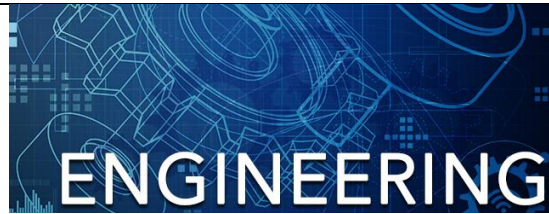**ENGINEERING 9 MYP DESIGN Year 4**

Course Overview:

This is a semester course that meets both provincial learning outcomes and IB MYP Technology aims and objectives. This course encourages students to develop design skills and technical skills through an applied science and engineering perspective. Students will use the design cycle to investigate an engineering problem, plan a solution to the problem, create and use an evaluation of the students' design. To overcome these engineering challenges, students will work collaboratively to overcome their assigned task. This course will also give students the opportunity to learn a variety of technical skills such as drafting and design, fabrication using various material and technical processes to create a multitude of various projects. Through direct instruction, student based inquiry and hands on project based learning, students will engage in solving various technical solutions to technical challenges.

Classroom Rules and Expectations:

• No horseplay – zero tolerance here in the shop.
• No Foul language – we have all heard it before but we want our class community to be respectful and represent ourselves with respect at all times.
• No food or drink without permission – please clean up after yourself, if this is abused, I will need to take away this privilege.
• It is expected that students will maintain a decent level of respect and courtesy towards staff and students.
• Students have the right to study in an environment that is free from racism, sexism, homophobia or any other form of harassment.
• It is expected that you will arrive on time for class. If you are late, please wait by the door until instructed to be seated.
• It is expected that students will not forfeit their right to success in this class by skipping classes.
• It is always expected that you will give your personal best.
• It is expected that you will maintain your integrity in class.
• It is expected that you will always try your hardest to maintain your personal honour while participating in this class.
• Participation in a regular cleanup is expected for this class.
In return you should expect from your teacher the following:
1. That he will always try to remain patient and understanding
2. That he will always try to show respect and courtesy
3. That he will always try to answer your questions and help you   succeed in this class
4. That he will try to remain flexible as possible
5. That he will maintain an environment that is safe and caring

Learning:

Through engaging with this course, students should UNDERSTAND…

Design is a collaborative endeavour which relies on a positive and healthy working environment.

Engineers apply their knowledge of math, Science and the humanities to overcome technical challenges.

Critical thought is essential to overcome technical challenges.

Through engaging with this course, students will KNOW…

Statement of Inquiry	Concepts	Unit Title/Topic
Successful engineering projects involve a systematic approach to ensure local and national standards are met in regards to responsible usage of resources, structural soundness and economic considerations.	**Scientific and Technology/ Communities**	IB Bridge Unit
Automation through robotics involves communication through design, problem solving and coding.	**Communication**	Robotics Unit

Through engaging with this course, students will DO…

CURRICULAR COMPETENCIES CATEGORIES	EXAMPLES
Design	Students will learn basic design principles including drafting, and Computer Aided Design
Knowledge integration	Integrate math, science and humanities to solve problems and inquiry into bridge unit.
Prototyping	Student will learn various prototyping techniques to aid in the iterative process.
Fabrication	Students will build a robot capable of picking up multiple object and accurately placing them in a bin.
Reflection	Students will make changes based on lessons learned from bridge testing.

Through this course, students will develop the following Approaches to Learning skills…

Below are some examples of how we develop ATL skills in this course:

Category Skill indicator	Examples
Thinking skills	Encourage unique and original thought through using a multitude of different perspectives and problem solving to overcome course design challenges.
Social skills	Working together to create a classroom community based on care for each other and acceptance of others.
Communication skills	Communicate though a variety of different design medium including web based and material.
Self-management skills	Develop positive ways to handle stress and challenging situations while in this class and outside of the class.
Research skills	Make connections between scientific research and related moral, ethical, social, economic, political, cultural or environmental factors.

Assessment:

Throughout this course, students will demonstrate their learning…

This course will focus on developing skills related to the following areas.	Formative assessment is assessment *as* learning, or assessment *for* learning. **Formative assessments could include;**	Summative assessment is assessment *of* learning. **Summative assessments could include;**
Inquiry and Analysis	Tests, quizzes, games, role plays, presentations.	Design Brief, Presentation
Developing Ideas	Final drawings, renderings, work flow, Sketchup, flow charts	Design brief
Creation	Sketches, prototypes, model	Design Brief/Final product
Reflection	Discussion, presentation, interviews	Reflection in Design Brief

Equipment needed for this course:

- **Laptop (optional)**
- **Pen/ mechanical pencil**

Academic Honesty and Personal Integrity

The faculty at Carson Graham expects our students to complete academic and nonacademic work that is authentic and respectful of intellectual property. All students are expected to adhere to the school's Policy for Academic Integrity. Ignorance of the standards related to academic honesty and student integrity is not an excuse for dishonesty, plagiarism and malpractice. You are expected to familiarize yourself with the policy.

https://www.sd44.ca/school/carson/About/schoolpolicies/Documents/Carson%20Graham%20Academic%20Honesty%20Policy%20reviewed%20December%202018.pdf

Assessment Rubrics:

Criterion A: Inquiring and analysing

Achievement level	Level descriptor
0	The student does not reach a standard described by any of the descriptors below.
1-2	The student: • **states** the need for a solution to a problem • **states** the findings of research.
3-4	• **outlines** the need for a solution to a problem • **states some** points of research needed to **develop** a solution, **with some guidance** • **states** the main features of an existing product that inspires a solution to the problem • **outlines some of** the main findings of research.
5-6	• **explains** the need for a solution to a problem • **states** and **prioritizes** the main points of research needed to **develop** a solution to the problem, **with some guidance** • **outlines** the main features of an existing product that inspires a solution to the problem • **outlines** the main findings of relevant research.
7-8	• **explains** and **justifies** the need for a solution to a problem • **states** and **prioritizes** the main points of research needed to **develop** a solution to the problem, **with minimal guidance** • **describes** the main features of an existing product that inspires a solution to the problem • **presents** the main findings of relevant research.

Criterion B: Developing ideas

Achievement level	Level descriptor
0	The student does not reach a standard described by any of the descriptors below.
1-2	The student: • **states one** basic success criterion for a solution • **presents one** design idea, which can be interpreted by others • **creates** an incomplete planning drawing/diagram.
3-4	• **states a few** success criteria for the solution • **presents more than one** design idea, using an appropriate medium(s) or labels key features, which can be interpreted by others • **states** the key features of the chosen design • **creates** a planning drawing/diagram or **lists** requirements for the creation of the chosen solution.
5-6	• **develops a few** success criteria for the solution • **presents a few** feasible design ideas, using an appropriate medium(s) and labels key features, which can be interpreted by others • **presents** the chosen design **stating** the key features • **creates** a planning drawing/diagram and **lists** the main details for the creation of the chosen solution.
7-8	• **develops a list of** success criteria for the solution • **presents** feasible design ideas, using an appropriate medium(s) and outlines the key features, which can be correctly interpreted by others • **presents** the chosen design **describing** the key features • **creates** a planning drawing/diagram, which **outlines** the main details for making the chosen solution.

Criterion C: Creating the solution

Achievement level	Level descriptor
0	The student does not reach a standard described by any of the descriptors below.
1-2	The student: • **demonstrates approaching** technical skills when making the solution • **presented in an incomplete form**.
3-4	The student: • **lists** the main steps in a plan that contains the details to follow the plan to create the solution • **demonstrates good** technical skills when making the solution • **creates** the solution, which **partially** functions and is **adequately** presented. • **states more than one change** made to the chosen design **or** plan when making the solution.
5-6	The student: • **lists** the steps in a plan, which **considers** time and resources, resulting in peers being able to follow the plan to create the solution • **demonstrates competent** technical skills when making the solution • **creates** the solution, which functions **as intended** and is presented **appropriately** • **states one change** made to the chosen design **and** plan when making the solution.
7-8	The student: • **outlines** a plan, which **considers** the use of resources and time, sufficient for peers to be able to follow to create the solution • **demonstrates excellent** technical skills when making the solution • follows the plan to **create** the solution, which functions as **intended** and is presented **appropriately** • **explains changes** made to the chosen design and plan when making the solution.

Criterion D: Evaluating

Achievement level	Level descriptor
0	The student does not reach a standard described by any of the descriptors below.
1-2	The student: • **describes** a testing method, which is used to measure the success of the solution • **states** the success of the solution.
3-4	The student: • **defines** a **relevant** testing **method**, which generates data, to measure the success of the solution • **states** the success of the solution against the design specification based on the results of **one relevant** test • **states one way** in which the solution could be improved • **states one way** in which the solution can impact the client/target audience.
5-6	The student: • **defines relevant** testing **methods**, which generate data, to measure the success of the solution • **states** the success of the solution against the design specification based on **relevant** product testing • **outlines one way** in which the solution could be improved • **outlines** the impact of the solution on the client/target audience, **with guidance**.
7-8	The student: • **outlines** testing methods used, which demonstrate the success of the solution • **outlines** the success of the solution against the design specification based on **authentic** product testing • **describes** how the solution could be improved • **outlines** the impact of the solution on the client/target audience.