# ELEN90049 RF Electronics and Design

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| **Credit Points:** | 12.50 |
| **Level:** | 9 (Graduate/Postgraduate) |
| **Dates & Locations:** | This subject is not offered in 2014. |
| **Time Commitment:** | Contact Hours: 1 two hour lecture per week Total Time Commitment: 200 hours |
| **Prerequisites:** | Prerequisites for this subject are |

| Subject | Study Period Commencement: | Credit Points: |
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| ELEN90043 Device Models | Semester 1 | 12.50 |
| ELEN90048 Passive Component Design & Simulation | Semester 1 | 12.50 |

**Corequisites:** Corequisite for this subject is

| Subject | Study Period Commencement: | Credit Points: |
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| ELEN90050 RF Systems and Architecture | Semester 2 | 12.50 |

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| **Recommended Background Knowledge:** | None |
| **Non Allowed Subjects:** | None |
| **Core Participation Requirements:** | For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/ |
| **Contact:** | Prof Stan Skafidas<br>Email: **sskaf@unimelb.edu.au (mailto:sskaf@unimelb.edu.au)** |
| **Subject Overview:** | **AIMS**<br>This subject will introduce students to high frequency design of low noise amplifiers, mixers, voltage controlled oscillators, power amplifiers, power combining techniques, Doherty power amplifiers, stacked transistor designs, dividers and phase locked loops. After completing this subject students will be able to design, simulate (schematic and post layout simulation), extract and fabricate components operating in the 50+GHz frequency range.<br>**INDICATIVE CONTENT**<br>Topics include:<br>Matching networks, Passive Components Design (Power Dividers, Couplers, Baluns, Filters, Inductors…), Low Noise Amplifier (LNA) Design, Up/Down Mixers Design, Voltage Control Oscillator (VCO) Design, Power Amplifier (PA) Design, and Transmitter/Receiver Design.<br>This material is complemented by the use of software tools (e.g. MATLAB, Cadence, HFSS, CST-Field solver) for computation and simulation. |
| **Learning Outcomes:** | **INTENDED LEARNING OUTCOMES (ILO)**<br>Upon successful completion of this subject students should be able to: |

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| | # Design, simulate and analyse the performance of RF low noise amplifiers, on chip power amplifiers, up and down conversion mixers, Voltage Controlled Oscillators and Phase Locked Loops. |
| **Assessment:** | One, written examination (not exceeding three hours) at the end of semester, worth 70%; Continuous assessment of submitted project work (not exceeding 30 pages in total over the semester), worth 30%. Intended Learning Outcomes (ILOs) are assessed in the final exam and submitted project work. |
| **Prescribed Texts:** | None |
| **Breadth Options:** | This subject is not available as a breadth subject. |
| **Fees Information:** | Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees |
| **Generic Skills:** | # Ability to apply knowledge of science and engineering fundamentals<br># Ability to undertake problem identification, formulation, and solution<br># Ability to utilise a systems approach to complex problems and to design andoperationalperformance<br># Ability to build and test real world systems that meet industry specialisation and manufacturing standards<br># Capacity for lifelong learning and professional development |
| **Notes:** | **LEARNING AND TEACHING METHODS**<br>Theoretical explanation and practical design details for given topics will be discussed in succession. Design examples and assignments are given to help students deeply understanding the design techniques.<br>**INDICATIVE KEY LEARNING RESOURCES**<br>Students are provided with lecture slides, tutorials and worked solutions, laboratory sheets, and reference text lists.<br>**CAREERS / INDUSTRY LINKS**<br>Exposure to engineering design context through research lab visits and/or guest lectures. |
| **Related Course(s):** | Master of Nanoelectronic Engineering |