**SURFACE WATER MANAGEMENT**

**SYLLABUS**

**Basic Information**

Clean beaches, healthy creeks, rivers, bays, and the ocean are important to the ecosystem as well as everyone living in the watershed. Residents in any watershed need clean and reliable water supply as well. Urbanization and human activities pose significant challenges in both water resources and water quality to maintain a healthy surface water system.

This course provides an overview of the hydrological cycle and introduces the challenges and toolboxes to restore a healthy surface water system and to ensure safe drinking water supply. The course features four field trips throughout Orange County. Each field trip sheds light on a type of surface water management solution that environmental engineers and scientists are currently implementing in the area. Students will learn about these issues and solutions in the real world as they explore the scenic nature of local waterways.

**Instructor's name**: Jian Peng, Nan Jia, Stella Shao

**Office location**: Online and in person field trips

**Office hours**: Tuesdays 7pm-8pm (Zoom meeting)

**Contact info:** Q&A in Piazza

**Course Objectives**

Readings and assignments will be oriented towards evaluating a student's understanding of the subject matter. Students are expected to synthesize materials from lectures and read sections of handouts listed in the Syllabus. Students will do their independent research to complete the project collectively as a team. Through the presentations, field trips, reading materials, and the final project, students will gain a better understanding of current surface water management issues, challenges, and potential solutions.

**Required Student Resources**

Slides, lecture notes, assignments and solutions, and other material will be posted on Piazza

**Course Schedule/Outline/Calendar of Events**

Provide students with a tentative projected outline of significant events that occur throughout the semester, including assignments, projects, examinations, field trips, guest speakers, etc.

| **Week** | **Topic**  *(Field trip detail starts from page 3)* | **Reading /Assignment** |
| --- | --- | --- |
| 1  Tuesday 6/21/2022, 7pm-8pm | **Introduction of surface water management**   * Hydrological cycle and watershed concept * Water quantity and quality challenges * Surface water management toolboxes * Regulatory background   **Overview of the field trip topics** | Reading:  H2OC Resources Runoff 101  Assignment: Form final project groups----  Research and present a real life project targeting to solve surface water resources or water quality challenges. |
| 2  Friday 6/24/2022, 9am-10:30am | **Low Impact Development (LID)**   * Field Trip 1: OC Public Work Glassell Campus Low Impact Development Project Site (Orange) * Address: 2301 North Glassell St, Orange, CA 92865 | Readings:  Prop. 84 Stormwater LID Retrofit Project - OC Public Works Glassell Campus  CASQA Low Impact Development Manual for Southern California (Selected chapters) |
| 3  Friday,  7/8/2022 9am-10:30am | **Natural Treatment System**   * Field Trip 2:San Joaquin Marsh Wildlife Sanctuary (Irvine) * Address: 5 Riparian View, Irvine, CA 92612 | Video: OCCK Streams - Water Warriors: Wetlands In Suburbia (<https://www.youtube.com/watch?v=eWWB1Fl_N2s>)  Assignment (mid-term check): Submit a one-page abstract describing selected project topic |
| 4  Friday, 7/15/2022 9am-10:30am | **Diversion and Constructed Wetland**   * Field Trip 3: Big Canyon Nature Park (Newport Beach) * Address:Back Bay Drive at Big Canyon Wash parking lot (map coordinates: 33.630639, -117.885423), Newport Beach, CA 92660 | Reading:  Dry Weather Diversions in California - Diverted by Diversions? (<http://www.beachapedia.org/Dry_Weather_Diversions_in_California_-_Diverted_by_Diversions%3F>) |
| 5  Friday,  7/22/2022  9am – 10:30am | **Recharge Water for Drinking Water Supply**   * Field Trip 4: Santa Ana River Recharging Basin (Anaheim) * Address: 4060 E La Palma Ave, Anaheim, CA 92807 | Reading/Video:  Stormwater Capture Potential in Urban  and Suburban California (<https://pacinst.org/wp-content/uploads/2014/06/ca-water-stormwater.pdf>) |
| 6  Tuesday 7/26/2022 7pm-9pm | * Student presentation * Q&A/discussion | Form final project presentation |

**Approved Academic Honesty Statement**

The following statement must appear on all syllabi: “The academic community is operated on the basis of honesty, integrity, and fair play. Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the ENVIRONMENT SUMMER CAMP.

Environmental Summer Camp

**Surface Water Management**

*Field Trip Introductions*

Coach: Jian Peng, PhD. OC Environmental Resources

Field Trip 1. OC Public Work Glassell Campus Low Impact Development Project Site (Orange)

**Date and Time**: Friday, June 24, 2022, 9am-10:30am 

**Address**: 2301 North Glassell St, Orange, CA 92865

**Description**: The project is a 10 acre, $4.6 million low impact development demonstration site to showcase how existing buildings and business parks can be retrofitted in a way to better protect water quality and enhance water resources through rainwater harvesting, infiltration, and pollution reduction. This is achieved rain tanks, bioswales, rain gardens, native and drought-tolerant plants and pervious pavers so rainwater can be harvested and reused, or it can infiltrate into the ground and become drinking water resource. In the process, the rainwater is cleaned up and will not carry pollutants to our rivers and ocean. Dr. Peng led the project conception, design, and research. We will walk around the nice campus and look at many LID features and learn about their functions.

Field Trip 2. San Joaquin Marsh Wildlife Sanctuary (Irvine)

**Date and Time**: Friday, July 8, 2022, 9am-10:30am

**Address**: 5 Riparian View, Irvine, CA 92612

**Description**: San Joaquin Marsh Wildlife Sanctuary 

encompasses over 300 acres of coastal freshwater

wetlands and provides habitat for more than 200 bird

species. It is also a natural treatment system to clean up urban runoff and serves as a living laboratory for

students, teachers, and the public. Water nourishes

everything that lives. By working to keep our watersheds clean and healthy we can help sustain a variety of habitats and the wildlife they support. We will see the San Diego Creek, several wetlands, a lot of wildlife, and take a short hike along nature trails.

Field Trip 3. Big Canyon Nature Park (Newport Beach)

**Date and Time**: Friday, July 15, 2022. 9am-10:30am

**Address**: Back Bay Drive at Big Canyon Wash parking lot (map coordinates: 33.630639, -117.885423), Newport Beach, CA 92660

**Description**: Big Canyon is a small (2 square miles) urban watershed that includes residential areas, a golf course, a reservoir, and a nature park, then it drains to the Upper Newport Bay. Due to local geology and hydrology, a trace element selenium enters into the watershed and accumulates in the biota (birds, fish) that could cause ecological impacts. The City of Newport Beach and Newport Bay Conservancy collaborated on a project to improve selenium management and habitat improvement to reduce selenium and improve the ecosystem. The area we will look at include a creek water diversion project to send polluted water to sewer, a subsurface wetland to remove selenium, invasive species removal, and native plant establishment to return the habitat to its natural state. We will start from the beautiful Upper Newport Bay Nature Reserve and take a walk along a trail to the park. The City of Newport Beach and Newport Bay Conservancy staff will lead the tour of the park and the restoration projects. 

Field Trip 4. Santa Ana River Recharging Basin (Anaheim)

**Date and Time**: Friday, July 22, 2022. 9am – 10:30am

**Address**: 4060 E La Palma Ave, Anaheim, CA 92807

**Description**: You turn on your tap and 

clean water comes out and you do not

think more about it. However, do you

know the water actually comes from as

far north as Lake Shasta in Northern

California, as far east as the Colorado

River, as far west as the Pacific Ocean, as deep as 1,500’ underground, and as gross as from your own toilet? You will find out from this field trip to Orange County Water District’s (OCWD) Anaheim Recharge Basins, a series of man-made lakes to recharge water from all different sources into the groundwater aquifer that underly Orange County. The recharged water is then used for drinking water supply. We will learn from OCWD staff about Southern California’s water resource challenges and how different agencies work together to tackle the problem. You will also learn what you can do to be part of the solution.