Books: No specific textbook is required for the class, although three books are recommended as options to consider as useful reference materials. One is basically a compendium of data that provides many examples of spectral data for various types of compounds. This book is called Structure Determination of Organic Compounds, Tables of Spectral Data, and was authored by Pretsch, Buhlmann, and Affolter in 2000 (ISBN 3540678158). A different edition of this book would also be adequate. The other two are more traditional books. Spectrometric Identification of Organic Compounds, 7th edition, by Silverstein, Webster, and Kiemle (2005, ISBN 0471393622) is improved over its six predecessors by virtue of the presence of more practice problems, as well as some updating of the content. Another good option is Organic Structure Analysis, 2nd Edition (P. Crews, J. Rodriguez, and M. Jaspars, ISBN 9780195336047; published in 2010). This is a relatively new and improved edition of a book first published in 1998, which we once used in the class, and it is somewhat more detailed than the Silverstein book. Either of these options would serve as a good source of additional information, explanations, examples, illustrations, and problems.

Efforts in this class will focus heavily on spectral interpretation, and this is best learned by covering basic principles and trends, discussing examples, and working problems*. Because of this emphasis on practical applications, we will not have time to cover theoretical aspects of the various techniques in the depth that they deserve. We will cover relevant theory to some degree in the course notes (see below). However, a "traditional" text in this area like those suggested above can serve as a helpful source of detailed, complementary explanations, as well as examples and practice problems beyond those to be provided in the course. There will be no specific assignments from either of these books, and that is why they are not required, but students in the past who have commented about them have found them useful. These books can all be purchased online from various sources.

Course Notes: Copies of the course notes (i.e., the Powerpoint slides used in class) will be provided for download (in pdf format on ICON) as the semester progresses. These will be made available before they are covered in class, so that students may add written comments to them during the lecture and, ideally, look them over before class. However, every year, some changes, deletions, and additions are typically made during the semester in an effort to keep the course updated, clarify points, and improve the quality of the notes, so the entire set is not made available at the beginning of the course.

Lectures: 9:30-10:45 AM TTh in room E215 CB. It may be necessary to cancel or reschedule one or two lectures during the semester due to schedule conflicts. If any class meetings need to be cancelled or rescheduled, advance notice will be given in class. Exams will be held outside of the regular class time, and this should give us some flexibility in making up any lost lecture periods.

Because 75 minutes is a long time to sit and listen to a lecture, we have traditionally taken a 5-minute break in the middle of class and extended the period by 5 minutes. Unless someone has an objection to this practice, I plan to do the same this year. Logistics for this will be discussed in class and will depend on student schedules and on whether there is a class before or after ours in the same room.
Exams: There will be two exams and a final. Times, dates, and places for exams will be arranged in class to accommodate student schedules. Exams will be open-book and cumulative, and will consist mostly of spectral interpretation and related types of problem-solving. A sizeable block of time is generally needed for each exam, so they are usually held in the evenings. Exam I is typically held sometime during the week before Spring Break.

Course Grades: Grades will be based on exam performance. The two mid-term exams will each be worth 30 percent of the final grade, while the final exam will be worth 40 percent. Problem sets will be assigned to provide practice in problem solving and exposure to different kinds of situations, but will not be graded. Answer keys will be posted on ICON, but most, if not all, of these problems will be discussed in class.

Course Content and Outline: This course will cover the most commonly used spectroscopic and spectrometric techniques in organic structure elucidation, with the exception of X-ray crystallography. The vast majority of course time will be spent on modern NMR (ca. 70%) and MS methods (ca. 20-25%), their practical applications, and interpretation of data generated using these techniques.

I. NMR Spectroscopy  
   A. General principles  
   B. $^1$H NMR  
   C. $^{13}$C NMR  
   D. Other Nuclei  
   E. FT NMR pulse sequences and relevant "1D" NMR experiments  
   F. 2D NMR  

II. Mass Spectrometry (MS)  
   A. Electron Impact MS  
   B. Fragmentation  
   C. High Resolution MS  
   D. Soft-ionization techniques (ESI, FAB, CI, MALDI, etc.)  
   E. MS-MS and other experiments  

III. Selected Aspects of IR, UV, and CD Spectroscopy Relevant to Organic Chemistry

Additional Information about Collegiate Policies and Procedures
The following policy and procedural statements have been summarized from the web pages of the College of Liberal Arts and Sciences and The University of Iowa Operations Manual.

Administrative Home. The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Student Academic Handbook.

Electronic Communication. University policy specifies that students are responsible for all official correspondence sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondence. (Operations Manual, III.15.2. Scroll down to k.11.)
Accommodations for Disabilities. A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information. Their office is located in 3101 Burge Hall (335-1462).

Academic Fraud. Plagiarism and any other activities wherein students misrepresent work that is not their own, cheat on exams, etc. are considered academic fraud. Academic fraud is a serious matter and is reported to the departmental executive officer (DEO) and to the appropriate Associate Dean. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the Student Academic Handbook.

CLAS Final Examination Policies. Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the CLAS Associate Dean for Undergraduate Programs and Curriculum.

Suggestions or Complaints. Students with a suggestion or complaint should first visit the instructor, then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Understanding Sexual Harassment. Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

Public health authorities recommend that people with flu-like illnesses stay home and not return to public spaces until 24 hours after they have no fever. In order to prevent the spread of disease, please do not come to class, meet with other groups of students, attend office hours, or contact offices in person while you are ill with a fever.

Reacting Safely to Severe Weather. In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site.