Course Outline
Graduate Accelerator Physics

Meeting Times: Tuesdays and Thursdays, 16:20-17:35, OCEAN/PHYSICS 224
Text: S. Peggs and T. Satogata, *Introduction to Accelerator Dynamics*, Cambridge University Press
Supplementary Texts: K. Wille, *The Physics of Particle Accelerators,* Cambridge University Press, H. Wiedemann, *Particle Accelerator Physics,* 3rd Edition or 4th Edition, Springer, A. W. Chao and M. Tigner, *Handbook of Accelerator Physics and Engineering,* J. D. Jackson, *Classical Electrodynamics*
Grading: Homework Problems 35%; Mid-term Examination 25%; Final Examination 40%
Office Hours: 15:00-16:00 Tuesdays and Thursdays, CAS 107

Course Content

- Introduction to Accelerator Physics and Linear Dynamics (Krafft)
    - Relativity and E&M
    - Transverse Stability and Betatron Motion
    - Linear Optics
    - Synchrotron Motion
- Advanced Linear Dynamics (Krafft)
    - Solenoids
    - Coupled Motion
- Magnets (Satogata)
    - Normal and Skew
    - Multipoles
    - Iron and Conductor-dominated Magnets
- RF Cavities (Satogata)
    - Waveguides
    - Transverse Modes
    - Pill-box Model
- Linear and Non-linear Errors and Their Correction (Satogata)
    - Closed Orbit Distortion and Correction
    - Resonances and Resonance Theory
    - Chromaticity and Its Correction
    - Slow Extracton
- Linacs (Satogata)

    - Proton and Ion
    - Electron
    - Energy Recovery
    - BBU

- Synchrotron Radiation (Krafft)
    - Synchrotron Radiation Distribution
    - Radiation Damping
    - Damped Beam Properties