Outline of Course of Study

Faculty of Engineering Secondary School
Department of Engineering
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Course title: Technological Design
Grade: 10
Type: Open
Ministry Course Code: TDJ2O
Credit value: 1.0 credit
Ministry curriculum policy documents:

- The Ontario Curriculum, Grades 9 and 10: Technological Education, 2009 (revised)
- Ontario Schools, Kindergarten to Grade 12: Policy and Program Requirements, 2016
- Growing Success: Assessment, Evaluation, and Reporting in Ontario's Schools, Kindergarten to Grade 12, 2010

Prerequisites and corequisites: none

Course Description

This course provides students with opportunities to apply a design process to meet a variety of technological challenges. Students will research projects, create designs, build models and/or prototypes, and assess products and/or processes using appropriate tools, techniques, and strategies. Student projects may include designs for homes, vehicles, bridges, robotic arms, or other products as well as virtual reality projects. Students will develop an awareness of environmental and societal issues related to technological design, and will learn about secondary and postsecondary education and training leading to careers in the field.

Overall Curriculum Expectations

By the end of this course, students will:

A. TECHNOLOGICAL DESIGN FUNDAMENTALS	
A1	identify and describe the purpose, scope, and steps of a design process;
A2	identify and describe tools, strategies, and skills needed for project research, planning and organization;
A3	demonstrate an understanding of how design ideas are represented graphically;
A4	explain the purpose of building models and prototypes, and identify tools, materials, and methods for building and testing them;
A5	demonstrate an understanding of communications methods used in the design process.
B. TECHNOLOGICAL DESIGN SKILLS	
B1	research, plan and organize projects, using a design process and appropriate methods and tools;
B2	apply appropriate methods for generating and graphically representing design ideas and solutions;
B3	create and test models using a variety of techniques, tools, and materials;
B4	use suitable communication methods throughout the design process.
C. TECHNOLOGY,THE ENVIRONMENT, AND SOCIETY	
C1	demonstrate an understanding of environmentally responsible practices, and apply them through-out the technological design process;

C2	describe how society influences technological innovation and how technology affects society.
D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES	
D1	apply appropriate health, safety, and environmental practices throughout the design process;
D2	identify careers in various technological fields, and describe the educational requirements for them.

Outline of Course Content

Unit 1: The Design Process – 10 hours
Students will explore the design process, understand its usefulness and effectiveness in engineering and will apply this process throughout the course.
Unit 2: Introduction to micro:bit– 6 hours
Students will learn about microcontrollers in everyday life and will learn the basic software associated with the micro:bit.
Unit 3: ePortfoilo– 8 hours
Students will create an ePortfoilo to demonstrate learning and to present their projects, both individually and group, in a well-presented manner.
Unit 4: micro:bit temperature, light and magnetic sensor – 6 hours
Students will learn about the on-board temperature, light and magnetic sensor of the micro:bit.
Unit 5: micro:bit accelerometer sensor – 6 hours
Students will learn about the on-board accelerometer sensor of the micro:bit.
Unit 6: micro:bit Radio – 6 hours
Students will learn about the on-board radio feature of the micro:bit.

Unit 7: micro:bit game development – 6 hours
Students will learn about using the micro:bit as part of game development.
Unit 8: Engineering Project Design: Prototyping – micro:bit – 8 hours
Using the skills, they have learned in the previous units, students will embark in an engineering design challenge by creating a prototype that solves a defined problem. They will conduct research, brainstorm ideas, and analyze various designs to create their prototype.
Unit 9: Engineering Project Design: Final Product – micro:bit – 12 hours
Using feedback from the teacher and their peers, students will improve upon their design through various iterations until they have developed the best prototype. The culmination of this task is a presentation to the class, which outlines their journey through the design process.
Unit 10: Introduction to CoSpaces – 6 hours
Students will learn the basic software associated with the CoSpaces platform.
Unit 11: CoSpaces - Moving in the Environment – 6 hours
Through a guided, hands-on lesson, students will learn how to use path and inputs to move around the VR/360 environment.
Unit 12: CoSpaces – Interaction – 6 hours
Students will learn how to incorporate Quiz and portals with their CoSpaces projects to be able to interact with objects and the users.
Unit 13: CoSpaces - Collisions and Physics – 6 hours
Students will learn how to code and manipulate the environment looking at the Physics modules.
Unit 14: Engineering Project Design: Prototyping – CoSpaces – 8 hours
Using the skills, they have learned in the previous units, students will embark in an engineering design challenge by creating a prototype that solves a defined problem. They will conduct research, brainstorm ideas, and analyze various designs to create their prototype.

Unit 15: Engineering Project Design: Final Product – CoSpaces – 12 hours
Using feedback from the teacher and their peers, students will improve upon their design through various iterations until they have developed the best prototype. The culmination of this task is a presentation to the class, which outlines their journey through the design process.

Teaching & Learning Strategies

This course is intended to give high school students a good understanding of technological design, as it is applied through programming and creating projects. Our goal is to keep students engaged and curious by having them 'learn by doing.'

During this course, the teacher will give a basic introduction to programming and will guide students through the design process. Programming using micro:bit (micro-computer) and CoSpaces (Virtual Reality and Augmented Reality) will be taught through hands-on lessons, where the students can follow the teacher's instruction. Students will be given class time to develop their skills on programming with teacher support and guidance. Students will also have access to these tools to various iterations of their prototypes.

As it is common in engineering projects, group work will be a big part of this course. Group work will allow students to practice a variety of skills including: problem solving, organization, communication, and collaboration. Teachers will offer ongoing feedback and will regularly check for understanding through informal discussions and quizzes for assessment for learning.

Through peer feedback offered by students to students (assessment as learning), prototypes will be refined into their final design.

Strategies for Assessment & Evaluation of Student Performance

Assessment, evaluation, and reporting of student achievement will be based on the policies and practices outlined in the following Ministry's policy document Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools, 2010.

Students will be evaluated based on the overall expectations of the course through the achievement charts in The Ontario Curriculum, Grades 9 and 10: Technological Education, 2009 (revised), as outlined in this document

The Ministry of Education's document Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools outlines policies for measuring and communicating achievement. Levels of achievement are defined as follows:

Level	Percentage	Achievement
Level 1	50—59%	Represents achievement that falls much below the provincial standard. The student demonstrates the specified knowledge and skills with limited effectiveness. Students must work at significantly improving learning in specific areas, as necessary, if they are to be successful in the next grade/course
Level 2	60—69%	Represents achievement that approaches the provincial standard. The student demonstrates the specified knowledge and skills with some effectiveness. Students performing at this level need to work on identified learning gaps to ensure future success
Level 3	70—79%	Represents the provincial standard for achievement. The student demonstrates the specified knowledge and skills with considerable effectiveness. Parents of students achieving at level 3 can be confident that their children will be prepared for work in subsequent grades/courses.
Level 4	80—100%	Identifies achievement that surpasses the provincial standard. The student demonstrates the specified knowledge and skills with a high degree of effectiveness. However, achievement at level 4 does not mean that the student has achieved expectations beyond those specified for the grade/course.

Seventy percent (70%) of the evaluation is based on daily classroom work and will be determined through a variety of methods, as outlined in the table below. Thirty percent (30%) of the evaluation will be based on a final design project which includes a prototype, presentation, and accompanying report. This final evaluation allows the student the opportunity to demonstrate comprehensive achievement of the overall expectations of the course.

Teachers will use "assessment for learning" and "assessment as learning" practices to help students identify: where they are in relation to the learning goals and what next steps they need to take to achieve the goals.

This ongoing feedback will help prepare students for "assessment of learning", the process of collecting and interpreting evidence for the purpose of summarizing learning at a given point in time, to make judgments about the quality of student learning on the basis of established criteria, and to assign a value to represent that quality.

Assessment breakdown for TDJ2O:

Formative Assessment, 70% of final grade	Percentage of grade	Overall Expectation(s)
Assignment: Microcontrollers in everyday life	2 %	A4, A5, B4, C2, D2
ePortfolio	8 %	A3, A4, A5, B4
micro:bit buttons and LEDs	1 %	A4, B3, B4
Assignment: micro:bit Turtle	1 %	A4, B3, B4
Assignment: micro:bit Sensors	1 %	A4, B3, B4
Assignment: micro:bit tilt and acceleration	2 %	A4, B3, B4
Assignment: micro:bit Radio	3 %	A4, B3, B4
Assignment: micro:bit Game	3 %	A4, B3, B4
Quiz: Design Process	2 %	A1, A2, A3
Design Process and Product Development – micro:bit	2 %	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, D1, D2
Problem Definition, Research - micro:bit	2 %	A1, A4, A5, B1, B2, B3, B4, C1
Analysis of Solutions and Conceptual Design - micro:bit	2 %	A1, A4, A5, B1, B2, B3, B4, C1
Presentation: 2-minute pitch of prototype – micro:bit	3 %	A1, A4, A5, B1, B2, B3, B4, C1
Design Project: Prototype, report, presentation - micro:bit	15 %	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, D1, D2
Assignment: Introduction to CoSpaces	2 %	A4, B3, B4
Assignment: CoSpaces - Movement	2 %	A4, B3, B4
Assignment: CoSpaces - Interactions	2 %	A4, B3, B4
Assignment: CoSpaces - Collisions	2 %	A4, B3, B4
Assignment: CoSpaces - Physics	2 %	A4, B3, B4
Design Process and Product Development - CoSpaces	3 %	A1, A4, A5, B1, B2, B3, B4, C1

Problem Definition, Research - CoSpaces	3 %	A1, A4, A5, B1, B2, B3, B4, C1
Analysis of Solutions and Conceptual Design - CoSpaces	3 %	A1, A4, A5, B1, B2, B3, B4, C1
Presentation: 2-minute pitch of prototype - CoSpaces	4 %	A1, A4, A5, B1, B2, B3, B4, C1

Summative Assessment, 30% of final grade	Percentage of grade	Overall Expectation(s)
Final evaluation: Design Project • Prototype (10%) • Report (10%) • Presentation (10%)	30%	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, D1, D2

Course Schedule and Instructional Hours

Online	Dates	Instructional Hours	Curriculum
Synchronous	July 26	2	Introduction to course and each other Introduction to engineering design process Introduction to micro:bit Micro-controllers in everyday life ePortfolio
Asynchronous	July 26-27	9	Course information Digital citizenship Micro-controllers in everyday life Micro:bit buttons, LED and sensors Engineering design process quiz • Course calendar quiz • Digital citizenship quiz • Course checklist • Engineering design process quiz • Assignment: microcontrollers in everyday life • Assignment: micro:bit buttons and LEDs
Synchronous	July 28	2	Engineering Design Project: Problem (micro:bit) Micro:bit Learning Teamwork
Asynchronous		5	Engineering Design Project: Problem (micro:bit) Micro:bit tilt and acceleration • Assignment: micro:bit sensors

Synchronous	July 29	2	Micro:bit Engineering Design Project: Analysis of solutions and conceptual design (micro:bit)
Asynchronous	July 29-30	9	Micro:bit turtle Micro:bit games Engineering Design Project: Analysis of solutions and conceptual design (micro:bit) • Assignment: micro:bit tilt and acceleration • EDP: problem definition and research (micro:bit)
	Aug 2	None	HOLIDAY
Synchronous	Aug 4	2	Micro:bit Engineering Design Project: Pitch presentations (micro:bit) Engineering Design Project: Next iteration of prototype (micro:bit)
Asynchronous	Aug 4	4.5	Micro:bit radio Engineering Design Project: Next iteration of prototype (Micro:bit) • EDP: pitch presentations (micro:bit)
Synchronous	Aug 5	2	Career explorations Engineering Design Project: Final product – group presentations (micro:bit)
Asynchronous	Aug 5-6	9.5	Engineering Design Project: Final product (micro:bit) • EDP: final project – prototype and report (micro:bit)
Synchronous	Aug 9	2	Introduction to CoSpaces EDP- They did it too
Asynchronous	Aug 9-10	9	EDP- They did it too CoSpaces Introduction CoSpaces Movement • Assignment: CoSpaces introduction
Synchronous	Aug 11	2	CoSpaces Engineering Design Project – CoSpaces Engineering Design Project: Problem (CoSpaces)
Asynchronous		4	Engineering Design Project: Problem (CoSpaces) CoSpaces Interactions • Assignment: CoSpaces movement • Assignment: design process and product development – they did it too
Synchronous	Aug 12	2	CoSpaces Engineering Design Project: Analysis of solutions and conceptual design (CoSpaces)

Asynchronous	Aug 12-13	9	CoSpaces Physics and GUI CoSpaces Choice Engineering Design Project: Analysis of solutions and conceptual design (CoSpaces) • Assignment: CoSpaces interactions • EDP: problem definition and research (CoSpaces) • Assignment: CoSpaces physics • EDP: analysis of solutions and conceptual design (CoSpaces) •
Synchronous	Aug 16	2	Engineering Design Project: Pitch presentations (CoSpaces) Engineering Design Project: Next iteration of prototype (CoSpaces)
Asynchronous	Aug 16-17	9	Engineering Design Project: Next iteration of prototype (CoSpaces) Engineering Design Project: Final product (CoSpaces) • Assignment: CoSpaces choice • EDP: pitch presentations (CoSpaces) • EDP: next iteration of prototype (CoSpaces)
Synchronous	Aug 18	2	Career explorations Presentations of ePortfolios
Asynchronous		4.5	Engineering Design Project: Final product (CoSpaces)
Synchronous	Aug 19	2	Engineering Design Project: Final product – group presentations (CoSpaces)
Asynchronous	Aug 18-19	9.5	Engineering Design Project: Final product (CoSpaces) EPortfolio • EDP: final presentations (CoSpaces) • EDP: final project – prototype and report (CoSpaces)
Asynchronous	Aug 20	6	• ePortfolio
TOTAL		110 hours	

Considerations for Program Planning

Instructional Approaches

In technological education teachers will be using projects as a means for students to gain knowledge and learn new skills such that they can achieve the course expectations. This type of course will give students ample opportunities to collaborate in teams and work cooperatively while working through the design process: brainstorming ideas and issues, researching solutions, analyzing possibilities, developing solutions, testing prototypes, and improving designs. Students will be actively engaged in their own learning through experiential learning strategies.

Through activity-based lessons, students will be given the opportunity to work individually and in teams. Teachers will model new skills, offering direction and support until students are confident in using those skills independently. By following the design process and actively problem-solving, students will gain understanding and develop new skill sets in manageable chunks. This scaffolding approach will provide students with the support they need to reach manageable objectives.

Group role play will allow students to internalize the engineering problem that will guide them to designing an innovative solution to a current societal issue. They will work collaboratively in groups, where each student has a specific role on the design team. Using emerging technologies such as programming with microcontrollers, students will have the opportunity to actively use their newly-developed skills to solve real problems.

Health and Safety in Technological Education

Students will be trained on how to safely use all technological equipment required for the class, particularly microcontrollers. Teachers will model proper procedures and safe practices, warning students of possible dangers inherent in using the equipment. Students must be able to demonstrate knowledge of how the equipment is used and what procedures must be followed to ensure its safe use.

Classroom practice will comply with relevant health and safety regulations including, but not limited to:

- the Ontario Workplace Safety and Insurance Act
- the Workplace Hazardous Materials Information System (WHMIS)
- the Food and Drugs Act
- the Ontario Health Protection and Promotion Act
- the Ontario Building Code
- the Occupational Health and Safety Act
- local by-laws

While teachers are responsible for their students' safety during a technology lab, they will encourage students to take responsibility of their own safety and that of others. They will support students in developing the knowledge and skills required to stay safe and maintain a safe learning environment for all students.

The Ontario Skills Passport and Essential Skills

The Ontario Skills Passport (OSP) is a web-based service that can track students' Essential Skills (such as reading, writing, and problem solving) and work habits (such as working safely and being reliable). These skills and work habits are easily transferable from school to work and are useful for employers looking to assess potential candidates for cooperative education placements. The OSP is also useful for students looking to assess, build, document, and track their skills through their educational, professional, and personal experiences. More information about the OSP can be found on the ministry website, skills.edu.gov.on.ca.

The Role of Information and Communications Technology in Technological Education

Information and communications technologies (ICT) tools allow teachers to expand their instructional strategies and support student learning. These tools include Internet websites, word-processing programs, and multimedia resources. These tools help students collect, organize, and present data for reports and presentations. They also enable students to connect with each other and the world to be able to share ideas and collaborate on projects.

Students will be encouraged to use ICT tools for most of the course in order to learn new skills and communicate their learning. Students will be using Power Point, for instance, to present their design projects to the class.

With the power of the Internet comes potential risks such as privacy, safety, and abuse of technology in the form of bullying or other malicious acts. Students must be made aware of these issues and teachers will model appropriate behaviour in their instruction. Teachers can also make use of ICT tools in their day-to-day teaching practice of curriculum design and in-class teaching.

Planning Technological Education Programs for Students with Special Education Needs

Classroom teachers have a duty to ensure that all students in their class have the opportunity to learn and succeed regardless of their special education needs. *Special Education Transformation: The Report of the Co-Chairs with the Recommendations of the Working Table on Special Education, 2006* promotes a set of beliefs that should guide program planning for students with special education. These beliefs include:

- All students can succeed.
- Universal design and differentiated instruction are effective and interconnected means of meeting the learning or productivity needs of any group of students.
- Each student has his or her own unique patterns of learning.
- Classroom teachers need the support of the larger community to create a learning environment that supports students with special education needs.
- Fairness is not sameness.

Teachers are encouraged to develop their program plan in accordance to their students' diversity of strengths and abilities. This can be achieved through a myriad of ways including: assessing each student's prior knowledge and skills, providing ongoing assessment, and allowing for flexible groupings. By assessing each student's current achievement level and weighing that against the course expectations, the teacher can determine if the student will be requiring any combination of: accommodations, modified expectations, or alternative expectations. If the student requires accommodations, modified expectations, or both, the information must be recorded in their Individual Education Plan (IEP).

Students Requiring Accommodations Only

Accommodations that are required by students must be identified on their IEP. Differentiated instruction and universal design lend themselves well to providing accommodations for students. Students will still be evaluated on the curriculum course expectations and achievement levels communicated by the Ministry.

There are three types of accommodations:

- Instructional accommodations: Teachers change the way in which lessons are taught including integrating technology and using different styles of presentation.
- Environmental accommodations: This includes a change in the learning environment whether it be classroom seating by location or group, or lighting.
- Assessment accommodations: These allow students to demonstrate their learning in a different way. For instance, they may be given the opportunity to give oral answers to written questions or they may be given more time to complete an assignment or test.

Students Requiring Modified Expectations

Modified expectations that are required by students must be identified on their IEP. For the most part, these expectations will be based on the regular course expectations but the number and/or complexity will differ. Modified expectations are specific, realistic, and measurable achievements that the student can demonstrate independently, given assessment accommodations.

It is the principal who will decide whether the achievement of the modified expectations constitutes successful completion of the course and whether the student is eligible to receive a credit for the course; this decision must be communicated to the student and their parents.

When course expectations are not extensively modified and it is expected that the student can achieve most of them, the modified expectations should determine how the required knowledge and skills differ from those identified in the course expectations. In the case, if the student is working toward a credit for the course, the IEP box must be checked on the Provincial Report Card.

With extensive modifications to expectations such that achievement of them is not expected to result in a credit, the expectations should identify the precise requirements or tasks on which the student's performance will be evaluated and which will be used to determine the student's mark on the Provincial Report Card. The IEP box must be checked and the appropriate statement from the *Guide to the Provincial Report Card, Grades 9-12, 1999* (p. 8) must be added. Modified expectations must be reviewed in relation to the student's progress at least once each reporting period, and must be updated as necessary.

Program Considerations for English Language Learners

Schools in Ontario have a very diverse and multicultural student population, such that 20% of students have a language other than English as their first language. These English language learners may be recent immigrants or refugees while others may be born in Canada into a family whose primary home language is either not English or is an English dialect differing significantly from the English taught in Ontario schools. Teachers must be mindful that many of these students are entering a new linguistic and cultural environment at school.

During their first few years in an Ontario school, English language learners pay receive support through English as a Second Language (ESL) programs or English Literacy Development (ELD) programs. ELD programs are primarily for newcomers who arrive with significant gaps in their education, often due to limited opportunities (in terms of education and literacy) in their home country.

It is important that teachers recognize the orientation process whereby English language learners adapt to a new social environment and language. Some may be very quiet at first, using body language rather than speech and/or limited verbal communication to convey their thoughts. These students thrive in a safe, supportive, and welcoming environment. As the students learn to speak English, it is important to note that oral fluency is not a good indicator of the student's literacy development and vocabulary.

It is the shared responsibility of the classroom teacher, the ESL/ELD teacher (where available), and other school staff to help in the development of students' English. Volunteers and peers may also provide significant support. Teachers are required to adapt their instruction to facilitate the success of their English language learner students. These adaptations may include:

- Modifying some or all course expectations such that they are challenging yet achievable given the student's English proficiency
- Using a variety of instruction strategies, such as visual cues, pre-teaching vocabulary, offering peer tutoring
- Using a variety of learning resources, such as bilingual dictionaries, visual material, simplified text
- Modifying assessments, such as giving extra time, offering the choice of demonstrating skills/knowledge orally or in writing, assigning cloze sentences instead of essays

When learning expectations are modified for an English language learner, it must be clearly indicated on their report card.

Equity and Inclusion Education in Technological Education

The Faculty of Engineering Secondary School abides by the University of Ottawa's Violence Prevention Policy and Prevention of Harassment and Discrimination Policy. These policies encourage staff and students to show respect for diversity in the school and the wider society. The policies aim to provide a safe learning environment, free from violence, harassment, and discrimination.

Differentiated instruction will be at the core of curriculum planning. By assessing each individual student's abilities, background, interests and learning styles, teachers can design their lessons based on the needs of their diverse students. The course content (what is being taught), process (how it is taught), and product (how students demonstrate their learning) will be designed in relation to the students' needs.

Generally, in technical courses such as technological design there is a clear gender disparity. Studies have shown that female students are often drawn to courses that have a societal aspect to them, rather than just abstract learning. It may be helpful for teachers to offer projects and activities that have a clear and meaningful societal application. For instance, instead of being asked to design a robotic arm (whose purpose is unknown), teacher can give students the option of designing an assistive device. Differentiated instruction offers students a choice from a range of activities or allows them to select their own projects; by giving students the power to choose their own topic, they can select something that most interests them and become more invested in the project.

Our Technological Design course (TDJ2O) will be using the United Nations Sustainable Development Goals as a focus for project development. If possible, given the current pandemic situation, the teacher will guide the class toward developing their own virtual technology fair, where they will showcase their prototype designs to their family and friends.

Environmental Education in Technological Education

It is important for students to understand their environmental impact in the world and how they can better the environment they are living in. It is the duty of the teacher to integrate environmental education into their curriculum planning such that students understand their personal responsibility to the environment and their role in society.

Environmental education can be integrated into the classroom in a variety of ways. In selecting their design projects, students can go the environmental route and select a project that is directly linked to environmental impact, such as a hydroponic system or a solar-powered vehicle. Additionally, students can focus on the environmental impact of their design by learning about the safe handling and disposal of materials used in the development of their device. By implementing strategies to reduce, reuse and recycle, students can learn about government agencies and community partners that support such practices. This will give students the opportunity to develop critical thinking skills and responsible practice with respect to environmental implications of their selected project.

Literacy, Mathematical Literacy, Financial Literacy and Inquiry/Research Skills

Many activities in the technological education curriculum requires students to practice and develop oral, written, and visual literacy skills. Students will be required to brainstorm ideas and effectively communicate them to their team members. They will need to be able to justify their choices for decisions taken in the design process and will need to be able to communicate them clearly to their audience in an oral presentation with visual support. They will be required to compose written reports on their progress and outline the steps taken during the design process in order to effectively convey their message to the reader. Students will be learning specialized terminology which they will be expected to use appropriately and precisely in their communication.

In developing and working with programming and building projects, students will build on their mathematical literacy. Students will be required to communicate clearly and concisely through the use of tables, diagrams, and/or engineering plans. Measurements will need to be perfectly accurate with respect to their designs, as parts will need to fit together during assembly.

While learning about the engineering design process and prototyping, students will understand the impact of economic choices in the world they live in, when new products are created. Financial literacy connections may be made as students learn about their place in the world, as a responsible and compassionate citizen and through critical thinking, decision-making and problem solving that can be applied to real life situations.

In conducting research for their projects, students will be required to explore a variety of possible solutions to their challenge, analysing the context of their data and properly interpreting it. They will be required to analyse the source of their information, determine its validity and relevance, and use it in appropriate ways. Teachers can support students by guiding them toward reputable sources including peer-reviewed journals. The ability to locate, question, and evaluate information allows a student to become an independent, lifelong learner.

The Ontario First Nation, Métis, Inuit Education Policy Framework

The Ontario First Nation, Métis, and Inuit Education Policy Framework is based on the vision that all First Nation, Métis and Inuit students in Ontario will have the knowledge, skills and confidence they need to successfully complete their secondary education to pursue postsecondary education or training and/or to enter the workforce. They will have the traditional and contemporary knowledge, skills, and attitudes required to be socially contributive, politically active, and economically prosperous citizens of the world. All students in Ontario will have knowledge and appreciation of contemporary and traditional First Nation, Métis, and Inuit traditions, cultures, and perspectives.

The Faculty of Engineering Secondary School abides by the goals stated in the Ontario First Nation, Métis, and Inuit Education Policy Framework to provide a supportive and safe environment for all FNMI students. These goals include:

- Increase the level of student achievement

- Reduce gaps in student achievement
- Increase the levels of public confidence

For example, the school will strive to develop awareness among teachers of the learning styles of First Nation, Métis, and Inuit students and instructional methods designed to enhance the learning of students, such as incorporating meaningful First Nation, Métis, and Inuit cultural perspectives and activities when planning instruction, and implementing strategies for developing critical and creative thinking.

The First Nation, Métis, and Inuit students will also have access to the support, activities and resources offered by the uOttawa Indigenous Resource Centre Mashkawazìwogaming. For example, students can have access to student mentoring from a university student, individual or group meeting with and Elder in residence, and social and cultural events to participate in, if they wish to.

The Faculty of Engineering Secondary School, as part as the University of Ottawa also supports the uOttawa Indigenous Action Plan Framework for 2019-2024 which is designed to facilitate the inclusion of First Nation, Métis, and Inuit students and support the specific needs of the indigenous community.

Career Education

In this era of technological innovation with rapidly evolving technologies, employers are always on the lookout for candidates with strong technical skills who can problem-solve effectively, think critically, and work collaboratively. These are the exact skills that will be developed through technology education. In going through the engineering design process, students will develop skills in: research, analysis, creativity, problem-solving, design, and presenting. They will practice these skills through both independent and group work.

Cooperative Education and Other Forms of Experiential Learning

Cooperative education and other forms of experiential learning, such as job shadowing, work experience, and field trips, allow students to apply the skills they've learned in the classroom to real-word work environments. They help students learn about the possible careers and employment opportunities in various fields of work, as well as broadening their knowledge of workplace practices and employer-employee relationships.

Students who choose a technological education course as the related course for two cooperative education credits are able, through this packaged program, to meet the group 1, 2, and 3 compulsory credit requirements for the OSSD.

Teachers must assess the health and safety of placements and ensure that their students understand their rights as they relate to health and safety, privacy and confidentiality, and abuse and harassment in the workplace.

All cooperative education and other workplace experiences will be provided in accordance with the ministry's policy document *Cooperative Education and Other Forms of Experiential Learning: Policies and Procedures for Ontario Secondary Schools, 2000*.

Planning Program Pathways and Programs Leading to a Specialist High Skills Major

Technological education courses are well suited for programs leading toward a Specialist High Skills Major (SHSM) or programs leading toward an apprenticeship or workplace destination. Technological education courses can also be combined with cooperative education credits in order to provide the workplace experience necessary for some SHSM programs, apprenticeships, and workplace destinations. SHSM programs would also include sector-specific learning opportunities offered by employers, skills-training centres, colleges, and community organizations.

Resources

No textbook is required for this course. Students will be given access to all course material in class and will be given access to software the course in order to continue their learning. Students will also be given access to any equipment required for the course, such as micro:bit and CoSpaces software.