# New Course Proposal Form

1. **Will this new course affect a current program?**
   - Yes [ ]
   - No [x]

   If "yes", has a Program Revision Form been submitted concurrently?
   - Yes [ ]
   - No [x]

2. **Teaching Department:**
   - Chemistry

3. **Administering Faculty/Unit:**
   - Science

4. **Campus**
   - (Downtown, Macdonald, Off Campus, Distance Ed, Other – specify)
   - Downtown

5. **Effective Term of Implementation**
   - (Ex. Sept. 2004 = 200409)
   - Term:
   - 200709

6. **Responsible Instructor**

7. **Course Title (Limit 30 Characters) - required for all courses:**

8. **Course Number(s)**
   - Indicate course number & the number of terms spanned:
   - (tick all that apply)
   - Subject/course number: CHEM 115

9. **Course Title to Appear in the Calendar (optional)**
   - (Limit 59 characters):
   - Advanced General Chemistry: Giants in Science

10. **Course Title to Appear in the Calendar (optional)**
    - (Limit 59 characters):
    - Note: This can ONLY be an expansion of word(s) abbreviated in the 30 character course title above.
    - Advanced General Chemistry: Giants in Science

11. **Credit Weight**
    - (or CEU's for non-credit CE courses):
    - 4

12. **Rationale for new course**
    - A course catering to the high end of our U0 cohort, specifically those who have already had significant portions of CHEM 110 & 120. This also fits well with the redesigned U0 Science program.

13. **Course Description**
    - (as it will appear in the Calendar [maximum 50 words]):
    - (N.B. Faculty of Medicine must append complete course outline)
    - An advanced combined version of CHEM 110 and CHEM 120 that will emphasize developments in the chemical sciences that changed the way nature was understood, focusing, where possible, on examples that led to Nobel Prizes.

14. **Supplementary information to appear in the Calendar in addition to the course description.**
    - Such as: equivalent course(s), contact hours, enrolment limitations, language of instruction etc.
    - Please enter the information as it should appear in the calendar notes.
    - CHEM 115 and (CHEM 110 plus CHEM 120) are considered equivalent from a prerequisite point of view. If you are planning on applying to medical school, note that some medical schools require applicants to have two general chemistry courses; at McGill you would have to take an additional physical chemistry course like CHEM 204 or equivalent to meet this requirement.
### 14. Schedule Types(s):  
(Enter all that apply – see course guidelines for a complete list.)  
(i.e. Lecture, Labs, Tutorial)

<table>
<thead>
<tr>
<th></th>
<th>Hours per Week</th>
<th>Hours per Week</th>
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</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td></td>
<td>3</td>
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<tr>
<td>Laboratory</td>
<td>3</td>
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</table>

Total Hours per Week: 6  
Total Number of Weeks: 13

### 15. Projected Enrollment:

- 80

### 16. Required text and/or preliminary reading list sent to library?

- Yes  
- No

### 17. Prerequisite(s) (Courses or Tests)  
Specify course number(s) or name(s) of test(s):

- Grade 12 Chemistry

If the student does not have a prerequisite should web registration be blocked?

- Yes  
- No

If "Yes" complete A and B:

A. Indicate minimum grade or test score(s) the student must attain in prerequisite course(s) or test(s):

B. Can the prerequisite course(s) or test(s) be taken in the same term as this course?

- Yes  
- No

### 18. Corequisite(s) Course Number(s):  
Specify course number(s) and title(s):

- PHYS 131 and MATH 140 or 150, or permission of instructor.

If the student does not register for the corequisite in the same term should web registration be blocked?

- Yes  
- No

### 19. Restriction(s):  
Enrollment is restricted to students who have obtained a grade greater than 95% in their high school university preparatory chemistry course (e.g., the Ontario Grade 12 University Preparation Chemistry Course [SCH4U]) or permission of the instructor. Not open to students who are taking or have taken CHEM 110 or 120.

### 20. Consultation Reports Attached

- Yes  
- N/A

### 21. Additional Course Charges (must be approved by the Fee Policy Committee)

<table>
<thead>
<tr>
<th>Description of Fee</th>
<th>Amount</th>
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### 22. Requires Teaching, Physical, or Financial Resources  
Not Currently Available (attach explanation)

- Yes  
- No
### 23. Approvals:

<table>
<thead>
<tr>
<th>Routing Sequence</th>
<th>Departmental Meeting</th>
<th>Departmental Chair</th>
<th>Other Faculty</th>
<th>Curric/Academic Committee</th>
<th>Faculty</th>
<th>SCTP</th>
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<tbody>
<tr>
<td>Name</td>
<td>D. Ronis</td>
<td>R.B. Lennox</td>
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<td>Signature</td>
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<td>March 15, 2007</td>
<td>March 15, 2007</td>
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**Departmental Contact Person (name/phone/email)**

David Ronis/398-5099/David.Ronis@McGill.ca
ADVANCED GENERAL CHEMISTRY: GIANTS IN SCIENCE
(4 Credits)

PROPOSED SYLLABUS

PART I: ATOMIC & MOLECULAR BASIS
(4 WEEKS)

ALBERT EINSTEIN, MAX PLANCK NIELS BOHR,
LOUIE DE BROGLIE, WERNER HEISENBERG, ERWIN SCHRODINGER,
PIERRE & MARIE CURIE, BECQUEREL, FRÉDÉRIC JOLIOT, IRÈNE JOLIOT-CURIE, OTTO
HAHN, LINUS PAULING, ROBERT MULLIKEN

- Light & Matter Interaction
- Quantum Mechanics, Atomic Structure and Orbitals
- Radioactivity, Nuclear Fission and Fusion, Radiation and application of Radioisotopes
- Valence Bond Theory, Hybridization, Molecular orbital theory, Metallic Bonding

PART II: CHEMICAL KINETICS
(2 WEEKS)

MICHAELIS AND MENTEN, HAMMOND AND LEFFLER, WILLARD LIBBY (NOBEL)
AHMED H. ZEWAIL (NOBEL), WILHELM OSTWALD (NOBEL),
M. EIGEN, R.G.W. NORRISH AND G. PORTER (NOBEL)
DUDLEY R. HERSCHBACH, YUAN T. LEE AND JOHN C. POLANYI (NOBEL),
SIR CYRIL NORMAN HINSHELWOOD AND NIKOLAY NIKOLAEVICH SEMENOV
(NOBEL)

- The rate of a chemical reaction
- Measuring reaction rates
- Effect of concentration on reaction rates: the rate law
- Zero, first and second order reactions
- Theoretical models for chemical kinetics
- The effect of temperature on reaction rates
- Reaction mechanisms
- Catalysis
PART III: THERMODYNAMICS  
(3.5 WEEKS)

WILLIAM FRANCIS GIAUQUE (NOBEL), WALTHER HERMANN NERNST (NOBEL)  
JACOBUS HENRICUS VAN'T HOFF (NOBEL), J. W. GIBBS  
CLAUSIUS, CARNOT, KELVIN  

- 2nd Law: Direction of Change, Entropy, Equilibrium  
- 3rd Law: An absolute entropy scale  
- Applications: Chemical Equilibrium in ideal gases and solutions, thermodynamic basis for LeChatelier's principle.

PART IV: SYNTHESIS AND DESCRIPTIVE CHEMISTRY  
(3.5 WEEKS)


- Chemical Synthesis and Catalysis  
- Acid and Base Chemistry  
- Electrochemistry  
- Phenomenological Descriptive Chemistry

GRADING SCHEME

<table>
<thead>
<tr>
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<th>Total %</th>
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<tbody>
<tr>
<td>2 Mid Term Exams</td>
<td>@ 20%</td>
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<tr>
<td>1 Lab</td>
<td>@ 20%</td>
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<td>Final Exam</td>
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<td><strong>TOTAL:</strong></td>
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Final Exam @ 40%
Dr. Laurie Hendren

Hi Laurie,

In the event that our new course, CHEM 115, "Advanced General Chemistry: Giants in Science," is approved, I would like it included in the list of approved Freshman Science courses. It should be indicated as such in the calendar.

Thanks in advance.

Regards,

David Ronis
Professor of Chemistry