

**Science 416 – Applied Science and Technology
Course Syllabus
2018-2019**

Instructor: Ms. Catherine James

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Course Overview:

STR416 is designed specifically for students who need to repeat Grade 10 Applied Science and Technology. There will be an opportunity to take a final exam during midterm exams and if the course is passed at that point, you may enrol in an elective course for the remainder of Terms 2 and 3. If you require more time to study the material to pass the course, there will be an opportunity to take the final exam during the June exam period. You will be evaluated on two components: practical (40%) and theoretical (60%).

Recommended Materials for Every Class:

- Textbook/Workbook (provided)
- Bound Notebook (provided if you do not one)
- Pencils/Erasers
- Ruler
- Calculator

You are not permitted to use looseleaf paper in this course. Your notes must be in a bound (coiled or stapled) notebook.

Reporting

Competency 1 (40%) <i>Practical</i>	Investigations, Activities, Lab Reports	100%
Competency 2 (60%) Uses mathematical reasoning	Assignments	30%
	Quizzes	20%
	Tests	50%
Total Mark 100%		

Homework completion, completion of in-class problems, and class participation are **crucial** in order to be successful on quizzes and tests.

Missing a Test or a Quiz

Tests must be written on the scheduled day. If you know ahead of time that you will be away, alternative arrangements must be made before the test date. Missed tests will be written on your own time at lunch.

Late Policy and Absences

All late arrivals will be recorded and detentions will be served with the office. *You* are responsible for catching up on class notes and completing any assignments, tests, or quizzes which you missed due to absence. If you are aware of your absence in advance, please let me know.

Topics To Be Covered

The Living World	The Material World	The Technological World
<p><i>Dynamics of ecosystems</i></p> <ul style="list-style-type: none"> - Disturbances - Trophic relationships - Primary productivity - Material and energy flow - Chemical recycling - Factors that influence the distribution of biomes - Ecosystems 	<p>Chemical changes</p> <ul style="list-style-type: none"> - Combustion - Oxidation <p>Electricity</p> <ul style="list-style-type: none"> - Electrical charge - Static electricity - Ohm's law - Electrical circuits - Relationship between power and electrical energy <p>Electromagnetism</p> <ul style="list-style-type: none"> - Forces of attraction and repulsion - Magnetic field of a live wire - Magnetic field of a solenoid - Electromagnetic induction <p>Transformation of energy</p> <ul style="list-style-type: none"> - Law of conservation of energy - Energy efficiency - Distinction between heat and temperature <p>Fluids</p> <ul style="list-style-type: none"> - Archimedes' principle - Pascal's law - Bernoulli's principle <p>Force and motion</p> <ul style="list-style-type: none"> - Force - Types of forces - Equilibrium of two forces - Relationship between constant speed, distance and time - Mass and weight 	<p>Graphical language</p> <ul style="list-style-type: none"> - Multiview orthogonal projection (general drawing) - Functional dimensioning - Developments (prism, cylinder, pyramid, cone) - Standards and representations (diagrams, symbols) <p>Mechanical engineering</p> <ul style="list-style-type: none"> - Adhesion and friction of parts - Linking of mechanical parts (degree of freedom of a part) - Guiding controls - Construction and characteristics of motion transmission systems (friction gears, pulleys and belt, gear assembly, sprocket wheels and chain, wheel and worm gear) - Speed changes, resisting torque, engine torque - Construction and characteristics of motion transformation systems (screw gear system, connecting rods, cranks, slides, cams, eccentrics and rotating slider crank mechanisms, rack-and-pinion drive) <p>Electrical engineering</p> <ul style="list-style-type: none"> - Power supply - Conduction, insulation and protection (resistance and coding, printed circuit) - Control (types: unipolar, bipolar, unidirectional, bidirectional) - Transformation of energy (electricity and light, heat, vibration, magnetism) - Other functions (condenser, diode, transistor, solid-state relay, other semi-conductors) <p>Materials</p> <ul style="list-style-type: none"> - Constraints - Characteristics of mechanical properties - Heat treatments - Types and properties <ul style="list-style-type: none"> - Plastics (thermoplastics, thermosetting plastics) - Ceramics - Composites - Modification of properties (degradation, protection) <p>Manufacturing</p> <ul style="list-style-type: none"> - Manufacturing (characteristics of drilling, tapping, threading and bending) - Measurement and inspection <ul style="list-style-type: none"> - Direct measurement (vernier caliper) - Control, shape and position (plane, section, angle)
<p style="text-align: center;">The Earth and Space</p> <p>Lithosphere</p> <ul style="list-style-type: none"> - Minerals - Energy resources <p>Hydrosphere</p> <ul style="list-style-type: none"> - Catchment area - Energy resources <p>Atmosphere</p> <ul style="list-style-type: none"> - Air mass - Cyclone and anticyclone - Energy resources <p>Space</p> <ul style="list-style-type: none"> - Solar energy flow - Earth-Moon system (gravitational effect) 		

Class Procedures

My foremost request is that we all respect one another in class. That means respecting each other individually, as well as respecting the thinking of others.

Additionally, your responsibilities including bringing all your materials to every class. ***Please do not do science work in pen.*** You need your science binder, your texts, and homework. You will not be permitted to go to your locker, as per school rules. As well, you must hand in all assignments on time. While I am somewhat flexible about late assignments due to illness or other excused absences, I expect you to see me the day you return from illness, **whether we have math that day or not**, to get your missed work. You need to be caught up at all times because you will quickly get behind. Assignments not turned in will be referred to study hall until the work is completed. If you know you will be absent on a due date, please see me prior to that date to arrange an alternative.

Plagiarism

Many students, afraid that their incomplete work will be checked by me, copy another student's answers prior to class. *If you do this, it is cheating and I will give a grade of zero for the assignment and refer you to the administration for disciplinary action.* The integrity of everyone's individual grade is important, especially as this course is needed for both high school graduation and post-secondary admission.

Extra Help Options

A regular tutorial schedule will be set during lunch hour in the next few weeks. These will be open forum: a place to complete homework, work on assignments, or ask questions while I am present. At your request, I will also make myself available after school for extra help sessions. If you feel the need to acquire outside Math tutoring, LEARN is an excellent (and free) online option for all WQSB students. Additional tutoring is also available, so please see me for information on available tutors.

Safety

Safety is paramount in a science laboratory. You must not use any of the equipment jokingly or inappropriately, as I will ask you to leave and you will not be able to finish the work or gain valuable hands-on experience. As well, for labs involving Bunsen burners, chemicals, or power tools, safety goggles, closed-toed shoes, and hair-tied back are mandatory.

I am looking forward to a great year with you in Science 416!