Master of Technology in
VLSI

Programme Level	Post Graduate
Year of Commencement	2018
Minimum Duration	2 Years (4 Semesters)
Maximum Duration	3 Years (6 Semesters)
Senate Meeting Reference	16.5/18.5

Objectives of the Program

After undergoing this program, the student will acquire both theoretical knowledge and practical skills in Electrical Engineering with specialization of VLSI and chip designing. The curriculum in supported with the advance learning courses of VLSI specialization in device level understanding, design, fabrication and tools. During M. Tech thesis, the students will use VLSI design, testing and fabrication laboratories. For a better insight of the specialization, the core laboratories for VLSI design and fabrication have been designed with considering experimental understanding of the Specialization Core courses. The laboratory experiments will build the basic concepts and the advanced concepts for chip designing. The VLSI laboratories will be the part of VLSI centre of IIT Mandi. Moreover, these VLSI laboratories will be further useful for undergraduate students of IIT Mandi, in advance learning of B. Tech with VLSI as minor area. The UG students will also use the VLSI centre facility to execute their major technical project. It is envisaged that adjunct faculty from industry such as SCL (Mohali). STMicroelectronics, Texas instruments, Analog Devices, NXP, Synopsys, Cadence, Mentor Graphics etc. will be engaged to provide industrial experience to M. Tech students.

The proposed M. Tech course is with the vision of center for design and fabrication of electron devices (C4DFED) at IIT Mandi. This is also a part of the special man-power development project from system to chip design (SMDP-C2SD) under the Ministry of Electronics and Information Technology (MeitY). The MeitY will be funding for the designed chip as a part of the M. Tech thesis under the India Chip Program. This initiative to fulfill the goal of development of country in the vision and mission of make in India.

How is this program different

- Very strong industry oriented curriculum.
- Practicum based learning.
- Industry oriented courses.
- The Chip designing EDA tools (Cadence, Mentor Graphics, Synopsys, Silvaco, Centaurus and Comsol) based learning. These tools are the latest one and used in all the VLSI industries.
- 100 Class and 1000 Class clean room facility available at IIT Mandi for device fabrications.
- Sophisticated instrumentations facility available for device fabrications and characterizations.
- Learning design as well as fabrication aspects of the chip.
- Generate and trained manpower for semiconductor design and upcoming fab-line in India.
- There is a vast market opportunities for the graduating students.

Course Structure

1st Semester

Code	Course Title	Credit L-T-P-C
EE 524	Digital MOS LSI Circuits	3-0-0-3
EE 519P	CMOS Digital IC design Practicum	0-0-3-2
EE 520	Microelectronic devices and modeling	3-0-0-3
EE 512	CMOS Analog IC Design	3-0-2-4
	Open Elective Outside Discipline - I	3-0-0-3
HS 541	Technical Communication	1-0-0-1
EE XXX	Independent study*	0-0-6-3
	Total Credits	**19**

2nd Semester

Code	Course Title	Credit L-T-P-C
EE 611	VLSI technology	3-0-0-3
EE 611P	VLSI fabrication Practicum	0-0-3-2
	Open Elective Outside Discipline - II	3-0-0-3
EE 529	Embedded System Design	3-1-0-4
	Discipline Elective-I	3-0-0-3
	Discipline Elective – II	3-0-0-3
	Total Credits	**18**

3rd Semester

Code	Course Title	Credit L-T-P-C
EE 650P	Post Graduate Project-1*	0-0-34-17
	Total Credits	**17**

4th Semester

Code	Course Title	Credit L-T-P-C
EE 651P	Post Graduate Project-2*	0-0-34-17
	Total Credits	**17**

* With the concern of student and his/her M Tech thesis supervisor, M.Tech. thesis can be carried out at industry.

Discipline Elective –I

EE 615 - Nano electronics and Microfabrication (3-0-0-3)
PH 502 - Photonics (3-0-0-3)
ME 509 - Nanomanufacturing (3-0-0-3)
EE 526 - Power semiconductor devices (3-0-0-3)
PH 504 - Organic opto electronics (3-0-0-3)

Discipline Elective –II

EE 619 - Mixed signal VLSI Design (3-0-2-4)
EE 621 - Microwave integrated circuits (3-0-0-3)
EE 523 - Digital VLSI Architecture (3-0-0-3)
CS 541P - IOT systems and cloud (1-0-3-3)
EE 516 - Biomedical systems (2.5-1.5-0-4)
CS 507 - Computer architecture (4-0-0-4)
EE 592 – selected topics on formal verification