2023- 2024 Syllabus

Introduction to Shipboard Engineering

Mr. Paul Judice

My Welcome: Welcome to Introduction to Shipboard Engineering It is my distinct pleasure to be your instructor this semester! This course will provide you with the tools to help you be successful in high school, college and after. Take this course seriously because it could be one of the most important courses you take throughout your academic career. One of my goals this semester is to help you feel confident as you embark upon the rest of your studies. I will guide you, cheer for you, coach you, and hold you accountable. This class as well as your other courses will require time management.

Course Description: Intro Shipboard Engineering is designed to provide training for entry-level employment and/or a basis for continuing education in shipboard engineering and merchant mariner credentialing. This course will build on the foundational knowledge previously acquired in the Principles of Maritime Science course. Shipboard engineering includes knowledge of the functions, troubleshooting, maintenance and repair of the systems and components of maritime engines such as centrifuge engines, outboards, and portable dewatering pumps. In addition, students will receive instruction in safety, emergency procedures, and shipboard auxiliary systems.

Course Objective:

1. The student demonstrates professional standards and employability skills as required by the maritime industry including knowledge of industry terminology and safety precautions. The student is expected to
    - **a.** Achieve employability skills and standards such as attendance, on-time arrival, and meeting deadlines;
    - **b.** Explain the importance of working toward personal/team goals every day; and
    - **c.** Demonstrate approved and ethical use of maritime technology.
2. The student distinguishes between and safely operates the tools necessary in the maritime industry. The student is expected to:
    - **a.** Label maritime hand tools and fasteners;
    - **b.** Identify safety precautions associated with different shipboard tools;
    - **c.** Demonstrate proper tool care procedures for shipboard tools;
    - **d.** Explain the operating characteristics of gauges such as temperature, duplex, compound, manometer, bourdon-tube, pyrometer, liquid-in-glass, bimetallic, hydrometer, reed-type tachometer, and vacuum;
    - **e.** Define standard terms, measurements, and gauge graduations associated with shipboard gauges;
    - **f.** Report data from gauges and use scales of measurement to identify proper operating parameters;
    - **g.** Replace faulty gauges and test for functionality.
    - **h.** Summarize the functional characteristics of shipboard valves such as check, pressure regulating, relief, ball, butterfly, gate, globe, needle, petcock,
    - **i.** Identify the safety precautions for shipboard valve safety;
    - **j.** Perform valve maintenance including lubrication, cycling, visual inspection, and testing;
    - **k.** Identify proper material for shipboard piping and tubing systems;
    - **l.** Explain procedures for shipboard piping and tubing such as sizing, cutting, bending, replacing, flaring using compression fittings, soft soldering, and silver brazing;
    - **m.** Explain safety procedures involved in soldering and brazing;
    - **n.** Describe the purpose and applications of flange shielding;
    - **o.** Perform proper repair and assembly procedures on PVC and steel shipboard piping and monitor for leaks; and
    - **p.** Identify the proper material choice for fabricating and renewing gaskets, seals, and O-rings.

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3. The student evaluates aspects of damage control, firefighting, and shipboard emergencies. The student is expected to:
    - **a.** Classify ship compartments, doors, hatches, and valves;
    - **b.** Describe necessary closures to increase and decrease levels of shipboard protection;
    - **c.** Demonstrate proper use of damage control equipment;
    - **d.** Examine aspects of shipboard fire safety;
    - **e.** Explain the chemistry, categories, and proper extinguishing agents of maritime fire;
    - **f.** Practice extinguishing a fire using portable extinguishers and agents;
    - **g.** Identify potential fire hazards aboard ship;
    - **h.** List the uses of shipboard portable pumps in providing and disposing of water for firefighting; and
    - **i.** Create a list of shipboard safety and firefighting procedures including electrical safety, oxygen depletion, and stability concerns; and
4. Explain evacuation procedures in an emergency. The student examines small boat propulsion. The student is expected to:
    - **a.** Identify the basic layout of a typical marine outboard engine by classifying the components of an outboard engine including powerhead, propeller, and lower units;
    - **b.** Demonstrate outboard engine safety precautions;
    - **c.** Compare maritime mechanical system components and their functions including two-stroke, four-stroke, fuel system, fuel, and lubricants;
    - **d.** List the theory of operation, classification, intake stroke, compression stroke, power stroke, and exhaust stroke;
    - **e.** Assess fuel requirements and lubricant oil requirements for maritime outboard engines;
    - **f.** Summarize fuel system components including fuel tanks, fuel hoses, fuel hose connections, fuel filters, fuel pumps, pressure vacuum fuel pumps, and mechanical fuel pumps;
    - **g.** Describe the function of components of the fuel system used in maritime outboards such as carburetors, fuel injection systems, water separators, fuel filters, low pressure pumps, vapor separators, high pressure fuel pumps, filters, fuel rails, pressure regulators, and fuel injectors;
    - **h.** Explain air inductions required for injected maritime outboard engines;
    - **i.** Describe maritime outboard oil injection systems including oil reservoirs, injector pump assemblies, oil and supply distribution systems, and oil recirculation systems for proper functioning;
    - **j.** Determine cooling system requirements including flow path, hose routing, and water flow diagramming;
    - **k.** List and describe the functions of cooling system components including water intake screen, water pump, water jackets, temperature regulator, thermostat and pressure release valve locations, and engine coolant temperature sensor;
    - **l.** Identify gear-case components including location, driveshaft and pinion gear, forward and reverse gears, propeller shaft, clutch shifter, shift rod, and shift mechanism;
    - **m.** List and describe the functions of gear-case attachments including propellers, propeller safety, trim tab, and zinc anode;
    - **n.** Describe the function of jet drive propulsion units such as installation of the reversing bucket, hydraulic steering controls, steering nozzle operation, oil cooler, shaft flange, drive shaft, universal joints, thrust bearing, and waterseal; and
    - **o.** Explain the safety precautions of jet drive safety.

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5. The student distinguishes among shipboard auxiliary equipment. The student is expected to:
    a. Identify air compressor components and functions;
    b. Explain safety precautions for an air compressor;
    c. Perform maintenance on an air compressor in accordance with manufacturer's guidelines such as cleaning cooling fins, adjusting belts, servicing intake filters, checking and changing oil, and conducting operational tests;
    d. Determine safety precautions, components, and functions of centrifugal pump systems; and
    e. Simulate setting up the dewatering pump to ensure steady suction.
6. The student describes the shipboard hydraulic systems. The student is expected to:
    a. Identify what determines the pressure created in a hydraulic system;
    b. Consider how different sized pistons are used to increases force;
    c. Explain the purpose of evaporator steam coils;
7. The student differentiates among the properties of different hydraulic fluids. The student is expected to:
    a. Express how a confined liquid can be used to produce work;
    b. Explain the function and purpose of shipboard water distillation equipment;
    c. Describe the operations of a distillate condenser;
    d. Compare the theories regarding changing sea water to drinking water equipment;

Contact Information:
Preferred Mode of Communication: TEAMS Chat or Email
Email: paul.judice@houstonisd.org
Web Address: www.houstonisd.org/paul.judice
Room: 147

Materials:

- HISD issued laptop and charger

Grade Weight and Grading Scale:
Formative- 60% (Daily Grades, Quizzes, Homework)
Summative- 40% (Projects, Tests, Essays)

(A=100-90) (B=89-80) (C=79-75) (D=74-70) (F=69-0)

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Honor Code: Jack Yates High School embodies a spirit of mutual trust and intellectual honesty that is central to the very nature of learning and represents the highest possible expression of shared values among the members of the school community. The core values underlying and reflected in the Honor Code are:

- Academic honesty is demonstrated by students when the ideas and the writing of others are properly cited; students submit their own work for tests and assignments without unauthorized assistance; students do not provide unauthorized assistance to others; and students report their research or accomplishments accurately
- Respect for others and the learning process to demonstrate academic honesty
- Trust in others to act with academic honesty as a positive community-building force in the school
- Responsibility is recognized by all to demonstrate their best effort to prepare and complete academic tasks
- Fairness and equity are demonstrated so that every student can experience an academic environment that is free from the injustices caused by any form of intellectual dishonesty
- Integrity of all members of the school community as demonstrated by a commitment to academic honesty and support of our quest for authentic learning.

Policy on Electronic Devices: Once students enter classroom, all electronic devices should be silenced and put away such that they are not visible. These include cell phones, headphones, ear buds, etc. Students may only use electronic devices if authorized by teacher. Teachers may use electronic devices for instruction purposes at their discretion.

Make Up and Late Work: Homework and daily class work should be submitted in a timely manner as much as possible. Evaluation on late work will be done on a case-by-case basis at the discretion of the teacher. Make-up work will not be made-up during class time; this time will be reserved for planned instruction. It is the responsibility of the student to get make-up work and to return it to the instructor in a timely manner.

Student Success: Additional time will be required for written assignments. The assignments provided will help you use your study hours wisely. Successful completion of this course requires a combination of the following:

- Reading the textbook
- Attending class in person and/or online
- Completing assignments
- Participating in class activities

There is no short cut for success in this course; it requires reading (and probably re-reading) and studying the material using the course objectives as a guide.

As your teacher, it is my responsibility to:

- Provide the grading scale and detailed grading formula explaining how student grades are to be derived
- Facilitate an effective learning environment through learner-centered instructional techniques
- Provide a description of any special projects or assignments
- Inform students of policies such as attendance, withdrawal, tardiness, and making up assignments
- Provide the course outline and class calendar that will include a description of any special projects or assignments
- Arrange to meet with individual students before and after class as required

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As a student, it is your responsibility to:

- Attend class on time
- Participate actively by reviewing course material, interacting with classmates, and responding promptly in your communication with me
- Read and comprehend the textbook
- Complete the required assignments and exams
- Ask for help when there is a question or problem
- Keep copies of all paperwork, including this syllabus, handouts, and all assignments
- Attain a raw score of at least 50% on the departmental final exam