

## **Syllabus**

Course No.:	PPT 292
Course Name:	Virtual Water Treatment Training
Semester:	Spring 2021
Credits:	1
Course Meetings:	45 hours of work is required
Instructor:	Andrew D. Sullivan
Phone:	247-3047
Email:	<a href="mailto:Andrew.Sullivan3@msubillings.edu">Andrew.Sullivan3@msubillings.edu</a>
Faculty Website:	<a href="http://www.msubillings.edu/cotfaculty/sullivan/">http://www.msubillings.edu/cotfaculty/sullivan/</a>
Office:	A061 – Tech Building
Office Hours:	See attached schedule

### **Required Texts and Material:**

An electronic timesheet and logbook will be utilized to track hours and progress.

### **Course Description:**

Provides an opportunity for experimental study and research in an area of process plant technology. Students will support the Montana EPSCoR CREWS project “Learn to Operate a Water Treatment Facility in Virtual Reality”. They will have the opportunity to expand their knowledge of water treatment facilities and explore a new direction of study as they are introduced to 3D content development, coding, and educational technologies.

### **Course Goals, Objectives, and Requirements:**

#### **Project Goals:**

1. Develop a virtual industrial water treatment plant training facility with the help of students that will provide authentic skills on how to operate water treating facilities not possible with other available training tools. Facilities will operate like authentic plants and allow students to practice modes of operation including startup, shutdown, normal operation, and responding to abnormal events.
2. Publish the virtual training facility in a public format that is freely available to expand the accessibility of wastewater training to students who live remotely or are not able to attend college for other reasons. This objective will enable other institutions and even industry to adapt the training facility into their curriculum to further improve wastewater treating competency.
3. Incorporate the virtual training facility into the Process Plant Technology curriculum at MSUB City College and leverage it to help transition the program to a HyFlex mode of delivery to accommodate both remote learners and learners who prefer traditional face-to-face education.

**Learning Goals:**

- Learn how to create 3D models in the Second Life virtual reality platform.
- Learn how to develop code in the Linden Scripting Language to enable user interactions with 3D content.
- Enhance student ability to self-start as they learn and apply new skills in a mentorship scenario as they transition away from conventional college learning styles to more independent learning like most workplaces. Help to build students into life-long learners.

**Time Sheet:**

- Researchers must enter a timesheet log for each work session at the following link:  
[https://docs.google.com/forms/d/1ac\\_f5KcPHqZ7F6CBOmrmOou9fMbU1fUCys8Z0GyyZhs/viewform?usp=send\\_form](https://docs.google.com/forms/d/1ac_f5KcPHqZ7F6CBOmrmOou9fMbU1fUCys8Z0GyyZhs/viewform?usp=send_form)

**Research Documentation:**

- Documentation will be the 3D content you build.

**Lab Time / Advisor Meetings / Logistics:**

- Project work time is flexible, and you may work when you like. You may also work remotely.
- Researchers will meet with the faculty advisor at least weekly to demonstrate what they have achieved, align on direction, and ask questions. The expectation is that researchers effectively prepare for the meeting to make it a valuable use of time.

**Academic Issues and Grading:**

1. Grades will be either pass or fail.
2. A passing grade can only be earned if the full hours of work required has been delivered.
3. Falsifying the timesheet by recording hours not worked will result in a non-passing grade.
4. The faculty advisor will monitor the timesheet and verify that work hours are consistent with deliverables presented during weekly meetings. Non-productive hours do not count to the total hour requirement.
5. Feedback on course performance will be provided during weekly meetings arranged by the student.

**Course Outline:**

The following plan is a guideline that will be adjusted to meet the needs of the class.

Estimated Hours	Activity
1	Project kickoff meeting. Your faculty advisor will provide you with a new avatar to be used for the project. It will be the project's avatar so don't change the password.
1	Install Firestorm on your personal computer from <a href="https://www.firestormviewer.org/">https://www.firestormviewer.org/</a> .
4	How to navigate in Second Life. Complete all activities at Caledon Oxbridge Gateway at <a href="http://maps.secondlife.com/secondlife/Caledon%20Oxbridge/92/196/27">http://maps.secondlife.com/secondlife/Caledon%20Oxbridge/92/196/27</a> including: <ul style="list-style-type: none"> <li>• College of Avatar Motion</li> <li>• College of Camera Motion</li> <li>• College of Communication</li> <li>• College of Finding</li> <li>• College of Avatar Customization</li> <li>• College of Money &amp; Commerce</li> </ul> Demonstrate your new skills to your faculty advisor.
4	Exercise: Customize your avatar to look like an operator. Your faculty advisor will provide Linden Dollars to achieve the task. Make sure you have all the standard Personal Protective Equipment (PPE) that an operator wears. Demonstrate your product to your faculty advisor.
4	Learn to create and build 3D models in Second Life. Log into Secondlife.com. Click help. Complete the "Creating" tutorials. There are 11 of them, but don't worry about the animation one yet. Work examples along with the tutorials where you can and demonstrate your product to your faculty advisor.
4	Exercise: Create a 4" gate valve as authentically as you can including shape, size, and color. Demonstrate your product to your faculty advisor.
2	Introduction to Linden Scripting Language. Coordinate with your faculty advisor for an overview on scripting.
4	Work your way through the Linden Scripting Language (LSL) tutorials at <a href="http://wiki.secondlife.com/wiki/LSL_Tutorial">http://wiki.secondlife.com/wiki/LSL_Tutorial</a> .
8	Exercise: Create a ball valve with handle that turns appropriately when it is clicked. Demonstrate your product to your faculty advisor.
4	Exercise: Update your ball valve script so that it announces if it is open or closed on a chat channel.
4	Exercise: Update your ball valve script so that it will move to a position if an appropriate command is received on a chat channel.
10	Exercise: Build a traveling screen in a wastewater channel. Include a start and stop button, water sprays, and debris removal. There are several YouTube videos that demonstrate the operation of traveling screens.
10	Exercise: Build a primary wastewater clarifier. Include a start and stop button, skimmer, sludge collector, influent well, scum collector, effluent weir and trough, and animations of oil and grease removal. Operation of Wastewater Treatment Plants: A Field Study Training Program, 2nd Edition, Volume 1, 1980 is <a href="#">freely available from EPA.gov</a> and provides a nice reference.

### **Safety:**

Some hazards can't be eliminated in a process plant or academic setting and must be managed to prevent serious injury. A discussion of hazards and how to mitigate them will be part of lectures, labs, and other activities and will include safety equipment checks, personal protective equipment requirements, and training. Student responsibilities include:

- Be fully engaged so you understand the hazards and are prepared to manage them.
- Be in a suitable physical and mental state to perform safely and determine if you are prepared to engage in an activity.
- Wear all required PPE. Safety glasses are always required in the lab. No open-toe shoes are allowed in the lab.
- Perform safely and professionally. Horseplay gets people hurt.
- Follow all rules and procedures.

Failure to follow safety rules may result in a written warning, a failing grade for the assignment or course, or loss of laboratory / activity privileges to protect other students. MSUB is not responsible for injury resulting from failure to follow rules or procedures.

### **Access, Assistance, and Advocacy:**

A summary of services to help you succeed in a positive, supportive, and enjoyable learning environment is listed below.

- [Academic Support Center](#). The City College branch is open M-F 9-5. Resources include tutoring and a writing center. Drop-in and by appointment. 247-3022.
- [Disability Support Services \(DSS\)](#). MSU Billings is committed to providing equal access. Please meet with me to discuss ways to ensure your full participation if you anticipate barriers. DSS will help us (247-3029, Tech Building A011).
- [TRIO/Student Support Services](#). Support for low income, first generation, and disabled students enrolled in a 4-year program (or 2+2 at City College). 657-2162
- [Native American Achievement Center](#). Advocacy and assistance for American Indian students. 657-2144
- [Student Health Services](#). Student Health Services provides medical care, mental health counseling, wellness services and education, and violence advocacy and prevention services. Located above the Academic Support Center at City College. Students can use Health Services even if they waive the student health insurance plan. 657-2153
- [Veterans Services](#). For assistance activating your VA Educational Benefits, getting access to VA assistance for tutors, or even joining the veteran student organization, contact the VA Representative in the Military and Veterans Success Center at 657-2982. For assistance on the posting of your VA Educational benefits please contact the Business Services office at 657-1707.
- [Veterans Upward Bound](#). Assistance for veterans from admission to graduation. 657-2075

**Class and Lab Policies:**

- We will follow all rules and guidance set by the University.
- Academic or personal misconduct will be managed per the procedures outlined in the [MSU Billings Student Policies & Procedures Handbook](#).
- Phones, computers, and tablets are not allowed in class.
- Food and drinks are not allowed in classrooms or labs.
- Disruptive behaviors will result in final grade reductions up to 10% per occurrence.

**Andy Sullivan's Spring 2021 Calendar**

	Monday	Tuesday	Wednesday	Thursday	Friday
<b>8:00-9:00</b>	PPT 211	PPT 212	PPT 211		
<b>9:10-10:10</b>	Office Hours		Office Hours		PPT 176
<b>10:20-11:20</b>	PPT 225	Office Hours	PPT 225		
<b>11:30-12:30</b>	Lunch	Lunch	Lunch	Lunch	Lunch
<b>12:40-1:40</b>	PPT 120	PPT 161	PPT 120	PPT 161	PPT 176
<b>1:50-2:50</b>	PPT 175	PPT 175	PPT 175	PPT 175	
<b>3:00-4:00</b>	PPT 212			Office Hours	
<b>4:10-5:10</b>					