ed.), A.S. Sedra, and K.C. Smith, Oxford University Press.

Computer Engineering

Review of computer architecture, microcontrollers and their instruction sets; Interfacing using common input/output devices – e.g. SPI, GPIO; Strategies for interrupt handling and exception handling; Interfacing combining code using functions implemented in high level and assembly languages; Real time operating systems; Software and hardware optimizations to achieve real time operations; Processor characteristics needed to match the requirements for typical DSP applications; Hardware and software optimization techniques including multiple busses; Super-scalar and other highly parallel instruction sets, critical timing paths; Optimizing compilers and multi-processor operation. Digital Design and Computer Architecture (2nd Ed.), by D. Harris, and S.L. Harris, Morgan Kaufmann Publishers.

Interrupt handling, DMA and interfacing. Source material TBD.

RF Circuits and Applied Electromagnetics

Electromagnetic fields and waves. Chapters 4, 5, 7-12 from Elements of Electromagnetics (6th Ed.), M. Sadiku, Oxford.

Microwave amplifiers. Chapters 2-4 from Microwave Transistor Amplifiers: Analysis and Design (2nd Ed.), G. Gonzalez, Prentice Hall.

RF and Microwave Circuits. Chapters 1-7, 10, 12 from Microwave Engineering (4th Ed), David M.Pozar, Wiley.