

# **Hydrostatics (Fluid Statics), Hydrodynamics (Fluid Dynamics) and Hydraulic Machines**

## **A Live Seminar on Basic and Intermediate Concepts, Principles and Practice of Hydrostatics and Hydrodynamics**

**Credit:** 7.5 PDH's (1-Day); 0.75 CEU's

**Lead Instructor:** Professor Bobby Rauf, PE, CEM, MBA

This course is intended to serve as an introduction to fluid statics, hydrodynamics and hydraulic machines for attendees with little or no fluids background. This course transitions from hydraulics concepts to laws, mathematical equations, sample problems and practical hydraulics case study examples. For those attendees or participants who possess prior fluids knowledge and experience, this course, is intended to serve as a refresher of the basics and an introduction to intermediate level knowledge on the subject of hydrostatics and hydrodynamics. As such, this course can be used to satisfy the Professional Development Hour requirement, as established by State Boards and other licensure agencies.

### **The Topics to be covered in this course are as follows:**

1. Hydrostatics concepts and analysis.
2. Hydrodynamics principles, laws and analytical techniques.
3. Application of Bernoulli, Darcy, Hazen-Williams, Manning, Water Horsepower, and other hydrodynamics equations.
4. Study of hydraulic machines commonly applied in industrial and commercial environment.
5. Review of "wire to water" and "water to wire" power flow and efficiency
6. Mathematical analysis involving matching of system head requirements with available pump curves.

### **After attending this seminar, the participants will:**

1. Be able to apply principles and techniques associated with fluid or hydrostatics.
2. Be able to understand, analyze and solve hydrodynamics problems.
3. Know the distinction between various types of hydraulic machines.
4. Possess skills needed to specify and select hydraulic machines for specific system head requirements.
5. Be able to distinguish between turbulent and laminar flows.
6. Be able to analyze open channel flow problems.
7. Be able to calculate frictional head losses in fluid flow systems.
8. Be able to analyze power and energy in hydroelectric systems

### **Potential Attendees:**

- Civil Engineers

- Electrical Engineers
- Mechanical Engineers
- Environmental Engineers
- Chemical Engineers
- Industrial Engineers
- Energy Professional
- Facility Managers
- Project Managers
- Other professional who wish to enhance their fluid statics and fluid dynamics knowledge

### **Instructor Bio:**

**Professor S. Bobby Rauf, P.E, C.E.M, MBA; member, ASEE, American Society of Engineering Education.**



Bobby Rauf is the President, Chief Consultant and a Senior Instructor at Sem-Train, LLC. Bobby has over 25 years of experience in teaching undergraduate and post graduate Engineering, Math, Business Administration and MBA courses, seminars and workshops. Professor Rauf is registered (PE) **Professional Engineer**, in the State of North Carolina and is a **Certified Energy Manager**.

Mr. Rauf was inducted as “**Legend in Energy**” by AEE, in 2014. He is a published author of multiple engineering and energy books and professional development courses. He holds a patent in process controls technology.

Professor Rauf is certified to instruct various engineering, ergonomics, and industrial safety courses. He has conducted certification training and trained engineers for Professional Engineering licensure exams in the United States, The United Kingdom, Kingdom of Saudi Arabia, The Netherlands and Ukraine, over the past ten years.

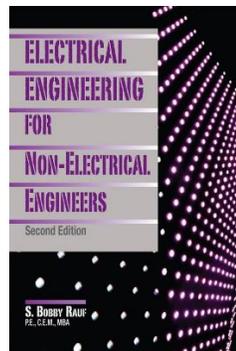
Mr. Rauf develops and instructs PDH (Professional Development Hour) and, continuing education, engineering skill building courses. He conducts these course in form of webinars, live on-site presentations, workshops, pre-recorded audio and self-study texts. Some his major clients include **Texas A&M University, Saudi Aramco – KSA, University of North Carolina at Charlotte, McNeese University, Lamar University, Clemson University, Association of Energy Engineers, EPIC College - Canada; US Bureau of Reclamation, BHP Billiton, PDH Engineers, CED, and PDH Source.** He is also an Adjunct Professor at Gardner-Webb University.

Professor Rauf has also developed and published several self-study books that cater to the continuous professional development needs of Engineers, Technicians and Technical Managers.

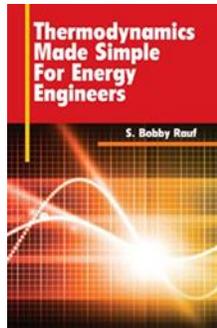
Mr. Rauf’s last full-time engineering employment, in the corporate world, was at PPG Industries, Inc. where he served as a **Senior Staff Engineer.** During his long career at PPG, his responsibilities included development and management of energy and ergonomics programs for multiple manufacturing plants, in the US and overseas. He also provided consultation and training services in, energy, electrical engineering, industrial safety, ergonomics and arc flash arena. His extensive engineering experience includes, power design, control system design, project management, process management, energy and utilities management, energy audits/assessments, plant maintenance, robotics, manufacturing automation, HVAC audits, and design of ergonomic equipment.

**Professor Rauf’s publications include** (Available through AEE, Amazon.com, and Barnes and Noble):

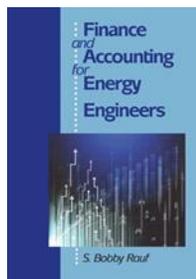
- 1) Text book titled “**Electrical Engineering for Non-Electrical Engineering,**” The Second Edition of this book was published in 2016 through Fairmont Press and CRC Press – Worldwide distribution.



- 2) Text book titled “**Thermodynamics Made Simple for Energy Engineers,**” Published in 2012 through Fairmont Press and CRC Press – Worldwide distribution.



- 3) Text book titled “**Finance and Accounting for Energy Engineers,**” Published in 2011 through Fairmont Press and CRC Press – Worldwide distribution.



### **Testimonials from clients:**

- 1) Timothy M., CEM, CDSM: “Bobby: I wanted to pass on my thoughts concerning the recently completed, Electrical Engineering for Non Electrical Engineers. I found it to be very helpful, especially the section on Power Factor. I have had it explained to me a number of times, but your explanation was the best.
- 2) Kimberly T., 2011: Bobby, I would like to say that even though I am not an engineer, I am really glad that I took this class (EE for Non-EE). You have helped me to dissect and visualize some of the terms and concepts that were not tangible to me prior to this class.
- 3) Gregory (Greg) V. D., P.E.: “Hi Bobby, I've enjoyed both of your pdhengineer.com webinars that I've attended.....I don't know how you get through a full 8 hours at such a high energy level!”
- 4) Dr. A. P., Professor and Dean, 2013: “Dear Bobby, it was such a pleasure to meet you and having you as the great instructor of our Electrical Engineering seminar. As I understood from the attendees they really enjoyed your course and learned a lot...”

### **Important Notes for Participants:**

- In order to enhance the learning experience, the class size is limited – register early.

- Seminars are subject to cancellation if the minimum registration threshold is not met. **Registration fees will be refunded in entirety if a seminar is cancelled.**
  - Name on the attendance certificate will be as it appears on the registration documents. **Please Note:** If an admin associate registers you, have them enter **YOUR** name on the registration/payment form.
  - Verify exact location of venue before the seminar date. \*
  - Bring valid ID and copy of registration information. \*
  - Light refreshments will be served. \*
  - Certificates of attendance will be provided.
  - The handouts for the course will be provided via “Drop Box.”
  - Venue Wi-Fi where available. \*
- \* This information applies to in-person, face to face, seminars only.*

### **List of Past and Current Clients:**

Mr. Rauf of Sem-Train has provided training and/or consulting services to over 5000 engineers and non-engineers through some of the following organizations, over the last fifteen years:

1. **BHP Billiton**
2. **Saudi Aramco (Dammam, Kingdom of Saudi Arabia)**
3. **US Bureau of Reclamation (Hoover Dam)**
4. **US Dept. of State (SemTrain, LLC, is SAM/CAGE approved for Federal Contracts).**
5. **CED**
6. **Balfour Beatty**
7. **Shaw Group**
8. **McNeese University**
9. **University of North Carolina, Charlotte**
10. **Texas A&M University,**
11. **Clemson University,**
12. **PPG Industries, Inc.,**
13. **PDHengineer,**
14. **PPI, Professional Publications**
15. **University of Maryland Baltimore County,**
16. **EPIC (Canada)**
17. **Y-F Asia – Singapore**
18. **Duke Energy**

**Sem-Train is an Approved sponsor of PDH (CPC and CEU) Engineering and Energy Courses at the following Board of Examiners for Engineers & Land Surveyors:**

- 1) **North Carolina (NCBELS)**
- 2) **New York (NYSED)**

- 3) Florida (FBPE)
- 4) Maryland
- 5) NJ – Approval Expected by Oct. 20, 2017.

**Lead Instructor's Phone:** (704) 477-9166. Note: Interested potential attendees are encouraged to call the instructor, directly, with technical seminar content related questions.

**Cancellation Policy:** Full refund granted if registration is cancelled **30 days** or more prior to the scheduled date of the seminar; otherwise, registrant can apply the course credit toward attendance at another, scheduled, equivalent event, in the region, at a later date. SemTrain, LLC, reserves the right to cancel the seminar when minimum registration threshold is not met. In such case, SemTrain, LLC, will issue full refund to the registrant.

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