AirUCI Summer 2008 Schedule

Monday, June 30th
9 am to 11 am: Room Rowland Hall 390
- Overview of the AirUCI summer program by Prof. Barbara Finlayson-Pitts
- Introductions of all AirUCI faculty and associates
- Teachers introduce each other
- Administrative notes by Prof. Sergey Nizkorodov
- Lecture by Prof. J. Mickey Laux
  - Overview of the atmosphere: Regions (p. 28), pressure and temperature (p. 29), inversions (p. 29, 41) and composition (p. 28, 29, 59, 91–97, 218, 219 & 239)
  - Free radicals (p. 48, 92, 176 & 177) and Sinks (p. 77 & 178)
  - Overview of common public environmental concerns
  - Mathematics in chemistry review (p. 93 & 94 “Box 3–1”)

11 am to 12 pm: Lunch with AirUCI faculty and researchers (provided)

12 pm to 2 pm: Room RH 390
- Lab safety issues (video)
- Form lab groups of 4 people (20 attendees divided into 5 experiments) and set up rotation schedule amongst the following 5 experiments
- Overview of wet labs by Prof. S. Nizkorodov and Prof. J. Mickey Laux
  1. Determination of PAH in cigarette smoke by HPLC
  2. Determination of MTBE and benzene in gasoline by GC/MS
  3. MTBE in gasoline and ethanol in vodka / mouthwash measured by FTIR
  4. Ozone generation and particle removal by air purifiers
  5. Laser–Induced Breakdown Spectroscopy (LIBS) of common metals
- Using Microsoft Excel for plotting on laptops

2 pm to 4 pm: Room RH 481
- General tours of the analytical chemistry labs and AirUCI shared labs
- Common lab techniques: pipetting, measuring volumes, mixing solvents, using syringes, safety, etc.

Tuesday, July 1st
9 am to 10 am: Room Rowland Hall 390
- Lecture by Prof. Sergey Nizkorodov
  - The use of light in analytical chemistry
  - Absorption of specific wavelengths by molecules and Beer's Law (p. 30, 31, 217, 218, 229, 242 & 245)
  - Fluorescence (p. 199–201)
  - Overview of the optical instrumentation used in the labs

10 am to 11 am: Room Rowland Hall 390
- Lecture by Prof. J. Mickey Laux
  - An “inside view” of chromatographic instruments and a mass spectrometer

11 am to 12 pm: Lunch with AirUCI faculty and researchers (provided)
12 pm to 4 pm: Rooms RH 481, RH 350, RH 354, RH385
- Each team does their first wet lab experiment

Syllabus-1
**Wednesday, July 2\textsuperscript{nd}**  
9 am to 11 am: Room Rowland Hall 390  
- Lecture by **Prof. Barbara Finlayson-Pitts**  
  - Interaction of light with matter and environmental photochemistry (p. 30 & 37–40)  
  - Applications to the Chapman reactions (p. 40–43), CFC’s (p. 55, 77–85 & 244), and Ozone Depletion (p. 27, 32–36, 47, 48, 50–55, & 59–76)  
  - Chemistry of NO\textsubscript{x} (p. 75 & 100), Photochemical Smog and Tropospheric Ozone (p. 97–109, 156–160, 179–181, 185–191 & 245)  

11 am to 12 pm: Lunch with AirUCI faculty and researchers (provided)  

12 pm to 4 pm: Rooms RH 481, RH 350, RH 354, RH 385  
- Continue with the second wet lab experiment  

**Thursday, July 3\textsuperscript{rd}**  
10 am to 12 pm: Room Rowland Hall 390  
(shifted by 1 hour because of the PC lab availability issues)  
- Lecture by **Prof. Doug Tobias**  
  - Molecular structure and vibrations (p. 214–217)  
  - Fundamentals of molecular dynamics  
  - Review of computational chemistry  

12 pm to 1 pm: Lunch with AirUCI faculty and researchers (provided)  

1 pm to 5 pm: Room MSTB 226B  
- Computer Lab: Chemistry on the computer  

**Friday, July 4\textsuperscript{th}**  
Independence Day break – no classes  

**Monday, July 7\textsuperscript{th}**  
10 am to 12 pm: Room Rowland Hall 390  
(shifted by 1 hour because of the PC lab availability issues)  
- Lecture by **Prof. Donald Dabdub**  
  - Basics of computer modeling and simulations  
  - Specific applications to LA basin (p. 97–109 on LA Smog)  
  - Global Circulation Models and Predictions (p. 254 & 255)  

12 pm to 1 pm: Lunch with AirUCI faculty and researchers (provided)  

1 pm to 5 pm: Room MSTB 226B  
- Computer Lab: Simulations of air pollution in the LA basin
Tuesday, July 8th
9 am to 11 am: Room Rowland Hall 390
  - Lecture by Prof. Sergey Nizkorodov
    - Particulate matter (PM$_{10}$ and PM$_{2.5}$) (p. 132–140)
    - Health risks of particulate matter (p. 155, 156 & 160–163)
    - Light interaction with particulates (p. 146, 246 & 247)
    - Aerosols: Composition and Effects on Global Warming (p. 133, & 246–251)
    - VOC’s (p. 97) and Polycyclic Aromatic Hydrocarbons, PAH (p. 507–517)
    - Alcohols as Fuel (p. 333–345), MTBE (p. 345 & 346)
    - Leaded Fuel (p. 679 & 687–691)
    - Basic Organic Nomenclature (Appendix AP–1 through AP–14)

11 am to 12 pm: Lunch with AirUCI faculty and researchers (provided)

12 pm to 4 pm: Rooms RH 481, RH 350, RH 354, RH385
  - Continue with the third wet lab experiment

Wednesday, July 9th
9 am to 11 am: Room Rowland Hall 390
  - Lecture by Prof. John Hemminger
    - Fundamentals of surface science and environmental concerns at surface interfaces
    - Catalysts and catalytic converters (p. 18 & 109–114)
    - Sea salt aerosols
    - Heterogeneous SO$_2$ oxidation (p. 126–128) and PSC’s (p. 64 & 65)

11 am to 12 pm: Lunch discussion of applications of material to their teaching (provided)

12 pm to 4 pm: Rooms RH 481, RH 350, RH 354, RH385
  - Continue with the fourth wet lab experiment

Thursday, July 10th
9 am to 11 am: Room Rowland Hall 390
  - Special lecture by Prof. Benny Gerber
    - The Hydrogen Bond in Chemistry (p. AP. 10 in the Appendix)

11 am to 12 pm: Lunch with AirUCI faculty, researchers (provided)

12 pm to 4 pm: Rooms RH 481, RH 350, RH 354, RH385
  - Continue with the fifth wet lab experiment

Friday, July 11th
9 am to 12.30 pm: Room Rowland Hall 390 (initially)
  - Guided tours of research labs of AirUCI Professors (split into small groups of 5 people)

12.30 pm to 2.30 pm: Lunch with AirUCI faculty and researchers (provided)
  - Pairing of teachers and researchers
  - Early dismissal at 2:30 pm.