MSc in Integrated Circuits and Intelligent Systems Design

Master of Science in Integrated Circuits and Intelligent Systems Design (ICISD)

The Master of Science in Integrated Circuits and Intelligent Systems Design (ICISD) prepares graduates for careers in IC design and intelligent hardware systems. The program addresses the evolving technology landscape where the integration of integrated circuits (IC) with intelligent systems, including AI-enabled functionality, is increasingly critical. By bridging traditional integrated circuit design with modern intelligent architectures, the curriculum equips students with multidisciplinary expertise required for hardware and AI-enabled system design. An optional internship, offered as part of the program, provides direct professional experience and industry exposure.

Program Focus

The program provides a technical foundation in integrated circuit design, combined with the system-level skills needed to develop modern intelligent hardware.

Key focus areas include:
- Analog and mixed-signal IC design fundamentals and practice
- Hardware foundations for accelerated computing (including tensor and GPU concepts).
- Power delivery and integrated power electronics topics, along with exposure to MEMS devices and digital hardware implementation.
- Industry-informed learning through guest lectures and industry-related case studies.

Curriculum

The program requires the completion of 36 credit hours over two years, structured to offer theoretical foundations and practical industrial exposure.

Core Courses:
- Principles of Computer Systems Design
- Analog Integrated Circuit Design
- Research Methods and Ethics
- Integrated Power Electronics
- Application Specific Chip Design
- Tensor and GPU Fundamentals
- MEMS Devices and Systems
- Graduate Seminar

Elective Courses:
- Printed and Flexible Electronics
- Signal Processing
- Semiconductor Technology
- Applied Deep Learning
- Machine Learning

Two tracks to choose from:
- Industrial Track: includes an industrial internship and a capstone project, which will be hosted at partner semiconductor companies in Qatar or worldwide, subject to availability.
- Research Track: includes a master's thesis for advanced research exploration.

Admission and Application Requirements

Applicants seeking admission to the Master of Science in Integrated Circuits and Intelligent Systems Design should have a bachelor's degree with a strong academic record (minimum 3.0 GPA out of 4.0) from a recognized university. Applicants with a background in Computer Science, Computer Engineering, Electrical and Electronic Engineering, or related fields are welcome to apply.

Applicants are required to submit an IELTS score of 6.5 or a TOEFL score of 79 to demonstrate their proficiency in English.

Further details about the language proficiency requirement and the process to seek exemption (where this is an option) are available on the website.

Application requirements

A completed online application form:
admissions.hbku.edu.qa

Academic transcripts

Official electronic copies of transcripts should be submitted as part of the online application. Final transcripts and graduation statements are required for all previous university studies. All transcripts submitted should include an explanation of the grading system. For those who have not completed their current studies, transcripts must include results from the last completed semester of coursework. Transcripts in languages other than English or Arabic must be accompanied with an official translation. Applicants who are admitted to the program based on copies of or incomplete transcripts will be required to provide original transcripts upon enrollment in order to register for courses.

Standardized test results

Official copies of standardized test results must be sent directly to HBKU. Please refer to the institutional codes below:
- TOEFL: 4981
- IELTS: No code required. Students should ask the IELTS center where they tested to send the IELTS TRF to Hamad Bin Khalifa University.

Letters of recommendation

Two letters of recommendation, at least one of which must be from an academic referee. Letters that are not directly written for this program, or are incomplete, will not be accepted.

Personal statement of interest

Applicants should submit a personal statement as part of the online application. The statement should explain why the candidate is applying to the program, and how their studies will contribute to the achievement of their personal objectives, including information about the applicant's research interests and achievements.

Resume/Curriculum vitae

Applicants should submit a copy of their current resume or curriculum vitae as part of the online application.

Identification document:

All applicants should submit an electronic copy of their passport as part of the online application. Nationals and residents of Qatar should also submit their valid Qatari ID.

Student funding

The College of Science and Engineering provides opportunities for funding on a competitive basis. Further information will be provided to applicants who are admitted to the program.

Admission inquiries

admissions.cse@hbku.edu.qa