CGS Agenda Item: 14-28
Effective: Fall 2014

Eastern Illinois University

NEW/REVISED COURSE PROPOSAL FORMAT

(Approved by CAA on 9/29/11 and CGS on 10/18/11, Effective Fall 2011)

This format is to be used for all courses submitted to the Council on Academic Affairs and/or the Council on Graduate Studies.

Please check one: ___ New course __**X**_ Revised course

PART I: CATALOG DESCRIPTION

1. **Course prefix and number, *such as ART 1000*:** TEC 5523
2. **Title (*may not exceed 30 characters, including spaces*):** Systems Simulation
3. **Long title, if any (*may not exceed 100 characters, including spaces*):** System Simulation
4. **Class hours per week, lab hours per week, and credit [*e.g., (3-0-3)*]:** 3-0-3
5. **Term(s) to be offered:** ___ Fall ___ Spring ___ Summer __**X**_ On demand
6. **Initial term of offering:** __**X** Fall ___ Spring ___ Summer **Year:** __2014____
7. **Course description:** Numerical modeling of industrial processes and systems on digital computers. Course topics include: problem formulation, model building, data acquisition, model translation, verification, validation, and analysis of results.
8. **Registration restrictions:**

   a. **Equivalent Courses**

   - **Identify any equivalent courses** (e.g., cross-listed course, non-honors version of an honors course).
     None
   - Indicate whether coding should be added to Banner to restrict students from registering for the equivalent course(s) of this course. ___ Yes __**X**_ No

   b. **Prerequisite(s)**

   - **Identify the prerequisite(s),** including required test scores, courses, grades in courses, and technical skills. Indicate whether any prerequisite course(s) MAY be taken concurrently with the proposed/revised course. Graduate standing (required).

     Experience with and access to current computer technology

   - Indicate whether coding should be added to Banner to prevent students from registering for this course if they haven't successfully completed the prerequisite course(s). ___ Yes _**X**__ No

     If yes, identify the minimum grade requirement and any equivalent courses for each prerequisite course:

   c. **Who can waive the prerequisite(s)?**
   ___ No one _**X** Chair ___ Instructor ___ Advisor ___ Other (Please specify)

d. Co-requisites (course(s) which MUST be taken concurrently with this one):

e. Repeat status: __X_ Course may not be repeated.

___ Course may be repeated once with credit.

Please also specify the limit (if any) on hours which may be applied to a major or minor.(3 C. U.s)

f. Degree, college, major(s), level, or class to which registration in the course is restricted, if any: Master of Science in Technology

g. Degree, college, major(s), level, or class to be excluded from the course, if any:

9. Special course attributes [cultural diversity, general education (indicate component), honors, remedial, writing centered or writing intensive]

10. Grading methods (check all that apply): _X_ Standard letter ___ CR/NC ___ Audit ___ ABC/NC ("Standard letter"—i.e., ABCDF--is assumed to be the default grading method unless the course description indicates otherwise.)

Please check any special grading provision that applies to this course:

___ The grade for this course will not count in a student's grade point average.

___ The credit for this course will not count in hours towards graduation.

If the student already has credit for or is registered in an equivalent or mutually exclusive course, check any that apply:

___ The grade for this course will be removed from the student's grade point average if he/she already has credit for or is registered in _____ (insert course prefix and number).

___ Credit hours for this course will be removed from a student's hours towards graduation if he/she already has credit for or is registered in _____ (insert course prefix and number).

11. Instructional delivery method: (Check all that apply.)

___ lecture ___ lab ___ lecture/lab combined ___ independent study/research

___ internship ___ performance ___ practicum or clinical ___ study abroad

__X Internet __ hybrid ___ other (Please specify)

PART II: ASSURANCE OF STUDENT LEARNING

1. **List the student learning objectives of this course:**

   a. **If this is a general education course, indicate which objectives are designed to help students achieve one or more of the following goals of general education and university-wide assessment:**
      - **EIU graduates will write and speak effectively.**
      - **EIU graduates will think critically.**
      - **EIU graduates will function as responsible citizens.**

   b. **If this is a graduate-level course, indicate which objectives are designed to help students achieve established goals for learning at the graduate level:**
      - **Depth of content knowledge**
      - **Effective critical thinking and Problem Solving**
      - **Advanced scholarship through research or creative activity**
      - **Effective oral and written communication.**

At the end of the course, Students will be able to:

1) Describe key terminology used in simulation.

2) Critique and evaluate aspects of modeling.

3) Describe what simulation software is and how it is used to model processes and systems.

4) Apply simulation techniques to specific complex situations.

5) Interpret the results generated by simulation software for complex situations.

6) Use and apply the results of a simulation in management decision making.

7) Create a simulation model that reflects a real production setting.

OBJECTIVE	Depth of Content Knowledge	Effective critical Thinking and Problem Solving	Advanced Scholarship research or…..	Effective oral and Written Communication
1	X			X
2	X			X
3	X			X
4		X		
5		X	X	
6	X	X	X	
7	X	X	X	X

2. **Identify the assignments/activities the instructor will use to determine how well students attained the learning objectives:** Quizzes, Homework Assignments, Laboratory Activities, Final Project

3. Explain how the instructor will determine students' grades for the course:

- Each activity will weight a specific number of points; the totality of points at the end of the course will determine their grade based on a predetermined scale.

OBJECTIVE	3 QUIZZES (45% Total)	10 LABORATORY SIMULATIONS 15%	HOMEWORK ASSIGNMENTS 20%	FINAL PROJECT 20%
1	X		X	
2	X		X	
3	X		X	
4	X	X	X	X
5	X	X	X	X
6	X	X	X	X

4. For technology-delivered and other nontraditional-delivered courses/sections, address the following:

a. Describe how the format/technology will be used to support and assess students' achievement of the specified learning objectives:

- Students will be guided by EIU's Learning Management System (LMS) applications as well as traditional student-professor contact methods (e-mail, telephone calls)

- Student will have their own software simulation software at home to do the laboratories and final projects

b. Describe how the integrity of student work will be assured:

- Students will have personalized projects for the "Final Project". The final project requires the building of a simulation model from a real setting (i.e. Local Restaurant, Bank, production line) and a written report with analysis and conclusions.

- Student will have to make online quizzes. The questions in each exam will come from a database of questions which will ensure that no same student has more than 10% of the same questions for a particular quiz (Question options also will be randomized).

- Responses for all laboratory activities, Quizzes, and final projects will be tested using TURNITIN.

c. Describe provisions for and requirements of instructor-student and student-student interaction, including the kinds of technologies that will be used to support the interaction (e.g., e-mail, web-based discussions, computer conferences, etc.): e-mail, LMS, Skype, telephone calls.

5. For courses numbered 4750-4999, specify additional or more stringent requirements for students enrolling for graduate credit. These include:

a. course objectives;
b. projects that require application and analysis of the course content; and
c. separate methods of evaluation for undergraduate and graduate students.

6. **If applicable, indicate whether this course is writing-active, writing-intensive, or writing-centered, and describe how the course satisfies the criteria for the type of writing course identified. (See Appendix *.)**

PART III: OUTLINE OF THE COURSE

Provide a week-by-week outline of the course's content. Specify units of time (e.g., for a 3-0-3 course, 45 fifty-minute class periods over 15 weeks) for each major topic in the outline. Provide clear and sufficient details about content and procedures so that possible questions of overlap with other courses can be addressed. For technology-delivered or other nontraditional-delivered courses/sections, explain how the course content "units" are sufficiently equivalent to the traditional on-campus semester hour units of time described above.

	Subjects	**Activities**	**Total* Hours**
MODULE 1	INTRODUCTION TO SIMULATION: - What is? And Why? - When Simulation is appropriate - Economic Justifications - System Dynamics: Entities, Activities, resources and controls - System complexity and performance metrics	- Video Lectures and training videos Designed specifically for this course - PP presentation (reading) - Textbook reading Assignments	**8**
MODULE 2	SIMULATION BASICS - The system approach - System Variables - System Analysis Techniques - Static and Dynamic simulation - Random variables and random behavior - PROMODEL introduction I	- Video Lectures and training videos Designed specifically for this course - Simulation laboratories (2) -- Textbook reading Assignments - QUIZ ONE	**8**
MODULE 3	DISCRETE EVENT SIMULATION - Discrete vs. Continuous simulation - Setting up and running the simulation - Simulation, animation and output processors - PROMODEL Introduction II	- Video Lectures and training videos Designed specifically for this course - Simulation laboratories (2) -- Textbook reading Assignments	**5**
MODULE 4	DATA COLLECTION AND ANALYSIS - Guidelines for data gathering - Determining data requirements - Identifying data sources - Making Assumptions - Introduction to Basic Statistics I	- Video Lectures and training videos Designed specifically for this course - Simulation laboratories (2) -Textbook reading Assignments - QUIZ 2	**8**

MODULE 5	MODEL BUILDING I - Introduction to basic Statistics II - Modeling Paradigms - Structural elements: Entities, Locations, resources and paths - Operational Elements: Arrivals and routing - Miscellaneous modeling Rare occurrences and cost modeling:	- Video Lectures and training videos Designed specifically for this course - Simulation laboratories (2) -Textbook reading Assignments	**5**
MODULE 6	MODEL BUILDING II - Verification and validation - Reason to Neglect - Establishing Standards for comparison - Simulation Output Analysis: Run length, terminating and non-terminating simulations	- Video Lectures and training videos Designed specifically for this course - Simulation laboratories (2) -Textbook reading Assignments - QUIZ 3	**8**
MODULE 7	SPECIAL TOPICS - Comparing Systems - Statistical methods for comparing - Optimization - Manufacturing systems	- Video Lectures and training videos Designed specifically for this course - Textbook reading Assignments - Final Project	**8**

PART IV: PURPOSE AND NEED

1. **Explain the department's rationale for developing and proposing the course.**
   a. **If this is a general education course, you also must indicate the segment of the general education program into which it will be placed, and describe how the course meets the requirements of that segment.**
   b. **If the course or some sections of the course may be technology delivered, explain why.**

   Purpose and need: To introduce graduate students to modeling and simulation techniques used to solve complex problems typically found in industry and service type companies. System simulation techniques help to determine the efficiency and effectiveness of processes and procedures within any type of organization. This course is currently taught in a hybrid format and the school is proposing to update the course format from Hybrid to Internet delivered.

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2. **Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.**
   A graduate level course is suitable for students who are preparing to become managers in industry. This course will provide graduate students with knowledge and skills to effectively solve problems and manage procedures and processes oriented to increase quality. They also will have the foundation to gain additional skills and practical experiences in the field to become accomplished leaders.

3. **If the course is similar to an existing course or courses, justify its development and offering.**
   This Course was created and has been taught for more than two decades at EIU. This course is currently taught in a hybrid format and the school is proposing to update the course format from Hybrid to Internet delivered.

a. **If the contents substantially duplicate those of an existing course, the new proposal should be discussed with the appropriate chairpersons, deans, or curriculum committees and their responses noted in the proposal.**
b. **Cite course(s) to be deleted if the new course is approved. If no deletions are planned, note the exceptional need to be met or the curricular gap to be filled.**

4. **Impact on Program(s):**

   a. **For undergraduate programs, specify whether this course will be required for a major or minor or used as an approved elective.**
   b. **For graduate programs, specify whether this course will be a core requirement for all candidates in a degree or certificate program or an approved elective.** This will be an elective course for the Master of Science in Technology

   If the proposed course changes a major, minor, or certificate program in or outside of the department, you must submit a separate proposal requesting that change along with the course proposal. Provide a copy of the existing program in the current catalog with the requested changes noted.

PART V: IMPLEMENTATION

1. **Faculty member(s) to whom the course may be assigned:** Dr. Rigoberto Chinchilla and other qualified faculty in the School of Technology as assigned by the chair.

   If this is a graduate course and the department does not currently offer a graduate program, it must document that it employs faculty qualified to teach graduate courses.

2. **Additional costs to students:** None

   Include those for supplemental packets, hardware/software, or any other additional instructional, technical, or technological requirements. (Course fees must be approved by the President's Council.)

3. **Text and supplementary materials to be used (Include publication dates):**

   - "Simulation Using Promodel" by - Harell –Gosh and Bowden (3rd Edition, 2010)
   - PROMODEL video Lessons specially designed for this course in D2L.

PART VI: COMMUNITY COLLEGE TRANSFER

If the proposed course is a 1000- or 2000-level course, state either, "A community college course may be judged equivalent to this course" OR "A community college course will not be judged equivalent to this course." A community college course will not be judged equivalent to a 3000- or 4000-level course but may be accepted as a substitute; however, upper-division credit will not be awarded.

PART VII: APPROVALS

Date approved by the department or school: 2/28/14

Date approved by the college curriculum committee: 4/21/14

Date approved by the Honors Council *(if this is an honors course):*

Date approved by CAA: CGS:

*In **writing-active courses**, frequent, brief writing activities and assignments are required. Such activities -- some of which are to be graded – might include five-minute in-class writing assignments, journal keeping, lab reports, essay examinations, short papers, longer papers, or a variety of other writing-to-learn activities of the instructor's invention. Writing assignments and activities in writing-active courses are designed primarily to assist students in mastering course content, secondarily to strengthen students' writing skills. In **writing-intensive courses**, several writing assignments and writing activities are required. These assignments and activities, which are to be spread over the course of the semester, serve the dual purpose of strengthening writing skills and deepening understanding of course content. At least one writing assignment is to be revised by the student after it has been read and commented on by the instructor. In writing-intensive courses, students' writing should constitute no less than 35% of the final course grade. In **writing-centered courses** (English 1001G, English 1002G, and their honors equivalents), students learn the principles and the process of writing in all of its stages, from inception to completion. The quality of students' writing is the principal determinant of the course grade. The minimum writing requirement is 20 pages (5,000 words).

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