



Brookmere Secondary (Coquitlam College)

ROBOTICS – Gr. 12

Instructor: Mr. Martinen, B.A., B.Ed.

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This is an interesting course that is designed to provide further study in the area of Geology, with a review of Physical Geography.

This course will use remotely operated vehicles (a.k.a. underwater robots) to inspire and challenge students to learn and creatively apply science, technology, engineering and math (STEM) to solve real-world problems and strengthen their critical thinking, collaboration, entrepreneurship, and innovation.

This course emphasizes and inspires a mindset of entrepreneurship and innovation by requiring students to transform their teams into “start-up” companies that respond to a Request for Proposal (RFP). In addition to their robots, the student teams also prepare technical reports, create a marketing (poster) display, and deliver engineering presentations.

This course fulfills the requirements for Applied Design, Skills, and Technologies - Grade 12 (4 total credits).

Content:

Unit 1 Basic Electronics	Nature of Matter, Static Electricity, Parts of Robot	~10 classes
	Basic Electrical Circuits, Safety	
	Solderless Breadboards	
	Meter Scales, Am/Volt/Ohmmeters, Directly/Inversely Related Terms	
	Ohm's Law, Prefixes	
	Schematics	
	Conductors, PCB's	
	Energy/Watts/Gears	
	Soldering	
Unit 2 Wiring & Cabling	Routing	~5 classes
	Connectors	
	Strain Relief	
	Flexibility	
Unit 3 Electrical Components	Lighting, LEDs	~10 classes
	Resistors	
	4-Band Resistor Color Code	
	5-Band Resistor Color Code	
	DC Motors, Servos, Stepper Motors	
	Capacitance	

	Capacitor Codes	
	Switches, Connectors, Fuses	
	Series Circuits	
	Parallel Circuits	
	Summary of Series and Parallel Circuits	
	Combination Circuits	
	Basic Magnetic Principles, Electric Current & Magnetism	
	Relays	
	DC and AC	
	Sandwich PCB, Couplers, Wheels, Molex Connectors	
	Transformer Theory	
Unit 4 Sensors	Potentiometers	~5 classes
	Infrared Distance	
	Accelerometer, Gyro, IMU	
Unit 5 Feedback Loops	Position Control	~5 classes
	Speed Control	
	Distance Measurement	
	Bang Bang vs. PID (Proportional Integral Derivative)	
Unit 6 Battery Technology	Sources of Electrical Energy - Batteries	~5 classes
	Other Sources of Electrical Energy	
Unit 7 ROV Build	Working in Water 1	~20 classes
	Working in Water 2	
	Structural and Materials 1	
	Structural and Materials 2	
	Structural and Materials 3 - Build Frame	
	Competition Mission	
	Pressure Hulls and Canisters 1	
	Pressure Hulls and Canisters 2	
	Pressure Hulls and Canisters 3 - Build	
	Buoyancy, Stability, and Ballast 1	
	Buoyancy, Stability, and Ballast 2	
	Moving and Maneuvering 1	
	Moving and Maneuvering 1 Labs	
	Moving and Maneuvering 2	
	Power Systems 1	
	Power Systems 2	
	Power Systems 3	
	Power Systems 4	
	Power Systems 5 - Construct Tether	
	Control and Navigation 1 - Control Systems and Navigation	
	Control and Navigation 2 - Basic Control, Switches, and Navigation Systems	

	Control and Navigation 3 - Advanced Control Options, Microcontrollers, Signal Communication	
	Control and Navigation 7 - Transistors	
	Control and Navigation 8 - Relays	
	Control and Navigation 9 - PWM	
	Control and Navigation 10 - H-Bridges	
	Control and Navigation 11 - Servos	
	Control and Navigation 12 - Stepper Motors	
	Basic Pneumatics	
	Final ROV Construction	

Evaluation:

Marks:	Tests	35%
	Homework	15%
	Technical Report Assignment	20%
	Mid-Term (15%) + Final Exam (15%)	30%

Mid-Term + Final Exam will be written by all students.

Your success in this course depends on your willingness to apply yourself and work hard.

Expectations:

Attendance Requirements

Regular attendance is essential for success in school.

Students will find that missed class work can never fully be made up.

It is, therefore, strongly advised that students avoid being absent from, or late for, any class.

The **One** Rule that covers all rules is "show mutual respect for everyone."

Other techniques that will help you to succeed include:

- come prepared (with books, pencils, etc.)
- take careful notes while listening
- save socializing for outside of class
- keep an organized notebook
- study for quizzes and tests
- ask questions

For extra help you can email me (Mr. Martinen) at: emartinen@coquitlamcollege.com.

Don't leave getting help until the last day before an exam.

By following the above you should be able to do well in the course and, as a bonus, you will enjoy it too!!

ACADEMIC DISHONESTY

All Students

Any form of cheating (ie: turning on or looking at an electronic device or looking at or exchanging other papers during an exam or bringing unauthorized materials into an exam, etc.) will be considered cheating.

A student caught cheating on a quiz, test or midterm will receive an automatic "0" for that specific quiz, test or midterm. A second cheating offence may result in expulsion from Coquitlam College

Cheating on a final exam will cause a student to receive an F in the course.

For an unscheduled test or quiz, students must be advised by the instructor that all unauthorized electronic devices be turned off and out of reach. If they do not comply, they risk receiving either a zero on the unscheduled test or quiz, fail the course or be expelled.

Ringin Phones

The invigilator should walk up to the student with the ringing phone and inform them that following the exam they must go with the instructor to the administration to deal with the consequences of disrupting the examination. They would typically receive a warning. A second offence would cause the student to receive an F for a midterm or final exam. A cell phone may stay on a student person, however if the phone is picked up from the or pulled out from a students' clothing this will be considered as cheating.

In order to have consistency in our cheating policies, everyone must follow the policies. Please refer to the exam regulations policy for further clarification found on the instructor portal homepage or website.

Student Photo Identification

All students are required to provide one of the following photo identifications to write the midterm and final exams: Coquitlam College Student Card, British Columbia Photo Identification (ie. Driver's License) or Government Photo Identification (ie. Passport).

Plagiarism

The unacknowledged use of the ideas or published material of others constitutes plagiarism. While much academic work must involve the consideration of ideas and material originally conceived or made accessible by others, there is a significant difference between an acknowledged restatement of such ideas and materials after intelligent assimilation, and the intentional unacknowledged reproduction of them.

Students caught intentionally plagiarizing will be dealt with by the Principal or Vice-Principal.

ACADEMIC SEMESTER SCHEDULE

Visit the office or our website at www.coquitlamcollege.com to view the academic schedule for important semester dates (eg. midterm or final exam week, holidays, etc.).

CLASSROOMS - FOOD & BEVERAGE

Food and beverages are not allowed in classrooms or the gym at any time. The exception to this is in Room 206 when there is a staff meeting, student council meeting or other specially planned events.

EMERGENCY PROCEDURES

Emergency Procedures are posted in each classroom.

EXAMINATIONS

All students are required to provide one of the following photo identifications to write the midterm and final exams: Coquitlam College Student Card, British Columbia Photo Identification (ie. Driver's Licence) or Government Photo Identification (ie. Passport).

Midterm exam dates are set by the instructors according to their course plans, typically in week 6 or 7. Instructors are responsible for typing and photocopying their own exams. There is a deadline by which midterm grades have to be submitted to Jocelyn in the office. This date is announced during midterm exam week.

Final exam dates are set by the Principal and Vice-Principal and are posted on the instructor portal, website and outside the office well in advance of the exam period.

Students must write exams at the assigned times.

GRADING

Below is the grading system, should you have any questions see your Department Head. Both a letter grade and a percentage mark will be provided for final grades.

Secondary & ESL Grades

SENIOR SECONDARY & ENGLISH STUDIES

<u>MARK</u>	<u>PERCENTAGE</u>	<u>POINTS</u>	<u>CREDIT MARK</u>	<u>USED IN GPA</u>
A	86 – 100	4.0	Yes	Yes
B	73 – 85	3.0	Yes	Yes
C+	67 – 72	2.5	Yes	Yes
C	60 – 66	2.0	Yes	Yes
C-	50 – 59	1.0	Yes	Yes
F	Below 50	0.0	No	Yes
IP	In Progress	0.0	No	No
W	Withdrawal	0.0	No	No
AUD	Audit	0.0	No	No
SG	Standing Granted	n/a	Yes	No
TS*	Transfer Standing	n/a	Yes	No

* TS granted on the basis of a passing mark in an equivalent course either on an internationally recognized examination or a Canadian or U.S. High School transcript.

PROCEDURAL FAIRNESS AND APPEAL POLICY

The College has a number of established appeal policies for student consideration. In student/teacher related situations, the process begins with student/teacher discussion and if further action is required, a meeting with a counsellor, vice-principal, or principal. Most matters are usually resolved through one of these discussions.

In the event a student is not satisfied with the outcome, they may submit a letter to the Board of Director /Registrar. Upon review of the situation, the Board will attempt to resolve the issue with the individual.

In the event a resolution is not reached, a mutually agreed upon third member from another institution who possesses the proper academic background will be appointed to review the situation.

Guidelines for third party intervention will focus on review of the original complaint and the procedure followed by the original decision maker.

SMOKING BAN

In compliance with the British Columbia Tobacco and Vapour Products Act, Coquitlam College is a 'tobacco and vaping free' campus. Students will be advised at the beginning of each semester and on a regular basis that smoking and vaping is prohibited anywhere on campus.

Students who ignore the policy will be warned and repeat offences will result in suspension for five (5) school days.

STUDENT APPEAL AGAINST GRADE PROCEDURES

If a student has cause to believe that a grade assigned on any single item of work is unjust, he/she should normally first discuss the matter with the instructor within seven days after the instructor has notified the student of the grade. Grades on final items of term work and final examinations graded after the end of classes may be appealed up to thirty (30) days following the last day of the evaluation period for the semester in which the course is offered.

If, after discussion with the instructor, a student still believes an injustice has been done, he/she may, within thirty (30) days, submit an appeal in writing to the Registrar. The appeal should include a copy of the work, the course title, reasons for the appeal and a summary of the conversation with the instructor involved. The student will be notified of the result by the Registrar.

STUDENT CONDUCT

Coquitlam College students are not allowed to represent student recruitment agencies. Any student conducting business for such an agency is risking expulsion from the College, as such an action is considered by Coquitlam College to be a serious conflict of interest. Students conducting such business will get one warning unless the breach is very serious.