

iWSG: International Winter School for Graduate Students

Co-organized by National Nanotechnology Infrastructure Network and Indian Institute of Technology,
Mumbai

2009 Theme: Nanoelectronics with an emphasis on Silicon

A first year graduate level course focused on nanoscale aspects of electronics with an emphasis on silicon and CMOS structures and their derivatives. The course assumes a completed undergraduate level background in basic semiconductor devices and basic semiconductor physics. The lectures balance the engineering and science perspective to practice and understanding of the devices. The course will also have a laboratory component.

Nov. 30 – Dec. 5: Class and Laboratory Sessions.

Dec. 6-(~3-5 days): 3rd world societal activities and field experience.

The course will be co-taught by US and Indian faculty and is expected to be attended by approximately 10 advanced graduate students from US and significantly larger number from across India and IIT Bombay. One of the US faculty, from social sciences and ethics teaching background, will lead and accompany in the societal activities of the student group.

Syllabus

Planar MOSFETs and their variations (SOI, Finfets, gate-all around MOSFETs, hetero-structure MOSFETs, Tunnel MOSFETs) – device physics

Non-volatile and volatile memories: Technologies and their physics

Advanced interconnects

Technology-aware and low power design

Variability, transport physics & nano-scale device modeling

Reliability in nanoscale MOSFETs

High k dielectrics and related physics

Novel structures