MC-NE Master of Nanoelectronic Engineering

Year and Campus:	2016
CRICOS Code:	069660E
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Level:	Graduate/Postgraduate
Duration & Credit Points:	150 credit points taken over 18 months
Coordinator:	Prof. Stan Skafidas
Contact:	**Melbourne School of Engineering** Current Students: General Information: **http://ask.unimelb.edu.au (http://ask.unimelb.edu.au/)** Email: **enquiries-STEM@unimelb.edu.au (mailto:%20enquiries-STEM@unimelb.edu.au)** Phone: 13 MELB (13 6352) +61 3 9035 5511
Course Overview:	**THERE IS NO FURTHER ENTRY INTO THIS COURSE** Nano-electronic systems are a new and exciting area of technology and the next step in the progression of micro-electronic systems. New nano-electronic systems distinguish themselves from their micro-electronic counterparts in that they: are smaller; more integrated; operate at higher frequencies; and use less power. The newest CMOS technologies have gate lengths that are almost exclusively nanometer widths. These systems exhibit effects, such as quantum effects, that traditional micro-electronic systems do not and consequently the older design methodologies are not accurate. Nano-electronic systems are critical in many areas including medicine, the environment, aerospace, wireless and photonic communication systems, and automotive applications. The Masters course outlined in this proposal will enable students to become familiar with theories governing nano-electronic systems and become proficient in the design and fabrication of nano-electronic systems and integrated circuits. Theory, concepts and design methodologies taught in the course are put into practice during laboratory sessions and used for the design project. This course is intended for students with an electrical and electronics engineering degree that want to specialize in the design of nano-electronic integrated circuits and systems. Students need to have a fundamental understanding of electronic circuits and devices, basic understanding of electromagnetic theory and analogue and digital signal processing theory. The 25 point capstone/research Major Design Project subject taken in the final year of study in the Master of Nanoelectronic Engineering is designed to draw together the various strands of the knowledge and the skills students have acquired during the course. It enables students to demonstrate the application of knowledge and skills “to design a substantial electronics system via a design project” and helps to prepare them for working life.
Learning Outcomes:	This program aims to provide students with the technological skills needed in the design and engineering of nano-electronics and systems. It will provide students with opportunities to: # Develop a fundamental understanding of the principles of nano-electronic systems engineering; # Develop an understanding of the basic principles underlying the design of nano-electronic circuits; # Acquire an understanding of the basic modelling principles of nano-electronic circuits; # Design and fabricate nano-electronic systems; # Use the latest design tools to: accurately model transistors and other fundamental building blocks; simulate circuits and systems comprised of nano-electronic components; layout by developing photolithographic masks for device fabrication; run design rule checks on the circuits; perform layout versus schematic tests; perform parasitic extraction and do post layout simulations and fabricate high frequency and high speed nano-electronics circuits and systems for high speed systems;

- Appreciate model and circuit mismatch;
- Design system level packaging;
- Use the latest design tools to model, simulate, layout, extract and fabricate low power nano-electronics circuits and systems suitable for biomedical applications;
- Obtain the mathematical and computational skills necessary for the solution of theoretical and practical design problems.

Course Structure & Available Subjects:

THERE IS NO FURTHER ENTRY INTO THIS COURSE

THE COURSE STRUCTURE BELOW ONLY APPLIES TO RE-ENROLLING STUDENTS WHO COMMENCED THEIR STUDIES PRIOR TO 2014

Master of Nanoelectronic Engineering is a 1.5 year (3 semesters full time), 150-point program. Students in this course are required to undertake 9 core subjects which includes Major Design Project (25 points) and 2 Approved Engineering Electives (each 12.5 point).

Core Subjects:

- Device Models (12.5 points)
- Passive Component Design & Simulation (12.5 points)
- Analogue Electronics (12.5 points)
- Mixed Signal Design (12.5 points)
- RF Systems and Architectures (12.5 points)
- RF Electronics and Design (12.5 points)
- Electronic Manufacturing (12.5 points)
- Electromagnetic Compatibility (12.5 points)
- Major Design Project (25 points)

Subject Options:

Standard Full Time Course Structure

Semester 1

Subject	Study Period Commencement:	Credit Points:
ELEN90042 Analogue Electronics	Semester 1	12.50
ELEN90043 Device Models	Semester 1	12.50
ELEN90047 Mixed Signal Design	Semester 1	12.50
ELEN90048 Passive Component Design & Simulation	Semester 1	12.50

Semester 2

Subject	Study Period Commencement:	Credit Points:
ELEN90045 Electronic Manufacturing	Semester 2	12.50
ELEN90044 Electromagnetic Compatibility	Semester 2	12.50
ELEN90049 RF Electronics and Design	Semester 2	12.50
ELEN90050 RF Systems and Architecture	Semester 2	12.50

Semester 3

Subject	Study Period Commencement:	Credit Points:
ELEN90046 Major Design Project	Semester 1, Semester 2	25

Approved Engineering Elective (25 points)

Entry Requirements:	**THERE IS NO FURTHER ENTRY INTO THIS COURSE**
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/
Graduate Attributes:	The Melbourne School of Engineering closely maps subject level attributes and knowledge to align with the Australian Qualifications Framework (AQF), whilst also aligning with Attributes of the University of Melbourne Graduate, Engineers Australia competencies and its own School attributes.
Generic Skills:	Master of Engineering graduates to have the following qualities and skills: # Ability to apply knowledge of science and engineering fundamentals # Ability to undertake problem identification, formulation, and solution # Ability to utilise a systems approach to complex problems and to design and operational performance # Ability to build and test real world systems that meet industry specialisation and manufacturing standards # Proficiency in engineering design # Ability to conduct an engineering project # Capacity for creativity and innovation # Understanding of professional and ethical responsibilities, and commitment to them # Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member # Capacity for lifelong learning and professional development