Introduction to Robotics (I2R) Course Syllabus

Introduction to Robotics is a hands-on, learn-by-doing course that will engage you in various design activities and challenges which will require you to develop your own original solutions to these problems.   You will be expected to learn the ROBOTC programming language and be able to design and build VEX robots in both individual & cooperative teams. You will cover basic programming and engineering topics such as simple machines, locomotion, gear ratios, feedback, loops, and algorithms etc. etc. I expect **you** to complete the assignments thoroughly and on time and I expect you to work hard to complete your challenges. If you do not meet these expectations, you will definitely not pass this course.

Course Framework

1. **Engineering Challenges and Investigations** - Most of the course time is used to design and construct various robots and mechanisms. Your constructions will be evaluated for its completion, creativity, and whether it meets all the goals of the challenge.   The engineering challenges serve as an assessment of how well you learned from and completed the preceding tutorials.   Each engineering challenge will have a predefined set of goals or rubric that will determine what grade you will receive.

2. **Deliverables** – Throughout this course, you will be assigned either a tutorial to learn the material or a report that is turned in at the completion of each engineering challenge. You are expected to complete your own unique deliverable whether a project is completed individually or in a group. Complete details on preparing a proper report are found on the back of this syllabus. These reports need to be completely word processed and will be uploaded to Turnitin.com for assessment.

3. **Quizzes** - There will be periodic quizzes to monitor and evaluate your completion of each tutorial.

4. **Binder** - During the course of this class, you will need to the maintain documentation of your findings, designs, tests, iterations, and reflections in a binder.   You will also be expected to organize and keep all of your deliverables in it, with each page numbered chronologically, and with a table of contents. If you have questions regarding this binder, please contact the teacher.

5. **Participation** - Because most of the course time is used to design, construct and program various robots, you will be expected to work hard and effectively during our limited class time. Each day you will be graded on how well you worked and whether or not you used your time in class wisely. You will receive or lose points on a weekly basis and your total will be updated and displayed on the class website.

6. **Online Resources** - Utilize the class website at www.mrhwang.com to access the class calendar, download assignments, determine your total discussion and participation points, and find tutorials or other supplemental learning materials. Access the locked areas using the class login: *guest* and the password: *sweet*.

Grading

1. **You grade will be determined by the standard district mandated scale of:**

90 - 100% of the total points will be an A
80 - 89.99% of the total points will be an B
70 - 79.99% of the total points will be an C
60 - 69.99% of the total points will be an D
 0 - 59.99% of the total points will be an F

2. **The total amount of points breakdown to approximately:**

Deliverables: 50%
Engineering challenges: 40%
Participation: 10%

3. **All students will receive a 1% bonus to their grade at the end of the semester. However, it will be forfeited if any of the following occurs:**
   ▪ you receive a disciplinary referral anytime during the semester including for tardiness
   ▪ cheating on ANY challenge, quiz, or deliverable (which includes plagiarizing)
   ▪ ditching or cutting class
   ▪ the teacher is forced to call home or contact your parent due to disciplinary reasons
   ▪ any letters or grade printouts that are sent home and not received by the parent.

4. **Otherwise, there will be NO curving or rounding up of grades.**

5. **Late assignments are worth 50% of their original points and can be turned in anytime before the end of the grading period.**

.Daily Procedures

1. Enter classroom, grab your laptop and other robotics materials, and start working.

2. With about 8 minutes left in class, you will put all your parts back into your box. You will save all your work and log off the computer. Then you will need to check around your workstation to make sure no parts have been dropped on the floor. Then you will return your box to the storage cabinet and take your battery pack and plug them in at the charging station. Finally, remain in your seats until I excuse you. Push in your chair as you leave.

Classroom Rules

1. **Be respectful.** When I or someone else is speaking, there should not be any other talking or noise. The speaker's words should not be distracted by someone else's comments. So listen for and carefully follow my directions.

2. **Be disciplined.** I expect everyone to come into class and to start working on their assignments without any prompting. Since you will not be able to work with the kits at home, our time in class is precious. You will go through and learn from the tutorials and document what is required in your journal to the best of your abilities. Do not waste your time by giving less than your full effort. You will not waste time socializing. You will not work on anything except for our assignments while in class. When you are done with a tutorial go on to the next one. When you are done with all the tutorials, move on to the engineering challenge. When done with that, figure out how you can make it better and finish up the deliverables. There is always something that you can do during our class time together.

3. **Be responsible.** The equipment that we are using is quite expensive and can be delicate as well. So all effort must be taken to prevent any damage or loss to them for future classes. Students who are grossly negligent will receive a referral and may be asked to pay for any

damage that they may incur. Also, these kits have very small pieces that are easy to misplace and lose. Every piece that is not picked up will cost the entire class 10 pts off of their grade regardless of the person or group that misplaced the part.

4. **Be prepared.** Bring your journal everyday.   Make sure you take care of your biological needs (restroom, water) before class and/or during break.

5. **Be honest.**   Do not cheat or copy someone else's work. You will not only receive a zero on the entire homework packet, you will also receive a referral. Remember, plagiarizing is cheating as well. If you copy someone else's program and turn it in as your own, you will receive a zero and receive a referral. When utilizing somebody else's information or program that is found online, you need to give credit to that person and to indicate that on in your deliverables and in your program. If you claim that information as being your own, it is considered cheating. If you get caught for any of the offenses above, you will call your parent or guardian in front of the class, and then explain to them what you did to receive the zero.

6. **Be conscious of the school rules.** Eating, drinking, cell phone, texting, dress code, tardiness, wearing headphones etc. etc. Students will be marked late if they are not in their seats when the bell rings. Students will receive a referral even if I suspect you are using your cell phone in class.

How to Succeed in this Class

1. Live by the class mantra: **Robots don't do what you want them to do, they do what you tell them to do.** In other words, robots always carry out their instructions perfectly. So if they are not behaving the way that you are expecting them to, there is always a reason for it e.g. bad programming, flawed design, malfunctioning equipment etc. etc.

2. Don't just jump into a project. Give yourself some time to brainstorm, plan, and research.

3. Set aside at least 50% of your allotted time for testing and troubleshooting. This is the number one reason why students are unable to complete or meet their engineering challenges. There are always unforeseen issues and problems. There are very few robots that work properly running on their first iteration of programming and/or design.

4. Don't be afraid of trying something out. Just save a copy of your previous work and go for it!

5. Document everything. When you figure out something, no matter how small, write it down to help you remember it for the next time.

6. If you can't figure it out, take it apart and break the problem down into its individual components. Then scientifically and logically tackle it, one part at a time. Put the scientific method to work for you. Don't just give up!

7. Work together. Helping each other out expands our group knowledge and fortifies your own. And just to see if you are reading this email me tonight at mrhwang@mrhwang.com with your name and the class mantra in the subject line and earn some extra credit.

8. Refer back to your previous experience, your notes, our tutorials, reference material when you get stuck. Download examples from others or the Internet to learn from.

9. If you figure it out on your own, you'll remember it much longer and better, be able to use that knowledge to solve future problems, and gain confidence in your abilities.

Deliverables Formatting

Proper Tutorial Writeup

1. Title
2. Answer all "Check Your Understanding" questions in the tutorial.
3. Insert a copy of your code with comments for each line.

Engineering Challenge Report

Be detailed and specific in each part of the report. Assume that the reader has no prior knowledge of the material and would require extra explanation to understand your report. Provide sketches or diagrams to help clarify your statements. The entire report is required to be word processed (nothing handwritten). Any sketches need to be scanned and inserted into your document.

1. Planning Session
   a) Identify and isolate behaviors (micro and macro) that you want your robot to perform.
   b) Discuss the solutions that hope will help you produce each behavior.
   c) Discuss the problems that can come up from the challenge.
   d) Provide sketches, prototype ideas, research photos that were used to develop your plan.
2. Postmortem
   a) Describe THREE things that went right.
   b) Discuss THREE specific things that you could have done to make the outcome better or easier if you could do it over again.
   c) What specific programing tip or building trick did you use, figure out, or learn as you completed the challenge. **Be detailed and specific.** Include code snippets, sketches or photos to demonstrate what you learned.
3. Appendix
   a) Annotated photo of your robot from all 3 sides (front, side and top) with labelled arrows pointing at specific parts or unique aspects of your build
   b) Printout of program with function summary AND with commented line by line analysis.