



## Approved Innovative Course

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Course: *Advanced Video Game Programming*

PEIMS Code: *N1300995*

Abbreviation: *VIDEOGD3*

Grade Level(s): *10-12*

Number of Credits: *1.0*

### Course description:

Advanced Video Game Programming students will be introduced to mobile application design and programming using Java and Eclipse for Android devices. Time will be spent learning basic Java programming and working with Android Studio to develop real working apps. Using Unity as an introduction to 3D game development, students will have exposure to and an understanding of: object-oriented programming concepts; game development skill with programs such as Unity; 3D modeling with programs such as Blender; image manipulation with programs such as GIMP; concepts related to the design process; and the ability to communicate and collaborate on group-based projects.

### Essential knowledge and skills:

#### Advanced Video Game Programming

- (a) General requirements. This course is recommended for students in Grades 11-12. Recommended prerequisites: Video Game Design and Video Game Programming. Students shall be awarded one credit for successful completion of this course.
- (b) Introduction.
  - (1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Information Technology (IT) Career Cluster focuses on building connections to entry level IT occupations, and technical and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.
  - (3) Advanced Video Game Programming students will be introduced to mobile application design and programming using Java and Eclipse for Android devices. Time will be spent learning basic Java programming and working with Android



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Studio to develop real working apps. Using programs such as Unity as an introduction to 3D game development, students will have exposure to and an understanding of: object-oriented programming concepts; game development skill; 3D modeling with programs such as Blender; image manipulation with programs such as GIMP; concepts related to the design process; and the ability to communicate and collaborate on group-based projects.

- (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.
  - (5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.
- (c) Knowledge and skills.
- (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
    - (A) identify and demonstrate positive work behaviors and personal qualities needed to be employable;
    - (B) demonstrate skills related to seeking and applying for employment such as building a resume and identifying potential job opportunities;
    - (C) create a career portfolio to document information such as work experiences, licenses, certifications, and work samples; and
    - (D) compare and evaluate employment opportunities in the game programming industry.
  - (2) The student applies technical skills related to software development, computer programming, and graphic design. The student is expected to:
    - (A) develop an application development for mobile application technology;
    - (B) create a program using any code;
    - (C) interpret technical and increasingly complex programming instructions in order and in detail;
    - (D) design and program real working education-based mobile application projects;
    - (E) apply digital design resources and color theory to draw and animate sprites, objects, platforms, backgrounds, and loops;
    - (F) examine common mobile application technologies and platforms;



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- (G) create and program original material;
  - (H) integrate separate files into a mobile application project;
  - (I) create and edit audio sound effects and music; and
  - (J) create user instructions, application rules, and document development processes using technical writing as part of a development team.
- (3) The student applies creativity, innovation, and critical-thinking skills to video game programming methodology. The student is expected to:
- (A) identify and discuss the steps of the engineering design cycle;
  - (B) explain how to solve practical problems using the engineering design cycle;
  - (C) apply technical skills to improve mobile application projects;
  - (D) apply technical skills to create, design, and program original applications;
  - (E) evaluate applications and discuss viable solutions for improving performance quality;
  - (F) review and critique applications for performance quality;
  - (G) explain the findings of reviewed applications to peers;
  - (H) evaluate the projects of self and of peers using established criteria; and
  - (I) display an understanding of marketing as a part of the video game design industry.
- (4) The student applies communication and collaboration skills as an individual and as part of a team. The student is expected to:
- (A) assemble and collaborate in mobile application development groups;
  - (B) develop and adhere to project timelines;
  - (C) use the engineering design cycle as a guide for product development;
  - (D) manage a project, lead a development team, assign tasks, evaluate progress, facilitate communication among team members and ensure that project is completed within time deadline; and
  - (E) conduct in-class presentations including demonstration of application.
- (5) The student applies the use of appropriate and available digital tools for research and learning. The student is expected to:



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- (A) research and document information related to current topics such as mobile application development, marketing statistics, and color and design theory; and
  - (B) develop appropriate ways to use wikis and blogs to engage users of mobile applications.
- (6) The student applies engineering, physics, and mathematical concepts to mobile application development. The student is expected to:
- (A) discuss the process used in designing and developing software and how it can be applied to other design and development projects such as bridges, buildings, and machines;
  - (B) explain how basic physics concepts such as gravity, acceleration, velocity, speed, trajectory, Newton's Laws of Motion, force, and elasticity are used in mobile application development;
  - (C) compare the interconnections between mathematical techniques and physics calculations used in mobile application development and the real world;
  - (D) compare the use of mathematics and physics to evaluate behavior within applications in the "virtual world" and in the "real world."
- (7) The student applies post-secondary and career options and resources related to mobile application development and STEM. The student is expected to:
- (A) research how technical and communication skills used in mobile application design translates to other technology industries and businesses;
  - (B) research postsecondary requirements such as, diplomas, certificates, and degrees needed to gain employment in game development and other technology-based industries; and
  - (C) research career trends such as wage data, experience required, job demand, job descriptions, and potential employers related to employment opportunities in mobile application development and technology based industries.

*Description of specific student needs this course is designed to meet:*

These courses give students the opportunity to investigate further into gaming development and provide them with real-world processes and systems used in the professional world of video games and simulations.



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### Major resources and materials:

Software Requirements: Gaming and programming software such as: Java Developer Kit; Eclipse Classic Version; Android SDK; ADT Plugin for Eclipse; SQLite Database Browser; Unity

Hardware Requirements: Computer - 1.6GHz or faster processor; 1 GB (32 Bit) or 2 GB (64 Bit) RAM (Add 512 MB if running in a virtual machine); 3GB of available hard drive space; 5400 RPM Hard Disk Drive; DirectX 9.0c capable video card running at 1024 x 768 or higher resolution display; Recommended graphics card that supports DirectX 10, with a supporting WDDM 1.1 driver; DVD-ROM Drive; Projector/Printer/Copier

Resources: Gaming and programming resources such as: Stempfuse.com; Android Developers; <http://developer.android.com/index.html>

### Recommended course activities:

Students will explore the physics, artificial intelligence, 3D modeling, alternative interfaces, and story & character design required in game and simulation design. Students will interact with videos, text, pictures, and animations to simulate a real-world environment.

Students will create the following game types: side scrolling; platform; maze; simulations; and racing within the program environment.

### Suggested methods for evaluating student outcomes:

- Worksheets and quizzes embedded within the curriculum,
- Rubric for assessing final product and participation,
- Electronic Portfolio of process for creating video game,
- Final product of a personalized video game.

### Teacher qualifications:

- (1) Any business or office education certificate.
- (2) Business and Finance: Grades 6-12.
- (3) Business Education: Grades 6-12.
- (4) Secondary Industrial Arts (Grades 6-12).
- (5) Secondary Industrial Technology (Grades 6-12).
- (6) Technology Education: Grades 6-12.



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(7) Technology Applications: Early Childhood-Grade 12.

(8) Technology Applications: Grades 8-12.

(9) Trade and Industrial Education: Grades 6-12. This assignment requires appropriate work approval.

(10) Trade and Industrial Education: Grades 8-12. This assignment requires appropriate work approval.

(11) Vocational Trades and Industry. This assignment requires appropriate work approval.

(12) Computer Science: Grades 8-12.

(13) Secondary Computer Information Systems (Grades 6-12)

*Additional information:*