INTEGRATED CIRCUIT TECHNOLOGY

(As per New Syllabus 2015-16 Prescribed by AKTU, Lucknow)

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PREFACE

Integrated Circuit Technology is an integral part of the subjects of electronic engineering. The book has been written as per the latest syllabus of ICT of AKTU, Lucknow. This book uses simple and easy to understand language to explain basics and advances of the subject. The authors have tried to provide logical and step wise methods to explain complicated ideas and concepts in a manner as simple as possible.

We have made attempt to present illustrative self study type approach. This book can be used to teach yourself ICT. Every chapter of this book is arranged in a sequential manner in comprehension with the prescribed syllabus. This book can be useful for the candidate preparing for GATE and IES.

The aim of the book is not only to cover the syllabus of the subject but also to transfer adequate knowledge to the students so that they become professionals.

✍ *Taslima*

✍ *S.K. Mahajan*

Dedicated

To

Hitendra Singh,

Abhinav, Akshay

and

Amay

NEC 603 Integrated Circuit Technology

Unit I

Introduction to IC Technology: *SSI, MSI, LSI, VLSI Integrated Circuits Crystal Growth and Wafer Preparation: Electronic Grade Silicon, Czochralski Crystal Growth, Silicon Shaping, Processing Considerations. Epitaxy: Vapor–Phase Epitaxy, Molecular Beam Epitaxy, Silicon on Insulators, Epitaxial Evaluation.*

Unit II

Oxidation: *Growth Kinetics, Thin Oxides, Oxidation Techniques and Systems, Oxides Properties, Lithography: Optical Lithography. Photo masks, Wet Chemical Etching. Dielectric and Polysilicon Film Deposition: Deposition Processes, Polysilicon, Silicon Dioxide, Silicon Nitride.*

Unit III

Diffusion: *Diffusion of Impurities in Silicon and Silicon Dioxide, Diffusion Equations, Diffusion Profiles, Diffusion Furnace, Solid, Liquid and Gaseous Sources, Sheet Resistance and its Measurement. Ion Implantation: Ion - Implantation Technique, Range Theory, Implantation Equipment.*

Unit IV

Metallization: *Metallization Application, Metallization Choices, Physical Vapor Deposition, Vacuum Deposition, Sputtering Apparatus. Packaging of VLSI devices: Package Types, Packaging Design Consideration, VLSI Assembly Technologies, Package Fabrication Technologies.*

Unit V

VLSI Process Integration: *Fundamental Considerations for IC Processing, NMOS IC Technology, CMOS IC Technology, Bipolar IC Technology, Monolithic and Hybrid Integrated Circuits, IC Fabrication*

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