

Master of Science (MSc) Program in IC Design Engineering

Program Director:

Howard LUONG, Professor of Electronic and Computer Engineering

Hong Kong is rapidly shifting to a knowledge-based economy. There is an increasing need to upgrade the knowledge of the professional workforce, particularly on subjects which are related to modern technological advances in the fields of information technology and integrated circuit (IC) design engineering.

IC design is a prime example of a knowledge-based industry. Workers in the industry are highly skilled professionals. The chips they design provide high added-value to the end-products. Today, IC design and manufacturing is a highly specialized and global business. A chip may be designed by an IC design company in Hong Kong and fabricated in a wafer foundry in Taiwan. The wafer packaging and assembly may be done in Hong Kong and the final testing may be carried out in Malaysia. The finished chips are then shipped to customers in the Pearl River Delta region. The IC business is now a highly segmented business and there are many specialized and low-cost service providers. These service providers are extremely competitive. IC design is on the top of the 'food-chain'. The IC design companies provide the most added value in the entire product development and manufacturing cycle. They are often called fabless design houses since these companies do not have their own manufacturing facility (or Fab). Hong Kong has several geographic and infrastructural advantages for engaging in the fabless IC design business, thus creating enormous need for education.

The Master of Science (MSc) program in IC Design Engineering is designed for professionals with a bachelor's degree in Engineering or Science who are interested in acquiring in-depth knowledge in microelectronic engineering, or upgrade their knowledge in the subjects of IC design engineering.

Program Learning Outcomes

On successful completion of the program, graduates will be able to:

- Identify, formulate, analyze and design integrated circuits and systems for various applications;
- Design and conduct experiments and analyze and interpret the resultant data;
- Use appropriate simulation tools to help design integrated circuits and systems with good understanding of their limitations and optimization;
- Design and simulate basic integrated circuits and systems subject to practical constraints; and
- Communicate effectively design choices and considerations via oral presentations and written reports.

Admission Requirements

Applicants must possess a bachelor's degree in Electronic Engineering or Engineering/ Physical Sciences, with second class honors or higher, or an equivalent qualification from a recognized university or tertiary institution.

Program Duration

The program can normally be completed in one year in full-time mode, or two years in part-time mode. All lectures will be delivered at HKUST, or suitable venues in Hong Kong and/or Mainland China. Classes will be held on weekday evenings and/or weekends.

Program Fee

The program fee is HK\$125,000 for full-time mode, and HK\$120,000 for part-time mode. New students admitted with credit transfer are also required to pay the full program fee. Students who take additional courses or need to retake any courses are required to pay additional fee.

Curriculum

The program comprises a total of 26 credits of coursework. Students are required to take 22 credits from the following course list and complete 4 credits of MSc Project:

EESM 5000	CMOS VLSI Design
EESM 5020	Digital VLSI System Design and Design Automation
EESM 5060	Embedded Systems
EESM 5100	Analog IC Analysis and Design
EESM 5120	Advanced Analog IC Analysis and Design
EESM 5200	Semiconductor Devices for Integrated Circuit Designs
EESM 5310	Power Management Circuits and Systems
EESM 5320	Radio-Frequency Integrated Circuits Design
EESM 5810	Business Development for Technological Innovations
EESM 5900*	Special Topics
EESM 5920	Topics in Analog IC Systems and Design
EESM 6980	MSc Project

Alternatively, subject to prior approval of the Program Director, students may take a maximum of 9 credits from outside this list offered by other programs. These 9 credits may include:

- EESM courses not in the above list, and
- A maximum of 3 credits of non-EESM courses.

The availability of courses offered by other programs may be subject to quota limitations imposed by individual programs.

Part-time students may take a maximum of 9 credits in each term.

* *Students may take EESM 5900 for a maximum of 6 credits.*

Credit Transfer

Credit transfer may be granted to students in recognition of studies completed successfully elsewhere. Upon the approval of the Program Director, a maximum of 3 credits can be transferred to the program, subject to University regulations governing credit transfer for postgraduate programs.

Graduation Requirements

Students must complete the program with a graduation grade average (GGA) of 2.850 or above as required of all postgraduate students at the University. Students failing to meet the GGA requirement are required to repeat or take additional course(s) even if they attain passing grades for all courses.