School of Engineering

MIT-ADT UNIVERSITY
PUNE, INDIA
A Leap Towards World Class Education

Programme Curriculum

MASTER OF TECHNOLOGY

PATTERN 2021

Electronics & Communication Engineering (Microelectronics & VLSI Design)

Faculty of Engineering

MIT ART DESIGN & TECHNOLOGY UNIVERSITY, PUNE

MIT SCHOOL OF ENGINEERING, PUNE

STRUCTURE & SYLLABUS

FOR

Master of Technology

ECE - Microelectronics & VLSI Design

UNDER FACULTY OF ENGINEERING

2 Year Postgraduate Program sanctioned by AC & BoS

(w.e.f. 2021-2022)

(74 CREDITS)

Department of Electronics and Communication Engineering

VISION

To be global leaders in the field of Electronics & Communication Engineering by offering quality education through industry collaboration, innovation, research and development to cater the needs of society with holistic approach

MISSION

- To provide quality education in the field of Electronics & Communication Engineering
- To inculcate research and innovation culture among the stake holders
- To enhance technical and inter personal skills among the students to make them employable and successful entrepreneur
- To provide ethical, spiritual and value based education addressing the social needs

Program Educational Objectives (PEOs)

The Programme Educational Objectives of **Post Graduate Course (M.Tech.) in Microelectronics and VLSI Design** are:

PEO 1

Graduates should demonstrate a strong foundation in the principles of microelectronics and VLSI Design, including competence in the design, analysis, and implementation of electronic systems.

PEO 2

Graduates should be prepared for successful careers in microelectronics and VLSI Design on the basis of professional skills, ethical conduct, and an understanding of contemporary issues in the field.

PEO 3

Graduates should be able to communicate technical concepts both orally and in writing with clarity and conciseness.

PEO 4

Graduates should be skilled at cooperating with others in interdisciplinary teams, acknowledging and appreciating the views of others, and making valuable contributions to the accomplishment of shared objectives.

Program Outcomes (POs)

The Programme Outcomes of **Post Graduate Course (M.Tech.) in Microelectronics and VLSI Design** are:

Engineering Graduates will be able to:

1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3. Design/Development of solutions: Design solution for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the culture, societal and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretations of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, Select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to access societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environmental and sustainability: Understanding the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and Receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management and finance principles and apply these to one's own work, as a member and leader in a team, to manage projects and multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

The Programme Specific Outcomes of **Post Graduate Course (M.Tech.) in Microelectronics and VLSI Design** are:

PSO1

Identify, formulate, and analyze engineering problems related to micro electronics and VLSI Design domains such as High speed design, RF circuit design, ASIC Design, Mixed Signal VLSI Design, Digital Design Techniques using appropriate methods and tools.

PSO2

In microelectronics and VLSI design, develop solutions for challenging engineering challenges while taking practical limitations like sustainability, manufacturability, ethical considerations, ethics, ethics, and health and safety into account.

M.Tech. (ECE –Microelectronics & VLSI Design)(MTMV)

(Minimum credits to be earned : 74)

SEMESTER-I

Course Code	Course Name	Hours/week				Maximum Marks		
		Lecture	Tutorial	Practical	Credits	CA	FE	Total
21MTMT105	Advanced Mathematics	3	1	0	4	40	60	100
21MTMV101	Research Methodology	3	0	0	3	40	60	100
21MTMV103	Digital Design Techniques	3	0	0	3	40	60	100
21MTMV104	Analog CMOS Design	3	0	0	3	40	60	100
21MTMV1[31-34]	Elective-I	3	0	0	3	40	60	100
21MTMV111	Laboratory- I	0	0	4	2	40	60**	100
21MTMV121	Technical Seminar-I	0	0	4	2	100	--	100
Total		**15**	**1**	**8**	**20**	**400**	**300**	**700**

SEMESTER-II

Course Code	Course Name	Hours/week				Maximum Marks		
		Lecture	Tutorial	Practical	Credits	CA	FE	Total
21MTMV201	Low Power VLSI Design	3	1	0	4	40	60	100
21MTMV202	Digital VLSI Circuits	3	0	0	3	40	60	100
21MTMV203	Testing and Testability	3	0	0	3	40	60	100
21MTMV204	VLSI CAD	3	0	0	3	40	60	100
21MTMV2[31-32]	Elective-II	3	0	0	3	40	60	100
21MTMV211	Laboratory- II	0	0	4	2	40	60**	100
21MTMV221	Mini Project	0	0	4	2	100	--	100
Total		**15**	**1**	**8**	**20**	**400**	**300**	**700**

CA=Continuous Assessment, FE=Final Examination,

**Final Lab exam will be conducted with viva-voce of the respective practical (50 exam +10 viva = 60)

Coding for course/subject: 21AE101, Where; 21=Year of BOS, AE =Branch Code, 1=Semester No., 01 to N=Sequence No of Subject. For SE to BE & also PG follow the above scheme of regulation.

SECOND YEAR ENGINEERING SCHEME

SEMESTER-III

Course Code	Course Name	Hours/week				Maximum Marks		
		Lecture	Tutorial	Practical	Credits	CA	FE	Total
21MTMV301	High Speed Digital Design	3	1	0	4	40	60	100
21MTMV302	Mixed Signal VLSI Design	3	1	0	4	40	60	100
21MTMV3[31-32]	Elective-III	3	1	0	4	40	60	100
21MTMV3[33-34]	Elective-IV	3	1	0	4	40	60	100
21MTMV321	Technical Seminar-II	0	0	4	2	40	60**	100
21MTMV322	Project Phase- I	0	0	4	2	40	60**	100
Total		**12**	**4**	**8**	**20**	**300**	**300**	**600**

CA=Continuous Assessment, FE=Final Examination,

**Final Lab exam will be conducted with viva-voce of the respective practical (50 exam +10 viva = 60)

Coding for course/subject: 21AE101, Where; 21=Year of BOS, AE =Branch Code, 1=Semester No., 01 to N=Sequence No of Subject. For SE to BE & also PG follow the above scheme of regulation.

SEMESTER-IV

Course Code	Course Name	Hours/week				Maximum Marks		
		Lecture	Tutorial	Practical	Credits	CA	FE	Total
21MTMV421	Project phase II	0	0	28	14	100	200	300
Total		**0**	**0**	**28**	**14**	**100**	**200**	**300**

LIST OF ELECTIVES

Elective	Course Code & Name	
Elective-I	21MTMV131	Neural Networks in VLSI
	21MTMV132	VLSI Technology
	21MTMV133	MEMS
	21MTMV134	Solid State Devices
Elective-II	21MTMV231	Semiconductor Memory Design and Testing
	21MTMV232	RF Circuit Design
Elective-III	21MTMV331	Biomedical Signal Processing
	21MTMV332	Digital Design And Verification With HDI
Elective-IV	21MTMV333	ASIC Design
	21MTMV334	System on Chip Design