SUBMARINE CONCEPT DESIGN
JULY 18-29, 2022

LECTURERS-IN-CHARGE: RADM Dave Goggins, USN, PEO Attack Submarines, and Dr. Chris Warren, CAPT, USN(ret.), Defense Consultant

TUITION: $5000

DAILY CLASS ROUTINE:

Week #1 (July 18 – July 22)

Mon (7/18)  Classroom facility open 0745 - 1700
             Class 0800 - 1700 w/1 hour lunch break
             Class Dinner, hosted by MIT, 1730 - 1930

Tue (7/19)   Classroom facility open 0730 - 1700.
             Class 0800 - 1700 w/Hosted Working Lunch

Wed (7/20)  Classroom facility open 0730 - 1700
             Class 0800 - 1700 w/1 hour lunch break

Thurs (7/21) Classroom facility open 0730 - 1900
              Class 0800 - 1900 w/Hosted Working Lunch

Fri (7/22)   Classroom facility open 0730 - 1700
             Class 0800 - 1700 w/1 hour lunch break

Week #2 (July 25 – July 29)

Mon (7/25)  Field trip to General Dynamics Electric Boat Quonset Point and Groton.
            Bus departs from front of Boston Marriott Cambridge (50 Broadway) at 0700 and returns around 1900. Lunch will be provided during the tour.

Tue (7/26)   Classroom facility open 0730 - 1900
              Class 0800 - 1900 w/Hosted Working Lunch

Wed (7/27)  Classroom facility open 0730 - 1900
             Class 0800 - 1900 w/1 hour lunch break

Thurs (7/28) Classroom facility open 0730 - 1700.
              Class 0800 - 1700 w/Hosted Working Lunch
              Class Dinner, hosted by MIT, 1700 - 1900

Fri (7/29)   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 25. 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**

- RADM Dave Goggins, USN  PEO Attack Submarines
- Dr. Chris Warren, CAPT, USN (ret.)  Defense Consultant
- CAPT Jon Rucker, USN  Program Manager, COLUMBIA Class Submarines (PMS397)
- CAPT Pete Small, USN  Program Manager, Unmanned Maritime Systems (PMS406)
- CAPT Andrew Gillespy, USN  Commanding Officer, SUPSHIP Groton
- CAPT Robert Oswald, USN  PMS 450, PAPM for Construction and Test
- CAPT(sel) Brian Heberley, USN  INSURV
- CDR Douglas Jonart, USN  Associate Professor of the Practice, Naval Construction and Engineering (Course 2N) MIT
- CDR Jonathan Gibbs  Assistant Professor, Department of Naval Architecture and Ocean Engineering, USNA
- CDR Kyle Woerner  Program Manager, DARPA
- CDR James Colgary  Undersea Rescue Command
- LCDR Robert Carelli, USN  Ship Coordinator, SUPSHIP Groton

**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.** Long-sleeve shirts are required. 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. An interactive MIT campus map is available on-line at http://whereis.mit.edu/.

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 2021. 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. Confirmations 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.
CANCELATION: 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 617-258-3431 or by e-mail at mmorgenstern@draper.com.

PORTABLE ELECTRONIC DEVICES: This course is CLASSIFIED. The classroom will be a 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) 258-3431 or mmorgenstern@draper.com at least three weeks prior to the first day of class.

VISIT REQUESTS: You will be required to submit two visit requests: one for the course to Draper and one for the tour to Supervisor of Shipbuilding Groton.

DISS is the preferred method for passing visit requests.

Draper Laboratory. The DISS SMO is S19934. Important information to include to prevent visit request being rejected; The (Reason for Visit) “Pro-Summer Course,” (POC) “Mark Morgenstern,” (POC Phone)
“617-258-3431,” (visit access) “secret,” along with the specific dates of your course (NOT for an entire year), will be needed to process your DISS visit. Visits should be processed at least **five (5) working days** prior to the start of your course to ensure adequate processing time.

If your clearance cannot be sent via DISS, a Visit Authorization Letter (VAL) will need to be faxed to The Charles Stark Draper Laboratory, Inc.

**NOTE:** The VAL should be sent on your letterhead to include name, address and telephone number of the commercial or government entity (CAGE Code), certification of the level of the facility clearance, full name of course attendee, SSN, citizenship, date and place of birth, specific dates of visit for your course (NOT for an entire year), the purpose of the meeting (Pro-Summer Course), your Draper point of contact (Mark Morgenstern, 617-258-3431) and your clearance information. Please specify if you are a student or an instructor.

The Charles Stark Draper Laboratory, Inc.
555 Technology Square
Cambridge, MA 02139-3563
Attn: Rachel Malcolm, Room 1004
DISS SMO: 519934
rmalcolm@draper.com
Tel: 617-258-1859
Fax: 617-258-2000

If you need to check on status of your visit request contact Draper's Personal Security office at persec@draper.com 617-258-1844.

**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) “860-772-7852”, (visit access) “secret”, (Date) “7/25/22” (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.