

## **Nanoelectronic Devices (RP 4.2.12)**

**SOI MOSFETs:** Source, drain and gate capacitances, fully and partially depleted devices, threshold voltage, body effect, short channel effects, current voltage characteristics, Lim and Fossum model, transconductance, transconductance-to-drain current ratio, channel mobility.  
(10)

**Other SOI MOSFETs:** Multiple gate SOI MOSFETs, double gate SOI MOSFETs, surrounding gate SOI MOSFETs, FinFETs, current drive, short channel effects, threshold voltage, volume inversion, channel mobility.  
(9)

**MOSFETs using high mobility channel materials:** High performance MOSFETs using strained Si, Ge and III-V semiconductors, GeOI MOSFETs, high-k gate dielectrics, interface trap charge density, mobility model, device parameters related to analog and digital circuit applications.  
(8)

**Ballistic Nanotransistors:** Introduction, physical insight to nanoscale MOSFETs, Natori's theory of ballistic MOSFETs, nondegenerate, degenerate and general carrier statistics, I-V characteristics of ballistic MOSFETs, degenerate and nondegenerate Si nanowire FETs.