Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Establish a Non-Thesis Option in the Master of Science in Chemical Engineering in the Department of Chemical and Biomolecular Engineering, School of Chemical Sciences, College of Liberal Arts and Sciences

SPONSOR: Hong Yang, Professor of Chemical and Biomolecular Engineering, hy66@illinois.edu; 244-6730, 114 Roger Adam Laboratory, 600 South Mathews Avenue, Urbana IL 61801; MC-712

COLLEGE CONTACT: Karen Carney, Associate Dean, College of Liberal Arts and Sciences, 217-333-1350, kmcarney@illinois.edu; 2090 Lincoln Hall

BRIEF DESCRIPTION: The Department of Chemical and Biomolecular Engineering (ChBE) would like to establish a non-thesis option leading to the Master of Science degree in Chemical Engineering. This proposal requires no changes to the current curriculum other than the addition of this non-thesis option.

JUSTIFICATION: Students in the Department of Chemical and Biomolecular Engineering have been required to complete a thesis as part of their requirements for the Master's degree. The M.S. degree with thesis will continue to be offered. However, ChBE is interested in also establishing a non-thesis MS option based on our existing program course requirements. In recent years, ChBE has developed 3+2 combined Bachelor / Master’s (3+2 BS/MS) degree programs with Tsinghua University and Zhejiang University, respectively, both in China. The non-thesis option might better serve students in these 3+2 programs as well as students in our PhD program who are interested in pursuing a non-thesis MS degree on their way to the PhD.

BUDGETARY AND STAFF IMPLICATIONS:

a. Additional staff and dollars needed: none
b. Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.): minimal to none
c. Effect on course enrollment in other units and explanations of discussions with representatives of those departments: N/A
d. Impact on the University Library: Letter from Thomas Teper is attached
e. Impact on computer use, laboratory use, equipment, etc.: no additional impact

DESIRED EFFECTIVE DATE: Upon approval
STATEMENT FOR PROGRAMS OF STUDY CATALOG:

Chemical and Biomolecular Engineering

chbe.illinois.edu
Head of the Department: Paul J.A. Kenis
114 Roger Adams Laboratory
600 South Mathews Avenue
Urbana, IL 61801
(217) 244-9214
E-mail: kenis@illinois.edu

Major: Chemical Engineering
Degrees Offered: M.S., Ph.D.

Major: Bioinformatics
Degree Offered: M.S.
Graduate Concentration: Chemical and Biomolecular Engineering

Medical Scholars Program: Doctor of Philosophy (Ph.D.) in Chemical Engineering and Doctor of Medicine (M.D.) through the Medical Scholars Program.

Graduate Degree Program

The Department of Chemical and Biomolecular Engineering offers graduate programs leading to the Master of Science and the Doctor of Philosophy degrees. The graduate curriculum in Chemical & Biomolecular Engineering is designed to educate students in general for careers in the area of chemical and biomolecular engineering sciences. Faculty pursue research programs in areas ranging from traditional areas, such as complex fluids, computation, and catalysis, to areas such as biomolecular engineering, biotechnology, and imaging.

Students generally apply to our PhD program, and complete a MS with a thesis, along the way. Alternatively, these students may complete the proposed non-thesis MS degree, on their way to the PhD, or when they decide to not finish the PhD program. The MS degree with thesis is especially meant for those students in the PhD program who decide to stop their pursuit of the PhD degree, but have met the MS degree course requirements and have completed sufficient research for a satisfactory MS thesis. The Department of Chemical and Biomolecular Engineering normally does not recruit students interested solely in its master’s program except as part of dual-degree programs with other universities.

Admission

Applicants for admission to advanced degrees programs in chemical engineering should have a background in chemistry and chemical engineering comparable to the training
offered in the undergraduate chemical engineering curriculum at the University of Illinois at Urbana-Champaign. Students whose prior training is deficient in one or more basic areas of chemistry or chemical engineering will be admitted with the understanding that their deficiencies will be removed to the extent prescribed by their advisors. Graduate College admission requirements also apply. In addition, applicants must submit results from the Graduate Record Examination (GRE) general test.

International students whose native language is not English are required to have a minimum paper-based Test of English as a Foreign Language (TOEFL) score of 610 (257 on the computer-based test). In addition, teaching is a requirement in the chemical engineering graduate program and there are special requirements for applicants whose native language is not English. The University requires a minimum Test of Spoken English (TSE) score of 50 for a contact teaching assistant appointment. It is desirable for applicants whose native language is not English to provide TSE scores in order to receive full consideration for admission and financial aid.

Admission for students participating in joint BS/MS 3+2 degree programs with international universities will be based on several admission criteria outlined in the Cooperative Education Program agreements, which include the student’s overall academic performance and communication skills in English, a strong background in chemical and/or biomolecular engineering (or closely related field, e.g., bioengineering), strong Graduate Record Examination (GRE) scores, and letters of recommendation from College professors. In addition, the most promising applicants will be interviewed by a team of Illinois faculty to determine final admission.

### Degree Requirements

For additional details and requirements, refer to the [department's degree programs information](#) and the [Graduate College Handbook](#).

### Master of Science, Chemical Engineering

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Thesis Option Required Hours</th>
<th>Non Thesis Option Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Hours Required – CHBE 599 (min/max applied toward degree):</td>
<td>min 12</td>
<td>0</td>
</tr>
<tr>
<td>Total Hours</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Minimum Hours Overall Required Within the Unit:</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Minimum 500-level Hours Required Overall:</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Other Requirements:*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHBE 565 (CHBE Seminar) must be taken every semester that the student is in residence. For the non-thesis option, a maximum of 2 hours of CHBE 565 may be counted as part of the 32 hours toward the degree.

Minimum GPA: 2.75  2.75

Master of Science, Bioinformatics

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Thesis Option-Required Hours</th>
<th>Non-thesis Option-Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>One course in Bioinformatics from approved list, one course in Biology from approved list, and CS 411 or CS 473</td>
<td>12 min</td>
<td>12 min</td>
</tr>
<tr>
<td>CHBE 572 and 580</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Thesis Hours Required – CHBE 599 (min/max applied toward degree):</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total Hours</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Minimum 500-level Hours Required Overall:</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Other Requirements:* A concentration not required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum GPA:</td>
<td>2.75</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Doctor of Philosophy

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of four graduate-level (ChBE 5XX) courses in chemical engineering</td>
<td>16</td>
</tr>
<tr>
<td>A coherent program of four additional graduate level courses</td>
<td>16</td>
</tr>
<tr>
<td>Thesis Hours Required – CHBE 599 (min/max applied toward degree):</td>
<td>0 min</td>
</tr>
<tr>
<td>Total Hours</td>
<td>96</td>
</tr>
<tr>
<td>Minimum Hours Overall Required Within the Unit:</td>
<td>16</td>
</tr>
<tr>
<td>Minimum 500-level Hours Required Overall:</td>
<td>20</td>
</tr>
<tr>
<td>Other Requirements:*</td>
<td></td>
</tr>
<tr>
<td>Teaching experience is required</td>
<td></td>
</tr>
<tr>
<td>Minimum GPA:</td>
<td>2.75</td>
</tr>
<tr>
<td>Master’s Degree Required for Admission to PhD?</td>
<td>No</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Qualifying Exam Required</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary Exam Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Final Exam/Dissertation Defense Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Dissertation Deposit Required</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Requirements include satisfactory performance on qualifying examinations, preliminary exam, and a thesis. The qualifying examinations are a combination of written and oral tests usually taken during the first year of study. The preliminary examination is an individual oral examination taken after the student has satisfied the course requirements. It focuses on the student's proposed thesis research.

**Multi-institutional Ph.D. Degree with National University of Singapore**

Students in this program will spend approximately equal proportions of their study at the Urban-Champaign campus and at the National University of Singapore (NUS), taking courses and/or working on their research. The project comprising the research component of the Ph.D. will be cooperatively overseen by faculty at Illinois and NUS. Students pursuing the multi-institutional degree must meet all of the requirements of the existing Ph.D. programs at each of the two institutions. Courses taken at each university must be approved by the other university before they are taken in order to be credited toward degree requirements. *The multi-institutional program is unaffected by the proposed non-thesis MS degree.*

**Medical Scholars Program**

The Medical Scholars Program permits highly qualified students to integrate the study of medicine with study for a graduate degree in a second discipline, including Chemical Engineering. Students may apply to the Medical Scholars Program prior to beginning graduate school or while in the graduate program. Applicants to the Medical Scholars Program must meet the admissions standards for and be accepted into both the doctoral graduate program and the College of Medicine. Students in the dual degree program must meet the specific requirements for both the medical and graduate degrees. On average, students take eight years to complete both degrees. Further information on this program is available by contacting the Medical Scholars Program, 125 Medical Sciences Building, (217) 333-8146 or at [www.med.illinois.edu/msp](http://www.med.illinois.edu/msp). *The medical scholars program is unaffected by the proposed non-thesis MS degree.*
3+2 BS/MS program

Students in this program will be limited to those enrolled at the partner universities (e.g.: Tsinghua University and Zhejiang University) as undergraduate students who will complete six semesters of the eight-semester Bachelor of Science program. If accepted, the students can complete their final two semesters of study towards the B.S. degree at University of Illinois in the Department of Chemical and Biomolecular Engineering and continue in subsequent semesters to earn credits at Illinois toward a Master of Science degree from Illinois. The M.S. degree will be awarded according to the program policies and practices of the Chemical and Biomolecular Engineering Department at the University of Illinois.

Graduate Teaching Experience

Experience in teaching is considered a vital part of the graduate program and is required as part of the academic work of all Ph.D. candidates in the ChBE program. This teaching experience is optional (at the discretion of the department, based on need) for terminal MS or 3+2 BS/MS degree students.

Faculty Research Interests

Please see chbe.illinois.edu/research.
CLEARANCES: Clearances should include signatures and dates of approval. These signatures must appear on a separate sheet. If multiple departments or colleges are sponsoring the proposal, please add the appropriate signature lines below.

Jonathan V. Sweedler, Director, School of Chemical Sciences

Date

Hong Yang, Professor & Director of Graduate Studies

Date

Unit Representative Paul Leveque, Paul P1

Date

Karen M. Cummings, College Representative

Date

Graduate College Representative

Date
Appendix A:
(Budgetary and Staff Implications)
(Replace the following material with your appendix, if any.)

New Degree Programs – Required Budgetary Implication Questions

1) How does the unit intend to financially support this program?

The new non-thesis MS degree will involve only small numbers of students: Fewer than 10 students per year will be part of the 3+2 BS/MS programs with foreign partner institutions. In addition, some of the students who are already in our PhD program may pursue this non-thesis MS degree on the way to their PhD degree, or will take this degree after deciding to stop in our PhD program. All these students will take existing courses. No additional courses or sections will be needed.

2) Will the unit need to seek campus or other external resources?

No need for campus or external resources.

3) If no new resources are required, how will the unit create capacity or surplus to appropriately resource this program? (What functions or programs will the unit no longer support?)

The number of additional students in this program will be 10 or fewer per year per institution, a small number compared to our total of more than 750 graduate and undergraduate students. As such, these additional students will be easily accommodated in existing courses and sections. (The other students taking this non-thesis MS degree will be a small fraction of the students in our PhD program, so these are not additional students.)

4) Please provide a market analysis: What market indicators are driving this proposal? What type of employment outlook should these graduates expect? What resources will be required to assist students with job placement?

The proposed non-thesis MS degree is primarily meant to help us strengthening our ties with strong international universities abroad, specifically through 3+2 BS/MS programs. Currently job prospects for MS graduates from ChBE are excellent. Based on our past experience, most international students in the MS program will return to their respective home countries where they will easily find employment. Through this degree program, we can partner with some of the top foreign universities, such as Tsinghua and Zhejiang in China.
Substantial resources are already in place to assist in job placement. The Career Counseling and Placement Services in the School of Chemical Sciences provide extensive job placement and career development services for all our students including MS and Ph.D. students. Details of these services can be found at: http://careers.scs.illinois.edu/alumni_services.

5) If this is a proposed graduate program, please discuss the programs intended use of waivers. If the program is dependent on waivers, how will the unit compensate for lost tuition revenue?

Students who apply to the non-thesis MS program will not be eligible for tuition waivers; they will be charged full tuition. For students in our PhD program, there will be no change in compensation and other financial options.
Dear Dr. Yang:

Thank you for giving the University Library the opportunity to review the Department of Chemical and Biomolecular Engineering's proposal to the Senate Committee on Educational Policy to establish a Non-Thesis Master of Science in Chemical and Biomolecular Engineering. Based upon the draft proposal that we received, it is our understanding that this degree will provide a mechanism for ChBE participation in a 3+2 cooperative bachelor/master degree program between the University of Illinois and several Chinese universities. It will also offer a degree option for those students who are interested in course-based graduate studies. Based on the proposal reviewed, there appear to be no changes to the curriculum currently offered in ChBE. That being the case, the proposal materials that you provided to the University Library do not lead us to believe that there will be an appreciable impact on our operations or collections.

If additional services or materials are required as the program develops—particularly in its graduate offerings, we will be happy to discuss securing the requisite resources with the program sponsors.

Sincerely,

Paula Kaufman
Juanita J. and Robert E. Simpson
Dean of Libraries and University Librarian

c: Thomas Teper
   Tina Chrzastowski
November 26, 2013

Gay Miller, Chair
Senate Committee on Educational Policy
Office of the Senate
228 English Building, MC-461

Dear Professor Miller:

Enclosed is a copy of a proposal from the College of Liberal Arts and Sciences and the Graduate College to establish a non-thesis option in the MS in Chemical Engineering. It now requires Senate review.

Sincerely,

Kristi A. Kuntz
Assistant Provost

Enclosures

c:  K. Carney
    M. Lowry
    H. Yang
Executive Committee

2012-2013 Members
Debasish Dutta, Chair

Members
Barry Ackerson
David Ceperley
Lin-Feng Chen
Kent Choquette
Jennifer Cole
Brooke Elliott
Susan Garmsey
David Hays
Christine Jenkins
Ashleigh Jones
Tina Mattila
Ramona Oswald
Yoon Pak
Joseph Rosenblatt
Alex Winter-Nelson
Assata Zcrai

Kristi Kuntz
Office of the Provost
207 Swanlund MC-304

Dear Kristi,

Enclosed please find the proposal entitled “Establish a Non-Thesis Master of Science in Chemical Engineering in the Department of Chemical and Biomolecular Engineering, School of Chemical Sciences, College of Liberal Arts and Sciences.”

The Graduate College Executive Committee has approved this proposal. I send it to you now for further review.

Sincerely,

William G. Buttlar
Associate Dean, Graduate College

c: A. Kopera
M. Lowry
Senate Educational Policy Committee
Proposal Check Sheet

PROPOSAL TITLE (Same as on proposal): Establish A Non-Thesis Master of Science in Chemical Engineering in the Department of Chemical and Biomolecular Engineering, School of Chemical Sciences, College of Liberal Arts and Sciences

PROPOSAL TYPE (Please select all that apply below):

A.  ☒ Program and degree proposals

1.  This proposal is for a graduate program or degree

   ☒ Yes   ☐ No

2.  Degree proposal (e.g. B.S., M.A. or Ph.D.)

   ☒ New degree — please name the new degree: Non-Thesis MS Degree in Chemical Engineering

   ☐ Revision of an existing degree — please name the existing degree to be revised:

3.  Major proposal (disciplinary focus, e.g., Mathematics)

   ☐ New major — please name the new major: _____

   ☐ Revision of an existing major — please name the existing major to be revised: _____

4.  Concentration proposal (e.g. Financial Planning)

   ☐ New concentration — please name the new concentration: _____

   ☐ Revision of an existing concentration — please name the existing concentration to be revised: _____

5.  Minor proposal (e.g. Cinema Studies)

   ☐ New minor — please name the new minor: _____

   ☐ Revision of an existing minor — please name the existing minor to be revised: _____

Document updated October 17, 2013
6. □ Proposal for renaming an existing degree, major, concentration, or minor
   □ degree □ major □ concentration □ minor
   Please provide the current name: _____
   Please provide the proposed new name: _____

7. □ Proposal for terminating an existing degree, major, concentration, or minor
   Please name the existing degree, major, concentration, or minor: _____

8. □ Proposal for a multi-institutional degree between Illinois (UIUC) and a foreign institution
   Please name the existing Illinois degree or program: _____
   Please name the partnering institution: _____

B. □ Proposal for renaming existing academic units (college, school, department, or program)
   Please provide the unit’s current name: _____
   Please provide the unit’s proposed new name: _____

C. □ Proposal for reorganizing existing units (colleges, schools, departments, or programs)
   □ Change in status of an existing and approved unit (e.g. change from a program to department) — please indicate current unit name including status: _____
   □ Transfer an existing unit
     Please provide the current unit’s name and home: _____
     Please provide the new home for the unit: _____
   □ Merge two or more existing units (e.g., merge department A with department B)
     Please provide the name and college of unit one to be merged: _____
     Please provide the name and college of unit two to be merged: _____
   □ Terminate an existing unit — please provide the current unit’s name and status: _____

D. □ Other educational policy proposals (e.g., academic calendar, grading policies, etc.)
   Please indicate the nature of the proposal: _____