TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Industrial Engineering

RE: Creation of new course -- IE 48100: Introduction to System Simulation

The faculty of the School of Industrial Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Course #: IE 48100 -- Introduction to System Simulation
Term Offered: Sem. 2; Lecture 3, Cr. 3

Prerequisites: IE majors only; IE 33000, minimum grade of D-; and IE 33600, minimum grade of D-
Description: The course presents a general introduction to the simulation concept and methodology. It covers simulation modeling in specialized simulation environments. Practical application of simulation to diverse systems will be discussed. Proper design and analysis of the simulation experiment is emphasized.

Learning Outcomes: Students will...

1. be able to construct discrete-event simulation models using a representative simulation software package.
2. be able to identify different types of simulation models and determine scenarios where each would be appropriate.
3. be able to perform analysis of data for the development of input models.
4. be able to design simulation experiments and conduct statistical analysis.
5. be able to verify and validate a simulation model.

Reason: Discrete Event System Simulation (DESS) is a common tool for Industrial Engineers. Until recently, DESS was incorporated into other classes and offered as graduate course (IE 58000), but the faculty believe there is a need for a stand-alone course at the undergraduate level due to several factors, including faculty availability, growing undergraduate and graduate enrollments, and industry demand. The course has been offered twice under the proposed structure as IE 49000 -- Intro to Simulation (Spring 2015 and Spring 2016).

Abhijit Deshmukh 11/3/16

Abhijit Deshmukh
Professor and Head
School of Industrial Engineering

Office of the Registrar

FORM 40 REV. 5/11

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

| Print Form |

DEPARTMENT Industrial Engineering   EFFECTIVE SESSION Spring 2017

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- [X] 1. New course with supporting documents
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit/type

- [ ] 7. Change in course attributes (department head signature only)
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:

Subject Abbreviation IE

Course Number 48100

Long Title Introduction to System Simulation

Short Title Intro to System Simulation

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

EXISTING:

Subject Abbreviation

Course Number

TERMS OFFERED
Check All That Apply:
- [ ] Fall
- [X] Spring
- [ ] Summer

CAMPUS(ES) INVOLVED
- [ ] Calumet
- [ ] Cont Ed
- [ ] Ft. Wayne
- [ ] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [X] W. Lafayette

CREDIT TYPE

1. Fixed Credit: Cr. Hrs. 3
2. Variable Credit Range:
   Minimum Cr. Hrs
   (Check One)   To [ ]   Or [ ]
   Maximum Cr. Hrs.
3. Equivalent Credit: Yes [ ]   No [ ]

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [ ]
   Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Fees: [ ] Coop [ ] Lab [ ] Rate Request
   Include comment to explain fee

6. Registration Approval Type
   Department [X]   Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

ScheduleType	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	50	3	15	100
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses
_____
_____
_____
_____
_____
_____

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

The course presents a general introduction to simulation concept and methodology. It covers simulation modeling in specialized simulation environments. Practical application of simulation to diverse systems will be discussed. Proper design and analysis of the simulation experiment is emphasized.

IE majors only; IE 33000, minimum grade of D-; and IE 33600, minimum grade of D-

*COURSE LEARNING OUTCOMES:
Students will...
1. be able to construct discrete-event simulation models using a representative simulation software package.
2. be able to identify different types of simulation models and determine scenarios where each would be appropriate.
3. be able to perform analysis of data for the development of input models.
4. be able to design simulation experiments and conduct statistical analysis

Calumet Department Head	Date	Calumet School Dean	Date

Fort Wayne Department Head	Date	Fort Wayne School Dean	Date

Indianapolis Department Head	Date	Indianapolis School Dean	Date

North Central Faculty Senate Chair	Date	Vice Chancellor for Academic Affairs	Date

West Lafayette Department Head   11/3/16   Date

West Lafayette College/School Dean   Date

West Lafayette Registrar   Date

OFFICE OF THE REGISTRAR

INSTRUCTIONS FOR COURSE ADDITIONS, EXPIRATIONS, OR REVISIONS

Undergraduate course additions, expirations, or revisions (course numbers 00100-49999) shall be originated by a department and submitted on Office of the Registrar Form 40 through appropriate channels to the Office of the Registrar at the West Lafayette campus

If the number, title, and description of a course are all changed, it shall be considered a new course.

A proposal to change or expire a course that is a requisite for a course in another department or that is a requirement for a curriculum in any college/school should be discussed with the department and college/school concerned before submitting a change. In particular if the change or expiration affects multiple campuses, all campuses involved should be consulted.

If the request is a course revision, only the items to be revised need to be specified on the Form 40. For example, check Item #2 to add an existing course, indicate the course identifier (subject abbreviation and course number) and the campus where the course is to be added.

New subject abbreviations must be coordinated with the Office of the Registrar.

The numbering system designates the level of the course with 00100-09999 pre-college, remedial, deficiency and non-degree courses; 10000-29999 lower division; 30000-49999 upper division; 50000-59999 graduate courses open to upper-division undergraduates; 60000-69999 graduate courses and 80000-89999 professional courses. The department and/or college/school shall propose a course number, subject to clearance by the Office of the Registrar, in order to avoid duplication.

A number that has been used for a course being expired should not be used again for a new course.

The title of the course should reflect major content of the course. Variable title courses should be specified. Courses such as: special topics, special problems, seminars, selected topics may be offered under a variable title for students.

Courses with variable credit should be so indicated and minimum/maximum credit hours are to be specified. Equivalent credit is granted for non-collegiate courses and should be so designated.

If the grade option for the course is to be other than regular grade, (i.e. pass/not pass option or satisfactory/unsatisfactory option) the appropriate item should be checked.

Courses that are repeatable for credit (indicate maximum number of credits the course may be repeated if applicable), credit by examination, variable title or requiring special fees should be indicated.

If special approval by department/instructor is required for scheduling purposes, it should be indicated.

Courses that are annotated as honors should be so indicated.

If a course has an off campus experience (i.e., Clinical Experience, Co-Op, Internship, Professional Practicum, Student Teaching or Study Abroad), please list accordingly.

Each instructional type that is utilized should be marked appropriately. For the definitions of each type, you can refer to http://www.purdue.edu/registrar/Forms/Form40Info/Banner_ScheduleTypes.pdf. Please indicate how many minutes per meeting, meetings per week and weeks offered. Additionally, of the total amount of credit associated with the course, please specify what percentage is to be recorded with each instructional type.

A department on a specific campus may create a course that is similar to an existing course offered on one or more campuses. However, the level and number for an existing course being offered on more than one campus shall remain the same unless the responsible department heads on all campuses that offer the course mutually agree to a change.

A course covering the same general area of essentially equivalent content will carry the same subject abbreviation, course number, and title for all campuses. However, basically equivalent courses may be offered with variable patterns (i.e. instructional types, such as laboratories) and variable credits with the approval of the responsible department heads.

*Your course learning outcomes should describe what you want your students to be able to know, do, and/or be as a result of completing the course.

ALL CAMPUSES INVOLVED IN ADDITIONS, EXPIRATIONS, OR REVISIONS SHOULD BE INDICATED AND THE APPROPRIATE SIGNATURES OBTAINED PRIOR TO SUBMISSION TO THE OFFICE OF THE REGISTRAR AT WEST LAFAYETTE.

IE 49000 – Intro to Simulation (Spring, 2016) Syllabus

Purdue University School of Industrial Engineering

Instructor

Professor Hong Wan, Office: Wang Hall 4514, Tel: (765)-494-7523, Email: hwan@purdue.edu

This semester we will use blackboard for material and grade posting, and **Piazza,** an online class communication system, as the major communication/Q & A tool. The Piazza website is: https://piazza.com/purdue/spring2015/ie49000/home The website also has mobile apps. All students are required to register to the website and all questions should be posted on the Piazza first. Before you post the question, please conduct a quick search to see if someone else has asked the same/similar one. The teaching staff will check the website and answer the questions promptly (within 24 hours)

Office hours will be posted by the end of the first week of the class. We expect majority of the questions should be handled by Piazza. If you cannot come to the scheduled office hours and the questions you have requires face-to-face communication, you can always schedule an appointment with the teaching staff.

Prerequisite:

Probability and statistics at the level of IE 33000; Knowledge of Markov chains, Poisson processes, and their application to queueing systems at the level of IE 33600.

Course webpage: We will use **Blackboard.** The syllabus, lecture slides, data file, modules, homework, grades and other materials will be posted on Blackboard.

Texts:

Required:

Discrete-Event System Simulation, 5/E, Jerry Banks, John S. Carson, II, Barry L. Nelson and David M. Nicol.

Simulation Modeling with Simio: A Workbook, http://www.simio.com/academics/workbook/simio-workbook-authors.php

Course Objective:

The course presents a general introduction to simulation concept and methodology. It covers simulation modeling in specialized simulation environments (@Risk and Simio). Practical application of simulation to diverse systems will be discussed. Proper design and analysis of the simulation experiment is emphasized.

Grade:

Three individual projects 25% each, homework and labs 25%

Homework:

Homework (include the lab) will be posted on web and discussed in class. The solution will be posted within 0-1 week. The TA and I will go through them quickly. Note that the final exams will be heavily based on the homework problems, class examples, and labs. Selective homework and labs will be required to submit and be graded.

Project:

The details of the requirement and grading of the projects will be discussed in class when the first project is handed out. You will be allowed one late project (within 48 hours of the original due time), otherwise you will not receive any credit for that project.

NOTE: YOUR SENIOR DESIGN PROJECT, IF INVOLVING SUFFICIENT SIMULATION COMPONENTS, CAN REPLACE ONE COURSE PROJECT. YOU NEED TO TALK WITH ME ABOUT THIS OPTION.

Academic Integrity:

You are welcomed to discuss the homework, projects, and lab with your classmates. However, you have to write the homework and conduct the lab and projects independently. Cite the name of the classmates with whom you discussed the homework and labs. The collaboration of the projects will be discussed with the first project handout. Students commit academic dishonesty will receive a failing grade for the course and be reported to the Dean of Student Office.

In case of an emergency...

In the event of a major campus emergency, course requirements, deadlines and grading policies are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Any such changes for this course will be posted on Blackboard.

Grade:

Three individual projects 25% each, homework and labs 25%

Homework:

Homework (include the lab) will be posted on web and discussed in class. The solution will be posted within 0-1 week. The TA and I will go through them quickly. Note that the final exams will be heavily based on the homework problems, class examples, and labs. Selective homework and labs will be required to submit and be graded.

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