UNIVERSITY of NICOSIA

| Course Code | Course Title | ECTS Credits |
|---|---|---|
| ECE-541 | RF Circuit Design | 8 |
| **Department** | **Semester** | **Prerequisites** |
| Engineering | Fall or Spring | ECE-540 |
| **Type of Course** | **Field** | **Language of Instruction** |
| Elective | Engineering | English |
| **Level of Course** | **Year of Study** | **Lecturer(s)** |
| 2st Cycle | 2nd | Dr Anastasis Polycarpou |
| **Mode of Delivery** | **Work Placement** | **Co-requisites** |
| Face-to-face | N/A | None |

**Objectives of the Course:**

The main objectives of the course are to:

- Provide graduate students with the necessary tools and knowledge for the design and testing of Radio Frequency (RF) circuits (passive or active)
- Employ techniques (graphical or analytical) for optimum design of RF circuits
- Provide deep understanding into the operation of microwave circuits and RF components such as isolators, resonators, circulators, amplifiers, oscillators, mixers, etc
- Identify important issues involved in the design of RF circuits
- Evaluate design performance based on certain figures of merit
- Introduce commercial software and tools for a more accurate design and testing of RF circuits and components

**Learning Outcomes:**

After completion of the course graduate students are expected to:

- Design passive or active RF circuits that perform according to specifications and design requirements
- Evaluate their design based on certain figures of merit using either analytical methods or commercially available software
- Design microwave resonators using transmission lines, dielectric loadings, waveguide cavities, etc
- Design microwave filters (LP, BP, etc) according to specifications
- Design ferrite-based microwave components (isolators, circulators, etc)
- Employ active RF components for the design of amplifiers, oscillators, and mixers

**Course Contents:**

- Review of important issues related to microwave circuit design (e.g., impedance matching, components, network analysis, etc)
- Design of microwave resonators using analytical tools and available commercial software packages
- Microwave filter design using analytical tools and available commercial software packages
- Ferrimagnetic components (e.g., isolators, phase shifters, circulators)
- Noise in RF Circuits

- Active RF components (e.g., PIN diodes, Varactor diodes, FETs, BJTs, etc)
- Design of RF amplifiers
- Design of RF oscillators and mixers

**Learning Activities and Teaching Methods:**

Lectures, in-class examples, exercises, design project

**Assessment Methods:**

Homework, mid-term and final exams, design project report.

**Required Textbooks/Reading:**

| Authors | Title | Publisher | Year | ISBN |
|---|---|---|---|---|
| David M. Pozar | Microwave Engineering | John Wiley & Sons | 2005 | 0471448788 |

**Recommended Textbooks/Reading:**

| Authors | Title | Publisher | Year | ISBN |
|---|---|---|---|---|
| Reinhold Ludwig et. al | RF Circuit Design: Theory & Applications | Prentice Hall | 2008 | 0131471376 |
| Christopher Bowick, et. al | RF Circuit Design | Newnes | 2007 | 0750685182 |
| Behzad Razavi | RF Microelectronics | Prentice Hall | 1997 | 0138875715 |