

# **Water and society: Sustainable use of *the* essential resource for life.**

10:00 AM-12:00 PM, 29 May, 5, 12, 19, and 26 June 2018

## Course summary:

Water is the most important natural resource associated with ecological and human wellbeing, economic productivity, and global security. Significant stresses are placed on the Earth's water resources by climate change, energy demand, population growth, conflicts, and other social changes. Achieving sustainable use of water may be the most critical natural resource issue now facing many societies, especially in arid and semiarid regions. This course will address the science and technology underlying sustainable water use. We will discuss water use within energy generation, domestic supplies, agriculture, and other industries highlighting water use and modification along entire production and supply chains. Emphasis will be placed on water use within agriculture which accounts for more than 70% of the world's freshwater use. We will discuss multi-disciplinary case studies that highlight specific challenges, successes, and failures in water use and management.

## Course outline:

### **1) Introduction to the course and the topic: Why study water?**

- a) Motivation behind this course
- b) Instructor and research assistant
- c) Course goals, mechanics, and biases

### **2) Water and life: Why is water so special?**

- a) Water content: animals, plants and microorganisms
- b) Physical characteristics of water affects biological processes

### **3) The Earth's water cycle: Where is the water?**

- a) Basics of the water cycle
- b) Where is the Earth's water?
- c) What is drought?
- d) How is the water cycle changing?

### **4) People and water: How can we adaptively manage water better?**

- a) Population, wealth and water
- b) Management and use of water resources
  - i) Water supply and quality
  - ii) Water-energy-food nexus
  - iii) Water in agriculture

### **5) Moving forward: What can we do?**

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Recommended reading\* and other resources on water:

**2) Water and life**

[Water: The chemical foundation of life.](#)

More of the basic chemistry that explains why water is so central to living organisms.

**3) The Earth's water cycle**

[Summary of the Water Cycle](#). U.S. Geological Survey. 2016.

Lots of background on the water cycle.

**4) People and water**

Arend, C., D. Beckworth, and L. Stitzer. 2017. *Arizona's Water Future. Colorado River shortage, innovative solutions, and living well with less*. Western Resource Advocates. \*

A thorough analysis of Arizona's water situation, now and into the future. ([PDF](#))

[Arizona Water Awareness](#).

Ideas, tips, resources and events about water in Arizona. Arizona Department of Water Resources.

Fulton, Julina and Fraser Shilling. 2015. **California's Water Footprint is Too Big for its Pipes**. *Sustainable Water: Challenges and Solutions from California*. A. Lassiter (ed.), University of California Press.

An excellent description of the water footprint concept and its significance in California. Discussion is applicable to Arizona. ([PDF](#))

Waterfall, Patricia, and Christina Bickelmann. 2006. *Harvesting Rainwater for Landscape Use*. University of Arizona-Cooperative Extension.

A great "nuts-and-bolts" handbook for water harvesting in southern Arizona. ([PDF](#))

[Sustainable Residential Design: Improving water management](#).

A site from the American Society of Landscape Architects with information on a variety of water saving tools in landscapes.

**Paying for the Fourth Revolution**. Chapter 9. Sedlak, David. 2015.

*Water 4.0: The Past, Present, and Future of the World's Most Vital Resource*. Yale Univ. Press.

A summary of the financial challenges that water utilities face in the United States. ([PDF](#))

**5) Moving forward**

**A Different Tomorrow**. Chapter 12. Sedlak, David. 2015. *Water 4.0: The Past, Present, and Future of the World's Most Vital Resource*. Yale Univ. Press.

Looking toward the future considering conservation and decentralizing water supplies and systems. One size (or type of conservation or system) will not fit all users. \* ([PDF](#))

Gleick, Peter, H. 2015. Afterward. **A Soft Path for California Water.** *Sustainable Water: Challenges and Solutions from California*. A. Lassiter (ed.), University of California Press.

An imagined (admittedly positive) view into the future of water resources management in California from the perspective of 2050. A thorough explanation of the “soft path” for their management. ([PDF](#))

Zetland, David. 2011. *The End of Abundance. Economic Solutions to Water Scarcity.*

For those interested in the economic foundations of sustainable water use.

Reisner, Marc. 1993. (updated) *Cadillac Desert: The American West and its Disappearing Water*. Penguin Books.

The primary, now classic, source of information on the history of large-scale 20<sup>th</sup> Century water delivery systems in the western United States. Sometimes it really helps to look back as we try to move forward.

Beard, Daniel P. 2015. *Deadbeat Dams: Why We Should Abolish the U.S. Bureau of Reclamation and Tear Down Glen Canyon Dam.* Johnson Books.

Lots of the backroom politics and scandals surrounding this federal agency written by one of its former heads.

Schneller-McDonald, Karen. 2015. *Connecting the Drops: A Citizen's Guide to Protecting Water Resources*. Cornell University Press.

Basics of water resource protection for citizens and activists.

#### [Twitter feed of Peter Gleick](#)

Co-founder of the Pacific Institute. Regularly posts information on water, climate, and sustainability.

#### Instructor:

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