EN – 3216 OPERATIONAL CONTROLSFALL 2021

LT Tim DeMoranville

A study of the principles of industrial measurement and control with an emphasis on practical applications aboard ship and in industry. Methods of sensing, measuring and transmitting data from industrial processes; feedback, automatic control systems, closed loop systems, controllers, control modes, and control configurations.

Office: Harrington 216A. Office Hours Mon/Wed-period 2, Thursday- Period 5.

508-830-5281 tdemoranville@maritime.edu

Attendance Policy:

Attenda Attendance is Mandatory. The lowest quiz grade will be dropped for those with perfect attendance. There will be two excused absences allowed with prior approval however, no quiz grade will be dropped. There will be no quiz make-ups and a "zero" will be entered. Special liberty DOES NOT qualify as an excused absence. For each unexcused absence there will be a (1) point deduction from the final course average. Must be in uniform, no boiler suits.

.

- A missed quiz will be graded as a zero (0)

- Cell phones, video and audio recording devices are not allowed in class.

  Students are expected to bring notebooks, writing utensils, etc.

- Grades will be determined from quizzes, tests, homework and attendance.

- No food or beverages are allowed in the classroom.

- Email and Blackboard must be monitored for course information

Uniform: – Uniform of the day is required in class.

The Academy offers, upon request, accommodations to students with documented learning disabilities. The ADA Coordinator, Asst. Dean Elaine Craghead, evaluates the documentation provided, determines appropriate services, and is available to discuss accommodations with students. The Disability Resources

office is located in the Academic Resource Center, ABSIC 320. Students can drop in during normal business hours, M-F 0800-1600, or call x5120, or email ADAcompliance@maritime.edu.

SECTION	SUBJECT
1.	Introduction to Process Control • Process Variable • Set Variable (set point) • Manipulated Variable (control Variable)
2.	Control Philosophy • Process Management • Safety Systems • On/Off and proportional control • Proportional control with feed back
3.	Data Acquisition • Temperature measurement • Measurement devices and installation • Pressure measurement and devices • Head pressure and level correlation
4.	Level measurement • Level instruments and devices • Direct connection and transmitter

- Trip devices and requirements

5. Flow Measurement
   - Displacement devices
   - Flow elements and differential pressure
   - Bernoulli's Principle

6. Analyzers
   - Viscosity measurement
   - Flue gas analysis
   - CEMS
   - Hydrogen purity analyzers

7. Control Dynamics and Operator Interface
   - PID control systems
   - Manual/automatic interface
   - Cascading Control

8. Final Elements/Manipulated Variables
   - Control valves
   - Positioners/DVC equipment
   - Calibration

9. Control Systems
   - Stand alone process control
   - Integrated process control
   - Analog and digital measurement
   - DCS overview

10. PLC Systems

- Diesel plant applications
- Gas Turbine application
- Stand alone auxiliary systems

11. Safety Systems

- Flame safety and combustion monitoring
- Purge requirements and permissive
- Over speed protection
- Lube oil backup systems
- Vibration and eccentricity monitoring

12. Combustion turbine (gas turbine) applications

- Starting systems
- Combustion control and monitoring
- Combustor and compressor bypass systems

13. Steam Plant Applications

- Combustion Control
- Level Controls
- Pressure regulating equipment
- Steam turbine generator operation

*This Schedule may be changed subject to class requirements