AirUCI Summer 2010 Schedule

Monday, June 28
9 am to 9:45 am: Room Rowland Hall 390
  • Brief welcome by Prof. Barbara Finlayson-Pitts
  • Entrance evaluations
9:45 am to 11:30 am: Room RH 390
  • 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), sources and sinks (p. 77 & 178)
    - Overview of common public environmental concerns
11:30 am to 12:30 pm: Lunch with AirUCI faculty and researchers (provided)
  • Introductions of the AirUCI faculty and associates (starting at noon)
  • Administrative issues
12:30 pm to 2:30 pm: Room RH 390
  • Lecture by Prof. J. Mickey Laux - continued
    - Mathematics in chemistry review (p. 93 & 94 “Box 3–1”)
    - Using Microsoft Excel for plotting on laptops
  • Safety by Prof. Sergey Nizkorodov
    - Discussion of laser and lab safety
    - Distribution of safety attire
    - Forming lab groups (20 attendees divided into 5 groups of 4 people)
2:30 pm to 4 pm: Room RH 481
  • Overview of wet labs by Prof. J. Mickey Laux
    - Determination of PAH in cigarette smoke by HPLC
    - Determination of MTBE and benzene in gasoline by GC/MS
    - MTBE in gasoline and ethanol in vodka / mouthwash measured by FTIR
    - Ability of catalytic converters to reduce air pollution
    - Laser–Induced Breakdown Spectroscopy (LIBS) of common materials
  • Common lab techniques: pipetting, measuring volumes, mixing solvents, using syringes

Tuesday, June 29
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)
    - Emission and fluorescence (p. 199–201)
    - Overview of selected lab experiments: catalytic converters; LIBS.
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
  • Each team does their first wet lab experiment
Wednesday, June 30
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 NOx (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
- Continue with the second wet lab experiment

Thursday, July 1
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 with examples pertaining to atmospheric chemistry research
  - Overview 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 – Spartan lab

Friday, July 2
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)
  - Solar energy research and photovoltaics [p. 312, 316 (Fig. 8-2), 319 (Fig 8-4) and 325-333]
  - Sea salt aerosols

11 am to 12 pm: Lunch with AirUCI faculty and researchers (provided)
- Short presentation by Prof. John Hemminger on the energy science policy and the importance of basic research in dealing with the combined energy/environment issues.

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

Saturday, July 3 to Monday, July 5: Independence Day Break

Syllabus-2
Tuesday, July 6
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)
  - Indoor air pollutants
  - VOC’s (p. 97) and Polycyclic Aromatic Hydrocarbons, PAH (p. 507–517)

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

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

Wednesday, July 7
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)
- Historical perspectives on air pollution research and regulation by Prof. Jim Pitts.

1 pm to 5 pm: Room MSTB 226B
- Computer Lab: Simulations of air pollution in the LA basin – PSE lab

Thursday, July 8
9 am to 11 am: Room Rowland Hall 390
- 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 and researchers (provided)

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

Friday, July 9
9 am to 1 pm: Room Rowland Hall 390 (initially)
- Guided tours of research labs of AirUCI Professors (split into 3 groups of 6-7 people)
- Exit evaluations
- Discussion of lab results

1 pm to 3 pm: Special lunch with AirUCI faculty and researchers (provided)