APPENDIX – I
UNIVERSITY OF MUMBAI
Syllabus for Certificate Course on
SEMICONDUCTOR SCIENCE AND TECHNOLOGY

Paper – I SEMICONDUCTOR SCIENCE.

- **The Atomic – Bond Model**

Crystal lattices
Current Carriers
Doping of semiconductor
(SD Chapter – 1)
} SSD

- **Energy Band Model**

Electron as wave
Energy Levels in Atom and Energy Bands
Electron and Hole as Particle
Population of electron states
(SD Chapter – 2)
} SSD

- **Drift and Diffusion**

Energy bands with applied electric field
Carrier Mobility
Diffusion current equation
Basic continuity equation
(SD Chapter – 3,4)
} SSD

- **Fundamental Devices Structure**

P – N Junction Principles
DC Mode
Capacitance in P – N Junction
BJT Principles
Current – Voltage Characteristics
(SD Chapter – 6)
} SAM

- **Metal – Semiconductor Contact and MOSFET Structures**

Metal – Semiconductor Contact
MOS Capacitor
MOSFET Principle and characteristics } SAM
Nanoscale MOSFETs
MOS based Memory Devices
(SD Chapter – 7,8)

Refernce : SD : Principle of Semiconductor Devices – Sima Dimitrijev

Paper II : SEMICONDUCTOR TECHNOLOGY

- **Integrated Devices Technology and Electronic**

A Diode in IC Technology
MOSFET Technologies } DDK
Bipolar IC Technology
(SD Chapter – 10)

- **Devices Electronics and Equivalent Circuit**

Diodes
MOSFET } DDK
BJT
(SD Chapter – 11)

- **Photonic Devices**

Light Emitting Diode
Photodctectors and Solar cell } SAM
Lasers..
(SD Chapter – 12)

- **Microwave FET and Diodes**

GaAs Versus Si
JFET
MESFET } SAM
HEMET
Negative Resistance Diodes
(SD Chapter – 13)

- **Power Devices**

Power Diodes
Power MOSFET IGBT
Thyristor
(SD Chapter – 14)

} DDK

Reference: SD: Principle of Semiconductor Devices – Sima Dimitrijev

Note: The approach can be described as a significant emphasis on explanation by words and figures. Related to mathematical equation, the main role of the word is not to guide the mathematical derivations; it is to explain the meaning and the role of different types of equations.

Practical component will be based on theory learnt. It will include visits to institution with device fabrication facility.

****