

WEAPONS EFFECTS AND SHIP/SUBMARINE SURVIVABILITY

AUGUST 5 – AUGUST 9, 2024

LECTURER-IN-CHARGE: Mr. Brian Beechener, Program Manager, Ship Survivability and Maritime Lethality Program Office, NSWC Carderock Division

TUITION: \$2887

DAILY CLASS ROUTINE:

Monday: Classroom facility opens at 0730 and will be secured at 1700.
Class begins at 0800 and ends at 1700 with a 1-hour break for lunch.
Optional ice breaker after class – Za Pizza, 350 Third Street, Cambridge.

Tuesday: Classroom facility opens at 0730 and will be secured at 1700.
Class begins at 0800 and ends at 1700 with a 1-hour break for lunch.

Wednesday: Classroom facility opens at 0730 and will be secured at 1700.
Class begins at 0800 and ends at 1700 with a 1-hour break for lunch.

Thursday: Classroom facility opens at 0730 and will be secured at 1700.
Class begins at 0800 and ends at 1700 with a 1-hour break for lunch.

Friday: Classroom facility opens at 0730 and will be secured at 1200.
Class begins at 0800 and ends at 1200.

COURSE DESCRIPTION AND OBJECTIVE: The objective of this course is to provide an overview of technical principles and concepts underlying (1) the damaging effects of weapons on ship and submarine structures and equipment, and (2) the protective features that can be incorporated to mitigate these effects in ship and submarine design.

Weapons explosion phenomena and damaging effects will be discussed for most types of weapons ranging from small arms, through conventional high-explosive anti-ship and anti-submarine weapons to weapons of mass destruction. Emphasis will be on the mechanical effects of conventional weapons phenomena. Protective features such as armor, ballistic protection, torpedo side protection, equipment shock hardening, improved compartment and equipment arrangements, and hull strengthening will be discussed.

The subject material will be presented to give the student an overall comprehension of how ship and submarine systems consider weapons effects in the ship design process, including examples from recent acquisition programs. The intent is not to teach the intricate design details of armor, shock hardening, etc., but to introduce the subject and bring the concepts together as a whole. There will be opportunity for student participation in informal discussions and classroom work problems.

The following topics will be covered:

- Explosion Phenomena
- Damage Mechanisms

- Destroyer Sized Ships - Weapons Damage and Protection Features
- Large Ships - Weapons Damage and Protective Features
- Submarines - Weapons Damage and Protective Features

LECTURERS

Mr. Manik Anand	Project Engineer, Vulnerability Assessment Branch, NSWCCD
Mr. Owen McGarity	Project Engineer, Vulnerability Assessment Branch, NSWCCD
Mr. Ben Medina	Project Engineer, Vulnerability Assessment Branch
Mr. Domenic Urzillo	Project Engineer, Underwater Explosions R&D Branch, NSWCCD
Mr. Mike Miraglia	Project Engineer, Hull Response & Protection Branch, NSWCCD
Mr. Eric Walzer	Project Engineer, Hull Response & Protection Branch, NSWCCD
Dr. Ken Nahshon	Project Engineer, Hull Response & Protection Branch, NSWCCD
Mr. Joseph Walther	Project Engineer, Hull Response & Protection Branch, NSWCCD
Mr. William Hoffman	Project Engineer, Hull Response & Protection Branch, NSWCCD
Mr. Keith Webster	Project Engineer, Hull Response & Protection Branch, NSWCCD
Mr. Laurent Edgell	Project Engineer, Vulnerability Assessment Branch, NSWCCD
Mr. Brian Lang	Head, Underwater Explosions R&D Branch, NSWCCD

Special Note: This course contains material governed by Distribution Statement D. Distribution is authorized to the Department of Defense and U.S. DoD contractors only. Other requests shall be referred to NAVSEA 05P1 via the Lecturer-in-Charge, Mr. Brian Beechener (brian.beechener@navy.mil; 301-227-4075).

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/NORFORN. It is open to active-duty U.S. military, U.S. government employees, and U.S. civilian contractor personnel with U.S. government sponsorship. It is NOT open to foreign nationals. A SECRET security clearance is required. A current U.S. Government ID or current Passport will be required each day to obtain a badge for classroom access. The course is limited to 36 students. Students with appropriate clearances that are outside of DoD must apply by 30 April 2023 to allow time for 'need to know' to be established and approval received through appropriate channels.

APPLICATION AND TUITION PAYMENT: Course enrollment is limited. Seats are reserved in order of receipt of complete applications with 'confirmation of enrollment' upon receipt of payment or obligation of funding through your training coordinator (SF-182).

Note: If course demand is high, 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 provided an application is received and their security clearance is processed by Draper Laboratory.

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: 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.