

EE6425

Fundamental of Radio Frequency Engineering

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Preface

—General information about the course

Aims and Objectives

Provide
essential techniques for
RF and microwave
Circuitry
design

Outcomes?

- **Know** the general knowledge about **RF and Wireless**
- **Have** a good understanding of **Distributive Parameters** and related analysis tools, such as Smith Chart, S-Parameters, Impedance Matching, etc.
- **Understand** the important considerations for **RF Amplifier Design**
- **Familiar with** RF circuit **Experiment Skills** and design software **Microwave Office**

Contents of the Course

- **Part I** The general knowledge about RF and wireless
- **Part II** Distributive parameters and related analysis tools
- **Part III** Considerations for RF amplifier design
- **Part IV** Simulations and experiments

Contents of the Course

•**Part I** The general knowledge about RF and Wireless

Chapter 1 Introduction to wireless techniques

•**Part II** Distributive Parameters and related analysis tools

Chapter 2 Transmission line and distributive concept

Chapter 3 S-parameters and smith chart

Chapter 4 Impedance matching

•**Part III** Considerations for RF Amplifier Design

Chapter 5 Stability considerations

Chapter 6 Gain considerations

Chapter 7 Noise figure analysis

Chapter 8 Small signal amplifiers

Part IV Simulations and Experiments

Lab 1 How to use “Microwave Office ” to simulate/optimize microwave circuits

Lab 2 How to use network analyzer and noise analyzer to test amplifier

Lab 3 Design, fabricate, and test a low noise amplifier

Lab 4 Demonstration and report

Assessment Pattern

- *Final Examination duration: 2 hours*, at the end of the semester, **50%** final score;
- Mid-term testing duration: **2 hours**, at the middle of the semester, **10%** final score;
- 5 coursework assignments, **5%** of final score;
- **35%** from experiment demo, report, and presentation;
- For a student to pass the course, at least **15%** of the maximum mark from the examination.

Reference Books

Essential Reading

- Mathew M Radmanesh: Radio Frequency and Microwave Electronics, (Prentice Hall, 2001)
- Reinhold Lidwig and Pavel Bretchiko: RF Circuit Design - Theory and Applications, (Prentice Hall, New Jersey, 2000)

Supplementary Reading

- S Y Liao: Microwave Devices and Circuits, (Prentice Hall, New Jersey, 3rd Edition, 1990)
- David Pozar: Microwave Engineering, (Addison Wesley, New York, 2nd Edition, 1990)
- E H Fooks and R A Zakarevicius: Microwave Engineering Using Microstrip Circuits, (Prentice Hall, New York, 1990)
- R E Collin: Field Theory of Guided Waves, (IEEE Press, New York, 2nd Edition, 1991)
- Robert S Elliott: An Introduction to Guided Waves and Microwave Circuits, (Prentice Hall, New York, 1993)