Accelerator Physics Course – Intro

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Introductions and Outline

- General Introduction: Lecturers and Students
- Syllabus
  - Week 1
  - Week 2
- Introduction
  - Lectures can be found in this link:

Syllabus – Week 1

- Mon 1/27, AM, Lecture 1: **'Relativity, EM Forces - Historical Intro'** (AB)
- Mon 1/27, PM, Lecture 2: **'Weak Focusing, Transverse Stability'** (GK)
- Tue 1/28, AM, Lecture 3: **'Phase Stability, Synchrotron Motion'** (AB)
- Tue 1/28, PM, Lecture 4: **'Linear Optics'** (GK)
- Wed 1/29, AM, Lecture 5: **'Magnetic Multipoles, Magnet Design'** (AB)
- Wed 1/29, PM, Lecture 6: **'Synchrotron Radiation'** (GK)
- Thu 1/30, AM, Lecture 7:**'Coupled Betatron Motion'** (AB)
- Thu 1/30, PM, Lecture 8: **'Radiation Distributions'** (GK)
- Fri 1/31, AM, **Mid Term Exam**
- Fri 1/31, PM, Practicum 1: **'FODO Lattice Design'** (IN)

Syllabus – Week 2

- Mon 2/3, AM, Lecture 9: **'Fundamentals of RF Cavities'** (SDS)
- Mon 2/3, PM, Lecture 10: **'Radiation Damping'** (AB)
- Tue 2/4, AM, Lecture 11: **'Low Emittance Lattices'** (AB)
- Tue 2/4, PM, Lecture 12: **'Particle Acceleration'** (SDS)
- Wed 2/5, AM, Lecture 13: **'Statistical Effects - I'** (GK)
- Wed 2/5, PM, Practicum 2: **'DBA Lattice'** (IN)
- Thu 2/6, AM, Lecture: 14: **'Statistical Effects - II'** (GK)
- Thu 2/6, PM, Lecture 15: **'Beam Dynamics of ERLs'** (IN)
- Fri 2/7, AM, **Final Exam**

Homework and Schedule

- Homework (**30**%)
  - Isurumali, Cannon and Suba are grading
  - Collected at start of every morning class
  - TAs will get it back to you the next day
  - Lectures will run: AM, 9 am - noon and PM, 1:30 - 4:30 pm
  - Homework and Tutoring will convene after dinner 7 pm - 9 pm
- Practicum (**10**%)
  - Isurumali is grading
- Exams: Mid Term (**30%**) Final (**30%**)
  - Mid-term (Friday, January 31)
  - Final (Friday, February 7)

Some References

1. Mario Conte, William W. MacKay, *An Introduction to the Physics of Particle Accelerators*, Second Edition, World Scientific, 2008
2. Andrzej Wolski, *Beam Dynamics in High Energy Particle Accelerators*, Imperial College Press, 2014
3. *The CERN Accelerator School (CAS) Proceedings*, e.g. 1992, Jyväskylä, Finland; or 2013, Trondheim, Norway
4. Shyh-Yuan Lee, *Accelerator Physics*, World Scientific, 2004
5. Helmut Wiedemann, *Particle Accelerator Physics*, Springer, 4th Edition, 2015