Wilkes University Curriculum Committee
PROPOSAL SUBMITTAL FORM

Directions:

- Completed and signed forms are due no later than the second Tuesday of every month. Submit one signed original hard copy and a scanned electronic copy with all signatures to the Chair of the Curriculum Committee.

1. Originator: Ernie Trujillo
   Chemistry
   Trujillo@Wilkes.edu  x4637

   Proposal Title: CHM-380: NMR Spectroscopy

2. [ ] New Program. (Major or Minor Degree Programs). This requires prior review and approval by the Provost and APC. Major = minimum of 30 credits, minor = minimum of 18 credits.
   [ ] New Concentration, Track, or Certificate. The Provost determines if review and approval by APC is necessary. Concentration – minimum of 12 credits, certification, endorsement and track are discipline specific.
   [ ] Elimination of Program. (Major or Minor Degree Programs). This requires prior review and approval by the Provost and APC.
   [ ] Elimination of Concentration, Track, or Certificate. The Provost determines if review and approval by APC is necessary.
   [ ] Program Revision. Significant revisions to a program require review and approval by the Provost. The Provost determines if review and approval by APC is necessary.
   [ ] General Education Revision. Submissions only accepted from the General Education Committee (GEC). Must be reviewed and approved by the Provost.
   [ ] Creation of new departments, elimination of existing department. This requires prior review and approval by the Provost and APC.
   [ ] Course additions or deletions not affecting programs (such as elective courses, transition of “topics” courses to permanent courses).
   [ ] Change in course credit or classroom hours.
   [ ] Incidental Changes. Includes changes in course/program title, course descriptions, and course prerequisites. (Although these changes do require approval by the Curriculum Committee, they do not go before the full faculty for approval).

Indicate the number of course modification forms that apply to this proposal:

   1 Course Addition Form (Attach Syllabi: refer to Faculty Handbook for requirements)
   ____ Course Deletion Form
   ____ Course Change Form

3. Executive Summary of Proposal.

   The Chemistry Department offers a junior/senior-level topics course in NMR Spectroscopy in alternate years. Over time, the course has become a regular addition to the department’s electives. This proposal, therefore, seeks to regularize the topics course into a standard offering.

Revised 4/30/2018
4. Other specific information. (Not applicable for incidental changes.)

This course is an upper-level Chemistry elective, hence no other programs will be affected. The course was created when the department acquired its 400-MHz NMR spectrometer, to provide an additional elective available to the Chemistry and Biochemistry majors. As the course has already run several times, as a topics course, no additional resources are necessary.

5. Program Outline. (Not applicable for incidental changes).

6. New Program Assessments: (For new programs ONLY)

7. Signatures and Recommendations. (please date)
   • If a potential signatory disagrees with a proposal he/she should write “I disagree with this proposal” and a signed statement should be attached to this submission.

Amy Bradley / Co-chair Chemistry
Print Name/Title
Department chair(s) of all potentially affected programs
Signature
Date

Donald Mencer / Co-Chair Chem. Donald E. Mencer
Print Name/Title
Department chair(s) of all potentially affected programs
Signature
Date

Prahlad Murthy / CSE Dean
Print Name/Title
Interim Dean
Signature
Date

Dean(s) of any potentially affected College/School.

Susan Hritzak
Print Name
Registrar
Signature
Date

Provost (For new programs, significant revisions and revisions to the General Education Program revisions only).

Print Name
Signature
Date

Chair, Academic Planning Committee. For new programs, program revisions sent via the provost. Signature indicates that the proposal has been reviewed and approved by APC.

Revised 4/17/2018
Wilkes University Curriculum Committee
COURSE ADDITION FORM

1. Course Title: **NMR Spectroscopy**

2. Course Number: CHM 380

3. Course Credits: 3
   Classroom Hours 2  Lab Hours 1  Other______

4. Course Pre-requisites: CHM-232, CHM-234

5. Course Co-requisites:

6. Effective Date of Addition (semester/year)  Spring 2020

7. Course Description (as proposed for the Bulletin):

   This course explores the capabilities of the Chemistry Department’s NMR spectrometer, and provides a groundwork in NMR theory beyond the level covered in the sophomore organic course. Topics covered include hardware, data processing, chemical shifts and coupling, one- and two-dimensional pulse sequences, dynamic NMR, the NOE effect, and gradient methods. Offered in alternate years.

8. Required Documentation:
   *Proposed Syllabus*  *Attach* proposed syllabi immediately after this document.
# Syllabus

Outline of topics for the semester:

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<th>Week</th>
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Text: Horst Frieboes: *Basic One- and Two-Dimensional NMR Spectroscopy, 5th edition*
Policies and General Information

This NMR Topics course will explore the capabilities of the Bruker 400 spectrometer, after providing a groundwork of NMR theory beyond the level covered in CHM 231/232.

Instructor
Ernie Trujillo
CSC-409 ext. 4637 trujillo@wilkes.edu
Office Hours: Tu, Th 1:30 – 3:30

Materials
Required: Friebolin, Basic One- and Two-Dimensional NMR Spectroscopy, 5th edn.

Class Meetings
Class: MW 2:00 CSC 402
Lab: F 2:00 CSC 306

Objectives
By the end of the semester, you will
- know how to use the vector model to show how spin magnetizations are effected by pulses and how they evolve with time.
- understand the origin of the measured NMR signal and how the observed spectrum is generated from it.
- have a sense of common first- and second-order splitting patterns, and how to interpret them.
- be familiar with common relaxation processes and their effects on spectra.
- appreciate how NMR may be used to obtain information about dynamic systems.
- be familiar with multinuclear NMR, including spectra of nuclei with I \( \neq \frac{1}{2} \).
- be able to follow a pulse sequence diagram.
- appreciate the power of including gradients into a pulse sequence.

Course Description
For most of the semester, we will spend two class hours each week discussing NMR topics, and the third actually on the instrument. Although the first few classes will follow a lecture format, hopefully the subsequent ones can have more a discussion feel. Please come with questions from the reading!

Each student will give one 20-minute presentations over the semester. Be on the lookout for topics you’d be interested in covering — from the syllabus, from the last few chapters of the text, or from other sources. Please let me know what topic you are interested in by the end of the tenth week of the semester.

In addition, each student should complete at least one project that explores a capability of the instrument — for example, use of the simulation software. After finishing a project, you should share what you’ve learned with the class and write a set of instructions so that others may also use the feature. Please submit the instructions both as hard-copy and as a computer file that may be posted. Instructions that past students and I have written may be accessed at http://www.chem.wilkes.edu/~trujillo/NMR/How_To.../.
Please let me know of your choice when you let me know your presentation topic, by the tenth week of the semester.

As I consider this an advanced senior-level course, it will follow a graduate-course model, with weekly problem-sets rather than exams. Students will be responsible for their own learning — in short, you’ll get out what you put in. Grades for the course will be based on class participation (15%), the presentation (15%), the project (15%), and the problem sets (55% total for 12 sets). Discussion of the concepts and chemical ideas is encouraged. However, since the problems will be graded, only individual work is to be recorded on the problems handed in.