The Minor in Game Design & Development consists of 5 courses (15 credits) selected from the core sequence of the BS in Game Design and Development and is intended for students studying in a technical computing field outside of GD&D who want to combine their knowledge and skill in software development with the media-centric approach to application design that is exemplified in the professional games and simulation industries. The minor defines a series of courses that build upon students existing knowledge in computing, physics, and mathematics to explore the design principles of games and interactive worlds through the creation of prototypes and software projects. It is expected that all pre-requisites (see reverse) be completed before a student is enrolled in the minor.

**IGME-202 Interactive Media Development**  
*(quarter “equivalents”: 4080-330 and 4080-434)*  
In this course, students will learn to create visually rich interactive experiences. It is a course in programming graphics and media, but it is also a course on the relationship between ideas and code. Students will explore topics in math and physics by building programs that simulate and visualize processes in the natural world. Assignments will include major programming projects, such as building a virtual world inhabited by digital creatures that display observable behaviors. *(a grade of C- or higher in IGME-106 or IGME-201) & (MATH-185 or MATH-241)*

**IGME-220 Game Design & Development I**  
*(quarter “equivalent”: 4080-380)*  
This course examines the core process of game design, from ideation and structured brainstorming in an entertainment technology context through the examination of industry standard processes and techniques for documenting and managing the design process. This course specifically examines techniques for assessing and quantifying the validity of a given design, for managing innovation and creativity in a game development-specific context, and for world and character design. Specific emphasis is placed on both the examination and deconstruction of historical successes and failures, along with presentation of ethical and cultural issues related to the design and development of interactive software and the role of individuals in a team-oriented design methodology. Students in this class are expected to actively participate and engage in the culture of design and critique as it relates to the field. *(IGME-202)*

**IGME-320 Game Design & Development II**  
*(quarter “equivalent”: 4080-381)*  
This course continues to examine the core theories of game design as they relate to the professional field. Beginning with a formalized pitch process, this course examines the design and development paradigm from storyboarding and pre-visualization through rapid iteration, refinement, and structured prototyping exercises to further examine the validity of a given design. Specific emphasis is placed on iterative prototyping models, and on methodologies for both informal and formal critique. This course also explores production techniques and lifecycle in the professional industry. *(IGME-202 and IGME-220)*

**IGME-209 Data Structures & Algorithms for Games & Simulations I**  
*(quarter “equivalent”: 4080-387)*  
This course focuses upon the application of data structures, algorithms, and fundamental Newtonian physics to the development of video game applications, entertainment software titles, and simulations. Topics covered include 3D coordinate systems and the implementation of affine transformations, geometric primitives, and efficient data structures and algorithms for real-time collision detection. Furthermore, Newtonian mechanics principles will be examined in the context of developing game and entertainment software where they will be applied to compute the position, velocity and acceleration of a point-mass subject to forces and the conservation of momentum and energy. Programming assignments are a required part of this course. *(a grade of C- or higher in IGME-106 or IGME-201)*

**IGME-309 Data Structures & Algorithms for Games & Simulations II**  
*(quarter “equivalent”: 4080-487)*  
This course continues the investigation into the application of data structures, algorithms, and fundamental Newtonian mechanics required for the development of video game applications, simulations, and entertainment software titles. Topics covered include quaternion representation of orientation and displacement, cubic curves and surfaces, classifiers, recursive generation of geometric structures, texture mapping, and the implementation of algorithms within game physics engines for collision detection and collision resolution of rigid bodies, and the numerical integration of the equations of motion. In addition, advanced data structures such as B+ trees and graphs will be investigated from the context of game application and entertainment software development. Programming assignments are a requirement for this course. *(IGME-209 and (MATH-185 or MATH-241))*
Prerequisites for the GD&D Minor

Students are expected to complete the mathematics requirement of their major as a portion of the pre-requisites to their introductory computing sequence and the science requirement. Students are required to complete three (3) basic prerequisites in order to pursue the Minor in Game Design & Development:

(1) Successful completion of a GCCIS recognized sequence in introductory computing

- CSCI-141 Computer Science I
- CSCI-142 Computer Science II
  OR
- CSCI-242 Computer Science for Transfer Students
  OR
- ISTE-120 Computational Problem Solving in the Information Domain I
- ISTE-121 Computational Problem Solving in the Information Domain II
  OR
- IGME-101 New Media Interactive Design and Algorithmic Problem Solving I
- IGME-102 New Media Interactive Design and Algorithmic Problem Solving II

(2) Successful completion of one introductory course on multi-media concepts

- IGME-110 Introduction to Interactive Media
- ISTE-140 Web & Mobile I
- ISTE-105 Web Foundations

(3) Successful completion of Physics & Math

- MATH-131 Discrete Mathematics or MATH-190 Discrete Mathematics for Computing
  AND
- PHYS-111 College Physics I or PHYS-211 University Physics I
  AND
- MATH-185 Mathematics of Graphical Simulation I or MATH-241 Linear Algebra
  AND
- MATH-181 Project Based Calculus I or MATH-181A Calculus I or MATH-171 Calculus A

Additional requirements/considerations:

- A 3.0 cumulative GPA is expected and required to be enrolled in the minor.
- Students may not enroll in/begin their minor prior to the end of their second year/beginning of their third year of study.
- If the above requirements are met, students will be enrolled in minor courses as space/resources permit. As the courses required for the minor are also required for students in the major, students in the major are given first priority.
- Students enrolled in the minor will not have the ability to enroll themselves in minor courses, rather you will be asked to submit your course requests on a per term basis prior to the enrollment period. You will receive an email from the minor advisor each semester prompting you to do this.
- Students interested in the GAMEDD-MN minor must schedule an appointment with the minor advisor, Jeff Spain. Please stop by the IGM Office at GOL-2131 or call 585-475-2763 to schedule the meeting.

Questions?
If you have any questions about the Minor in Game Design, please contact the minor advisor, Jeff Spain at jhsics@rit.edu

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