J-Term Course Title: **Introduction to Game Development with Pygame**

Course Description:

This course is an introduction to computer programming through an application of the Python language. The elements of the language will be taught as students develop computer games with the Pygame interface to the Simple Directmedia Layer (SDL) library. Students will develop a simple physics engine (algorithms that model object motion and interaction) as well as apply more advanced open-source engines. High school math may be helpful but not required! There will be instructive exercises as well as longer project work. The course concludes in a competition with teams battling for survival in virtual arenas.

Goals:

The primary goal is to introduce students to computer programming by developing computer games. The intent is to teach the Python language through an engaging application of the Pygame game-development environment (Pygame is an interface to the Simple Directmedia Layer library). There will be some emphasis given to Object-Oriented Programming methods (OOP).

A secondary goal is to introduce students to numerical methods for modeling physical systems. Students will develop their own simple physics engines. This will involve a <u>very</u> basic introduction to numerical solutions of differential equations. A student background in high school physics and calculus is beneficial but definitely not required.

There will be some overview discussion of how the mathematics of advanced physics engines can be used in modeling more complex interactions such as nonspherical rigid-body collisions. Here again, advanced math will not be required! This is intended to spark interest in some students for future investigation and study.

This course will foster teamwork. There will be lab exercises, individual and team-based project work, and a culminating competition between teams in virtual arenas. This will necessitate both individual effort and cooperative parsing and execution of project tasks.

The course is aimed at those with little or no programing experience and is intended to attract students from all departments at Gustavus. The majority of students may come from science programs, but we also hope to see some history and philosophy majors. Programming is a useful skill for any academic focus.

Grades will be based on a set of programming exercises, one exam on the Python language, and a team project.

Finally, I'm expecting to see amazement as students watch their programs literally become life-like on the screen. The oh-wows in this course will come fairly early and painlessly, creating appetite for learning more of the Python language and associated game development methods.