

## **Course Name: Wetlands Engineering**

**Course Description:** The JWTI “Introduction to Wetlands Engineering” course covers all aspects of the engineering of constructed wetlands (CW), including their scope, applicability, and design for municipal, agricultural, and industrial wastewater treatment, as well as for stormwater management.

The various types of passive CWs are addressed. These are pond wetlands, free water surface (FWS) wetlands, and sub-surface flow (SSF) wetlands. As well, the use of more advanced, semi-passive, engineered wetlands (EWs) for treating recalcitrant wastewaters (e.g., leachates, biosolids) under extreme conditions is covered. The Course also addresses natural wetlands and their use in WWT, lagoon WWT systems, floating aquatic plant WWT systems, and phytofiltration, the aquatic kind of phytoremediation. It addresses the advantages and disadvantages of CWs for WWT; the kinds of contaminants that can be treated in them (e.g., BOD, COD, suspended solids, nutrients, pathogens, metals, and salts); their performances under various conditions: the various mechanisms that are involved in CW treatment; and the cost and economics of CWs both alone and vs other WWT alternatives. It reviews example constructed wetlands projects, and demonstrates how CWs projects are implemented.

**Target Audience:** This course is designed for:

- Planners
- Regulators
- Project Managers
- Design Engineers
- Operators
- Wastewater Treatment Engineers
- Pollution Prevention Specialists

**Course Outline:** This course addresses the following topics:

- Module 1: Natural Systems for Wastewater Treatment
- Module 2: Wetland Ecosystems
- Module 3: Constructed Wetlands
- Module 4: Stormwater Wetlands
- Module 5: Treatment Wetlands
- Module 6: Constructed Wetlands Design
- Module 7: Constructed Wetlands Projects
- Module 8: Constructed Wetlands Systems Construction
- Module 9: Summary and Wrap Up

**Length of the Course:** This course is delivered in one day with two 15 minute breaks and a lunch break.

# Jacques Whitford Training Institute



**Course Location:** TBD

**Course Evaluation and Certification:** None.

**Course Pre-requisites:** None.

**Materials:** Detailed course notes are provided.

**Supplementary reading(s):** Provided during the course.

**Instructor Information:** Dr. James Higgins is Director of Ecological Engineering for Jacques Whitford Environment Limited. He has designed the facilities for and project managed many constructed wetlands and phytoremediation projects. He teaches university level, graduate level courses on these related subjects.

**Other Important Information:** A few of the topics that will be covered include:

- Wetland Plants & Planting
- Wet Pond Stormwater Wetlands
- Pond-Marsh Stormwater Wetlands
- Dry Pond Stormwater Management
- Lagoon Wastewater Treatment
- Free Water Surface (FWS) Wetlands
- Sub-Surface Flow (SSF) Wetlands
- Engineered Wetlands (EWs)
- CW Hydrology & Hydraulics
- CW Design Parameters & Models
- Expected CW Performance
- CWs For Municipal, Agricultural and Industrial Wastewater Treatment
- The Treatment of CSO In CWs
- The Treatment of Acid Rock Drainage & Landfill Leachate in CWs & EWs
- The Dewatering/Mineralization of Municipal Biosolids in Reed Bed CWs
- The Operation & Maintenance of CWs

**Available Support Services:** If you have any questions, please contact [course\\_admin@jacqueswhitford.com](mailto:course_admin@jacqueswhitford.com) or call Course Admin at JWTI (613) 738-0708 ext. 3204.