

COURSE APPROVAL DOCUMENT
Southeast Missouri State University

Department: Polytechnic Studies

Course No. EG492

Title of Course: Modeling and Simulation

Date: 5/13/15

Please check: New
 Revision

I. Catalog Description (3 Credit Hours):

Development of modeling and simulation concepts by applying computing resources in the analysis and optimization of operational and behavioral characteristics of complex systems/products.

II. Co- or Prerequisite(s):

IM311 or MA223 or MA523 or Consent of the instructor

III. Purposes or Objectives of the Course (optional):

1. To introduce the development of computer simulation and modeling systems using commercially viable software to support and automate business decision making.
2. To enable students to acquire an understanding of the basic concepts and skills associated with computer simulation and modeling, decision theory and modeling of business decisions.

IV. Student Learning Outcomes (Minimum of 3):

1. Students will be able to apply probabilistic models in modeling real world systems.
2. Students will be able to implement a simulation of a real world model using commercially viable software.
3. Students will be able to analyze probabilistic distribution of data generated from the simulation model and correlate it to real world data.

V. Optional departmental/college requirements:

VI. Course Content or Outline (Indicate number of class hours per unit or section):

- | | |
|---|---------|
| 1. Review of Probability and Statistics | 1 Week |
| 2. Queuing Theory | 2 Weeks |
| 3. Random Numbers and random number generation | 1 Week |
| 4. Queuing models | 1 Week |
| 5. Statistical Models | 1 Week |
| 6. Input Modeling | 1 Week |
| 7. Simulation Software | 2 Weeks |
| 8. Verification and Validation of Simulation Models | 1 Week |
| 9. Output Data Analysis | 2 Weeks |
| 10. Optimization of Simulation Models | 3 Weeks |
| 11. Manufacturing System Simulation | 1 Week |

Please Attach copy of class syllabus and schedule as an example

Signature: _____
Chair

Date: _____

Signature: _____
Dean

Date: _____

Course Syllabus

Southeast Missouri State University

Department: Polytechnic Studies

Course No.: EG492

Title of Course: Modeling and Simulation

Revision: New

I. Catalog Description

Development of modeling and simulation concepts by applying computing resources in the analysis and optimization of operational and behavioral characteristics of complex systems/products.

Credit Hours of Course: 3

Contact Hours of Course: 4 (2 hrs lecture, 2 hrs lab)

II. Prerequisites: IM311 or MA223 or MA523 or Consent of the instructor

III. Objectives of the Course:

1. To introduce the development of computer simulation and modeling systems using commercially viable software to support and automate business decision making.
2. To enable students to acquire an understanding of the basic concepts and skills associated with computer simulation and modeling, decision theory and modeling of business decisions.

IV. Students Learning Outcomes:

Students will be able to:

1. Apply probabilistic models in modeling real world systems.
2. Implement a simulation of a real world model using commercially viable software.
3. Analyze probabilistic distribution of data generated from the simulation model and correlate it to real world data.

IV. Expectation of Students:

1. Students are expected read assigned materials.
2. Students are expected to complete all assignments. Assignments will ONLY be accepted on the due dates provided, unless previous arrangements are made or student provides a written medical doctor's excuse.
3. Students are expected to participate in class and group discussions
4. Student work will be completed in accordance with Code of Student Conduct (<http://www6.semo.edu/judaffairs/code.html>)

5. In a professional environment, work areas are kept clean. In keeping with a professional attitude towards fellow students, always clean your area before leaving.
6. All laboratory work must be completed during the regularly scheduled lab time.

V. Course content:

1. Review of Probability and Statistics	4 hrs
2. Queuing Theory	7 hrs
3. Random Numbers and random number generation	4 hrs
4. Queuing models	4 hrs
5. Statistical Models	4 hrs
6. Input Modeling	4 hrs
7. Simulation Software	7 hrs
8. Verification and Validation of Simulation Models	4 hrs
9. Output Data Analysis	8 hrs
10. Optimization of Simulation Models	9 hrs
11. Manufacturing System Simulation	4 hrs
12. Examination	1 hr

VI. Textbook and Other Required Materials or Equipment:

Online, free from Library- *Simulation Modeling and Analysis with Arena, By Tayfur Altioek (Author), Benjamin Melamed (Author)*

Optional- *Simulation Modeling and Analysis, By Averill M Law(Author), W David Kelton(Author)*

Optional Review Book- *Introduction to Probability Models by Sheldon M. Ross*

Supplemental materials will be provided by the instructor.

VII. Student Evaluation:

Grading Policy:

• Homework:	20%	90-100	A
• Labs:	20%	80-89.9999	B
• Class participation:*	5%	70-79.9999	C
• Mid-term Exam:	25%	60-69.9999	D
• Final Exam :	30%	<68	F

The weight of evaluation criteria may vary at the discretion of the instructor and will be indicated at the beginning of each course.

*: Participation to class discussions, taking labs, homework, and exams on the assigned time slots. The instructor reserves the right, acting within the policies and procedures of the university, to make changes in course content or instructional techniques without notice or obligation. No late assignments will be accepted. **“Emergencies”** require that

YOU contact the instructor ASAP. Request for a late submission after the due time will not be granted.

VIII. Lab Rules and Safety Agreement:

Students must read, sign and follow the Laboratory Rules and Safety Agreement provided by the instructor.

IX. Academic Policy Statement:

Academic honesty is one of the most important qualities influencing the character and vitality of Southeast Missouri State University. Academic misconduct or dishonesty is inconsistent with membership in an academic community and cannot be accepted. Violations of academic honesty represent a serious breach of discipline and may be considered grounds for disciplinary action, including dismissal from the University. Academic dishonesty is defined to include those acts which would deceive, cheat, or defraud so as to promote or enhance one's scholastic record. Knowingly or actively assisting any person in the commission of an above-mentioned act is also academic dishonesty. Students are responsible for upholding the principles of academic honesty in accordance with the "University Statement of Student Rights" found in the STUDENT HANDBOOK. The University requires that all assignments submitted to faculty members by students be the work of the individual student submitting the work. An exception would be group projects assigned by the instructor. In this situation, the work must be that of the group. Academic dishonesty includes: Plagiarism and Cheating.

Plagiarism: In speaking or writing, plagiarism is the act of passing someone else's work off as one's own. In addition, plagiarism is defined as using the essential style and manner of expression of a source as if it were one's own. If there is any doubt, the student should consult his/her instructor or any manual of term paper or report writing. Violations of academic honesty include:

- Presenting the exact words of a source without quotation marks;
- Using another student's computer source code or algorithm or copying a laboratory report; or
- Presenting information, judgments, ideas, or facts summarized from a source without giving credit.

Cheating: Cheating includes using or relying on the work of someone else in an inappropriate manner. It includes, but is not limited to, those activities where a student:

- Obtains or attempts to obtain unauthorized knowledge of an examination's contents prior to the time of that examination.
- Copies another student's work or intentionally allows others to copy assignments, examinations, source codes or designs;
- Works in a group when she/he has been told to work individually;
- Uses unauthorized reference material during an examination; or

- Have someone else take an examination or takes the examination for another.

X. Disabilities Statement:

Southeast Missouri State University and Disability Services remain committed to making every possible educational accommodation for students with exceptionalities. Many services and accommodations which aid a student's educational experience are available for students with various types of exceptionalities. It is the student's responsibility to contact Disability Services to become registered as a student with a exceptionality. Accommodations are implemented on a case by case basis. For more information visit the following site: <http://www6.semo.edu/ds/>.

XI. Civility and Harassment

The University strives to offer learning experiences and opportunities designed to help students think effectively, develop the capacity to communicate, discriminate among values, and make relevant judgments. A major determinant of a successful educational experience is a shared sense of respect among and between the students and their instructor. Mutual respect for all as well as a no tolerance policy on harassment of any kind is expected. Every student at Southeast is obligated at all times to assume responsibility for his/her actions, to respect constituted authority, to be truthful, and to respect the rights of others, as well as to respect private and public property.

XII. Other Information:

Questions, comments or requests regarding this course or program should be taken to your instructor. Unanswered questions or unresolved issues involving this class may be taken to the department chair.