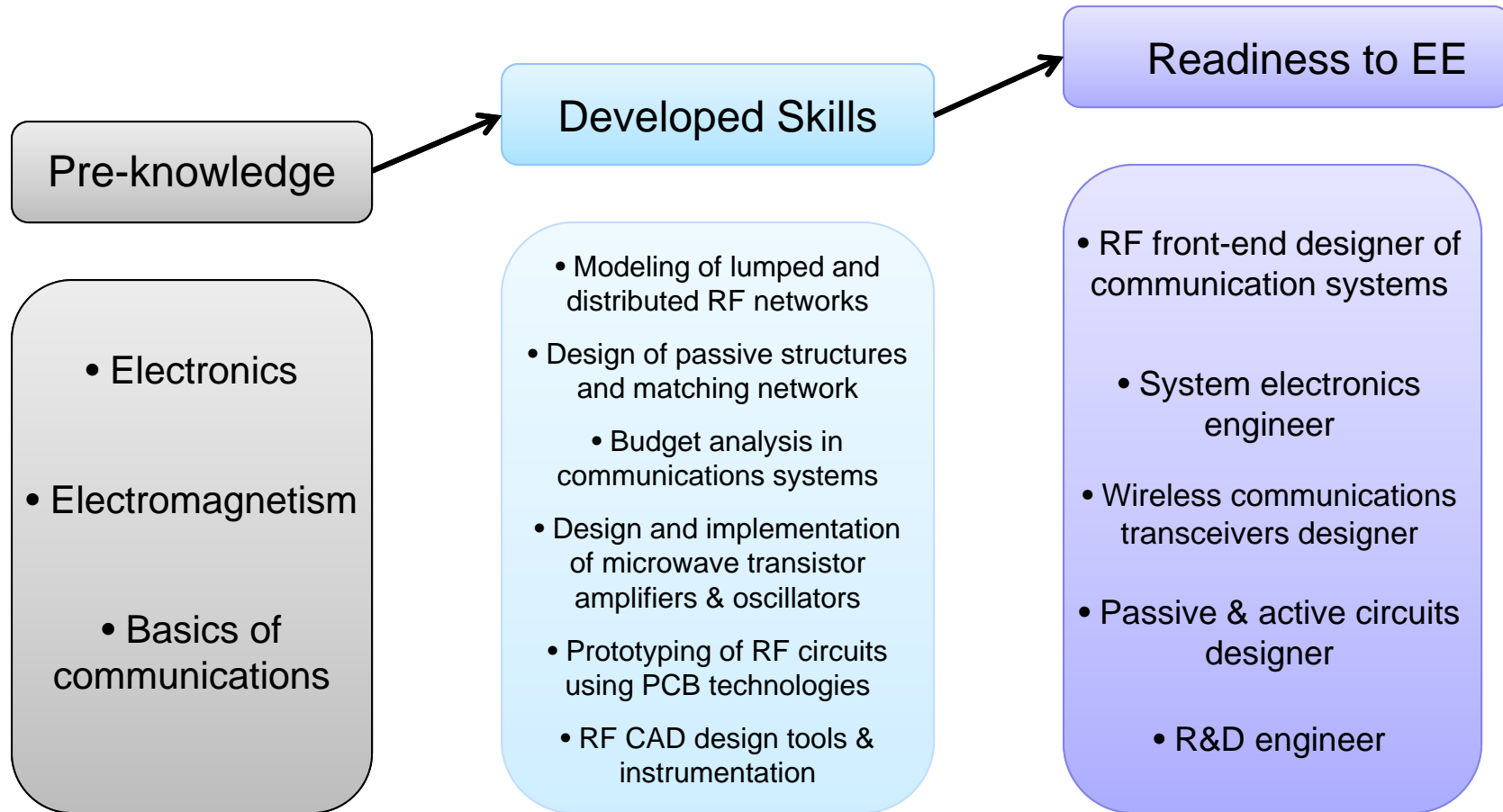


Microwave Transistor Amplifiers and Oscillators  
ENEL 574  
*“RF Communication Transceivers”*

Professor F. Ghannouchi  
Dept of Electrical and Computer Eng.  
Schulich School of Eng. Office ICT 336  
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# Course Relevancy to EE career

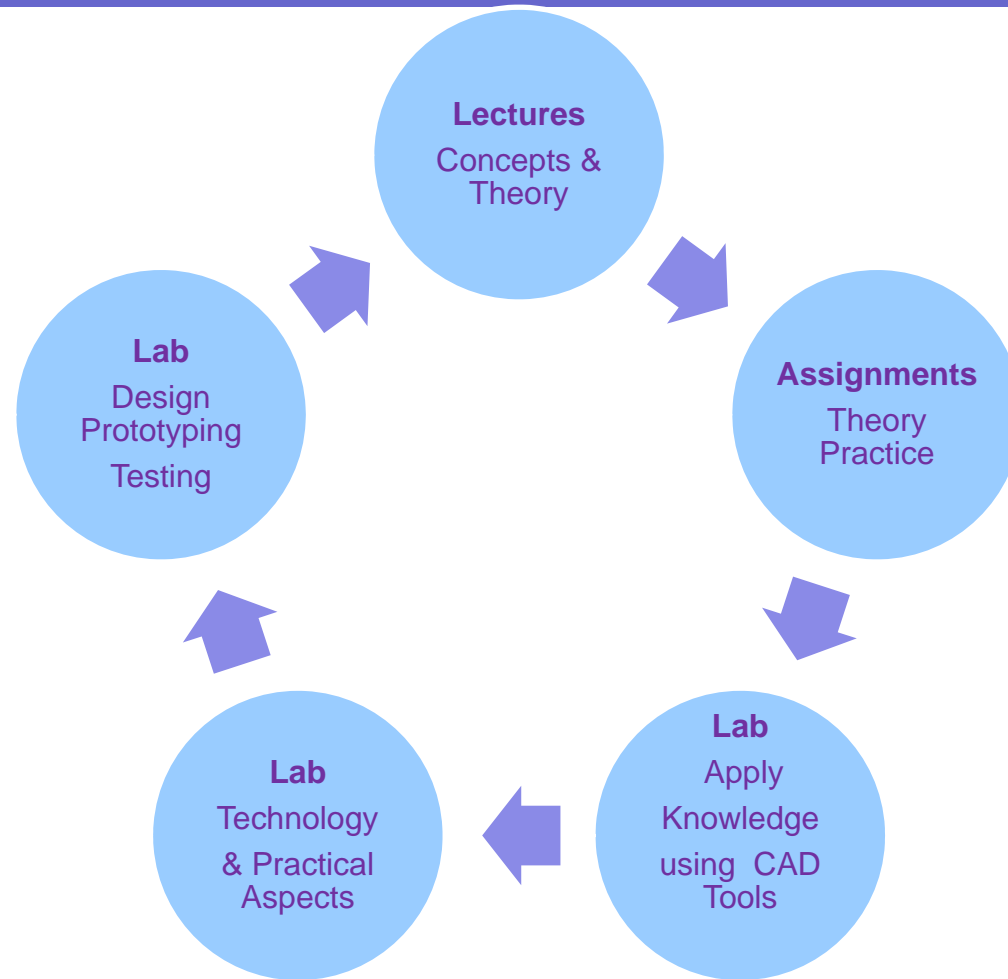


# Course Topics

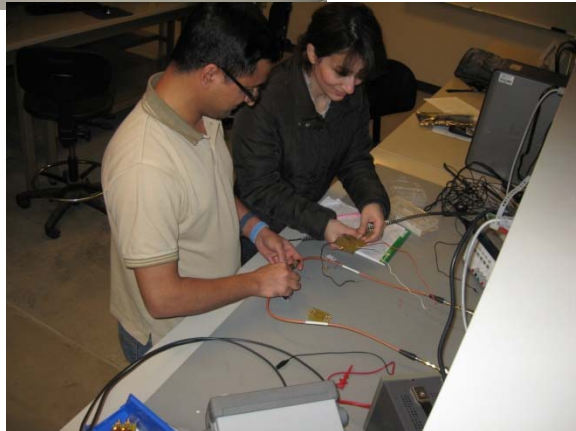
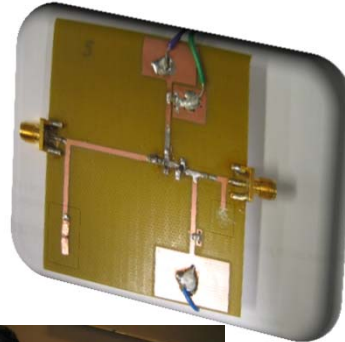
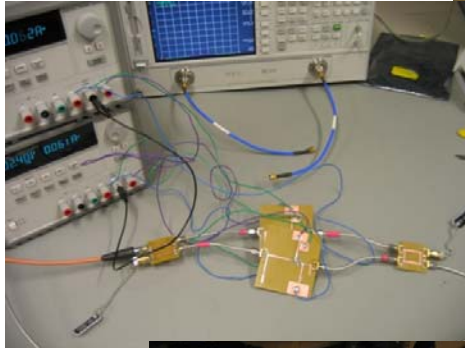
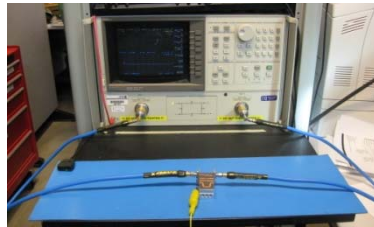
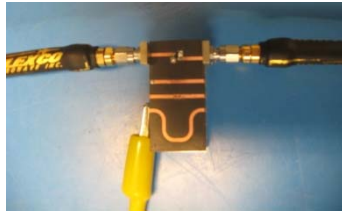
The course covers:

- A review of transmission line theory and applications
- Transistor small-signal modeling
- Design and analysis of microwave transistor amplifiers
- Performance analysis of communication transceivers (SNR, SFDR, C/IMD, ACPR, BER)
- Noise analysis of wireless transceivers
- Design low-noise amplifiers, balanced & multi-stage amplifiers.
- Application to the knowledge acquired to the CAD, manufacturing and testing of a balanced amplifier
- Training and hand-on: design software (ADS), measurement equipments (I/V analyzer, VNA, Spectrum etc.)

# Course Components & Learning Scheme



# From Theory to Prototype



Device

- Instruments: VNA & S/C Analyzer
- Software IC-Cap

Design

- Amplifier Design Theory
- ADS Software

Prototyping

- Layout Generation
- PCB Manufacturing & Assembly

Testing

- Measurements & Tuning
- Comparison with simulation

# Evaluations

## Text Book and Notes

- Textbooks: G. Gonzalez, Microwave Transistor Amplifiers: Analysis and Design, 2nd edition, Prentice Hall (ISBN 0-13-254335-4)
- Course notes
- Lab notes

## Evaluations

- Mid-term exam
- Final exam
- 4 Assignments
- 2 Lab reports
- Project Presentation

# Student's feedback from USRI Reports

**Question:** If appropriate, please comment about the Laboratory and/or Tutorial Section(s) in this course

## Answer's samples

- **Student 1;** *"It was excellent as it includes a practical design of Low Noise Amplifier. Laboratory involves few initial sessions with learning and building basics for amplifiers design and later sessions involves the design of Low Noise Amplifier with commercially available device. The printed circuit was developed and the LNA is designed in hardware. This really helps in learning how to practically design a low noise amplifier in real world and it has given us a good chance to test the hardware developed to validate our design methodology. The most important thing is demonstration of small signal s-parameter measurement of transistor for characterizing its behavior and using the measurement results in software for design. Working with this measurement setup is really useful in industry and comprise of important part of practical design approach used in industry"*
- **Student 2 :** *"Laboratory is an essential part of the course and is able to provide students experience with practical problems encountered during design"*
- **Student 3:** *"every thing was ok. Nothing can be added here"*

**Question:** Please provide general comments about the course

## Answer's samples

- **Student 1:** *"Course was really interesting"*
- **Student 2:** *"This course was useful. I learned lots of useful topics in this course. Make other students interested to register in this course"*
- **Students 3** *"The course is excellent in terms of developing strong basics required for amplifier design and it also includes the real practical experiment in designing the amplifier in lab. We find really a great opportunity to learn how amplifiers are designed in industry. It also includes the understanding of various softwares for design assistance like Agilent ADS as CAE tools"*