

**SARDAR PATEL UNIVERSITY**  
**Programme & Subject: M.Sc (Electronics)**  
**Semester: IV**  
**Syllabus with Effect from: June - 2014**

<b>Paper Code: PS04CELE01</b>	<b>Total Credit: 4</b>
<b>Title Of Paper: IC Fabrication Technology</b>	

Unit	Description in detail	Weightage (%)
I	Classification of ICs, Electronic grade Silicon, Growth of silicon single crystals by Czochralski and Float Zone methods, Oxygen and carbon in silicon, Segregation coefficients, Silicon shaping and processing considerations, Epitaxial deposition of silicon, Evaluation of epitaxial layers, Oxidation of silicon, The Deal-Grove Model of oxidation, Oxidation systems, Oxide evaluation, Effect of impurities.	25%
II	High pressure and plasma oxidation, Oxide etching-wet and dry, Reactive plasma etching, Sputter etching, Lithographic processes, Optical lithography - Pattern generation and mask making, photo resists, Optical printing, New resist technologies, Non-optical lithographic techniques-Electron beam lithography, X-ray beam lithography, Ion-beam lithography.	25%
III	Diffusion of dopant impurities, Laws of diffusion, diffusion profiles, Diffusion systems, Problems in silicon diffusion, Ion implantation, Evaluation techniques for diffused Layers, Metallization - problems & trends, Clean room, Integrated devices-passive components, Bi-polar transistor technology, Isolation techniques.	25%
IV	NPN transistors, Isoplanar structure, Special purpose bi-polar transistors, Integrated injection logic, Hot electron effects in bi-polar transistors. MOS technology, MOS Structures and speed of response, Geometrical effects and Scaling down of MOS devices, Typical N-MOS IC technology for VLSI, CMOS technology and structures, BiCMOS, IC failure mechanisms.	25%

**Basic Text & Reference Books:-**

- **VLSI Technology**  
S. M. Sze, (Mc Graw-Hill International Edition, N.Y, U.S.A.)
- **VLSI Technology**  
Sujata Pandey & Manoj P Pandey (Dhanpat Rai & Co. New Delhi, INDIA)
- **The Science and Engineering of Microelectronic Fabrication** Stephen  
A Campbell, (Oxford University Press Inc. N.Y., U.S.A.)
- **Semiconductor Devices - Physics and Technology**  
S. M. Sze, (John Willey & Sons Inc., U.S.A.)
- **Modern Semiconductor Fabrication Technology**  
Peter Gise & Richard Blanchard (Reston Book - Prentice Hall, N.J., U.S.A.)
- **Integrated Circuits**  
K.R.Botkar (Khanna Publishers, New Delhi, INDIA)

