Sixth International Accelerator School for Linear Colliders – Curriculum (v.5, 10/12/2011)

November 6 – 17, 2011, Asilomar Conference Center, Pacific Grove, California, U.S.A.

Daily Schedule

Breakfast	07:30 – 09:00
Morning	09:00 – 12:30, including ½-hour break
Lunch	12:30 – 14:00
Afternoon	14:00 – 17:30, including ½-hour break
Dinner	18:00 – 19:00
Tutorial & homework	19:00 – 22:00

List of Courses (black: required, red and blue: elective)

	Morning	Afternoon	Evening
November 6		*Arrival, registration*	*Reception*
November 7	Introduction	ILC	Tutorial & homework
November 8	CLIC	Muon collider	Tutorial & homework
November 9	Joint lecture: Linac basics	Joint lecture: Beam instrumentation	Tutorial & homework
November 10	Course A: Accelerator physics Course B: RF technology	*Site visit to SLAC*	Tutorial & homework
November 11	Course A: Accelerator physics Course B: RF technology		Tutorial & homework
November 12	Course A: Accelerator physics Course B: RF technology		Tutorial & homework
November 13	Course A: Accelerator physics Course B: RF technology	*Excursion*	Tutorial & homework
November 14	Course A: Accelerator physics Course B: RF technology		Tutorial & homework
November 15	Course A: Accelerator physics Course B: RF technology		Tutorial & homework
November 16	Course A: Accelerator physics Course B: RF technology	Study time	Study time
November 17	Final exam	*Free time*	*Banquet;* *Student Award Ceremony*
November 18	*Departure*		

Program

	Monday, November 7	Tuesday, November 8	Wednesday, November 9	Thursday, November 10
Morning 09:00 – 12:30	**Opening remarks** **Lecture I1 – Introduction** (3 hrs) ***Barry Barish*** *(Caltech)* • Tera scale physics • ILC and LHC • Layout of the ILC • Parameter choices & optimization • Other possible future lepton colliders: CLIC and the muon collider • Detectors	**Lecture I3 – CLIC** (3 hrs) ***Frank Tecker*** *(CERN)* • Klystron vs. beam driven acceleration • CLIC layout • Parameter choices & optimization • Driver beam stability • Comparison of the CLIC and ILC • Technical challenges	**Joint lecture of Courses A & B:** **Linac basics** (3 hrs) ***Daniel Schulte*** *(CERN)*	**Course A: Accelerator physics** **Lecture A1 – Linac** (9 hrs) ***Daniel Schulte*** *(CERN)* **Course B: RF technology** **Lecture B1 – Room temperature RF** (12 hrs) ***Walter Wuensch*** *(CERN)*
Afternoon 14:00 – 17:30	**Lecture I2 – ILC** (3 hrs) ***Barry Barish*** *(Caltech)* • e- and e+ sources • Bunch compressors and spin rotators • Damping rings • Main linac • Beam delivery system • Civil construction issues	**Lecture I4 – Muon collider** (3 hrs) ***Robert Palmer*** *(BNL)* • Muon collider basics • Machine layout • Major sub-systems • Challenges	**Joint lecture of Courses A & B:** **Beam instrumentation** (3 hrs) ***Hermann Schmickler*** *(CERN)*	**Site visit to SLAC**
Evening 19:00 – 22:00	Tutorial & homework	Tutorial & homework	Tutorial & homework	Tutorial & homework

Program (cont'd)

	Friday, November 11	Saturday, November 12	Sunday, November 13	Monday, November 14
Morning 09:00 – 12:30	**Course A: Accelerator physics** **Lecture A1 – Linac** (cont'd) ***Daniel Schulte*** *(CERN)* **Course B: RF technology** **Lecture B1 – Room temperature RF** (cont'd) ***Walter Wuensch*** *(CERN)*	**Course A: Accelerator physics** **Lecture A2 – Sources** (6 hrs) ***John Sheppard*** *(SLAC)* **Course B: RF technology** **Lecture B1 – Room temperature RF** (cont'd) ***Walter Wuensch*** *(CERN)*	**Course A: Accelerator physics** **Lecture A3 – Damping rings** (12 hrs) ***Yunhai Cai*** *(SLAC)* **Course B: RF technology** **Lecture B2 – Superconducting RF** (cont'd) ***Shuichi Noguchi*** *(KEK)*	**Course A: Accelerator physics** **Lecture A3 – Damping rings** (cont'd) ***Yunhai Cai*** *(SLAC)* **Course B: RF technology** **Lecture B2 – Superconducting RF** (cont'd) ***Shuichi Noguchi*** *(KEK)*
Afternoon 14:00 – 17:30	**Course A: Accelerator physics** **Lecture A1 – Linac** (cont'd) ***Daniel Schulte*** *(CERN)* **Course B: RF technology** **Lecture B1 – Room temperature RF** (cont'd) ***Walter Wuensch*** *(CERN)*	**Course A: Accelerator physics** **Lecture A2 – Sources** (cont'd) ***John Sheppard*** *(SLAC)* **Course B: RF technology** **Lecture B2 – Superconducting RF** (12 hrs) ***Shuichi Noguchi*** *(KEK)*	**Excursion**	**Course A: Accelerator physics** **Lecture A3 – Damping rings** (cont'd) ***Yunhai Cai*** *(SLAC)* **Course B: RF technology** **Lecture B2 – Superconducting RF** (cont'd) ***Shuichi Noguchi*** *(KEK)*
Evening 19:00 – 22:00	Tutorial & homework	Tutorial & homework	Tutorial & homework	Tutorial & homework

	Tuesday, November 15	Wednesday, November 16	Thursday, November 17	Friday, November 18
Morning 09:00 – 12:30	**Course A: Accelerator physics** **Lecture A3 – Damping rings** (cont'd) ***Yunhai Cai*** *(SLAC)* **Course B: RF technology** **Lecture B3 – LLRF & high power RF** (9 hrs) ***Stefan Simrock*** *(ITER)*	**Course A: Accelerator physics** **Lecture A4 – Beam delivery system and beam-beam** (cont'd) ***Andrei Seryi*** *(John Adams Inst.)* **Course B: RF technology** **Lecture B3 – LLRF & high power RF** (cont'd) ***Stefan Simrock*** *(ITER)*	**08:00 – 12:30 Final exam** (4.5 hrs)	**Departure**
Afternoon 14:00 – 17:30	**Course A: Accelerator physics** **Lecture A4 – Beam delivery system and beam-beam** (6 hrs) **Andrei Seryi** (John Adams Inst.) **Course B: RF technology** **Lecture B3 – LLRF & high power RF** (cont'd) ***Stefan Simrock*** *(ITER)*	**Study time**	*Free time*	
Evening 19:00 – 22:00	Tutorial & homework	Study time	Banquet at 19:00; Student Award Ceremony	

Notes on the Program:

1. There are a total of 11 school days in this year's program, excluding the arrival day (November 6) and the departure day (November 18). The time is divided as follows: 2 days for required courses, 6-1/2 days for elective courses, 1/2 day for excursion, 1/2 day for site visit to SLAC, 1/2 day for study time and a final examination day.
2. The required course consists of four lectures: Introduction, ILC, CLIC and the muon collider. Every student must take this course.
3. There are two elective courses: Course A (the red course) is accelerator physics, Course B (the blue course) is RF technology. They will run in parallel. Each student will choose one of these.
4. The accelerator physics course consists of lectures on four topics: (1) linac, (2) sources, (3) damping rings, and (4) beam delivery system and beam-beam effects.
5. The RF technology course consists of lectures on three topics: (1) room temperature RF, (2) superconducting RF, and (3) LLRF and high power RF.
6. There is a half-day joint lecture on linac basics and another half-day joint lecture on beam instrumentation for all students.
7. There will be homework assignments, but homework is not counted in the grade. There will be a final examination. Some of the exam problems will be taken from variations of the homework assignments. The exam papers will be graded immediately after the exam and results announced in the evening of November 17 at the student award ceremony.
8. There is a tutorial and homework period every evening. It is part of the curriculum and students are required to attend. Lecturers will be available in the evening of their lecture day during this period.
9. Lecturers have been asked to cover the basics as well as possible. Their teaching material will be made available online to the students well ahead of time (a few weeks prior to the school). Students are strongly encouraged to study this material prior to the beginning of the school.
10. Lecturers of the elective courses are required to provide lecture syllabus as soon as possible in order to help students make their selection.
11. All lecturers are responsible for the design of homework and exam problems as well as the answer sheet. They are also responsible for grading the exams.
12. The award ceremony will honor the top (~10) students based on their exam scores.