

NS 3325 Naval Weapon Systems

Fall 2026, Section A

3.0 Credits

Course Location and Meeting

Tuesday/Thursday, 0800-0915

O'Keefe Building, Second Floor, Navy Classroom (Room 210)

Instructor

LT Robert Guild

Email

rbguildjr@gatech.edu

Office Hours & Location

O'Keefe, Room 212G

M, W 0900-1000

or by appointment

General Information

Course Description

This course is designed to provide a comprehensive technical and operational overview of U.S. Navy weapon systems and the sensor, combat, and control architectures that support them. The course examines the detect-to-engage sequence and covers radar, sonar, electronic warfare, electro-optics, fire control, ballistics, propulsion, guidance, fuzing, warheads, undersea weapons, nuclear systems, and emerging technologies. Emphasis is placed on system-level understanding, physical principles, operational tradeoffs, and the role of weapon systems in sea control and power projection.

Learning Objectives

- Explain the Detect-to-Engage sequence
Describe how sensors, combat systems, command and control, and weapons integrate to defeat threats to naval warfare.
- Apply fundamental physical principles to the naval warfare domain
Analyze the implementation of electromagnetics, acoustics, optics, and ballistics to the operation and performance of naval sensors and weapon systems.
- Analyze RADAR and SONAR systems
Understand systems metrics and impacts relating to performance factors, tracking methods, signal processing, and environmental effects.
- Describe the principles of operation and employment of electronic warfare systems
Explain detection, deception, protection, and countermeasures.
- Analyze fire controls concepts
Apply relative motion, interior and exterior ballistics, and the factors influencing weapon accuracy and effectiveness.
- Examine weapon propulsion, guidance, fuzing, and warhead architecture
Analyze how design choices impact reliability, effectiveness, and mission suitability.
- Assess the capabilities and limitations of major weapons systems.
Differentiate the platforms employed by the Navy and the weapons employed thereon.
- Understand the role of Cyber Warfare

April 10, 2026

(Subject to Change)

- *Describe the application of cyber warfare to modern naval operations.*
- Demonstrate system level thinking
Analyze and communicate the technical, environmental, and operational factors that influence naval combat.

Course Texts

(1) Payne, Craig. Principles of Naval Weapon Systems Second Edition. Annapolis, MD. Naval Institute Press, 2010

*Course texts are loaned to students but are subject to availability with priority going to NROTC students.

Course Learning Management Software

canvas.gatech.edu

Grading

Assignment	Date	Weight (Points)
Quizzes	N/A	100
Platforms Quiz	27AUG	100
Exam I	01OCT	200
Exam II	05NOV	200
Platform Presentation	01DEC/03DEC	200
Final Oral Board	10-17DEC	200
Total		1000

Description of Graded Components

Quizzes

Quizzes will occur at my discretion and will cover any material discussed or read. Generally, a short quiz will take place each class meeting period. The format will always be short answer. The lowest four quiz scores will be dropped.

Platforms Quiz

The platforms quiz will specifically cover the identification, capabilities, and limitations of United States Navy platforms.

Exams

All exams will be conducted in class and will cover any material discussed or read.

Platform Presentation

Individually, students will present (~10 minutes) an analysis of a United States Naval platform, applying principles from this course. The analysis will include discussion of onboard

sensors, weapon systems, capabilities, and likeness to adversary platforms. A complete assignment guide and grading rubric will be provided on the course LMS.

Final Oral Board

The final oral boards will be given at the end of the course, individually. The student is expected to answer course related questions with high accuracy, to include drawings and analysis of large course concepts.

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

No grades will be curved. Final grades will be rounded up if within 0.50% of the next grade.

Regrading

Regrading must be requested via email within 24 hours of an assignment being returned. Regrade requests cannot be submitted for any grades higher than 80%. The request should stipulate the issue of concern and will typically be honored only in cases of an obvious oversight on the part of the grader. A regrade will constitute a complete reassessment of the concerned portion; the score will not always increase.

Late/Missed Assignments

Any assignment not submitted on time or an assessment not begun on time due to an unexcused absence will result in a loss of 10% from the assignment score for each day late. Assignments not submitted or made up within three days will not be accepted for any credit. An assignment submitted, or an assessment begun, one second after the scheduled time constitutes late submission of one day and so forth for every 24-hour period thereafter. Refer to the attendance policy for assignments missed due to institute approved absences.

Late quiz submission or make-up will not be permitted unless due to an institute approved absence as outlined in the attendance policy. Note that the lowest four quizzes are dropped.

Course Expectations & Guidelines

Academic Integrity

Cheating, plagiarism, and all forms of academic dishonesty are expressly forbidden in this class, and by the university's Honor Code (<http://honor.gatech.edu/content/2/thehonor-code>). Any form of cheating will immediately earn you a failing grade for the assignment, and I will pursue further disciplinary actions according to Georgia Tech's policies and procedures (see

http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code#Article_II:_Academic_Honor_Code for more information on this).

Academic misconduct is any act that does or could improperly distort Student grades or other Student academic records. Such acts include but need not be limited to the following:

- Unauthorized Access: Possessing, using, or exchanging improperly acquired written or verbal information in the preparation of a problem set, report, essay, examination, or other academic assignment.
- Unauthorized Collaboration: Unauthorized interaction with another Student or Students in the fulfillment of academic requirements.
- Plagiarism: Submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating the authorship.
- False Claims of Performance: False claims for work that has been submitted by a Student.
- Grade Alteration: Alteration of any academic grade or rating so as to obtain unearned academic credit.
- Deliberate Falsification: Deliberate falsification of a written or verbal statement of fact to a Faculty member and/or Institute Official, so as to obtain unearned academic credit.
- Forgery: Forgery, alteration, or misuse of any Institute document relating to the academic status of the Student.
- Distortion: Any act that distorts or could distort grades or other academic records.

Faculty are responsible for the academic integrity of their classroom. If I have reason to believe that a breach of the Honor Code has been committed, I am obligated to report the offense to Student Honor Committee and the unit chain of command.

The flagrancy of the violation determines which course of action the instructor or student is expected to follow. The option of warning the student personally is open to the instructor only in the event of minor suspicion or if there is no evidence available. If suspicion is strong or if evidence is available, the instructor is obligated to report the incident to the Student Honor Committee and the unit chain of command.

Accommodation for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible to set up a time to discuss your learning needs.

Attendance

Students are responsible for all material covered in their absences, and they are responsible for the academic consequences of their absences. Students should discuss planned absences with their instructors as soon as possible after the beginning of an academic term.

All lecture slides will be posted to the course canvas page following the lecture.

April 10, 2026
(Subject to Change)

In the event of an illness that requires medical attention, students are responsible for contacting the Office of the Vice President for Student Life and Dean of Students as soon as possible to report the medical issue or emergency, providing dated documentation from a medical professional and requesting assistance in notifying their instructors.

Students who are absent because of participation in approved Institute activities (i.e. field trips, professional conferences, athletic events) will be permitted to make up the work missed. Approval of such activities will be granted by the Student Academic and Financial Affairs Committee of the Academic Senate, and statement of the approved absence may be obtained from the Office of the Registrar.

I respect your right to observe your religion and will do what I can to accommodate your needs. With this in mind, you are permitted to be absent from class to take part in religious observances. For planning purposes, I ask that you provide me with written notice of your upcoming absence within the first two weeks of class. For more information on Georgia Tech's policy regarding student rights and responsibilities around planned absences from class, please see <http://catalog.gatech.edu/rules/4/>.

Communicating all absences is key to success.

Confidentiality of Student Information

All faculty must report allegations of sexual misconduct and intimate partner violence to the Title IX Coordinator. In addition, all faculty are obligated to report any allegations of discrimination to the Office of Human Resources. I encourage you to talk with me about an incident if you think I can be helpful—I just want you to understand my reporting obligations before doing so.

Honor Code

Cheating, plagiarism, and all forms of academic dishonesty are expressly forbidden in this class, and by the university's Honor Code (<http://honor.gatech.edu/content/2/thehonor-code>). Any form of cheating will immediately earn you a failing grade for the assignment, and I will pursue further disciplinary actions according to Georgia Tech's policies and procedures (see http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code#Article_II:_Academic_Honor_Code for more information on this).

Academic misconduct is any act that does or could improperly distort Student grades or other Student academic records. Such acts include but need not be limited to the following:

- Unauthorized Access: Possessing, using, or exchanging improperly acquired written or verbal information in the preparation of a problem set, laboratory report, essay, examination, or other academic assignment.
- Unauthorized Collaboration: Unauthorized interaction with another Student or Students in the fulfillment of academic requirements.

- Plagiarism: Submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating the authorship.
- False Claims of Performance: False claims for work that has been submitted by a Student.
- Grade Alteration: Alteration of any academic grade or rating so as to obtain unearned academic credit.
- Deliberate Falsification: Deliberate falsification of a written or verbal statement of fact to a Faculty member and/or Institute Official, so as to obtain unearned academic credit.
- Forgery: Forgery, alteration, or misuse of any Institute document relating to the academic status of the Student.
- Distortion: Any act that distorts or could distort grades or other academic records.

Faculty are responsible for the academic integrity of their classroom. If I have reason to believe that a breach of the Honor Code has been committed, I am obligated to report the offense to Student Honor Committee and the unit chain of command.

The flagrancy of the violation determines which course of action the instructor or student is expected to follow. The option of warning the student personally is open to the instructor only in the event of minor suspicion or if there is no evidence available. If suspicion is strong or if evidence is available, the instructor is obligated to report the incident to the Student Honor Committee and the unit chain of command.

Collaboration, Group Work, and use of Generative AI

Students are encouraged to discuss class content and ask each other questions. However, quizzes and exams shall not be shared.

In this course, the use of Generative AI tools is encouraged as part of your learning and creative process. These tools can support brainstorming, revising drafts, exploring alternative perspectives, and practicing communication with emerging technologies. However, responsible use is expected.

All submitted work that included the use of AI must include a brief AI Usage Statement outlining:

- Which tools were used
- When they were used
- What prompts or questions were given
- How the AI output informed or shaped your final submission

You are expected to critically engage with any AI-generated content and ensure your final work reflects your own understanding and academic voice. Generative AI should never be used to fabricate data, cite non-existent sources, or bypass learning objectives. Use of Generative AI must comply with Georgia Tech's Honor Code and academic integrity guidelines.

Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Student Use of Mobile Devices and Laptops in the Classroom

Cellphones shall not be used in the classroom. Laptops may be used at my discretion. If you have a need to take notes on a computer, send me an email and we will figure out a solution on a case-by-case basis.

Food and Drink in the classroom

No food is permitted in the classroom. Please only have sealable drinks.

Uniform and Appearance

Midshipmen shall arrive to class in the uniform of the day and well-groomed. I ask civilian students to adhere to a business-casual dress code.

Campus Resources for Students

The mental health of my students is one of my top priorities. In the event you do need help, please reach out to the Counseling Center at Georgia Tech. While I am willing and able to be a resource, I am required to report on anything I learn about that may threaten you or others in any way. A list of resources for undergraduate students' academic success and information about advising can be found at [Success at Tech](#)

Teaching Philosophy

I want to focus on the following attributes over my time teaching at Georgia Tech. You will find these exceptionally important when you go out to the fleet, in my experience. I will abide by these and I ask that you try to as well.

Humility

None of us ever know everything – there is always something we can work and improve on. Humility is also a matter of respect. Respect the learning process, and be self-aware enough to know that none of us have it all figured out.

Communication

Ensure that we are always on the same page. If we aren't, that's a problem! If you master this skill here, you will be ahead of your peers in the fleet. Make sure that I am up-to-date on things you think I need to know about, which is a skill in itself. I have an open door policy.

Patience

Be respectful when others are sharing opinions. Be kind in the face of adversity. You will need plenty of patience once you commission. Leading sailors is a blessing but can be extremely frustrating as well.

I hope you practice these attributes and join me in having a successful semester.

Submitted: Robert Guild Approved: H. S. Vasquez
R. B. GUILD, LT, USN H. S. VASQUEZ, CAPT, USN

Course Schedule

Date	Topic	Reading	Notes
25 Aug	Naval Platforms Overview		Intro + Book Issue
27 Aug	Detect-to-Engage Sequence		Platforms Quiz
01 Sep	Electromagnetic Wave Characteristics		
03 Sep	EM Wave Generation		
08 Sep	RADAR – Pulsed Principles		Labor Day (07SEP)
10 Sep	RADAR – Performance Factors		
15 Sep	RADAR – Tracking Systems		
17 Sep	Electro-Optics		
22 Sep	Principles of Underwater Sound		
24 Sep	Passive SONAR		
29 Sep	Active SONAR		Exam Review
01 Oct	Exam I		
06 Oct	No Class		Fall Break (05-06OCT)
08 Oct	Fire Control, Ballistics		
13 Oct	Weapon Architecture		
15 Oct	Guidance Systems		
20 Oct	Fuzing Systems		Platform Presentation Intro
22 Oct	Blast and Fragmentation Warheads		
27 Oct	Special Warheads, Damage Prediction		
29 Oct	Underwater Weapons		
03 Nov	Nuclear Weapons		Exam Review
05 Nov	Exam II		
10 Nov	Weapons Overview		Veteran's Day (11NOV)

April 10, 2026
(Subject to Change)

Date	Topic	Reading	Notes
12 Nov	Information Systems		Platform Presentation Review
17 Nov	Networking Basics		Oral Board Intro
19 Nov	World-Wide Web		
24 Nov	No Class		Thanksgiving Break (KSU/GSU)
26 Nov	No Class		Thanksgiving Break
01 Dec	Platform Presentations		
03 Dec	Platform Presentations		
08 Dec	Final Oral Board Practice		
10-17 Dec	Final Oral Board		Pending Final Exam Matrix

April 10, 2026
(Subject to Change)