APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR and MINOR

1. Submitted by the College of   **Engineering**   Date: **8/3/2009**

    Department/Division offering course: **Chemical and Materials Engineering**

2. What type of change is being proposed?   ☑ Major   ☐ Minor*

*See the description at the end of this form regarding what constitutes a minor change. Minor changes are sent directly from the dean of the college to the Chair of the Senate Council. If the Senate Council chair deems the change not to be minor, the form will be sent to the appropriate Council for normal processing and an email notification will be sent to the contact person.

3. Current Distance Learning (DL) status: ☑ N/A   ☐ Already approved for DL†   ☐ *Please Add*   ☐ *Please Drop*

    If ADDING, check one of the methods below that reflects how the majority of the course content will be delivered.

     Internet/Web-based ☐   *Interactive Video* ☐   *Extended Campus* ☐

†If already approved for DL, a new Distance Learning Form must be submitted with this form <u>unless</u> the department affirms (by checking this box) ☐ that the proposed course changes will not affect DL delivery.

PROPOSED CHANGES
Please complete <u>all</u> "Current" fields.

Fill out the "*Proposed*" field <u>only</u> for items being changed. <u>Enter N/A if not changing.</u>

Circle the number for each item(s) being changed. For example: ⑥

4. Current prefix & number: **CME 199**   *Proposed prefix & number:*   **CME 220**

5. Current Title   **Computational Tools in Chemical Engineering**

    Proposed Title†   **Computational Tools in Chemical Engineering**

    †*If title is longer than 24 characters, offer a sensible title of 24 characters or less:*   **Comp Tools in Chem Eng**

6. Current number of credit hours: **3**   *Proposed number of credit hours:* **3**

7. Currently, is this course repeatable?   YES ☑   NO ☐   If YES, current maximum credit hours: _____

    Proposed to be repeatable?   YES ☑   NO ☐   *If YES, proposed maximum credit hours:* _____

8. Current grading system: ☑ Letter (A, B, C, etc.)   ☐ Pass/Fail

    Proposed grading system: ☑ *Letter (A, B, C, etc.)*   ☐ *Pass/Fail*

9. Courses must be described by <u>at least one</u> of the categories below. Include number of <u>actual contact hours per week</u> for each category.

    Current:

CLINICAL	COLLOQUIUM	DISCUSSION	LABORATORY	3 LECTURE
INDEPEND. STUDY	PRACTICUM	RECITATION	RESEARCH	RESIDENCY
SEMINAR	STUDIO	OTHER – Please explain:		

    Proposed:

CLINICAL	COLLOQUIUM	DISCUSSION	LABORATORY	3 LECTURE
INDEPEND. STUDY	PRACTICUM	RECITATION	RESEARCH	RESIDENCY
SEMINAR	STUDIO	OTHER – Please explain:		

10. Requested effective date (term/year):   **Spring** / **2010**

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11. Supplementary teaching component: ☑ N/A ☐ Community-Based Experience ☐ Service Learning ☐ Both

    Proposed supplementary teaching component: ☐ *Community-Based Experience* ☐ *Service Learning* ☐ *Both*

12. Cross-listing: ☑ N/A or _____ _____ / _____ _____
                                                      Current Prefix & Number   printed name   Current Cross-listing Department Chair   signature

    a. *Proposed – REMOVE current cross-listing:* ☐ _____ / _____ _____
                                                      printed name   *Current Cross-listing Department Chair*   *signature*

    b. *Proposed – ADD cross-listing:* _____ _____ / _____ _____
                                Prefix & Number   *printed name*   *Proposed Cross-listing Department Chair*   *signature*

13. Current prerequisites:

    Enrollment in the College of Engineering or permission by instructor

    Proposed prerequisites:

    CME 200

14. Current Bulletin description:

    An introduction to computational tools used in chemical engineering, such as Microsoft Excel, visual basic for applications and Maple.

    Proposed Bulletin description:

    An introduction to computational tools used in chemical engineering, such as Microsoft Excel, MATLAB, and Aspen.

15. What has prompted this change?

    The course was originally offered as CME 199 during spring semester of the freshmen year. It was difficult to teach computational tools without some chemical engineering background. We changed the curriculum such that they will take it after CME 200. Therefore, we need to change the prereq and also course number to reflect that it will follow CME 200.

16. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:

    Based on feedback from constituents, we believe the students will benefit more from MATLAB than Maple. Therefore, MATLAB will be taught instead of Maple. Also, because they have already taken CME 200, we will also add ASPEN to the content which will introduce them to a simulation package related to chemical engineering.

17. Please list any other department that <u>could</u> be affected by the proposed change:

    <u>None</u>

18. Will changing this course change the degree requirements for ANY program on campus? ☐ YES ☑ NO
    If YES‡, list below the programs that require this course:

    ‡ In order for the <u>course</u> change to be considered, <u>program</u> change form(s) for the programs above must also be submitted.

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19. Is this course currently included in the University Studies Program? ☐ Yes ☑ No

20. ☐ Check box if changed to 400G or 500.   If changed to 400G- or 500-level, *you must include a syllabus showing differentiation* for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4*)

21. Within the department, who should be contacted for further information on the proposed course change?

Name: **Kimberly Anderson, DUGS**   Phone: **7-4815**   Email: **kanderson@engr.uky.edu**

22. Signatures to report approvals:

August 22, 2008
DATE of Approval by
Department Faculty

11/20/09
DATE of Approval by College
Faculty

1/19/2010
*DATE of Approval by
Undergraduate Council

*DATE of Approval by Graduate
Council

*DATE of Approval by Health
Care Colleges Council (HCCC)

*DATE of Approval by Senate
Council

*DATE of Approval by the
University Senate

Douglass Kalika
Reported by Department Chair

RICHARD J. SWEIGARD
Reported by College Dean

Reported by Undergraduate Council Chair

Reported by Graduate Council Chair

Reported by Health Care Colleges Council Chair

Reported by Office of the Senate Council

Reported by the Office of the Senate Council

*If applicable, as provided by the *University Senate Rules* (http://www.uky.edu/USC/New/RulesandRegulationsMain.htm)

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Excerpt from *University Senate Rules*:

SR 3.3.0.G.2   Definition. A request may be considered a minor change if it meets one of the following criteria:

    a.   change in number within the same hundred series;
    b.   editorial change in the course title or description which does not imply change in content or emphasis;
    c.   a change in prerequisite(s) which does not imply change in content or emphasis, or which is made necessary by the elimination or significant alteration of the prerequisite(s);
    d.   a cross-listing of a course under conditions set forth in *SR 3.3.0.E*;
    e.   correction of typographical errors.

Rev 3/07

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University of Kentucky
Department of Chemical and Materials Engineering
CME 220-001: Computational Tools in Chemical Engineering
New Syllabus

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Instructor: Dr. Barbara Knutson   FPAT 175 (Anderson Tower)
      Phone: 257-5715   e-mail: bknutson@engr.uky.edu
      Office hours: Thursdays 10:00 am – 11:00 am

Time and Place: Monday & Wednesday 2:00 - 2:50 pm, FPAT [F.P. Anderson Tower] 259
            Friday 2:00 - 2:50 pm, BE [Business and Economics] 105*
            *Note: The room for Friday classes will change in April to accommodate
            ASPEN instruction. More details will follow.

Teaching assistants: Rob Wydra <wydrar@gmail.com>
                     Sundar Authimoolam <sundarprasanth86@gmail.com>
                     TA office hours will be announced.

Textbook: R. W. Larsen, *Engineering with Excel 3nd ed.* [ISBN 0-13-147511-8]
             Holly Moore, *MATLAB for Engineers, 2nd ed.* [ISBN: 0-13-604422-0]

Course Management: Blackboard

Overview and Course Objectives

Computational tools are fundamental to engineering practice for the efficient solution of engineering problems and the design of systems, components, or processes. The objective of this course is to serve as an introduction to the modern engineering computing tools that will be incorporated throughout the chemical engineering curriculum. Examples of programs that will be emphasized include Microsoft Excel, Matlab and ASPEN.

Catalog Data: CME 220 Computational Tools in Chemical Engineering (3 credit hours)
An introduction to computational tools used in chemical engineering, such as Microsoft Excel, MATLAB, and Aspen. . *Prerequisite:* CME 200

Course Outcomes: By the end of the course, students should:
1. Develop proficiency with the spreadsheet calculation and graphing features of Microsoft Excel
2. Understand and be able to use the Matlab user interface to solve equations and systems of equations
3. Know the basic capabilities Excel and Matlab, and know when to apply them
4. Be able to perform linear regression for a set of data
5. Understand basic concepts of computer programming such as decision statements and constructing loops
6. Write simple programs to solve engineering problems
7. Be able to numerically solve nonlinear equations using Matlab and Excel
8. Be able to numerically solve sets of linear equations using Matlab and Excel

9. Have a basic understanding of numerical differentiation and integration
10. Use ASPEN to determine thermodynamic properties of process streams and simulate material and energy balances.

Important Dates [see the Registrar's calendar online for add/drop deadlines, etc.]

January 13	First day of class.
January 18	Academic holiday.
February 19	Exam 1
March 8	Midterm of semester.
March 15-19	Spring Vacation. Academic holiday.
April 9	Exam 2
April 30	Last day of class.
May 5	Final Exam, 3:30 – 5:30 pm

Grading
If your composite class score is in the following ranges, you will receive *at least* the corresponding grade. Any adjustments in the grade based on the averages and grade distribution of the class will favor higher grades.

100% to 90%: A   89% to 80%: B   79% to 70%: C   69% to 60%: D   <60%: E

Grading Components

Final Exam	35%
Exams (2)	15% each
Quizzes	15%
In-class assignments	10%
Homework	10%

Reading, Homework, and Learning Strategies
Reading assignments will be posted on the course web site and announced in advance in class. You will make the best use of your time in class if you keep up with the assignments, and come prepared for class. This is particularly important in *this* course, because we have only two lectures a week, with the third class session each week devoted to in-class computer labs.

In-class Computer Assignments and Quizzes
On Fridays, we will meet in a computer lab in the B&E building (see above). Note that the room for Friday will change in April to accommodate ASPEN instruction. The in-class computer time will be spent on in-class assignments that will need to be submitted by the end of class. Quizzes may also be scheduled at this time. Because there will be a time limit on the assignments, it is important that students come prepared, and have practiced either by completing assigned reading, or by doing homework. To encourage this preparation, some quizzes will also be conducted online via Blackboard and will need to be completed prior to class meetings. These will be announced in class and via Blackboard.

Academic Integrity
All work that students turn in will be expected to be their own. Due to its digital nature, the temptation to copy computer files may be greater than handwritten work. However, **instances of cheating and plagiarism will be taken very seriously in this class.** Students will be asked to

submit in-class exercises, quizzes, exams and some homework problems via Blackboard, to reduce the possibility for copying without detection. Therefore, students are expected to be familiar with Blackboard, and in the event of a transmission problem, it will be the **student's responsibility** to prove that they attempted to submit an assignment and that their files have not been changed. Students found to violate principles of academic integrity will at least receive an "E" for the assignment and may be subject to departmental or university sanctions.

Policy on Academic Accommodations Due to Disability
If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Tentative Sequence of Topics
  A. *Excel* basics
      a. Introduction to spreadsheets and Excel [Larsen Ch. 1]
      b. Plotting with Excel [Larsen Ch. 3]
      c. Excel functions [Larsen Ch. 4]
  B. Matrix operations in Excel and solving sets of linear equations [Larsen Ch. 5]
  C. Linear regression in Excel
      a. The linear regression problem
      b. Excel's trendlines – use and interpretation [Larsen Ch. 6]
  D. Solving nonlinear equations
      a. Approaches to solution [Larsen Ch. 9]
      b. Newton-Raphson method in *Excel*
      c. *Excel*'s Solver, optimization and linear programming
  E. Using macros in Excel [Larsen Ch. 12]
  F. *Matlab* basics
      a. Introduction to user interface and syntax [Moore Ch. 1-2]
      b. Functions available in *Matlab* [Moore Ch. 3]
  G. Problem solving with *Matlab*
      a. Manipulating matrices & solving sets of linear equations [Moore Ch. 4]
      b. Plotting in *Matlab* [Moore Ch. 5]
      c. User-defined functions in *Matlab* [Moore Ch. 6]
      d. Logical functions, control and programming [Moore Ch. 8]
  H. Logical Functions and Programming Structures in *Matlab* [Moore Ch. 12]
  I. Matrix algebra in *Matlab* [Moore Ch. 9]
  J. Numerical methods in *Matlab* [Moore Ch. 12]
  K. Introduction to simulation of chemical processes with *ASPEN*
      a. Thermodynamics properties and vapor/liquid equilibria
      b. Flowsheets and solving process problems with *ASPEN*