

Graduate Diploma in Integrated Circuits (IC) and Systems Design (Offline/Online Optional)

Organized by:
Department of Electrical Engineering,
FAST NUCES ISLAMABAD
Duration : 2 Semesters (8 Month),
1st Sept 2020 – 30th March 2021



WHY INTEGRATED CIRCUITS (ICs) DESIGN ?

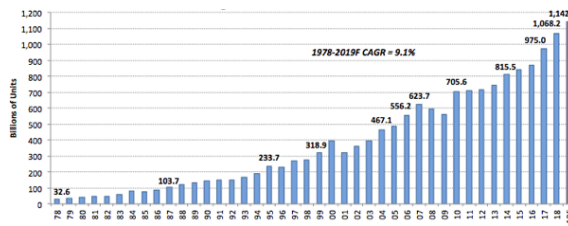
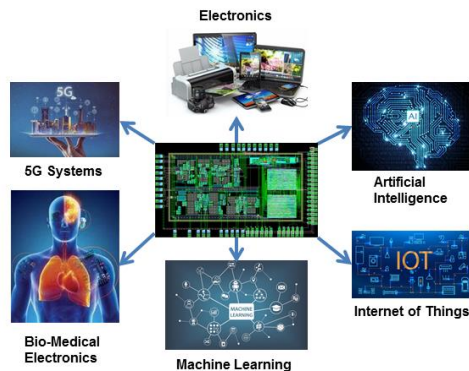
WHY FROM FAST NUCES

- Integrated circuits (ICs) is one of the most impactful inventions of the 20th century
- IC Design is pivotal in 21st century technology trends; e.g. 5G systems, Artificial Intelligence (AI), and smart systems, which are supposed to be leading towards 5th industrial revolution
- Resulting a high demand of IC design engineers globally
- IC growth trend of last four decades also shows promising IC engineers future
- Can be an excellent addition in resume for higher studies or job search abroad
- Lack of skilled IC designers in Pakistan is a major bottleneck in international investments in circuit design sector
- A pool of skilled IC designers can attract international companies in Pakistan

- A unique program first time in Pakistan.
- Introduction and experience on a wide range of IC design tools
- Offers design experience on sophisticated 65nm, 130nm, and 180nm process development kits (PDKs)
- A well synchronized theoretical and experimental program
- A hands on experience on complete IC design process
- Offers a rare opportunity of customized IC fabrication and testing
- An opportunity to learn modern IC design technique from experts

ELIGIBILITY

- Bachelor of:
 - Electrical Engineering
 - Electronics Engineering
 - Telecommunication Engineering
- Pre-requisite:
 - Two basic electronics courses

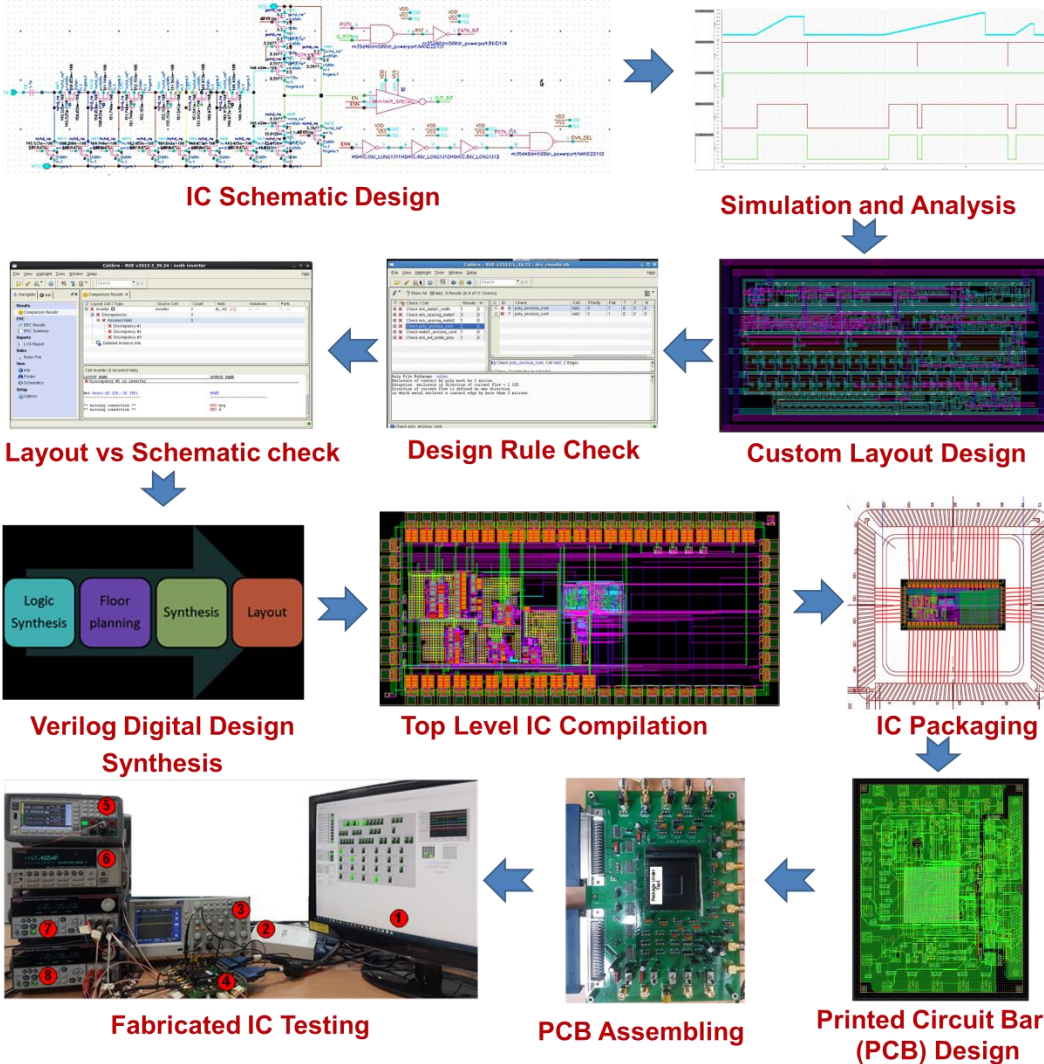


IC Industry Growth Trend (1978 – 2019)

IC Design Trending Areas

PROGRAM GOALS

- Introduction to CMOS integrated circuits basics and fabrication process
- Detailed illustration and hands on experience of complete integrated circuit system design



TEACHING AND TECHNICAL STAFF

Prof. Dr. Rashad M Ramzan

M.S. Royal Institute of Technology
Stockholm, Germany

Ph.D. Linkoping University, Sweden.

Professor Dept. of Electrical Engineering
(EE), FAST, NUCES, ISB.

Dr. Hassan Saif

M.S. & Ph.D. Sungkyunkwan
University, South Korea.

Asst. Prof., Dept. of EE FAST, NUCES, ISB.

Mr. Muhammad Omar

Sr. Design Engr. (High Frequency Sensors),
Dept. of EE FAST, NUCES, ISB.

Engr. Abdul Jabbar

RF Design Engr. (RF Elect. & Frontend),
Dept. of EE FAST, NUCES, ISB.

Engr. Abdul Wajid

Lab Engr. (IC Design),
Dept. of EE FAST, NUCES, ISB.

Engr. Hamza Atiq

Lab Engr. (RF & IC Design),
Dept. of EE FAST, NUCES, ISB.

COURSE OUTLINE

PRE-SEMESTER

- 2 week crash course
- Course Contents
 - CMO Device characteristics
 - CMOS Inverters
 - Transmission gates
 - Multiplexer
 - Combinational logic
 - Sequential logic
 - Verilog Digital Logic Synthesis and CAD Tools

SEMESTER 1

- Mixed Signal ICs:
 - Non-linearity & Mismatch
 - IC fabrication process
 - Layout Fundamentals
 - Sample and hold circuits
 - Performance metrics
 - Digital to analog converters
 - Analog to Digital Converters
 - Z – Transform
 - Oscillators
 - Reference generators
 - Phase Lock Loop (PLL)
- Signal Integrity & SoC Design:
 - Signal integrity principals
 - Chip interconnect
 - Transmission lines and power planes
 - Clock distribution network
 - Pad types
 - Pad driver circuits and
 - High speed characteristic
 - IBIS modeling
 - IC Packaging types

SEMESTER 2

- Custom IC design group project
- IC packaging design
- Printed circuit board (PCB) design
- IC testing tool/instruments training
- Fabricated IC testing
- Technical paper writing

Who Should Enroll

- Industrial Engineers looking for:
 - IC design skills
 - PCB design skills
- Higher education aspirant from abroad

REGISTRATION FEE AND DETAILS

- Total Seats = 16 [8 Organization sponsored (All Filled), 8 Self]
- Organization Sponsors: Dr. Bilal Zafar (2), Dr. Azam Beg (2), Dr. Khurram Muhammad (2), Dr. Rana Azhar (1), Dr. Imtinan Elahi (1).
- Fee = PKR 100,000/- (inclusive of IC fabrication & testing facilities)
- Contacts For Registration: rashad.ramzan@nu.edu.pk, hassan.saif@nu.edu.pk, muhammad.omar@nu.edu.pk