New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Proposal_Classification_Chart.pdf) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

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| **Title of Proposal** | **Intro to Photo-realistic Rendering and Animation** |
| **Date** | **September 20 2018** |
| **Major or Minor** | **Major** |
| **Proposer’s Name** | **Dr. Esteban Beita Solano** |
| **Department** | **Architecture Technology** |
| **Date of Departmental Meeting in which proposal was approved** | **2/26/2018** |
| **Department Chair Name** |  **Sanjive Vaydia** |
| **Department Chair Signature and Date** |  **sanjive.jpg** |
| **Academic Dean Name** | **Kevin Hom** |
| **Academic Dean Signature and Date** | **kevin.jpg** |
| **Brief Description of Proposal**(Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | **The changes applied to the syllabus will update the class to meet the latest techniques and standards used in the architecture rendering industry. Rendering techniques have changed dramatically in the last few years with improvement in software, requiring and update in the course name and material. Also, in order to align with our new Bachelor of architecture program and make it easier to students to take a range of courses, the course now 3 class hours and 3 credits.** |
| **Brief Rationale for Proposal**(Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body).  | These changes are important to align with our new Bachelor of architecture program, as well as keeping the class in pace with the needs of the architecture visualization industry. |
| **Proposal History**(Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | **This a modification for an existing course.****4/4/19 – updated copy submitted****3/31/19 - updated copy submitted****3/14/19 - updated copy submitted****3/8/19 - updated copy submitted****3/6/19 - updated copy submitted** |

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

**Changes to be offered in the Architectural Technology department**

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| **CUNYFirst Course ID** | ARCH 3591 |  |  |
| **FROM:** |  | **TO:** |  |
| **Department(s)** | Architectural Technology | **Department(s)** | Architectural Technology |
| **Course** | ~~ARCH 3591 Computer Assisted Architecture Animation~~ | **Course** | ARCH 3592 Intro to Photo-realistic Rendering and Animation |
| **Prerequisite** | (ARCH 1291 or ARCH 1212) with a grade of C or higher | **Prerequisite**  | (ARCH 1291 or ARCH 1212) with a grade of C or higher |
| **Corequisite** | none | **Corequisite** | none |
| **Pre- or corequisite** | none | **Pre- or corequisite** | none |
| **Hours** | ~~2 cl hrs, 2 Lab hrs, 3 cr~~  | **Hours** | 3 cl, 3 cr |
| **Credits** | 3 | **Credits** | 3 |
| **Description** | ~~This elective course is an introduction to the use of the computer to assist in the production of 2D architectural animations, composite renderings, 3D animated models, time-lapse studies and other architectural design tools. This course involves the use of the computer, methods of architectural rendering and animation, and the drawing and storage of computer animations with different devices.~~ | **Description** | Space visualization using a combination of photo-realistic renderings, animations, and interactive 360-degree panoramic renderings. Creation of computer-generated scenes that can be viewed and explored as virtual and augmented reality.  |
| **Requirement Designation** |  | **Requirement Designation** |  |
| **Liberal Arts** | [ ] Yes [ ] No  | **Liberal Arts** | [ ] Yes [ ] No  |
| **Course Attribute (e.g. Writing Intensive, Honors, etc** |  | **Course Attribute (e.g. Writing Intensive, Honors, etc** |  |
| **Course Applicability** | [ x] Major[ ] Gen Ed Required[ ] English Composition[ ] Mathematics[ ] Science[ ] Gen Ed - Flexible[ ] World Cultures[ ] US Experience in its Diversity[ ] Creative Expression[ ] Individual and Society[ ] Scientific World[ ] Gen Ed - College Option[ ] Speech[ ] Interdisciplinary [ ] Advanced Liberal Arts | **Course Applicability** | [x ] Major[ ] Gen Ed Required[ ] English Composition[ ] Mathematics[ ] Science[ ] Gen Ed - Flexible[ ] World Cultures[ ] US Experience in its Diversity[ ] Creative Expression[ ] Individual and Society[ ] Scientific World[ ] Gen Ed - College Option[ ] Speech[ ] Interdisciplinary [ ] Advanced Liberal Arts |
| **Effective Term** | Spring 2019 |  |  |

**Rationale:** Provides for consistency between all of our electives and makes the students schedule easier.

**ARCH 3592 Intro to Photo-realistic Rendering and Animation**

Credits: 3 Class Hours, 3 Credits

**Course Description:**

This visual-oriented course will teach students to visualize space through a combination of photo-realistic renderings, animations, and interactively using 360-degree panoramic renderings and computer-generated scenes that can be viewed and explored as virtual and augmented reality.

**Prerequisites:**

(ARCH 1291 or ARCH 1212) with a grade of C or higher

**Reference Text:**

**(The texts are not required for the class)**

* *Audodesk 3ds Max 2018 Complete Reference Guide, Kelly L. Murdock*
* *Autodesk 3ds Max 2018 Essenstials, Dariush Derakhshani*
* *3D Photorealistic Rendering: Interior & Exteriors with Vray and 3ds Max*
* *V-Ray My Way: A Practical Designer’s Guide to Creating Realistic Imagery Using V- Ray & 3ds Max*

**Attendance Policy:**

Excessive absences will be reflected to the student’s final grade at the discretion of the instructor due to lack of class participation and mastery of course material. For the purposes of record, two late arrivals are considered as one absence.

**Grading**:

Your final grade will be an average of the six projects assigned during the semester. There is no final exam, but all projects must be turned in on time. Students who are absent are responsible for finding out what the assignments are from classmates and turning it in on time. Late submissions will be graded down 1/3 grade for each day late.

20% Homework Assignments

20% Projects, introductory

20% Projects, development

30% Projects, final

10% Class Participation

**Learning Objectives:**

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| **General Education Learning Outcomes / Assessment Methods** |
| **Learning Outcomes** | **Assessment Methods** |
| Upon successful completion of this course the student shall be able to: | To evaluate the students’ achievement of the learning objectives, the professor will do the following: |
| 1. **KNOWLEDGE; Inquiry / Analysis,**

Derive meaning from experience, as well as gather information from observation. Use creativity to solve problems. | 1. **Evaluate** the student’s understanding of precedent studies as a tool to generate creativity, problem solving, and information gathering.
 |
| 1. **KNOWLEDGE; Depth of Knowledge,**

Engage in an in-depth, focused, and sustained program of study. Pursue discipline, inquiry-based learning in the major. | 1. **Review** the student’s project development for understanding of rendering techniques needed to created photo-realistic renderings.
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| 1. **SKILLS; Communication,**

Communicate in deviser settings and groups, using oral (both speaking and listening and visual means. | 1. **Assess** students’ use of communication skills during oral presentations, written descriptions, and digital presentations.
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| **Course Specific Learning Outcomes / Assessment Methods** |
| **Learning Outcomes** | **Assessment Methods** |
| Upon successful completion of this course the student shall be able to: | To evaluate the students’ achievement of the learning objectives, the professor will do the following: |
| 1. Develop previously learned computer assisted graphics and rendering skills, and build upon these for learning VR/AR techniques. (Skill)
 | 1. **Review** students’ projects for integration of their expression of architectural space. Measure student’s integration of rendering and VR/AR industry practices into their presentations.
 |
| 1. Students must demonstrate the ability to import files of 3D architectural buildings from other programs for modification and enhancement, and other types of software interoperability important for computer graphics. (Skill)
 | 1. **Assess** the students’ ability to synthesize and apply what is learned from lab work, through the grading of assignments and projects.
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| 1. Employ and create lights and daylight/sunlight simulations. (Skill)
 | 1. **Appraise** the students’ ability to synthesize apply what is learned through the grading of assignments, projects and students’ expression of architectural space.
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| 1. Create and apply realistic materials as well as color/material alternates. (Skill)
 | 1. **Assess** the students’ ability to synthesize and apply what is learned through the grading of assignments, projects and students’ expression of architectural color and material.
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| 1. Create realistic renderings and panoramas that compliment 2D plans and elevations in presenting their design. (Skill)
 | 1. **Assess** the students’ ability to synthesize and apply what is learned through the grading of assignments, projects and student expression of architectural space.
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| 1. Create walkthrough/flythrough animations, animate architectural objects and output these animations to video. (Skill)
 | 1. **Assess** the students’ ability to synthesize and apply what is learned through the grading of assignments, projects, students’ expression of architectural space and time.
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**Lab Regulations**:

* You are responsible for backing up your work – do not leave any of your files on lab computers! They may be erased.
* Do not work on your Flash drives. Copy your files to the desktop before working and copy from desktop to your backup disk and erase desktop file before leaving the lab.
* You will be instructed as to the locations for submitting your projects, including via email.

**PROJECTS**

**01\_INTERIOR\_DAY – photo-realistic rendering**

**…………………………………………………………………………………………………………………….**

Students will create a series of interior daytime renderings of a selected space. Students have an option of developing a new 3D model for the project or use a model from previously completed project.

**02\_INTERIOR\_NIGHT – photo-realistic rendering**

**…………………………………………………………………………………………………………………….**

Students will create a series of interior night renderings of a selected space. Students have an option of developing a new 3D model for the project or use a model from a previously completed project.

**03\_EXTERIOR\_DAY – photo-realistic rendering**

**…………………………………………………………………………………………………………………….**

Students will create a series of interior daytime renderings of a selected space. Students have an option of developing a new 3D model for the project or use a model from a previously completed project.

**04\_EXTERIOR\_NIGHT – photo-realistic rendering**

**…………………………………………………………………………………………………………………….**

Students will create a series of interior daytime renderings of a selected space. Students have an option of developing a new 3D model for the project or use a model from a previously completed project.

**05\_ANIMATION – photo-realistic rendering**

**…………………………………………………………………………………………………………………….**

Students will produce a 30 second animation of one of the previously completed projects.

**06\_VR – Virtual Reality Development (VR)**

**…………………………………………………………………………………………………………………….**

Students will learn the steps to create VR panoramic images or AR images of their final project

Students will learn the steps to create VR panoramic images of their final project

**SEMESTER SCHEDULE OUTLINE:**

Each class will start with a lecture introducing new topics, 3d modeling techniques and rendering techniques for about an hour. After the lecture, students will work on practicing all the material covered in the lecture for the rest of the class, while I walk around and address any problems or questions individually. Finally, towards the end of the course, we will take the last 30 minutes to discuss everything learned during the class, expectations for the following week and the next topic.

**01/25 –** Introduction to class and 3ds Max 2016 / Basic Modeling

**02/01 –** Introduction to V-Ray / V-Ray Materials / Modifying and Applying Materials

**01/08 –** Advance techniques in creating photo-realistic materials

**01/15 –** Introduction to working with interior and exterior lighting / V-Ray Plane

**01/22 –** Start project 01 / Interior photo-realistic rendering / Photoshop post work

**03/01 –** Continue working on interior rendering / V-Ray rendering settings

**03/08 –** Present project 01 / Start work on interior night rendering

**03/15 –** continue working on night renderings

**03/22 –** Present project 02 / Start work on project 03 / Exterior day rendering scene

**03/29 –** Continue working on exterior day rendering

**04/05 –** Present project 03 / Start work on project 04 / Exterior night rendering

**04/12 –** Continue working on exterior night rendering

**04/19 – SPRING BREAK**

**04/26 –** Present project 04 / 3ds Max Animation Techniques / Start preparing scene

**05/03 –** Continue working on animation

**05/10 –** Continue working on animation

**05/17 – Present all material for the semester**

**Lesson 1 – Understanding 3DS Max Interface**

**3DMAX Interface:**

**Main Toolbar, Command Panel, Icons and Flyout Icons**

**Viewports and Viewport Navigation**

* -Zoom (Middle Button Scroll)
* -Pan (Press Middle Mouse Button and Drag)
* -Orbit (Press ALT+ Middle Mouse Button)
* -Maximize Viewport/Layout Toggle – Lower Right Navigation Controls Group
* -Zoom Extents or Zoom Selected Object (White Box Option)

**Viewport Options, Part 1**

* -Access by Right-clicking Viewport Name
* -Select View – Front, Top, User, etc.
* -Shading/Wireframe/Edged Faces Viewport Display
* -Viewport Layouts
* -Displaying/Hiding Grid

**Create Panel**

* -3D Objects/Spline Ojects/Lights/Cameras/Helper Objects
* -Parametric Objects Concept – objects can be modified not by editing their geometry, but by typing in their Parameters, Say Width, Length and Height for Box.
* -Using numerical entry to modify object parameters.

**Selecting & Grouping Objects**

* -Select by clicking
* -Select by Window (Left to Right) or Crossing Window (Right to Left), Must be enabled in Customize/Preferences/General/Auto Window Crossing by Direction
* -Select in Select by Name Icon and Dialog – Note for the future: Observe object filters for selection
* -Add to Selection by holding CTRL and clicking or Window Selection.
* -Deselect by holding ALT and clicking or Window Selection.
* -MUST NAME OBJECTS AS YOU CREATE THEM. Give descriptive names and give naming plenty of thought as MAX Sorts them by Name.
* -Create Named Selection Sets by selecting objects, then typing name in the Selection Set Window in the Main Toolbar Center. Recall saved selection Sets.
* -Grouping Objects, Attaching and detaching objects to and from group, Opening and Closing Group. Main difference between Selection Sets and Groups is that all object in a closed group act as a single object, Selection Set is only for convenient selection of objects.

**Transforms & Object Snaps**

* -Move, Scale and Rotate.
* -Uneven Scale and Squash Scale.
* -Using Transform Gizmos.
* -Using Axis Constraints Toolbar (Enable Use of Axis Constraints in Right Click Snap Icon on Main Tool Bar, Then Go to Options Tab)
* -Enabling Snaps (Click Snap Toggle on Main Toolbar)
* -Setting and Using Snaps, Rotate Angle Snaps, Spinner Snap.
* -3D, 2.5D and 2D Snaps.

**Displaying & Hiding Objects**

* Use Display Icon in the Command Panel to Either Hide (not displayed or editable) or Freeze (displayed as dark gray, but not selectable or editable)
* -Hide Selected/Unselected/By Name, Unhide by Name/Unhide All options.
* -Note for the future: Hiding/Unhiding and Freezing/Unfreezing can be assigned to keyboard shortcuts to save time.
* -Hiding whole categories of Objects – i.e. Lights, Cameras, etc.

**Modifiers, Part One**

* Modifiers Command Panel Interface.
* -Concept of Modifiers vs. Transforms: Modifiers are applied on top of base Object in the Modifier Stack and do not affect the Root Object, Transforms change the Root Object Irrevocably.

**Typical MAX Project Workflow**

* -Start by drawing and 3D Modeling in AutoCAD (You can also do some 3D modeling in MAX. What you choose to do in which program will depend on what it is you are modeling: some things are easier done in AutoCAD some in MAX)
* -Import Lines and 3D Models into MAX
* -Model or modify as required
* -Assign Materials
* -Create Cameras
* -Create Lights
* -Create Still Renderings, output to Graphic Files
* -Animate Cameras, Objects, Lights, Materials
* -Create Animated Video and output to Video Files
* -Assemble presentations with drawings, text, renderings and animations in PowerPoint.

**Homework Assignment:**

-Create every type of MAX Object by exploring Create Panel and all sub-types of 3D Geometry (Standard & Extended Primitives, Doors and Windows, Architectural, etc), Shapes (Lines, Circles,NGon, Text, etc.) Lights, Cameras. Do not place any Helpers, Systems or Space Warps.

-Create a scene with all these objects, create 3 camera views and at least 3 lights and be prepared to show that you know how to use parameters to modify the objects (i.e. Door Height or window depth, etc.).