Date: April 24, 2012

To: Elizabeth D. Capaldi  
   Executive Vice President and University Provost

From: Mitzi Montoya  
   Vice Provost, Dean, and Professor  
   College of Technology and Innovation

Re: Establishment of Concentration in Gaming within the B.S. in Graphic Information Technology

Please accept this memo of support for the establishment of the proposed concentration in Gaming within the B.S. in Graphic Information Technology. The attached proposal has been developed by the faculty of Engineering, has been reviewed and approved through the established process within the college and has full support of the faculty and the College of Technology and Innovation dean’s office.

The department of Engineering has sufficient resources to support the new concentration in Gaming without impacting the offering of core courses within the unit.

If you have any questions or concerns, please do not hesitate to contact me.

CC: Scott Danielson, Associate Dean of Academic Programs, College of Technology and Innovation  
   Ann McKenna, Chair and Associate Professor, College of Technology and Innovation
Proposal to establish a Gaming concentration within the B.S. in Graphic Information Technology, College of Technology and Innovation at the Polytechnic campus.

1. Please see the attached supporting letter from the chair of the academic unit verifying that the proposed concentration has been reviewed and approved by program faculty and that the unit has the resources to support the concentration as presented in the proposal, without impacting core course resources.

2. Please see the attached supporting letter from the Dean of the College of Technology and Innovation verifying that the concentration has been reviewed and received approval by the college.

3. All courses needed for the concentration will be taught by the faculty within the College of Technology and Innovation.

4. A statement concerning demand for the program (student/community/market) follows.

The ability to engage students while teaching them is a hallmark of gaming’s attraction to both educators and students. Gaming’s ability to engage the user has a basis in biology, as argued by Guttenpan, "computer games stimulate the brain’s reward system to produce dopamine, a chemical which helps orient our attention and enhances the making of connections between neurons, which is the physical basis for learning" (2012). Gaming technology is a valuable resource to industry, the military, research communities and manufacturing, all market sectors looking at gaming as a way to communicate training and concepts to employees and customers.

The video gaming industry has evolved into much more than entertainment, and the demand for higher education focused on meeting the gaming industry’s needs has grown with it. The Bureau of Labor Statistics projects that employment for computer software engineers, some of whom develop video games, will grow by nearly a third in the next decade. More than 200 institutions, from MIT to DigiPen Institute of Technology, are offering courses or degrees in video games, according to the Entertainment Software Association, a trade group for the video game industry, with the United States as the number one video game market in the world (NPR, 2012), and career opportunities in contemporary gaming technologies are promising. According to a 2010 Game Developer Research statement, “there are about 45,000 total employees in the U.S. video game industry, with an average salary of close to $80,000. Salaries can reach into the six figures, and programmers are among the highest-paid.” Salaries are competitive with game programmers earning average annual salaries of $85,000, game designers and art and animation artists earning an average of $67,000 (2008 Game Developer Salary Survey).

At ASU Polytechnic campus, the BS in Graphic Information Technology program has the faculty and physical resources to educate students to meet these needs. Graduates of the gaming concentration will be able to analyze, design and develop the various game mechanics, levels and art assets needed to create video games. In addition, students will learn and apply the latest game development skills, tools and technologies to make them industry ready. The College of Technology and Innovation program began to offer Gaming courses in fall 2011, and we anticipate that all classes in the concentration will be well subscribed. We currently are teaching GIT 294 Introduction to Video Game Art, CST 194 Introduction to Game Development, CST 294 Intermediate Game Development, GIT 312 3D Computer Graphics Modeling, and GIT 411, 3D Animation for Video Games, which form the basis for the proposed concentration.

Information Sources:


Proposal to establish a Gaming concentration within the B.S. in Graphic Information Technology, College of Technology and Innovation at the Polytechnic campus.

5. The knowledge, competencies, and skills (learning outcomes) students will have when they complete this proposed concentration are stated below.

Graduates of this program will be able to critically analyze, design and develop the various game mechanics, levels and art assets needed to create video games. Graduates of this program will be able to apply the latest game development skills, tools and technologies that would make them industry ready.

Program Competencies
Students will
- design and develop video games' visual characteristics
- identify, repeat and resolve critical errors in the design of games' graphic representations
- demonstrate an understanding of the principles of the game production pipeline that includes level design, game art and programming to facilitate production of game user interfaces
- map various game software development relationships using the Unified Markup Language (UML)
- apply the principles of control structures, conditionals and loops as it relates to gaming visual features
- showcase proficiency in applying the principles of object-oriented programming in the design of the game software graphic interface

Outcomes for Game Development
Outcome 1: Graduates of this program will be able to understand the complete game production pipeline

Measure 1.1 (Direct)
CST 111 Introduction to Game Development and CST 211 Intermediate Game Development
Performance Criterion 1.1
80% of the students will earn a rating of 80% or better in the game idea and design document submissions

Measure 1.2 (Indirect)
CST 194 Introduction to Game Development and CST 211 Intermediate Game Development
Performance Criterion 1.2
80% of the students will earn a rating of 80% or better in the final game submission

Outcome 2: Graduates of this program will be able to critically analyze, design and develop the various game mechanics, levels and art assets needed to create video games

Measure 1.1 (Direct)
CST 111 Introduction to Game Development and CST 211 Intermediate Game Development
Performance Criterion 1.1
80% of the students will earn a rating of 80% or better in standalone game design and production assignments and homework

Outcomes for Video Game Art
Outcome 1: Students will be able to create Classic pixel art assets for video game like background, props, platforms and characters.
Measure: GIT 211 Project 1 (P1: Classic Pixel Art character Creation)
Performance: 80% of students will earn a rating of 80% or better on GIT 211 P1

Outcome 2: Students will be able to create 2d art assets for 2D level for video games using industry standards software and technics.
Measure: GIT 211 Project 2 (P2: Xbox 360 level creation: Group work)
Performance: 80% of students will earn a rating of 80% or better on GIT 211 P2
Proposal to establish a Gaming concentration within the B.S. in Graphic Information Technology, College of Technology and Innovation at the Polytechnic campus.

Outcome 3: Students will understand simple color theory adapted for video game art assets
Measure: GIT 211 Project 1 (P1: Classic Pixel Art character Creation)
Performance: 80% of students will earn a rating of 80% or better on GIT 211 P1

Outcome 4: Students will understand and will be able to create 2D perspectives for 2D video games
Measure: GIT 211 Project 2 (P2: Xbox 360 level creation: Group work)
Performance: 80% of students will earn a rating of 80% or better on GIT 211 P2

Outcome 5: Students will model 3D mesh like trees, foliage, buildings and characters for 3D video games using box modeling technique following video game formats.
Measure: GIT 312 Project 1 (P1: Tree and foliage model for 3D video game project)
Performance: 80% of students will earn a rating of 80% or better on GIT 211 P1

Outcome 6: Students will learn UV unwrapping of 3D mesh for video games
Measure: GIT 211 Project 4 (P4: 3D character unwrapping in 0 to 1)
Performance: 80% of students will earn a rating of 80% or better on GIT 211 P4

Outcome 7: Students will learn the different channels used in video games for texturing like: Color, alpha, normal, bump and specular maps.
Measure: GIT 312 Final Project: Model and texture a full character for 3D video game.
Performance: 80% of students will earn a rating of 80% or better on GIT 211 Final Project

Outcome 8: Students will learn how to rig and skin and create a puppetting system for a character for 3D video games
Measure: GIT 411 Project 2 (P2: Create rig and then skin character create in GIT 312)
Performance: 80% of students will earn a rating of 80% or better on GIT 411 P2.

Outcome 9: Students will create a set of 5 animations loops that blend together properly: Idle, walk, jump, shoot, getting hit.
Measure: GIT 411 Final Project (FP: animate the character created in GIT 312 for video game)
Performance: 80% of students will earn a rating of 80% or better on GIT 411 FP.

The requirements for the concentration follow. All required courses and the minimum number of hours required for the concentration are specified.
The proposed concentration has 15 hours and is comprised of:

CST 111 Introduction to Game Development (3)
This course introduces fundamental video game development concepts and techniques prevalent in the video game industry. The students would have an opportunity to understand these techniques and learn how they are applied during the production of a video game. The areas covered include game design, game production, asset production, game programming, game art and animation. The students will gain hands-on experience by writing 2D game prototypes while learning different game mechanics and features. This course is intended to serve as an introduction into the game production cycle. The course breaks down the complex process of game creation into a simple step by step program. No programming knowledge is required for the course. However, some degree of computer proficiency is desirable.

GIT 211: Introduction to Video Game Art (3)
2D and 23D art assets for video games. Areas covered: classic pixel art, seamless texturing and tiling, sprite animation, 3D virtual studio, box modeling.
Proposal to establish a Gaming concentration within the B.S. in Graphic Information Technology, College of Technology and Innovation at the Polytechnic campus.

CST 211 Intermediate Game Development (3)
Introduction to multiplayer games, artificial intelligence, and tile-based worlds using a scripted programming environment. Game scripting will be used to automate, repeat, change, anticipate, and govern the action of games from a simple word game to a complicated multiplayer game like pool. Gaming terminology and basic genres, enhancements such as fine-tuning graphics, creating optimal soundtracks, and using high score lists, as well as creating and modifying online chat files are introduced. This course adds on to the skills learnt in CST 111 and introduces video game scripting to the student. Scripting skills are essential in every aspect of game development and are used by designers, programmers and artists in the game industry. Students learn the core scripting skills required to implement game features and apply those to enhance the prototype created in CST111.

GIT 312 Computer Graphics Modeling and Representation (3)
3-D modeling applications: modeling for video games, mapping techniques, texturing, box modeling, geometric representation, strategies and assemblies.

GIT 411 Computer Animation (3)
3-D computer animation methods: rigging for video games, principles of animation, loops, skinning, blending, advanced modeling and motion.

Are any new courses required? If so, provide course syllabi and Proposal for Curriculum Action forms.

- CST 111 Introduction to Game Development (3)
- CST 211 Intermediate Game Development (3)
- GIT 211: Introduction to Video Game Art (3)

All courses have been submitted through ChangeMaker.

7. A list of the primary faculty participants follow.

- Arnaud Ehgner, Lecturer, Department of Engineering, College of Technology and Innovation
- Ashish Amresh, Assistant Professor, Department of Engineering, College of Technology and Innovation

8. The minimum residency requirement of the concentration is 6 credits.

9. A Major Map for the new concentration is attached.

10. A completed Appendix document. This information is to be used during the implementation phase to ensure this program appears correctly and completely on Degree Search.
Proposal to establish a Gaming concentration within the B.S. in Graphic Information Technology, College of Technology and Innovation at the Polytechnic campus.

APPENDIX

OPERATIONAL INFORMATION FOR UNDERGRADUATE CONCENTRATIONS
(This information is used to populate the Degree Search/catalog website.
Please consider the student audience in creating your text.)

1. Proposed Concentration Name: Gaming

2. Program Description (150 words maximum)

Graduates of the BS in graphic information technology with a concentration in gaming will be able to critically analyze, design and develop the various game appearance and art assets needed to create video games. In addition they will learn and apply the latest game visual development skills, tools and technologies that would make them industry ready.

3. Contact and Support Information

Building Name, code and room number: (Search ASU map) PRLTA, 330
Program office telephone number: (i.e. 480/965-2100) 480-727-1189
Program Email Address: egr@asu.edu
Program Website Address: https://technology.asu.edu/git

4. Delivery/Campus Information Delivery: on campus-ground / I courses

Note: Once students elect a campus or Online option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.

5. Campus/Locations: indicate all locations where this program will be offered.

☐ Downtown Phoenix ☒ Polytechnic ☐ Tempe ☐ West ☐ Other:

6. Additional Program Description Information

A. Additional program fee required for this program? No
B. Does this program have a second language requirement? No

7. Career Opportunities & Concentrations

Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration. (150 words maximum)

Graduates from the video game art focus may work on PC, mobile apps and console video games as modeler, texture artist for characters and environments as well as character animator and rigger.

Graduates with a concentration in gaming will find employment in a variety of capacities ranging from computer and software design to graphic design and graphics arts. Jobs are often distinguished by high levels of theoretical expertise applied to solving complex problems and creation and application of new
Proposal to establish a Gaming concentration within the B.S. in Graphic Information Technology, College of Technology and Innovation at the Polytechnic campus.

Technologies. Students specializing in software engineering are skilled at creating video game engines, designing artificial intelligence systems, developing multiplayer networking systems and creating human centered interfaces. Students specializing in video game production are skilled at asset management, 3D rendering and animation including technically challenging tasks like skinning, rigging, and texturing for game asset production. Salaries can range from $50,000 to $125,000 a year depending on experience and market demand.

8. Additional Admission Requirements

If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements. None

9. Keywords

List all keywords used to search for this program. Keywords should be specific to the proposed program.

3D animation
3D character Artist
3D Modeling
Animation
Environmental artist
Game design
Level Design
Texturing
Video game design

10. Advising Committee Code

List the existing advising committee code to be associated with this degree. UGTIEN

Note: If a new advising committee needs to be created, please complete the following form:
Proposal to create an undergraduate advising committee
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<th>Hrs</th>
<th>Upper Division Course/Grade</th>
<th>Minimum Grade if Required</th>
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Graduation Requirements Summary:

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<td>(120 minimum)</td>
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<td>(56 minimum)</td>
<td>(2.000 Min.)</td>
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General University Requirements: Legend

- General Studies Core Requirements:
  - Literacy and Critical Inquiry (L)
  - Mathematical Studies (MA)
  - Computer/Statistics/Quantitative applications (CS)
  - Humanities, Fine Arts, and Design (HU)
  - Social and Behavioral Sciences (SB)
  - Natural Science-Quantitative (SQ)
  - Natural Science-General (SG)

- General Studies Awareness Requirements:
  - Cultural Diversity in the US (C)
  - Global Awareness (G)
  - Historical Awareness (H)

- First-Year Composition

TECHNICAL FOCUS AREAS: Students select a technical focus area from the options below.

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<td>GIT 417 Advanced Internet Programming 3</td>
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<td>GIT 418 Multimedia Authoring, Scripting and Production 3</td>
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<td>GIT 435 Web Management and E-Commerce 3</td>
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<td>GIT 334 Image Capture and Manipulation 3</td>
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<td>GIT 426 Gravure Technology       3</td>
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<td>GIT 437 Color Reproduction Systems 3</td>
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<th>Modeling and Animation</th>
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<td>GIT 212 Computer-Aided Design and Drafting 3</td>
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<td>GIT 312 3-D Computer Graphics Modeling and Representation 3</td>
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<td>GIT 313 Technical Illustration and Photorealistic Rendering 3</td>
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<td>GIT 411 Computer Animation       3</td>
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<td>TWC 301 General Principles of Multimedia Writing 3</td>
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<td>TWC 347 Written Communication for Managers 3</td>
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<td>TWC 445 Computer Documentation 3</td>
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<td>TWC 446 Technical and Scientific Reports 3</td>
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Hi Scott. See below. Please send paperwork if needed. If I recall, there is a form that has to be submitted with the proposal. Thanks, Pam

Pamela J. Harris, Ph.D.
Assistant Director, Division of Teacher Preparation
Mary Lou Fulton Teachers College
Arizona State University
Mail Code 2680; Office 330-V Santa Catalina Hall
Phone: 480-727-5188

Hi Pam,

Please let the folks at CTI that our college has no issues with their gaming proposal. Thanks, Liz

Elizabeth R. Hinde, Ph.D
Associate Professor and Director
Division of Teacher Preparation
Arizona State University
Mary Lou Fulton Teachers College
4701 West Thunderbird Rd FAB S-222
PO Box 37100
Phoenix, AZ 85069
602-543-6315
Subject: Re: Gaming Proposal Impact Statement
Date: Wednesday, July 25, 2018 12:00:00 AM MST
From: Marlene.Tromp@asu.edu
To: Roger.Berger@asu.edu

Dear Scott (if I may):

Roger Berger, Director of Math and Natural Sciences, and I have conferred and discussed the proposed Gaming concentration with faculty, and while we have also been developing a gaming concentration, as well, we see differences between this one and the one we have been crafting, and thus are in support of this proposal.

Sincerely,
Marlene

Dr. Marlene Tromp, Director
School of Humanities, Arts and Cultural Studies (SHArCS)
Professor of English and Women and Gender Studies
New College of Interdisciplinary Arts and Sciences
Arizona State University
Office: 602-543-4444 Fax: 602 543-3006
marlene.tromp@asu.edu
newcollege.asu.edu <http://newcollege.asu.edu>

Learn the Truth on Titanic's 100th Anniversary:

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On 9/18/12 11:29 AM, "Robert Taylor" <RDTaylor@asu.edu> wrote:

FYI - Scott's proposal is attached.

Dr. Rob Taylor
Associate Dean
New College, ASU
rdtaylor@asu.edu
602-543-3025
From: Scott Danielson  
Sent: Tuesday, September 11, 2012 5:35 PM  
To: Robert Taylor  
Subject: Gaming Proposal Impact Statement

Robert,

I am asking for your comment on the attached proposal for a gaming concentration within the B.S. in Graphic Information Technology, offered in the College of Technology and Innovation at the Polytechnic campus.

Please contact me if there are any questions. Thank you.

Scott Danielson, Ph.D., P.E.  
Associate Dean for Academic Programs  
College of Technology and Innovation  
Arizona State University  
480-727-1185
On 9/21/12 11:24 AM, "James Collofello" <JAMES.COLLOFELLO@asu.edu> wrote:

Yann-Hang,

I spoke with Scott today about the their Graphic Information Technology program and their desire to add a "gaming" concentration.  
http://asuongline.asu.edu/degree-programs/undergraduate/bachelor-science-graphic-information-technology-concentration-web

My sense is that this will have a different focus than our gaming certificate with much more emphasis on developing the game graphics although this is definitely not clear from the proposal wording.  It would be helpful to Scott if you can send the course descriptions for the CPI classes in the certificate to both of us.

We might also begin thinking about a possible parallel track through the gaming certificate that might incorporate both ASU and Poly students in the future. Clearly their computing and software engineering students will also have a desire for gaming. Ideally there would be some common courses/modules that might be offered online.

jim

James S. Collofello  
Associate Dean of Academic and Student Affairs  
Professor of Computer Science and Engineering  
School of Computing Informatics and Decision Systems Engineering  
Ira A. Fulton Schools of Engineering  
Arizona State University

-----Original Message-----
From: Scott Danielson  
Sent: Friday, September 14, 2012 10:57 AM  
To: James Collofello  
Cc: Yann-Hang Lee; Ronald Askin; Chell Roberts  
Subject: RE: Gaming Proposal Impact Statement

Jim,

Since I don't find a Fulton-based gaming program listed in the ASU Degree Search tool, I assume you are concerned about the Fulton-based gaming certificate program. But since we both have classes and faculty that work in these areas hopefully we can continue to agree share the
programmatic space. I believe that Chell and Ron had some conversations and meetings about gaming last year so perhaps either Chell or Ron can add to the conversation.

Our proposal is for a concentration within the existing and long-standing CTI-based BS in Graphic Information Technology program. The students involved in, and attracted to, our GIT program over the years have not been the same students attracted to the Fulton certificate program or an engineering program. So it seems like the certificate and the concentration are targeting two different groups of students.

I am hopeful we can continue the conversation and reach agreement.

Scott

From: Scott Danielson
Sent: Tuesday, September 25, 2012 9:33 AM
To: James Collofello
Subject: FW: Impact Statement needed CST11 and CST 211 on Polytechnic campus

Jim,
I thought you might find Yann-Hang's response to two of the courses in the GIT gaming certificate of interest. Seems like a different response than the one he gave you with regard to the concentration proposal. Fortunately, it looks like it would help you register no objection to our proposal, in my view! Also, attached is a revision of the proposal's high level outcomes as we discussed. Let me know what you think. Sorry if I am mixing topics in an email, but I still have not heard on the MS in Engineering. I did confirm with Mitzi that she believed Dean's agreed on its going forward. If you think I should ask her to contact Paul, let me know.
Thanks.

Scott

From: Ann McKenna
Sent: Monday, September 24, 2012 10:47 AM
To: Scott Danielson
Cc: Timothy Lindquist
Subject: FW: Impact Statement needed CST11 and CST 211 on Polytechnic campus

Scott,
I've received the impact statements for CST 11 and CST 211, see email from Yann-Hang below. There is no objection on either. Can you help guide me on what I need to do now?
Thanks,
Ann

----- Forwarded Message
From: Yann-Hang Lee <yhlee@asu.edu>
<applewebdata://3ADA0A41-2F18-4447-981F-5EE70D735E7E/yhlee@asu.edu>
Ann,
CST 111 is similar to our CPI 111. We believe the course can attract Poly's student to study game development and will not object to the proposal.
There are some major differences between CST 211 and our CPI 211. Hence, we will not object to the proposal of CSE 211. We do feel the course can attract students to study game programming.
Please let me know if you have any questions.

Yann-Hang
(480) 727-7507

From: Ann McKenna
Sent: Friday, September 21, 2012 2:27 PM
To: Yann-Hang Lee; Ann McKenna
Cc: Timothy Lindquist; Julie Barnes
Subject: Re: Impact Statement needed CST11 and CST 211 on Polytechnic campus

Yes, I should have included those in my email. They are attached here.
Thanks,
Ann

On 9/21/12 2:11 PM, “Yann-Hang Lee” <yhlee@asu.edu> wrote:
Do you have the syllabi of the courses? Can I access them via ChangeMaker?

Yann-Hang
(480) 727-7507

From: Ann McKenna
Sent: Thursday, September 20, 2012 12:06 PM
To: Yann-Hang Lee
Cc: Timothy Lindquist; Julie Barnes
Subject: Impact Statement needed CST11 and CST 211 on Polytechnic campus
Importance: High
Hi Yann-Hang,

We have two courses pending approval in changemaker that require an impact statement. The two courses are:

CST 111 Introduction to Game Development
CST 211 Intermediate Game Development

These courses are part of a focus area in our computing studies program. They have been offered as omnibus courses and we are now requesting permanent course numbers. Since there are similar courses in the Informatics program (CPI 111 and CPI 211) we require an impact statement. One significant difference is that these course will be taken by students on the Polytechnic campus to satisfy a separate and distinct degree program. There is a need to offer the courses at Poly because of the seat limitations and different emphasis of existing courses.

As you know tomorrow is the deadline for submitting courses through changemaker so it would be wonderful if you could return the attached forms by tomorrow. I apologize for the short time frame.

Best,
Ann

----- End of Forwarded Message

-----Original Message-----
From: James Collofello
Sent: Friday, September 14, 2012 9:15AM
To: Scott Danielson
Cc: Yann-Hang Lee; Ronald Askin
Subject: FW: Gaming Proposal Impact Statement

Hi Scott,

We do have concerns regarding a significant overlap of your proposal with our existing gaming program. Please see note from Yann-Hang below.

Jim

James S. Collofello
Associate Dean of Academic and Student Affairs Professor of Computer Science and Engineering Chair of Computing Informatics and Decision Systems Engineering Ira A. Fulton Schools of Engineering Arizona State University

-----Original Message-----
From: Yann-Hang Lee
Sent: Friday, September 14, 2012 9:06AM
To: James Collofello
Cc: Ronald Askin; Yoshihiro Kobayashi; Brian Nelson
Subject: RE: Gaming Proposal Impact Statement
Jim,

Here is our comment:

The proposed concentration does look like a nearly exact copy of our existing program, and so would directly conflict in terms of students.

The course contents are overlapped between CST111 and CPI111. (2D Game Development) CST211 and CPI311. (Game Programming) GIT211 and CPI321. (Game Art) GIT312 and CPI421 (3D Modeling and Texturing) GIT411 and CPI422 (3D Animation)

Yann-Hang
(480) 727-7507

-----Original Message-----
From: James Collofello
Sent: Tuesday, September 11, 2012 6:40 PM
To: Yann-Hang Lee
Cc: Ronald Askin
Subject: FW: Gaming Proposal Impact Statement

Gentlemen,

Please see email below and advise.

Jim

James S. Collofello
Associate Dean of Academic and Student Affairs Professor of Computer Science and Engineering

From: Scott Danielson
Sent: Tuesday, September 11, 2012 5:37 PM
To: James Collofello
Subject: Gaming Proposal Impact Statement

Jim,

I am asking for your comment on the attached proposal for a gaming concentration within the B.S. in Graphic Information Technology, offered in the College of Technology and Innovation at the Polytechnic campus. I don't think there is any overlap with your computer science program but if you have any concerns, please let me know.

Thank you.

Scott Danielson, Ph.D., P.E.
Associate Dean for Academic Programs
College of Technology and Innovation