MISSOURI WESTERN STATE UNIVERSITY

SCHOOL OF LIBERAL ARTS AND SCIENCES

DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS
Undergraduate Program

COURSE NUMBER: CSC 318
COURSE NAME: SIMULATION AND MODELING

INSTRUCTOR: **KENT PICKETT**
OFFICE: **AG 132C**
OFFICE HOURS: **THUR 5:00-6:20PM – FRI 12:00-1:00PM**

COURSE DESCRIPTION:

An introduction to computerized simulations. Focus is on the architecture and development of time-step and event-sequenced models used extensively by industry and government. Other topics include process generators for random events, the development of computerized games for management training, and current simulation research.

PREREQUISITES

CSC 285 and either MAT 137 or MAT 167.

OBJECTIVES:

Upon completing this course students will use graphic software programs specific to graphic design. They will be able to:

- Create a simulation that has a time stepped architecture.
- Identify the appropriate time step for their simulation architecture to model the process being simulated.
- Identify the random process generators needed to appropriately model the process being simulated.
- Understand the relationship between the time step and the random processes
- Understand the probability and statistical methods necessary to create finite random process generators.
- Develop and program the random processes generators supporting the random activities in a simulation. First Introduction is to generators with finite outcomes.
- Develop a time stepped simulation in an Object Oriented programming language context.
- Design and develop Event Based Simulation Architectures.
- Identify key events in a process so that the process can be adequately modeled/simulated with an event based architecture.
- Identify and create processes for each event that represents the event's impact on the simulation space.

- Understand the structure of classic game types (.i.e.single shooter first person, multiplayer, etc
- Design and develop a two player game using simple AI techniques to simulate the movements by each player.
- Understand minimax theory as applied in a gaming strategy.

REQUIRED TEXTS

There is no required text for this course.

COURSE TOPICS COVERED:

Topic	Subtopics
Serial Model Execution	Process generators for time step enviornments
Probability Review	Generation of process generators from frequency data
Object Oriented Time Step Simulations	Drivers for Simulations in object oriented architectures (Statistical calculation objects,)
Event Based Simulations	Events, Event Queue, Clock
Random Process predicting time till next event	Normal distribution, Poisson Processes
Artificial Intelligence in gaming architectures	Minimax Theory, Markov Chains predicting behavior Finite State machines.