

SUBMARINE CONCEPT DESIGN

JULY 15-26, 2024

FLAG LEAD: RDML Jon Rucker, PEO Attack Submarines

LECTURER-IN-CHARGE: Dr. Chris Warren, CAPT, USN(ret.), Defense Consultant

TUITION: \$5774

DAILY CLASS ROUTINE:

Week #1 (July 15 – July 19)

- Mon (7/15) Classroom facility open 0745 – 1700.
Class 0800 - 1700 w/1-hour lunch break
Class Dinner, hosted by MIT, 1730 - 1930
- Tue (7/16) Classroom facility open 0730 - 1700
Class 0800 - 1700 w/Hosted Working Lunch
- Wed (7/17) Classroom facility open 0730 - 1900
Class 0800 - 1900 w/1-hour lunch break
- Thurs (7/18) Classroom facility open 0730 - 1700
Class 0800 - 1700 w/1-hour lunch break
- Fri (7/19) Classroom facility open 0730 - 1700
Class 0800 - 1700 w/Hosted Working Lunch

Week #2 (July 22 – July 26)

- Mon (7/22) Field trip to General Dynamics Electric Boat Quonset Point and Groton
Bus departs from front of Draper Laboratory (555 Technology Square) at 0700
and returns around 1900. Lunch will be provided during the tour.
- Tue (7/23) Classroom facility open 0730 – 1900.
Class 0800 - 1900 w/Hosted Working Lunch.
- Wed (7/24) Classroom facility open 0730 – 1900.
Class 0800 - 1900 w/1-hour lunch break.
- Thurs (7/25) Classroom facility open 0730 – 1700.
Class 0800 - 1700 w/Hosted Working Lunch.
Class Dinner, hosted by MIT, 1700 – 1900.
- Fri (7/26) Classroom facility open 0730 – 1200.
Class 0800 – 1200.

COURSE DESCRIPTION AND OBJECTIVE: The course is intended to provide the student with an understanding of the conceptual phase of submarine design. It consists of a series of lectures on each of the most important steps in the design process. The following topics will be covered:

- Historical development, mission profiles, and factors influencing past design and requirements
- Development of requirements into a concept meeting the constraints of submarine operations
- Basics of submarine systems, layout and operations
- Relationships of weight, buoyancy, volumes and hydrostatics
- Determination of the speed and power relationships
- Development of the structural envelope that will resist the hydrostatic and hydrodynamic forces to be encountered by the submarine
- Submarine safety and its influence on design
- Overview of current design, advanced concepts, production, and market factors

Each student has an opportunity to apply these principles by completing a submarine concept design on a PC-based model. This feasibility study will provide an opportunity to explore new concepts and innovations.

The Daily Class Routine and other aspects of the course are subject to change to accommodate federal, state, and local guidance.

An all-day field trip to the General Dynamics Electric Boat Quonset Point and Groton facility is planned for Monday, July 22. Class members will tour the facility and meet with EB personnel. The tour is subject to the availability of Electric Boat personnel and restrictions on the disclosure of information imposed by the U.S. government. Bus transportation will be provided to and from Cambridge. The class will return to Cambridge in the late afternoon.

LECTURERS

RDML Jon Rucker, USN	PEO Attack Submarines
Dr. Chris Warren, CAPT, USN (ret.)	Defense Consultant
CAPT Pete Small, USN	Project Manager – SSN(X)
CAPT Andrew Gillespy, USN	Professor of the Practice, Naval Construction and Engineering (Course 2N) MIT
CAPT Brian Heberley, USN	Commanding Officer, SUPSHIP Groton
CAPT Robert Oswald, USN	Program Manager, Submarine Acoustic Systems (PMS401)
CDR Matthew Frye, USN	Strategic Systems Programs (SSP) Ship Integration Branch Engineer
CDR Jonathan Gibbs, USN	Associate Chair and Assistant Professor, Department of Naval Architecture and Ocean Engineering, USNA
CDR Sjaak de Vlaming	PMS 435, Photonics
CDR Chris MacLean, USN	Assistant Professor of the Practice, Naval Construction and Engineering (Course 2N) MIT
CDR Andrew Freeman, USN	Aft Project Officer and AoA Lead – SSN(X)
LCDR Robert Carelli, USN	Underwater Ship Husbandry Project Manager , NAVSEA 00C

SPECIAL INSTRUCTIONS FOR QUONSET POINT AND/OR GROTON FACILITY TOUR: Groton and Quonset Point are industrial environments and visitors are required to dress accordingly. Sturdy leather shoes must be worn; sports shoes are not allowed. Safety protection such as hard hats and/or glasses will be provided. Purses, cameras, cell phones with and without cameras, and recording devices are prohibited. If circumstances require, this tour will be cancelled and additional lecture material will be substituted.

Special Note: This course contains material governed by Distribution Statement D. Distribution authorized to the Department of Defense and U.S. DoD contractors only. Other requests shall be referred to PEO Attack Submarines via the Lecturer-in-Charge, Dr. Chris Warren.

LOCATION: Classes will be held in the Hill Building, Building NE-80, Room 1409 at 1 Hampshire Street, Cambridge, MA. The classroom is adjacent to MIT's main campus at The Charles Stark Draper Laboratory. Click [here](#) for a map of relevant locations for the course.

COURSE ELIGIBILITY AND CLASSIFICATION: Applicants are expected to have mature technical backgrounds which, either through experience or education is at least equivalent to graduate education. This course is classified SECRET/NOFORN/RD. A final SECRET security clearance is required. The course is open to U.S. active-duty military, U.S. Department of Defense employees, and U.S. civilian contractor personnel with U.S. Department of Defense sponsorship. It is not open to foreign nationals. A U.S. Government ID or Passport will be required each day to obtain a badge for classroom access. Students with appropriate clearances that are outside of DoD must apply at least three weeks in advance to allow time for 'need to know' to be established and approval received through appropriate channels.

APPLICATION AND TUITION PAYMENT: Course enrollment is limited. **DUE TO THE HIGH DEMAND FOR ENROLLMENT, APPLICATIONS ARE DUE 1 APRIL 2024.** Shortly thereafter, we will work with the course sponsor to determine the roster for the course, enabling as many commands as possible to participate and selecting those candidates that will best augment both the course, as well as the submarine Naval architecture community. Confirmation announcements for acceptance into the course will be made early May.

Note: We reserve the right to release any unconfirmed enrollments in order to provide a wait-listed student an opportunity to attend. Nominally will do so three weeks before course start date. However, we will make every effort to notify you beforehand and request your intentions.

Flexible payment options, including:

- 1) Wire transfer
- 2) Credit card (VISA, MasterCard, Discover Card, American Express)
- 3) Check

Please see detailed directions on our website for application and payment. Link on upper right of the 2N course webpage <http://2n.mit.edu/> or direct to link of <http://naval-pro-summer.mit.edu/>.

It is critical that you provide the name of your training coordinator and/or the person who will be making the tuition payment on your application as we must receive payment in order to hold your place in the course – without payment (or obligated funds via approved SF-182) we may need to release your seat to someone else on the wait list.

In advance of payment, a training officer approval (block 3b of SF182) obligating funds is accepted to confirm enrollment. Full payment is due MIT at least one week before course.

CANCELLATION: Cancellations within ONE (1) week of the first day of the course will be subject to a \$100.00 charge. Substitution by another applicant will be allowed.

ACCOMMODATIONS: Course tuition DOES NOT include accommodations. Each student must arrange his or her own transportation and hotel accommodations. Hotel space in Cambridge is very limited during the summer, so early advance reservations are strongly recommended. We have reserved a small block of rooms at the government rate at a local hotel which is located a short walking distance from the classroom and provides convenient access to the MBTA Red Line at the Kendall/MIT station. We will send you information about our hotel block when we confirm enrollment and payment (or obligated funds via approved SF-182) in the course. The hotel will release the hold on any unclaimed rooms FOUR (4) weeks prior to the first day of the course. Car rental is neither necessary nor recommended.

STUDENT ATTIRE: Business casual. Students are advised to bring a sweatshirt, sweater or jacket in the event that the classroom is cold.

REFRESHMENTS: Continental breakfast will be provided in the morning and a light snack each afternoon. Lunch will be provided on those days when working lunches/guest speakers are scheduled.

POINT OF CONTACT: If you have any questions, please contact the Naval Professional Summer Coordinator at 617-324-2237 or by e-mail to profsum@mit.edu.

EMERGENCY CONTACT INFORMATION: During class, students may be contacted by leaving a message at 617-258-2285 or by e-mail at dsegall@draper.com.

PORTABLE ELECTRONIC DEVICES: This course is CLASSIFIED. The classroom will be managed as a CLOSED AREA at all times during the period of instruction. Among other restrictions, this means that no recording devices or other electronic devices will be allowed into the room unless prior arrangements have been made. Such arrangements must be made at least three weeks prior to the first day of class. Personal electronic equipment must be left outside the classroom. The area will be guarded, but will NOT be locked. Please keep this in mind when deciding what to bring with you and what to leave in your hotel room. Examples of personal electronic equipment that are NOT allowed in the classroom: laptops, PDAs, iPods, calculators, wireless fitness trackers (such as Fitbit, Basis Peak, or Jawbone Up), cell phones, Iwatches, cameras, and flash drive memory sticks. NOTE that this is not an all-inclusive list. If you have a Portable Electronic Device not listed here, do not hesitate to ask Draper Security prior to bringing the device inside the classroom.

If you require a medical assist electronic device, arrangements can be made to allow these in the classroom. Please contact Draper at (617) 258-2285 or dsegall@draper.com at least three weeks prior to the first day of class.

VISIT REQUESTS: Two visit requests need to be sent: one to Draper for the course and one to SUPSHIP for the tour.

Draper Laboratory: Visit requests can be sent via two methods and should be sent no later than three weeks prior to your class in order to ensure adequate processing time.

1. **Preferred Method:** Visit requests can be sent via DISS SMO Code 519934. Please ensure that the following is included in DISS visit requests:
 - a. POC: John Mich/MIT ProSummer
 - b. Valid dates (length of the course/visit only)
 - c. POC phone number: 617-258-1459
 - d. In the Visit Notes section, specify whether you are an instructor or student and enter name of the course you are teaching or attending
2. If you cannot use DISS, visit requests can be faxed to (617) 258-2000. Faxed visit requests must contain the following information.
 - a. Employer's Name
 - b. Employer's address, Phone Number and CAGE Code
 - c. Visitor(s) Full Name
 - d. Social Security Number
 - e. Citizenship
 - f. Date and Place of Birth
 - g. POC: John Mich/MIT ProSummer
 - h. Valid dates (length of the course/visit only)
 - i. Purpose: (Specify whether you are an instructor or student and enter the name of the course you are teaching or attending.)
 - j. Clearance Information

If you need to confirm that your visit request has been received and is in order, please contact Draper's Personal Security Office at persec@draper.com or (617)-258-3105.

Supervisor of Shipbuilding, Groton: Visit requests for the tour shall be submitted to the Supervisor of Shipbuilding, Groton. The DISS SMO is N62789. Important information to include to prevent visit request being rejected; The (Reason for Visit) 'MIT Course Tour,' (POC) 'LCDR Alex Scott,' (POC Phone) '860-266-9259,' (visit access) 'Secret,' (Date) '7/22/24' (NOT for a year). Visit requests should be processed at least ten (10) working days prior to the start of your course to ensure adequate processing time. Please submit a visit request to the Supervisor of Shipbuilding even if you already have an EB badge. The Supervisor of Shipbuilding will not be able to edit your area access permissions or issue a temporary badge if you forget yours unless they have a current visit request.