

Hydropower Fundamentals

RENG 101 – 5 Credits – September 2011



Class Description:

This class provides the fundamentals for hydropower production. The course materials include an overview of hydrology physics, power, head, and flow-rate. In addition, the course covers traditional system components including spillways, gates, valves, trashracks, penstocks, generators, hydro batteries, and governors.

Location:

**WEI Headquarters Site
Haskell Business Center
1301 Fraser Street, A3
Bellingham, WA 98229**



Dates and Times:

The class is scheduled to run on **Monday and Wednesday evenings at 6:00-9:00 PM** from **September 7th to September 28th**. This provides a total of (8) evening classes to cover the course material. In addition, the Instructor has the option to utilize Saturday mornings for field trips and other course materials. Please see the Class Calendar on the third page for details.

Tuition and Registration:

Tuition for this class is \$400. Tuition must be paid before the class begins. Program enrolled students have seniority for this class and should register online three-weeks before the class begins. Continuing education students may begin registering online two-weeks before the class begins. Students may also send class registrations by mail to the following address:

**Washington Engineering Institute
Registration Office
PO Box 483
Custer WA 98240**

School Provided Materials:

- **Lecture Notes:** The school provides lecture handouts as needed.
- **Guide to Hydropower.** Daniel A. New, Published by Canyon Hydro Industries. Copies provided to students with permission of Canyon Hydro Industries.

Student Provided Materials:

- 3 Ring Binder, calculator, engineer calculations pad (green sheets), and small straight edge for linework.
- Laptop computer with wireless capability
- Positive, motivated, respectful, and helpful classroom character

Instructor

Jim Perry, PE, MSCE, MBA Civil Engineering Technology Instructor

Experience: 26 years of experience in private civil engineering practice. Mr. Perry is currently the owner/CEO of Engineered Solutions Northwest, LLC, a land development civil engineering design firm located in Burlington, Washington.

Registration: Professional Engineer
State of Washington License #37175

Education: Master of Science in Civil Engineering
California Institute of Technology

Master of Administration in Business
University of California, Riverside

Bachelor of Science in Civil Engineering
Walla Walla College

Format:

Class Structure: Evenings will typically run in one-hour blocks as follows:

6:00 PM – Class setup and first hour
6:50 PM – Break
7:00 PM – Class
7:50 PM – Break
8:00 PM – Class last hour

Final Exam and Grades:

Grades will be determined by attendance (20%), research project (20%), and homework assignments (60%). The Instructor holds the sole authority to issue grades and shall issue grades based on a 4.0 schedule as follows.

Grading legend

4.0	A
3.7	A-
3.3	B+
3.0	B
2.7	B-

2.4	C+
2.0	C
1.7	C-
1.3	D+
1.0	D
0.7	D-

AU	Class audited with no grade earned
EXP	Experiential credit granted per policy
EDU	Prior education credit granted per policy
I	Incomplete – Instructor Allows Extra Time to Complete
W	Withdrawn from class

September 2011 – Hydropower Fundamentals – RENG 101

Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
						1		2		3		4	
5		6		7 Orientation		8		9		10 Pressure		11	
				6:00-9:00 PM Faculty & Student Introductions Program Orientation Energy, Work, Power (p4) Micro Hydro Research Project						6:00-9:00 PM Whatcom/Skagit Hydropower Components of a Hydro System (p5-11) Water Pressure Calculations and Diagrams (p12-13)			
12 Flow		13		14 Turbines		15		16		17 Optional Lab		18	
6:00-9:00 PM Flow Calculations, Flow Meters, and Weirs (p14-19)				6:00-9:00 PM Turbine Types (p20-23) Force and Torque Calculations Energy and Power Calculations						9:00-12:00 AM			
19 Big Hydro		20		21 Micro Hydro		22		23		24 Optional Lab		25	
6:00-9:00 PM Traditional Hydropower Systems History, Plans, and Analysis of Existing Local Hydropower Dam				6:00-9:00 PM Micro Hydro Systems Canyon Hydro guest lecture						9:00-12:00 AM Canyon Hydro field trip (Meet at BIAWC building at 8:00am for carpooling to Deming)			
26 Tidal Energy and In-Water Permitting		27		28 System Analysis		29		30					
6:00-9:00 PM Tidal Energy and In-Water Permitting DOE guest lecture				6:00-9:00 PM Hydro Battery Seasonal Power Analysis Power Modeling Tollhouse Energy Guest Lecture									

Washington Engineering Institute, 4055 Hammer Drive Suite B2, Bellingham WA 98226

website: www.weiedu.org

email: admin@weiedu.org

phone: (360) 739-1428



PO Box 483
 Custer WA 98240
admin@weiedu.org
 (360) 739-1428

Class Registration Form 2010 v2.0

Returning students with a Student ID do not need to fill out the gray portions of this form.

Name	
Address	
Phone	
Email	

Class Requested	RENG 101 – Hydropower Fundamentals
Class Month / Date	September 2011

WAC 490-105-160 – State Licensed School Reporting Requirements:

Student ID #		
SSN #		
Date of Birth		
Gender		
Disability	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Race	<input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Hawaiian Native or Pacific Islander <input type="checkbox"/> Hispanic <input type="checkbox"/> White/Caucasian <input type="checkbox"/> Multi-racial <input type="checkbox"/> Other	
Prior Education	<input type="checkbox"/> Less than high school graduation <input type="checkbox"/> GED <input type="checkbox"/> High School Graduate <input type="checkbox"/> Post H.S., no degree or certificate <input type="checkbox"/> Associate Degree <input type="checkbox"/> Bachelor Degree <input type="checkbox"/> Master or Doctorate Degree	GED Year _____ Graduation Year _____ Graduation Year _____ Graduation Year _____ Graduation Year _____
Name of Last School Attended		

Student Signature

Date