

**SARDAR PATEL UNIVERSITY**  
**Vallabh Vidyanagar, Gujarat**



(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)  
Syllabus with effect from the Academic Year 2026-2027

**PROGRAMME STRUCTURE**

**Master of Semiconductor Science and Technology**

**MSc (SST) Semester: III**

<p>Programme Outcome (PSO) - For MSc-SST Programme</p>	<p>The M.Sc. in Semiconductor Science and Technology is a four-semester postgraduate program offered by Sardar Patel University under the Faculty of Science. It is designed to provide students with in-depth training in the theoretical, fundamental, and applied aspects of semiconductor science and technology. The program integrates essential core physics courses with the latest technological advancements in semiconductors. The main objective of this program is to prepare students for a research-oriented or industry-based career in semiconductor technology, microelectronics, nanotechnology, device design and fabrication, and semiconductor materials.</p> <p>The program offers core theory courses (Quantum Mechanics, Statistical Mechanics, Electrodynamics) and specialized subjects such as Semiconductor Physics, Semiconductor Devices, Vacuum Technology, Thin Film Deposition, Crystal Growth Techniques, Fabrication Processes and Packaging. Complementary laboratory training, internships, industrial interaction, and a project dissertation ensure practical competency and exposure to real-world applications. This program also aims to i) Cultivate strong analytical, design, and experimental skills relevant to semiconductor device technology, ii) Encourage interdisciplinary learning and problem-solving across physics, material science, and electronics, iii) Instil in the students a scientific temperament and ethical practices suitable for professional research and industry, iv) Bridge academia-industry gap through projects and collaborative internships.</p> <p>After successful completion of the M.Sc. in Semiconductor Science and Technology, students will be able to:</p> <ol style="list-style-type: none"><li>1. Demonstrate a thorough understanding of theoretical aspects of semiconductor science and technology and apply them to problems in semiconductor science and device engineering.</li><li>2. Gain specialized knowledge in semiconductor physics, solid-state materials, device structures, thin-film technology, vacuum systems, fabrication processes and packaging.</li><li>3. Conduct experiments independently and collaboratively in semiconductor labs, including crystal growth, film deposition, electrical/optical characterization, and cleanroom practices.</li><li>4. Analyse and interpret experimental and simulation data on electronic and optoelectronic device performance and fabrication.</li><li>5. Develop and demonstrate project management skills through internships and dissertation projects involving real-world problems in industry or advanced research laboratories.</li><li>6. Interact effectively with professionals in the semiconductor industry, understanding market trends and needs, design standards, and translating academic knowledge into commercial applications.</li></ol>
--	--

	<p>7. Understand semiconductor technology's societal and environmental impacts, including energy efficiency, sustainability, and the ethical use of electronic waste and resources.</p> <p>8. Communicate ideas effectively through research articles, patents, presentations, technical reports, and outreach activities.</p> <p>9. Prepare for diverse career opportunities in semiconductor industries, R&amp;D labs, government organizations, academia, and technology entrepreneurs and startup initiators.</p> <p>10. Cultivate scientific curiosity and critical thinking, enabling lifelong learning, adaptability, and innovation in emerging areas like nanoelectronics, MEMS, and flexible electronics.</p>
--	---

<b>To Pass</b>	At least 40% Marks in the University Examination in each paper and 40% Marks in the aggregate of University and Internal examination in each course of Theory, Practical & 40% Marks in Viva-voce.
----------------	--

Course Type	Course Code	Name Of Course	Theory/ Practical	Credit	Exam Duration in hrs	Component of Marks		
						Internal	External	Total
						Total	Total	Total
Core Course	PS03CSST01	Nano-Fabrication and Device Testing	T	4	3	30	70	100
	PS03CSST02	VLSI Design and Device Simulation	T	4	3	30	70	100
	PS03CSST03	<u>High Frequency Semiconductor Devices and their Packaging for RF, Space and Defence</u>	T	4	3	30	70	100
	PS03CSST04	<u>Fundamentals of Semiconductor Packaging Technology</u>	T	4	3	30	70	100
	PS03CSSP05	Practicals-I	P	4	3	30	70	100
	PS03CSSP06	Practicals-II	P	4	3	30	70	100
	PS03CSST07	Comprehensive Viva-Theory	T	1	-	-	50	50