Course Review / Wrap-Up

Learning Objectives

1. **Recall** the skills you learned this semester
2. **Illustrate** how you will use these skills in the future
3. **Assess** the utility of learning objectives
4. **Recommend** how to improve the use of public domain models in this class

1. Course Reflection

What are the one or more key (most important or life changing) things you learned this semester? What can you now do as a result of this course? (a list of course learning objectives starts on page 4).

2. Illustrate and Apply

Which skills will you use immediately or in the future? In graduate school and/or at your current or next job?

In 10 years? In 30 years?

3. Assess the learning objectives

Each class this semester started by listing the learning objectives for the day (what you should be able to do by the end of the class or PBL). Was this helpful? Why or why not?

How could the use of learning objectives be more effective?

4. Model recommendations

This year I again used public-domain water resources models as tools to help solve water resources problems. What was helpful or positive about using the models? What difficulties did you encounter? What improvements can you suggest for future classes?

Model	Positive Aspects	Difficulties Encountered	Suggested Improvements
VLE			
SWMM			
WEAP			

What Have You Accomplished this Semester? (yes, you have!)

a. Demonstrate critical analysis skills and capabilities expected of practicing water resources engineers, including to **identify**, **evaluate**, and **recommend** alternatives
   - **Describe** the steps for rational planning
   - **Calculate** financial performance indicators
   - **Apply** performance indicators to make decisions
   - **Apply** the rational planning steps to complete PBL-1, 2, 3, and 4

b. Coherently and concisely **present** engineering designs in oral, written, and web formats
   - PBL-1, 2, 3, and 4

c. **Recognize**, **describe**, and **adapt** engineering designs to physical, economic, environmental, social, political, and other constraints that limit water resources engineering and management
   - **Describe** limitations of performance indicators
   - PBL-1, 2, 3, and 4.

d. **Complete** water resources designs in a timely fashion providing and using peer feedback
   - PBL-1, 2, 3, and 4.

e. **Work** both individually and in a small team to solve water resources problems
   - PBL-1, 2, 3, and 4.

f. **Apply** public-domain water resources models to **solve** current water problems

   VLE Model
   - **Enter** input data for a landscape
   - **Compare** costs, required inputs and impacts for two landscapes

   SWMM
   - **Enter** rainfall, catchment, and other input data in the SWMM model
   - **Generate** the outflow hydrograph for a design storm over a catchment
   - **Represent** LID methods, detention basins, and outlets in SWMM

   WEAP
   - **Import** time-series data into WEAP
   - **Enter** demand site, reservoir, reach gain/loss, and return flow data and **set up** scenarios to simulation in WEAP
   - **Test** the impact of proposed reservoirs and reservoir operations on water deliveries

g. **Identify** cost effective water conservation actions for an individual residential household
   - **List** water uses
   - **Define** water demand
   - **Describe** reasons engineers forecast water demands
   - **Disaggregate** demand into its components
   - **Forecast** water demand using three engineering methods
   - **Describe** modeled landscape lifecycle stages, components, inputs, and impacts
   - **Specify** factors that influence the effectiveness and adoption of conservation approaches

h. **Propose**, **design**, and **contrast** conventional and low-impact storm water management techniques for a new subdivision
   - **Infer** the appropriate rainfall intensity and hytograph from a depth-duration-frequency chart

- **Calculate** the probability to observe at least one depth-duration event over a specified time period
- **Apply** the SCS method to estimate a composite curve number, time of rise, and peak flow for a rainfall-runoff event
- **Construct** a unit hydrograph for a small catchment
- **Convolve** unit hydrographs to develop a storm runoff hydrograph
- **Give examples** of LID methods
- **Compare** advantages and disadvantages of different permeable pavements
- **Size** a detention basin and **specify** a basin outlet
- **Route** runoff through the basin and outlet
- **Iterate** and **design** to meet outflow requirements

i. **Compare** the costs and yields of additional Bear River reservoir storage
- **Define** water availability.
- **Characterize** Guide Curve operation and relate reservoir release to available water.
- **Calculate** reservoir releases given a time series of inflows and delivery targets.
- **Construct** a release - reliability plot.
- **Determine** firm yield
- **Describe** reasons to model priority-based water allocations
- **Draw** a system schematic (that includes water sources, demand sites, and return flows)
- **Calculate** allocations given available water and delivery priorities
- **List** factors that effect reservoir firm yield

j. **Recommend** aquifer storage and recovery sites within Cache County
- **Define** types of conjunctive use
- **Classify** advantages and constraints
- **Illustrate** conjunctive use application in Cache Valley
- **Describe** types of groundwater recharge
- **Compare** requirements and disadvantages of different artificial recharge methods
- **Assemble** the data requirements, design, and management considerations for undertaking in Cache Valley
- **Define** appropriation and water rights
- **List** major elements of a right
- **Locate** a water right in the State database
- **Compare** rights for appropriation, groundwater, recharge, and recovery
- **Fill out** a water right change application