Class Syllabus for
Maritime Robotics/Design & Fabrication

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Welcome to the Maritime Robotics/Design & Fabrication class at PTHS. This course has been created to give each student entry level experience in Rhino6CAD, fundamental drafting, design, basic fabrication, tool use, and a basic introduction to block programming and radio control technology. Through major projects, this class strives to incorporate real life work experiences, problem solving techniques, technical knowledge, leadership development, group collaboration, and technical skills to complete a series or challenging projects and exercises.
Throughout this program, you will explore design, drafting and fabrication through computer aided drafting (CAD) and manufacturing tools. In addition to real world skills, you will utilize creativity and tools to obtain experience in problem solving, critical thinking, communication skills, and teamwork. These are qualities needed to successfully enter trades school, college or a career.

This course has been broken up into 4 main "I will" goals:

Goal 1 – I can use hand illustrations, sketching, technical drawing and drafting skills to convey my ideas to team mates and others.
I will master the use of specific tools for measuring as well as master concepts and terminology in the area of Engineering.

Goal 2 – I will be able to work as a team to design and construct major projects to design specifications outlined by the instructor or the customer. I will develop basic skills in programing and/or the ability to utilize RC technology to accomplish the tasks outlined by the instructor. I will be able to demonstrate mastery of the necessary mathematics, physics, and communications concepts that are relevant to the construction of any minor or major project.

Goal 3 – I will learn fundamentals of CAD through the Rhino suite as well as make 2-D and 3-D objects using the Epilog laser cutter, 3D printers, and other CAD operated technologies. I will also learn how to properly use tools such as the laser cutter, 3D printer, CNC milling machines, hand drill, drill press, hand tools, grinder and sander for the fabrication and construction of projects issued throughout the year.

Goal 4 – I will be able to work independently or as a productive team member in a group, and complete any necessary assembly, programming, manufacturing tasks that will be needed to complete the project. I will be able to present my project to an audience using some form of communication.

- Energy Sources/Forms of Energy
- Energy Applications
- Machine Control
- Product Testing
- Basic Computer Programing
- Energy Applications
- Fluid Power
- Kinematics
- Material Properties
- Precision measuring, Applied Algebra, Geometry and possibly Trigonometry

Areas of study in this course include the following:

- History of Engineering
- The Process of Design
- Team Development
- Modeling
- Sketching
- Drafting/Mechanical Drawing Techniques
- Presentation and Delivery
- CAD/CAM
- Reverse Engineering
- Mechanisms

Course Materials and Resources:

· CAD tutorial DVDs will be provided by the instructor
· There may be a text book for this course this year (depending on what major project is assigned), but any reading materials will either be handed to you directly or you will be given the necessary on line address to access it.
· If you have a PC at home, you should consider signing up for RhinoCAD 5.0 – a trial period of this CAD suite may still be free. As long as you do not save your work, you can use this service as a way to practice your skills. If you like it, you may consider purchasing a lifetime license for about $200.
· There is a $25 materials fee for this class – please see the office staff if you have not submitted this fee

GENERAL CLASS PROCEDURES:

NOTEBOOKS

A. Each student will have a 1" (one inch) three-ring binder as a notebook for this class. A neat, organized and complete notebook is an integral part of the recipe for a successful experience in this class. If you have a record of your assignments in the notebook, missing assignments can be easily traced. Complete notebooks make doing homework easier and make success on exams and projects more likely. Please make it a point that all work done in this class is to the highest standards possible.

••Your lab notebook will have four main sections. These sections are in the order as follows:

1. Entry Section - This section includes a listing of the projects due and a space for the instructors signature when they are complete.

2. Daily Assignments, Notes and Work - This section includes all of the assignments and handouts that the student has obtained in class.

3. Projects and Tasks – This section includes illustrations, sketches and drawings (including CAD hard copies) done in class.

4. Tool Safety -- This section includes notes on tool safety.

B. You can take your notebook home for homework, to study for a quiz, to show your parent or guardian, or any time it is necessary. Because it is VERY IMPORTANT that you have your notebook in class, you are absolutely required to bring your notebook back to class at the beginning of the next day that the class meets. If you lose your notebook, you will have to replace it (no photocopies allowed). Please let the teacher know immediately if you have lost your notebook. A notebook grade will not be given to a missing notebook.

C. In the event of a notebook check, any points given will be lost if you do not have your notebook with you at the time of a notebook check.

DISCIPLINE

A. Talking when the instructor is talking, standing in areas which are off limits to students, horseplay, continuous improper language, writing on desks or behavior contrary to that described in this document, will result in a disciplinary action.

B. Unsafe shop practices (those activities that run contrary to machine and shop safety) will result in your removal from the class.

C. Insubordination, abuse or vandalism of shop or computer equipment and/or use of shop or computer equipment in a manner that they were not intended for, will result in the removal from the class. Any damaged or broken equipment resulting from these behaviors will be replaced at the student's expense and will include the time spent, by the instructor, to order a replacement.

D. For the safety of others, tampering with safety equipment may result in removal from the class.

E. Eating or drinking (except water in a clear plastic or stainless container) during class hours is prohibited. If you are eating or drinking (other than water), or an open food or drink container or package is exposed during class time, your food and/or drink will be taken away by the instructor, for good. No liquids will be consumed at the computer stations.

F. No bandanas or sunglasses will not be worn during the class period. They will be taken away and given back ***when it is convenient for the instructor***. No hoods will be worn in class.

G. Cell phones, i-pods, CD players and other electronic communication and entertainment devices will be confiscated if they are seen, used or heard in class without the instructor's permission. Confiscated items will be given to the office ***at the instructor's convenience*** for later disbursement (usually 24 hours).

H. When a substitute teacher is present, any identified behavior problems by the substitute will result in an automatic office referral–no questions asked.

I. Students who consistently do not participate in class activities, and/or keep an organized, up-to-date notebook will be considered as a noncompliant student and will be placed on a behavior modification plan. Failure to follow this plan will result in a removal from the class for the remainder of the semester.

Computers in Programming and CAD
The CAD and programming portions of this course contain the current software and hardware used in industry. This is an investment in your education. The use of these facilities and materials is a privilege.

You are responsible for the condition of the equipment. You will be using highly technical, sophisticated computers and equipment and must be treated as such. The following rules will be enforced at all times:
• No food, drink or gum in class or lab at any time.
• Please wash and dry hands thoroughly before using any computers or equipment.
• Keep all work areas neat and clean.
• Do not touch computer monitor screens.
• If you have computer problems call the instructor over. Never try to fix them on your own.
• Save all of your work files to your own account or, if it is to be cut on a machine, saved to a designated flash drive.
• Do not attempt to load or download anything from the class computers. Do not change the screen saver.
• All school rules and computer use rules pertaining to school computers apply to this class as well.

Machines and Tools:
You will also be expected to demonstrate technical competency in machine and tool operations, and you will be assessed on the safe and proper usage of the machine tool, knowledge of tooling and setup, and the overall quality of the product you fabricate.

Safety Examination:
As per state law, you will be required to pass a safety test(s) with a score of 100% and show competency in its use. Failing to meet that objective will not allow you to work with the tool in the fabrication lab.

You are allowed to take the safety test as many times as needed in order to pass, however, you cannot operate the tool or machine until you have passed the safety test and have shown competency in its operation.

GRADED DOCUMENTS

There are two main categories of assignments that are graded in this course – selected assignments and quizzes.

SELECTED ASSIGNMENTS

A. A **SELECTED** assignment is any assignment that you have been asked **to turn in for grading.** These assignments will always be turned into the "**In Box**" for paper assignments (unless otherwise stated by the instructor) or at a specific location in the room. All word text for **SELECTED** assignments that are "handed in" will be written in **black or dark blue ink, or in #2 pencil or word-processed only.** No odd colored pencils or inks will be accepted.

B. To receive full credit for a **SELECTED** assignment the following must occur:
• With the exception of orthographic and isometric illustrations or plans, it must be headed correctly with the student's full name then period (with a circle around it) above all other heading information, the date just below the name and period, then the science day number below the date (see example below right)
• It must be turned in on time for full credit.

John Doe 5

Day #12

C. In this class, late **SELECTED** assignments will be accepted but the scores will be reduced by 25%. Students are expected to turn in all assignments (even if they are late) and, when offered, to re-do assignments. If you were absent, you have as many days to turn in a **SELECTED** assignment as you were absent. After this time it will be late. All machine safety quizzes must be taken and passed with a score 100% (before repeat reductions).

D. If you forget to head your **SELECTED** assignment correctly (as described above), it will be handed back to you to complete the heading and you will only receive 75% of the original credit.

E. **SELECTED** ASSIGNMENTS are assessed as follows:

0% of point value = assignment was not turned in on time, was illegible, incomplete, or the instructor has not received it (or any combination of these three).

75% of point value = Assignment was turned in on time, was legible and complete (with viable answers to all portions of the assignment) but was not headed correctly.

100% of point value = Assignment was turned in on time, was legible, headed correctly and complete (with viable answers to all portions of the assignment).

F. The instructor can make ANY assignment a **SELECTED** assignment at any time. Be prepared for this and make sure that they are 100% complete, headed correctly, and finished on time.

QUIZZES

A. Any quiz you take in this class will test your comprehension of the material and your ability to apply it. Make sure you understand and master all that is done in class. You may have to get extra help in the areas that you are struggling with.

B. An oral quiz option can be made available for anyone with special needs. If this applies to you (and you probably already know who you are), you will be asked to answer questions covering the same material as on a written exam, but with an oral format. This option will be given by advanced appointment only and must be done within the retake weeks of the exam retake period.

C. Remember, this class, and all other classes, come before sports. If you need to get extra help before a quiz or to finish a project, tell your coach that you will be missing practice to get extra help. I will not accept the excuse of "I had to play sports" or "I had to go to practice" if you miss your opportunities to get help after school. Also, time periods between grade checks may be longer than a week. Failing grades may not be improved quick enough to play within a week.

CLASS EVALUATION

A. It is very important to remember that ***this instructor does not give you a grade – you earn it!*** Now that you are in high school, you have been granted full responsibility for your own success in this class. The grading scale for this class is as follows:

A = 93% - 100%	B = 83% - 86.99%	C = 73% - 76.99%
A- = 90% - 92.99%	B- = 80% - 82.99%	C- = 70% - 72.99%
B+ = 87% - 89.99%	C+ = 77% - 79.99%	D = 60% - 69.99%

F = Below 60% (see part D below)

B. All Incomplete grades (I) obtained on progress reports during the semester must be completed by the end of the semester or you will earn a failing (F) final semester grade.

C. Theft, extreme or repeated safety violations, chronic academic dishonesty (cheating), or repeated classroom behavior problems may be grounds for removal from class (sec #2, C). Papers may be taken away if cheating is suspected. Students will receive a zero for that activity.

D. There are four major items graded in this course:
1. Major Team Projects: This project represents the culmination of all of the technical, mechanical, computer and collaborative skills you have learned in this class. This includes any sketches, scaled mechanical drawings, rendered CAD illustrations, CAM tool pathways, parts and components and the final presentation and operator's manual (if assigned).

2. Course Content Work: This portion of the grade includes reading questions, assignments, and lab activities associated with the class.

3. Quizzes: These quizzes will cover book material, class material or be over material covered either in the CAD or programming section. It will also cover safety quizzes.

4. Personal Design Work: Work associated with any personal design and manufacturing assignments.

ABSENCE POLICY

This course is fast paced and lab/hands-on oriented. Real world work habits, technical knowledge and skill acquisition are best developed in the lab. To build these skills the student needs to be present, on-time and ready every day. Remember, you are part of a larger team and your skills, time and effort are very much needed for the success of the team.

A. Whether your absence is excused or unexcused, you are expected to do all work, hand in all **SELECTED** assignments and master all material missed during your absence. Keep in mind that "I was absent" will never be an acceptable answer for any Chapter Quiz question or any assignment question or project in this class.

B. If you were absent, please go to the attendance office first before entering the classroom. If you miss any class work because of your absence, follow these simple instructions:

1. DO NOT ask the instructor first upon your return. Ask your lab partner(s) for information missed during your absence.

2. Once you have found out what you have missed, obtain the necessary materials at an appropriate time during or after class.

3. DO NOT crowd the front of the room, or the instructor's desk, at the beginning of class. This stalls class time and will not be accepted.

C. It is your responsibility to ask another reliable student to help you obtain the handouts, lab work, activities and any other material that you missed when you were gone. Do not crowd the front of the room at the beginning of class. Ask for missing assignments at an appropriate time during or after class.

It is highly recommended that you get the email address and phone number of at least three ***reliable*** team mate or classmates in order to get missing work much easier and quicker. If you go to Mr. Behrenfeld's web site, all necessary papers and assignments will be found under the class heading: Maritime Robotics/Design & Fabrication.

D. Unless you have an excused absence the day of any Quiz or two or more consecutive days before the day of the quiz, be prepared to take it at its scheduled time.

E. Due to the nature of the machines, it is recommended that you do your best to make up assignments as quickly as possible.

F. Any **SELECTED** assignment that is turned in after the number of days you were absent will be considered as a late assignment and will not be given any points.

G. If you were absent on the day any **SELECTED** assignment or project was handed in, clearly place the word "ABSENT" at the top of the assignment or project and hand it in upon your return otherwise it will be considered a late assignment and its maximum point value will be 0%.

H. Leaving the classroom for any reason (except for emergencies) without prior written or verbal permission from the instructor will result in an unexcused absence.

I. Grades are maintained on the Skyward website. It may take a while for assignments to get entered after being graded. Please be patient. Late assignments take longer to enter.

I. See student handbook regarding number of absences and class eligibility.

TARDY POLICY

A. If you enter class late, give the instructor the tardy slip from the office. I do not accept tardy slips from anyone other than the person in charge of the attendance window next to the office. If you leave another class late, get that slip from the office!

B. The **excused tardy** has no consequences but you are responsible for ALL of the information you have missed.

C. An **unexcused tardy** is NOT accepted. If you come tardy to class unexcused without a note from the office, you will be counted as absent. If you have an unexcused tardy longer than 10 minutes, you should be counted as absent by office personnel.

D. This is a 10/10 class. Nobody will be excused 10 minutes after the starting bell or before the ending bell because this is instruction time so plan ahead of time. Obviously there are emergency exceptions to this procedure.

E. This is also a 12 absence class. Please see your student handbook if you have questions about this statement.

Note to self: You must have completed all computer use forms and understand that you are not to tamper with any of the computers in ways that are not outlined in this class. Do not alter the screen or any other part of the computer.

NOTE: The instructor's role in this class is that of a facilitator rather than a disseminator of rote facts and simple answers. This means that it is the student's responsibility to make sure that all assigned material is completed with a genuine effort to understand the material contained within. The instructor will not simply provide answers to content questions, but rather promote good reasoning and critical thinking skills to assist students in forming educated responses. Students are expected to approach topics with maturity, take ownership of their learning, and maintain a proactive stance in monitoring their progress in the course.