

ANTH 616-600: Research and Reconstruction of Ships

Spring 2021 Syllabus

Course Information

Time: Friday 12:30-3:30

Location: ANTH 105 - ShipLAB

Credit Hours: 3

Instructor Details

Instructor: Dr. Carolyn Kennedy

Office: ANTH 107D, Remote via zoom (preferred)

Office Hours: MW 12-2 (campus); TR 11:30-1:30 (remote only)

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Course Description:

This course is an introduction to the basic technical skills required for recording, representing and interpreting ship archaeological remains. Students are expected to develop a practical approach to the conceptualization and design of a ship. This course is divided in three parts: recording a shipwreck, reconstructing a ship from its archaeological remains, and producing a comprehensive ship project.

Course Learning Outcomes

- a) the particular vocabulary of shipbuilding;
- b) the basic rules and methods to map an archaeological site;
- c) the basic rules and methods to record hull remains: how to quantify and represent 3D curves on paper and how to produce a clear and comprehensive set of documents with all relevant records pertaining to a particular set of ship's hull remains;
- d) the basic principles of ship construction, in terms of the structural components of a ship and its construction sequence;
- e) the process of designing a ship's hull in the three standard views of the so-called "lines drawings" of a vessel;
- f) the basic rules to reconstruct an archaeologically excavated ship's hull and formulate an educated guess about the vessel's probable size, shape, and structural composition;
- g) the standards for graphic representation of ship's hulls and their components;
- h) the basic rules of hull analysis.

Required Texts:

Steffy, J. Richard. 1994. *Wooden Ship Building and the Interpretation of Shipwrecks*. College Station, TX: Texas A&M University Press.

Materials:

- Mechanical pencils (0.3 & 0.5 mm lead drafting pencils are ideal)
- Spare leads (H or 2H leads are less likely to smudge)
- Erasers
- Triangles
- Dividers

Grading Policy:

Grades will be based on six lab projects and one term project.

Lab Projects

1) Elementary Lines:

Draw the lines of a generic hull, 45 cm long, 15 cm in beam. There should be two waterlines, one buttock line, at least five sections, and a single diagonal. Do not worry about keels, rabbets, or any other refinements. The primary goal here is to produce a set of fair, properly justified lines. This drawing should be properly titled, dated, and signed. The project is due at the beginning of class in **Week 4**.

2) Slightly More Complicated Lines:

Draw the lines of a vessel 20 meters long, six meters in beam, with a draft amidships of 2.2 meters. The vessel should have a transom and a rabbeted keel, stem, and sternpost. There should be a deck, and the location of its outboard edge should be indicated by a dashed line on all three views. Draw this vessel at scale 1:50, and provide a graphic scale of the proper form. The drawing will be graded on the basis of accuracy (agreement of points between views; each point out of agreement by more than 0.5 mm is 1.6 points off), completeness, fairness, and neatness. This drawing should be properly titled, dated, and signed. The project is due at the beginning of class in **Week 5**.

3) Hull Calculation:

Calculate the displacement and basic hull coefficients (block, prismatic, midships, waterplane) for the hull drawn for Project Number 2. You may submit the results either as a separate sheet, or as a neat table on the drawing itself. The project is due with Project Number 2 at the beginning of class on **Week 6**.

4) Mapping:

In groups of two or three, map a scatter of timbers using three different methods: 1) triangulation, 2) direct survey measurement (DSM), and 3) photogrammetry. First, define the parameters of the “site” by mapping the area and preparing a plan view that shows the locations of the datums. Then, record a sufficient number of points on each timber so that its orientation can be accurately determined within the plan view of the site. Your two plans (one for triangulation, one for DSM) are to be drawn at 1:10, must include a sketch of each timber (with its field number and its measured points clearly identified), and must also include the datum points, a north arrow, a metric scale, and a title block. Include, as well, a

table for each plan that lists the measurements from each datum to each measured point, the measurements taken to map the outline of the room, and the measurements between datum points. Your photogrammetry map should include scale bars and control points (targets) to scale the model. The project is due on **Week 7**.

5) **Fragment Recording:**

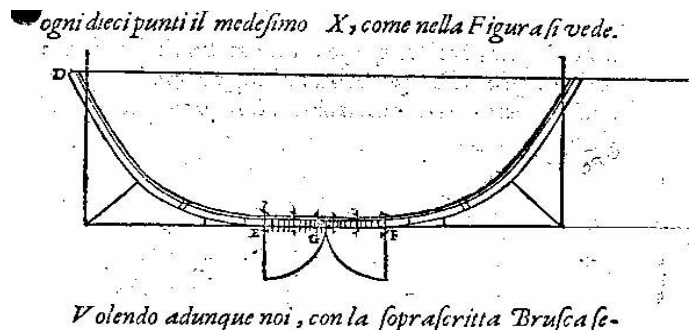
Record a fragment of a timber from the Ship Lab shelves. This should include one letter format data recording sheet and a 1:10 scale drawing with at least 3 views and one section showing the wood grain. The project is due at the beginning of class in **Week 8**.

6) **Recording Curves:**

In this assignment, you will record a frame using two different methodologies: 1) offsets, using a horizontal datum and plumb bob and 2) a digital goniometer. From your “field” data you will prepare a drawing showing the two frame sections, sequentially and not superimposed, at a scale of 1:10,

with each point plotted. The horizontal plane must be indicated, as well as the angle of list as determined from the top of the keel. Selecting the section you feel is most accurate, you will then prepare a complete section drawing of the frame at 1:10 showing its molded dimensions, the overlap and

fastening of the floor and futtock, as well as the dimensions, locations, details of the keel and planking. Both of your completed section drawings must include metric and **Imperial scales** and a title block. Finally, prepare tables of offsets and (digital goniometer). Project is due on **Week 9**.

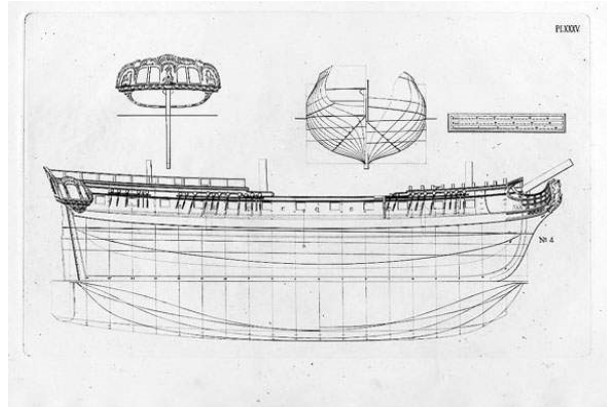


Project No. 6 Checklist:

- Pencil drawing showing two frame curvatures.
- Pencil drawing of detailed frame section.
- Tables of offsets and goniometer measurements and readings.

Term Project

Seventy-five percent of your final grade will depend on an individual ship report. This will consist of a short (2,000 words or so) analysis of the vessel's purpose, form, and construction, a scantling list, a *scrapbook*, and a set of drawings. The scrapbook text should not be merely a description of the vessel (that is the purpose, of the drawings), but an account of your choices: why it was built the way it was and how it was suited to its purpose. ***I expect your scrapbook to be illustrated with sketches***



and figures that document your choices in the process of reconstructing your ship. Topics you might address include choice of materials and fastening methods, vessel size and cost, function, performance, and durability. Include a bibliography of your principal sources.

The final report must include an *Introduction*, a description of the vessel of your choice, a description of the sources you used, a description of the result, with illustrations (sketches, sources, details, solutions), a discussion of your choices and, where appropriate, what you would change, and a hull analysis section. The hull analysis section must include a table of the *principal dimensions of your vessel* in metric units (with contemporary equivalents), a *scantling list*, and your calculation of the size of the vessel in both a neutral modern unit (metric tons *displacement*) and appropriate contemporary units. For example, the size of the Kyrenia ship was reckoned by the number of amphorae it could carry, while the Bremen cog was measured in grain lasts. For some vessels, you may need to furnish other information, such as the weight of the armament for warships. In addition to the displacement, please include a table of the main hull coefficients. All drawings and tables must be included in your report in letter format, paginated and with captions indicating each operation, especially your hull calculations and coefficients. The drawings must include at least the following:

1. A complete set of lines;
2. Construction plans:
 - a. Longitudinal section;
 - b. Two transverse sections (one at the widest point on the hull);
 - c. Plan of main deck.

All drawings must be labeled (project name, drawing description, your name, scale, and date completed) and signed by you. Neatness counts, but pencil final copies are fine. Inked final drawings look nice, but if you do not already have extensive inking experience, ruining a final copy is a poor way to get it; concentrate on good pencil work instead.

The vessel to reconstruct must have enough archaeological data and:

1. It must be built of wood.
2. No dugouts, rafts, birch bark canoes, etc.
3. No pleasure craft.
4. It must be at least 10 meters long, but no more than 40 meters.
5. It should not have elaborate castles or deck structures.
6. It may not be a specific vessel for which plans already exist, or a direct copy of such.

You will find that some vessels are simply not practical for a semester project: 100-gun ships of the line, for example. Within the limits above, the possibilities are endless. This project is supposed to be fun, so use your imagination.

Helpful hint: start early and work on the written report as you draw. Read Dr. Crisman's "*Guidelines for writing your Term Paper.*" This project is not just a test of your drafting skills. The grading is as follows: 15% on lines, 40% on construction drawings, 20% on the written portion. This raw grade is then multiplied by a coefficient



between 0.9 and 1.1, which represents, for lack of a better term, degree of difficulty. Those who attempt more will receive credit for it. At the same time, this coefficient is a measure of how broad your research was and how effectively you have distilled the available evidence into a believable reconstruction. For example, a copy of a simple ship, such as one of the Zwammerdam barges, which does not take into account evidence from other vessels of the period, would receive a low coefficient, perhaps 0.93. On the other hand, an attempted reconstruction of real field data from an excavated wreck that has not yet been studied would require a great deal of extra effort and broad research to fill in the holes, and would thus receive a high coefficient, perhaps 1.03. This project is a chance to do original research and to communicate the results of research and analysis in a clear, understandable product.

Get started on the research and decision-making for this project early. Avoid the trap of over-researching, trying to get every detail right before you start drawing. Very often, the best way to find out what you do and do not know about your ship is to start drawing, and the process of drawing will help you to plan further research. The lines must be completed by the beginning of class in **Week 9**; you will need the time after that to complete the construction drawings and the written report. A scantling list and midships construction section must be completed by the beginning of class in **Week 10**. The construction drawings should be completed by **Week 12**. Finally, **the project is due at the beginning of class on Tuesday, May 4th, 2021**. Don't even think of being late - turn in what you have done. Late projects will lose a letter grade (10%) per day late.

Checklist for submission:

- Drawings (lines, construction, deck)
- Title blocks on all drawings
- Written analysis and bibliography
- Principal dimensions
- Scantling list
- Calculated displacement and hull coefficients (with worksheets showing calculations)

Written portion:

A short, written report, about 2,000 words. Presented in the IJNA format, Times New Roman 12, double line spacing, with a cover page and bibliography:

1. Introduction
2. Description of the vessel chosen
3. Research
4. Final result
5. Hull Analysis
 - 5.1. Principal dimensions
 - 5.2. Scantling list
 - 5.3. Hull calculations
 - 5.4. Coefficients
6. References (reference page should not include page numbers)

Summary of Assignments:

Lab Project 1 (Hull lines)	= 5 %
Lab Projects 2-6 (4% each)	= 20 %
Final Project	
Paper	= 20 %
Lines	= 15 %
Construction Drawing	= 40%
Total	=100 %

Grading Scale

A	90%
B	80%
C	70%
D	60%
F	<60%

Course Schedule

(Subject to Change)

Week		Activities/ Assignments Due	Topic	Readings
1	Jan 22	Review course requirements & syllabus	Introduction to the course, syllabus, writing guidelines.	Steffy, <i>Wooden Ship Building</i> , review the terms and diagrams in the illustrated glossary, pp. 266-298.
2	Jan 29	Begin Project No. 1 (draw the lines of a small vessel, according to the requirements set out in the assignment sheet). Due by Week 4.	Introduction to Hull Lines. Understanding Hull Lines: Sheer, Half-breadth and Body Plans.	Steffy, <i>Wooden Ship Building</i> , pp. 8-20. Kennedy, 2016, Ship Lines Instruction Manual.
3	Feb 5	Project No. 2 (draw the lines of a 20-meter vessel according to the requirements set out in the assignment sheet). Due by Week 5.	Hull Lines, Continued. Diagonals, Rabbits, and Transoms.	Kennedy, 2016, Ship Lines Instruction Manual. Kennedy, 2019, The History and Archaeology of the Lake Champlain Steamboat <i>Phoenix II</i> (1820-1837), Doctoral Dissertation, Department of Anthropology, Texas A&M University, College Station, TX: pp 158-183.
4	Feb 12	Begin Project No. 3 (calculate displacement and hull coefficients for the lines drawn for Project No. 2). Due by Week 6.	Basic Hull Analysis. Tonnage, Displacement, and Performance.	Steffy, <i>Wooden Ship Building</i> , Appendices A and B, pp. 251-255. Gilmer, Thomas C. and Johnson, Bruce. Introduction to Naval Architecture. Annapolis, MD: Naval Institute Press, 1982, pp. 37-59. Chapelle, Howard. The Search for Speed Under Sail. New York: W. W. Norton & Co., 1967, pp. 3-51.

5	Feb 19	Begin Project No. 4 (record a timber scatter according to the requirements set out in the assignment sheet). Due by Week 7.	Recording Shipwreck Sites and Hull Structure. Introduction to Surveying and Mapping.	<p>Castro et al., 2018, Recording Early Modern Hull Remains, ShipLAB Report 35 Draft 1: pp 1-9.</p> <p>Batchvarov, K., 2020, A Method for Documenting Hidden Structures on Shipwrecks: the case of <i>Vasa</i> and <i>Warwick</i>, <i>IJNA</i>, 49.1, 65-71.</p> <p>Rule, N., 1989, The Direct Survey Method (DSM) of underwater survey, and its application underwater, <i>IJNA</i>, 18.2, 157-162.</p> <p>Steffy, <i>Wooden Ship Building</i>, pp. 189-213.</p>
6	Feb 26	Begin Project No. 5 (record hull timbers according to the requirements set out by your instructor). Due by Week 8.	Recording Timbers and Fragments.	<p>Castro et al., 2018, Recording Early Modern Hull Remains, ShipLAB Report 35 Draft 1: pp 10-18.</p>
7	Mar 5	Begin Project No. 6 (Record the curvature of a frame using offsets, a bevel-gauge goniometer, and a digital goniometer, according to the requirements set out by your instructor). Due by Week 9.	Recording Intact Structure & Curves.	<p>Castro et al., 2018, Recording Early Modern Hull Remains, ShipLAB Report 35 Draft 1: pp 19-42.</p> <p>Cozzi, Joseph. "The Goniometer: an improved device for recording submerged shipwreck timbers," <i>International Journal of Nautical Archaeology</i>, Vol. 27, No. 1 (1998), pp. 64-80.</p> <p>Kennedy, 2019, The History and Archaeology of the Lake Champlain Steamboat <i>Phoenix II</i> (1820-1837), Doctoral Dissertation, Department of Anthropology, Texas A&M University, College Station, TX: pp 167-183. (Review)</p>

8	Mar 12	Work on Term Project.	Recopying and Drafting Field Measurements. From Field Notes, to Notebooks, to Drafting Table.	Anderson, Jr., Richard K. <i>Guidelines for Recording Historic Ships</i> . Washington, D.C.: National Park Service, U.S. Department of the Interior, 1988, pp. 4.3.1- 4.6.92.
9	Mar 18	Work on Term Project.	Digital reconstructions	Dostal, C., Fix, P., Kennedy, C., Herbst, J., Shultz, L., Borrero, R., 2020, Integrating digital and conventional recording techniques for the documentation and reconstruction of an 18 th -Century wooden ship from Alexandria, VA, <i>Digital Applications in Archaeology and Cultural Heritage</i> , 16 , 1-10.
10	Mar 26	Work on Term Project.	Materials and Tools for Shipbuilding. Ship Timber and Tools of the Shipwright's Trade.	Steffy. <i>Wooden Ship Building</i> , pp. 256-259. Horsley, John. <i>Tools of the Maritime Trades</i> . Camden, ME: International Marine Publishing Co., 1978, pp.70-157.
11	Apr 9	Work on Term Project	Guest Lecture, Kevin Crisman.	TBD
12	Apr 16	Work on Term Project	Guest Lecture, Kevin Crisman	TBD
13	Apr 23	Work on Term Project	Open Lab Day	
14	Apr 28	Present Term project	Student Presentations	
15	May 4	Term Projects Due by 5pm		

Late Work Policy

Late work will be penalized by one letter grade (10%) every day late. (Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy. See [Student Rule 7.](#))

Diversity in the Anthropology Classroom

Respect for cultural and human biological diversity are core concepts of Anthropology. Anthropological research provides perspectives and data that can be used to examine many current social issues that may be appropriate to discuss in this class. Students and faculty should expect to both defend and critique diverse points of view in a respectful manner. Please respect the different experiences, beliefs and values expressed by your fellow students and instructor, and refrain from derogatory comments about other individuals, cultures, groups, or viewpoints. There is no justification for discrimination or hateful speech or behavior in any form. The Anthropology Department supports the Texas A&M University commitment to diversity, and welcomes all individuals regardless of all age, background, citizenship, disability, education, ethnicity, family status, gender, gender identity, geographical origin, language, military experience, political view, race, religion, sexual orientation, socioeconomic status, and work experience (See <http://diversity.tamu.edu/>).

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments. Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. ([See Student Rule 24.](#))

Academic Integrity Statement and Policy

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one’s work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case” ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at <https://aggiehonor.tamu.edu>.

***NOTE:** Faculty associated with the main campus in College Station should use this Academic Integrity Statement and Policy. Faculty not on the main campus should use the appropriate language and location at their site.*

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit <https://disability.tamu.edu>. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

***NOTE:** Faculty associated with the main campus in College Station should use this Americans with Disabilities Act Policy statement. Faculty not on the main campus should use the appropriate language and location at their site.*

Title IX and Statement on Limits to Confidentiality

Texas A&M University and the College of Liberal Arts are committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws provide guidance for achieving such an environment. Although class materials are generally considered confidential pursuant to student record policies and laws, University employees — including instructors — cannot maintain confidentiality when it conflicts with their responsibility to report certain issues that jeopardize the health and safety of our community. As the instructor, I must report (per Texas A&M System Regulation 08.01.01) the following information to other

University offices if you share it with me, even if you do not want the disclosed information to be shared:

Allegations of sexual assault, sexual discrimination, or sexual harassment when they involve TAMU students, faculty, or staff, or third parties visiting campus.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In many cases, it will be your decision whether or not you wish to speak with that individual. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the Student Counseling Service (<https://scs.tamu.edu/>).

Students and faculty can report non-emergency behavior that causes them to be concerned at <http://tellsomebody.tamu.edu>.

COVID-19 Temporary Addendum to Minimum Syllabus Requirements

The Faculty Senate temporarily added the following statements to the minimum syllabus requirements in Spring 2021 as part of the university's COVID-19 response.

Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Spring 2021 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely if that option is available, and should not participate in face-to-face instruction.**
- Face Coverings—[Face coverings](#) (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the [Face Covering policy](#) and [Frequently Asked Questions \(FAQ\)](#) available on the [Provost website](#).

- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must properly wear an approved face covering. If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the [Student Conduct office](#) for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students, or dismiss the class in the case of a traditional face to face lecture.

Personal Illness and Quarantine

Students required to quarantine must participate in courses and course-related activities remotely, if that option is available, and **must not attend face-to-face course activities**. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence (See [Student Rule 7, Section 7.2.2.](#)) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7.