Course Objectives

The objectives of the course are to provide students with a working knowledge of the basic NMR techniques available to the modern chemist and to allow students to gain practical experience by applying these techniques to structural problems in organic chemistry.

Course Description

The course begins with a general introduction to the NMR phenomenon, including generation and acquisition of the NMR signal, data processing and lineshape. After introducing simple proton and carbon NMR spectra, the course turns to its main focus; describing the basic tools of NMR spectroscopy and their uses. These tools include chemical shift, J coupling, NOE and other relaxation phenomena. The use of one-dimensional techniques such as chemical shift additivity rules, spectral editing, decoupling and difference spectroscopy for solving problems in structure analysis and dynamic chemical systems will be emphasized. Two-dimensional techniques for resolving couplings, and chemical shift correlation experiments will also be illustrated by application to a wide variety of organic structural problems.
CHEMISTRY 520

Interpretation of 1D and 2D NMR Spectra

Fall 2006

Course Syllabus

Instructor: Dr. Mike McGregor
Email: mmcgregor@chm.uri.edu

Course Grading:

| Problem Sets | 30% |
| Exams        | 40% |
| Final Exam   | 30% |

Date       | Topic                                           |
------------|-------------------------------------------------|
09/11       | Basic NMR Theory, Chemical Shift, Shielding     |
09/18       | $^{13}$C Chemical Shift                         |
09/25       | Spin-Spin Coupling                             |
10/02       | Analysis of NMR Spectra                        |
10/16       | First Exam                                      |
10/23       | Homonuclear Decoupling, NOE, Dynamic Systems    |
10/30       | Heteronuclear NOE, Spectral Editing             |
10/24       | Relaxation, Interpretive Uses of $T_1$          |
11/6        | Principles of Two-Dimensional Experiments      |
11/13       | Second Exam                                     |
11/20       | Homonuclear Correlation Spectra                 |
11/27       | Heteronuclear Correlation Spectra               |
12/04       | Long-Range Correlation Spectra                  |
12/11       | Computer Assisted Identification                |
12/18       | Final Exam                                      |