Ninth International Accelerator School for Linear Colliders – Curriculum (v8, 10/11/2015)

26 October – 6 November, 2015, Delta Whistler Village Suites, Whistler, BC, Canada

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
Tutorial & homework	17:30 – 18:30
Dinner	19:00 – 20:00
Tutorial & homework	20:00 – 22:00

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

	Morning	Afternoon	Evening
Mon 26 Oct		*Arrival, registration*	*Reception*
Tues 27 Oct	Introduction to science, ILC and CLIC		Tutorial & homework
Wed 28 Oct	Introduction to science and XFEL	Joint lecture: Linac basics	Tutorial & homework
Thurs 29 Oct	Joint lecture: Instrumentation basics	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology	Tutorial & homework
Fri 30 Oct	*Excursion: TRIUMF site visit and Vancouver sightseeing*		Tutorial & homework
Sat 31 Oct	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology		Tutorial & homework
Sun 1 Nov	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology		Tutorial & homework
Mon 2 Nov	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology		Tutorial & homework
Tues 3 Nov	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology		Tutorial & homework
Wed 4 Nov	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology	Joint session with LCWS	Tutorial & homework
Thurs 5 Nov	Course A: Linear collider physics Course B: Linear collider technology Course C: XFEL physics & technology	Study time	Study time
Fri 6 Nov	Final exam	Free time	Banquet; Student Award Ceremony
Sat 7 Nov	*Departure*		

Program

	Tuesday, 27 October	Wednesday, 28 October	Thursday, 29 October	Friday, 30 October
Morning 09:00 – 12:30	**Welcome – *S Koscielniak (TRIUMF)*** **Introduction – *W Chou*** *(Fermilab)* **Lecture I1 – Introduction to linear colliders** (1.5 hrs) ***Daniel Schulte*** *(CERN)* **Lecture I2 – ILC** (3 hrs) ***Masao Kuriki*** *(Hiroshima Univ.)*	**Lecture I4 – Introduction to XFEL** (3 hrs) ***Claudio Pellegrini*** *(SLAC/UCLA)*	**Joint lecture AB2 –Instrumentation basics** (3 hrs) ***Hermann Schmickler*** *(CERN)*	Excursion: (08:00 – 19:00) TRIUMF site visit Vancouver sightseeing
Afternoon 14:00 – 17:30	**Lecture I2 – ILC** (cont'd) ***Masao Kuriki*** *(Hiroshima Univ.)* **Lecture I3 – CLIC** (1.5 hrs) ***Frank Tecker*** *(CERN)*	**Joint lecture AB1 – Linac basics** (3 hrs) ***Daniel Schulte*** *(CERN)*	**Lecture A1 – Linac** (9 hrs) ***Daniel Schulte*** *(CERN)* **Lecture B1 – NC RF** (9 hrs) ***Walter Wuensch*** *(CERN)* **Lecture C1 – XFEL theory** (6 hrs) ***Zhirong Huang & Panos Baxevanis*** *(SLAC)*	
Evening 19:00 – 22:00	Tutorial & homework	Tutorial & homework	Tutorial & homework	Tutorial & homework

Program (cont'd)

	Saturday, 31 October	Sunday, 1 November	Monday, 2 November	Tuesday, 3 November
Morning 09:00 – 12:30	**Lecture A1 – Linac** (cont'd) ***Daniel Schulte** (CERN)* **Lecture B1 – NC RF** (cont'd) ***Walter Wuensch** (CERN)* **Lecture C1 – XFEL theory** (cont'd) ***Zhirong Huang & Panos Baxevanis (SLAC)***	**Lecture A2 – Sources** (6 hrs) ***Masao Kuriki** (Hiroshima Univ.)* **Lecture B2 & C3a – SC RF** (12 hrs / 6 hrs) ***Takayuki Saeki** (KEK)*	**Lecture A3 – Damping rings** (12 hrs) ***Yannis Papaphillipou** (CERN)* **Lecture B2 – SC RF** (cont'd) ***Takayuki Saeki** (KEK)* **Lecture C3b – NC RF** (6 hrs) ***Walter Wuensch** (CERN)*	**Lecture A3 – Damping rings** (cont'd) ***Yannis Papaphillipou** (CERN)* **Lecture B3 & C3c – Instrumentation** (6 hrs) ***Hermann Schmickler** (CERN)*
Afternoon 14:00 – 17:30	**Lecture A1 – Linac** (cont'd) ***Daniel Schulte** (CERN)* **Lecture B1 – NC RF** (cont'd) ***Walter Wuensch** (CERN)* **Lecture C2 – XFEL beam physics** (3 hrs) ***Tor Raubenheimer (SLAC)***	**Lecture A2 – Sources** (cont'd) ***Masao Kuriki** (Hiroshima Univ.)* **Lecture B2 & C3a – SC RF** (cont'd) ***Takayuki Saeki** (KEK)*	**Lecture A3 – Damping rings** (cont'd) ***Yannis Papaphillipou** (CERN)* **Lecture B2 – SC RF** (cont'd) ***Takayuki Saeki** (KEK)* **Lecture C3b – NC RF** (cont'd) ***Walter Wuensch** (CERN)*	**Lecture A3 – Damping rings** (cont'd) ***Yannis Papaphillipou** (CERN)* **Lecture B3 & C3c – Instrumentation** (cont'd) ***Hermann Schmickler** (CERN)*
Evening 19:00 – 22:00	Tutorial & homework	Tutorial & homework	Tutorial & homework	Tutorial & homework

	Wednesday, 4 November	Thursday, 5 November	Friday, 6 November	Saturday, 7 November
Morning 09:00 – 12:30	**Lecture A4 – BDS & beam-beam** (6 hrs) ***Andrei Seryi** (John Adams Inst.)* **Lecture B4 – LLRF** (6 hrs) ***Themis Mastoridis (CalPoly)*** **Lecture C3d – Undulators** (3 hrs) ***Efim Gluskin** (ANL)*	**Lecture A4 – BDS & beam-beam** (cont'd) ***Andrei Seryi** (John Adams Inst.)* **Lecture B4 – LLRF** (cont'd) ***Themis Mastoridis (CalPoly)*** **Lecture C3e – Seeding lasers** (3 hrs) ***Stephen Milton (CSU)***	**08:00 – 12:30 Final exam** (4.5 hrs)	**Departure**
Afternoon 14:00 – 17:30	Joint session with LCWS (13:30 – 18:00)	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 (October 26) and the departure day (November 7). The time is divided as follows: 2-1/2 days for required courses, 5-1/2 days for elective courses, one day for excursion and site visit, 1/2 day for a joint session with the Linear Collider Workshop (LCWS), 1/2 day for study time and a final examination day.
2. The required course consists of six lectures: introduction, ILC, CLIC, XFEL, linac basics and instrumentation basics. Every student must take this course.
3. There are three elective courses: Course A (the red course) is linear collider beam physics, Course B (the blue course) is linear collider technology, and Course C (the purple course) is XFEL beam physics and technology. They will run in parallel. Each student will choose one of these.
4. The linear collider beam 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 linear collider technology course also consists of lectures on four topics: (1) normal conducting RF, (2) superconducting RF, (3) instrumentation, and (4) LLRF and high power RF.
6. The XFEL course is a new addition to this year's school. It has three parts: (1) FEL theory, (2) FEL beam physics, and (3) FEL technology, which consists of five lectures: NC RF, SRF, instrumentation, undulators and seeding lasers.
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 6 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 ahead of time. 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.