

# **EE/MSE 486/528: Integrated Circuit Fabrication**

Syllabus, Spring 2017 (Dunham)

<http://dunham.ee.washington.edu/ee486>

- Review of Semiconductors and Devices (1 lecture; Chapter 1)
- IC Fabrication Processes (1 lecture; Chapter 2)
  - Basic Process Steps
  - CMOS fabrication
  - Self-aligned processes
- Diffusion (3 lectures; Chapters 3 and 7)
  - Fick's Law
  - Point defects – interstitials and vacancies
    - \* Structure and charge states
    - \* Self-diffusion
  - Coupled diffusion of dopants with point defects
    - \* Effects of Fermi level
    - \* Non-equilibrium effects
- Ion Implantation (3 lectures; Chapter 8)
  - Implantation Modeling
    - \* Electronic and nuclear stopping
    - \* Channeling
  - Damage Annealing
    - \* Transient enhanced diffusion (TED)
- Oxidation (2 lectures; Chapter 6)
  - Oxidation kinetics (thin oxides, stress effects)
  - Oxidation enhanced (and retarded) diffusion (OED)
  - Other film growth processes: (oxy)nitridation, silicidation
- Photolithography (2 lectures; Chapter 5)
  - Exposure and Development
  - Enhancement techniques and advanced methods (proximity correction, phase shift masks, surface imaging, immersion, extreme UV, e-beam projection, X-ray)
- Deposition (2 lectures; Chapter 9)
  - PVD (evaporation, sputtering)
  - Chemical vapor deposition (CVD)
- Etching/Backend (2 lectures; Chapters 10 and 11)
  - Reactive ion etching (RIE)
  - Chemical-mechanical polishing (CMP)