



IN-SCHOOL WORKSHOPS

SCIENCE, TECHNOLOGY, ENGINEERING & MATH WORKSHOPS FOR GRADES 3 TO 8



UNIVERSITY OF
TORONTO

Engineering

IN-SCHOOL WORKSHOPS

SCIENCE, TECHNOLOGY, ENGINEERING & MATH WORKSHOPS FOR GRADES 3 TO 8

We link our workshops to Ontario curriculum expectations and are pleased to offer the following workshops to grade 3 to 8 classes. For pricing and booking instructions, please see the back cover. Each workshop can accommodate a maximum of 30 students and is offered at your school. Workshops for 2018 are offered between May 9 and June 15, 2018.

Our workshops are designed to be scalable for all grades from 3-8 and can be customized for different grades. Please contact us if you have a specific request.

UNDERSTANDING STRUCTURES & MECHANISMS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
Hydraulic Hijinks (SM-1)	Students will design and construct a hydraulic crane as a working mechanical system.	Gr.5	Technological problem-solving skills to design, build and test a structure and mechanical system that performs a specific function; the advantages and disadvantages of different types of mechanical systems	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	Mechanical Engineering
		Gr.7	Safety procedures for using tools and handling materials; physical models that investigate the effects of various forces on structures	Understanding Structures and Mechanisms: Form and Function	Mechanical Engineering
		Gr.8	Technological problem-solving skills to investigate a system that performs a function; relationship between work, force and distance; mechanical advantage	Understanding Structures and Mechanisms: Systems in Action	Mechanical Engineering
Colossal Super-structures (SM-2)	Students will design, build and test structures that can withstand applied loads.	Gr.3	Technological problem-solving skills and knowledge to design and build a strong and stable structure that serves a purpose	Understanding Structures and Mechanisms: Strong and Stable Structures	Civil Engineering
		Gr.5	Factors that impact the strength of a structure and its ability to support and resist loads; materials and construction techniques that add strength and stability to structures; vocabulary, including compression, tension, strength and stability; problem-solving skills in designing, building and testing a strong structure that serves a purpose	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	Civil Engineering
		Gr.7	Factors that determine the ability of a structure to support a load; problem-solving skills that determine the most efficient way for a structure to support a given load	Understanding Structures and Mechanisms: Form and Function	Civil Engineering
Indy 500 (SM-3)	Students will design, build and test a model racecar.	Gr.4	Investigations into rotary motion in one system or its components and how energy is transferred to another system or component in the same structure	Understanding Structures and Mechanisms: Pulleys and Gears	Mechanical Engineering
		Gr.5	Technological problem-solving skills to design, build and test a structure; external forces acting on a structure; design, build and test integrating principles of aerodynamics; evolution and change in systems	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	Mechanical Engineering
		Gr.6	Applications of the properties of air; different forces (thrust, drag, lift, weight); design, build and test integrating principles of aerodynamics	Understanding Structures and Mechanisms: Flight	Mechanical Engineering





UNDERSTANDING LIFE SYSTEMS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
Creature Creation (LS-1)	Students will design and construct a unique creature using principles of adaptation for survival in specific environments and ecosystems.	Gr. 3	Relationships in which plants and animals depend on each other (e.g., plants provide food for energy; animals help disperse pollen and seeds)	Understanding Life Systems: Understanding Basic Concepts	Biology / Bioengineering
		Gr. 4	Identification of factors (availability of water or food, amount of light, type of weather) that affect the ability of plants and animals to survive in a specific habitat	Understanding Life Systems: Habitats and Communities	Biology / Bioengineering
		Gr. 6	Characteristics of organisms; classification systems; biodiversity and its role in maintaining the resilience of species	Understanding Life Systems: Biodiversity	Biology / Bioengineering
Gene Machine (LS-2)	Students will extract DNA from plant cells through chemical processes and explore the structure and importance of cells.	Gr. 5	Building models to demonstrate how organs or components of body systems in organisms work and interact with other components	Understanding Life Systems: Developing Investigation and Communication Skills	Biology / Bioengineering
		Gr. 6	Distinguishing characteristics of plants and animals; role of biodiversity; cell theory; DNA; principles of heredity	Understanding Life Systems: Biodiversity	Biology / Bioengineering
		Gr. 7	Cell theory; structures and organelles in cells; characteristics, structure and function of plant and animal cells; DNA; principles of heredity	Understanding Life Systems: Cells	Biology / Bioengineering
Forensic Fun (LS-3)	Students will use knowledge of chemical interactions to solve a mystery.	Gr. 5	Assess the effects of social and environmental factors on human health, and propose ways in which individuals can reduce the harmful effects of these factors	Understanding Life Systems: Relating Science and Technology to Society and the Environment	Chemistry / Chemical Engineering
		Gr. 6	Following established safety procedures for outdoor activities and field work	Understanding Life Systems: Developing Investigation and Communication Skills	Chemistry / Chemical Engineering
		Gr. 7	Human activities and technologies that alter balances and interactions in the environment	Understanding Life Systems: Interactions in the Environment	Chemistry / Chemical Engineering



UNDERSTANDING MATTER & ENERGY

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
Alarm Systems (ME-1)	Students will create working alarm systems using circuit components.	Gr. 3	Safety procedures during science and technology investigations; effects of increasing or decreasing amounts of force or energy applied to an object	Understanding Matter and Energy: Developing Investigation and Communication Skills	Electrical Engineering
		Gr. 4	Development of technological problem-solving skills to design, build and test a device that makes use of the properties of light or sound	Understanding Matter and Energy: Light and Sound	Electrical Engineering
		Gr. 6	Series and parallel circuits; circuit components; design, build and test an alarm system that transforms electrical energy into another form of energy to perform a function; conductors and insulators of electricity	Understanding Matter and Energy: Electricity and Electrical Devices	Electrical Engineering
Circuit Mazes (ME-2)	Students will explore the concept of closed circuits as they design and create a circuit maze system.	Gr. 3	Safety procedures during science and technology investigations; effects of increasing or decreasing amount of force or energy applied to an object	Understanding Matter and Energy: Developing Investigation and Communication Skills	Electrical Engineering
		Gr. 4	Technological problem-solving skills to design, build, and test a device that makes use of the properties of light or sound	Understanding Matter and Energy: Light and Sound	Electrical Engineering
		Gr. 6	Designing and building series and parallel circuits, drawing labelled diagrams, identifying the components used in each, and describing the role of each component in a circuit	Understanding Matter and Energy: Electricity and Electrical Devices	Electrical Engineering
Slime & Polymers (ME-3)	Students will formulate and synthesize polymer creations.	Gr. 3	The effects of the action of forces in nature on the natural and built environment, and identification of ways in which human activities can reduce or enhance this impact	Understanding Matter and Energy: Relating Science and Technology to Society and the Environment	Chemistry / Chemical Engineering
		Gr. 5	Physical properties of materials and their applications; properties of solids, liquids and gases; physical and chemical changes	Understanding Matter and Energy: Properties and Changes in Matter	Chemistry / Chemical Engineering
		Gr. 7	Properties of pure substances and mixtures; particle theory of matter; experimentation skills to investigate the properties of mixtures and solutions; concentration of solutions in qualitative and quantitative terms	Understanding Matter and Energy: Pure Substances and Mixtures	Chemistry / Chemical Engineering

UNDERSTANDING SPACE & EARTH SYSTEMS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
Extreme Roller-Coasters (SE-1)	Students will design, build and test model roller-coasters, while applying laws of physics and principles of design.	Gr. 4	Social and environmental costs and benefits of using objects in the built environment that are made from rocks and minerals	Understanding Earth and Space Systems: Rocks and Minerals	Mechanical Engineering
		Gr. 5	Technological problem-solving skills to design, build and test a device that transforms one type of energy into another; Law of Conservation of Energy	Understanding Earth and Space Systems: Conservation of Energy and Resources	Mechanical Engineering
		Gr. 7	Environmental and economic impacts of using conventional and alternative forms of energy	Understanding Matter and Energy: Relating Science and Technology to Society and the Environment	Mechanical Engineering

UNDERSTANDING SPACE & EARTH SYSTEMS (CONT.)

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
Rocket Science! (SE-2)	Students will build and test rockets to investigate the principles of aerodynamics.	Gr. 4	Social and environmental costs and benefits of using objects in the built environment that are made from rocks and minerals	Understanding Earth and Space Systems: Rocks and Minerals	Aerospace Engineering
		Gr. 6	Components of the solar system; technological tools and devices needed for space exploration; physics of flight and forces acting on an object in flight	Understanding Earth and Space Systems: Space	Aerospace Engineering
		Gr. 7	Social and environmental benefits of technologies that reduce heat loss or transfer; environmental and economic impacts of using conventional and alternative forms of energy	Understanding Earth and Space Systems: Heat in the Environment	Aerospace Engineering
Crazy Catapults (SE-3)	Students will explore how force and energy affect motion by designing and building catapult mechanisms.	Gr. 4	Social and environmental costs and benefits of using objects in the built environment that are made from rocks and minerals	Understanding Earth and Space Systems: Rocks and Minerals	Mechanical Engineering
		Gr. 5	Technological problem-solving skills to design, build and test a device that transforms one type of energy into another; Law of Conservation of Energy	Understanding Earth and Space Systems: Conservation of Energy and Resources	Mechanical Engineering
		Gr. 7	Environmental and economic impacts of using conventional and alternative forms of energy	Understanding Earth and Space Systems: Relating Science and Technology to Society and the Environment	Mechanical Engineering

FULL DAY WORKSHOPS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
A.I. Bots (FD-1)	Students will learn about robotics and fundamental coding and problem solving skills.	Gr. 4	Technological problem-solving skills to design, build, and test a device that makes use of properties of light or sound	Understanding Matter and Energy: Light and Sound	Robotics / Computer Science
		Gr. 6	Technological problem-solving skills to design, build and test a device that transforms electrical energy into another form of energy in order to perform a function	Understanding Matter and Energy: Electricity and Electrical Devices	Robotics / Computer Science
		Gr. 7	Evaluation of the importance for individuals, society, the economy, and the environment of factors that should be considered in designing and building structures and devices to meet specific needs	Understanding Structures and Mechanisms: Form and Function	Robotics / Computer Science
Sustainable Urban Planning (FD-2)	Students will work to plan an eco-city of the future with consideration of environmental impact and energy conservation.	Gr. 4	Positive and negative impacts of human interactions with natural habitats and communities, taking different perspectives into account, and evaluations of ways of minimizing the negative impacts	Understanding Life Systems: Habitats and Communities	Civil Engineering / Industrial Engineering
		Gr. 5	Scientific inquiry/research skills to investigate issues related to energy and resource conservation; effects of various technologies on energy consumption	Understanding Earth and Space Systems: Conservation of Energy and Resources	Civil Engineering / Industrial Engineering
		Gr. 7	Assess the impact of selected technologies on the environment; costs and benefits of selected strategies for protecting the environment	Understanding Life Systems: Interactions in the Environment	Civil Engineering / Industrial Engineering

LEADERSHIP WORKSHOPS

SCIENCE, TECHNOLOGY, ENGINEERING & MATH WORKSHOPS FOR GRADES 3 TO 8

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	STEM CONNECTION
Extreme Roller Coaster Design Challenge	Students will work in teams to design, build, and test model roller coasters in a rapid prototyping session, while applying laws of physics, principles of design, budgetary considerations and client specifications.	Gr. 5	Technological problem-solving skills to design, build and test a device that transforms one type of energy into another; Law of Conservation of Energy; Designing with varying client specifications in mind	Understanding Earth and Space Systems: Conservation of Energy and Resources	Mechanical Engineering
		Gr. 8	Technological problem-solving skills to design, build, and test a device according to client specifications; examination of the effects of various components of the system and how they affect its function and output	Understanding Structures and Mechanisms: Systems in Action	Mechanical Engineering
No Bones About it	Students will examine how components of the human skeleton come together to allow us to function in the ways we do. They will then look to comparative anatomy to learn more about living organisms and their environment as inspiration for innovation.	Gr. 5	Investigating how the skeletal system works with other systems in the body to help us function the way we do; using bio-inspired design in engineering to help improve lives for those with injury or disease; exploring comparable systems in other living things	Understanding Life Systems: Human Organ Systems	Biomedical Engineering, Materials Science
		Gr. 7	Investigating the factors and structures that allow the body to do the things it does; Biomimicry and bio-inspired design in engineering to help improve lives of those with injury or disease; exploring comparable skeletal structures of other living things	Understanding Structures and Mechanisms: Form and Function	Computer/ Environmental Engineering
Emergency Shelters	Students will create shelters for an emergency situation while testing their communication, teamwork and collaboration skills. Structures will be tested for stability and efficiency of their design in context. Students will work together to resolve challenges and explore priorities in a time of crisis.	Gr. 3	Factors that impact the strength and stability of a structure; problem-solving skills in designing, building and testing a strong and stable structure that serves a purpose; forming a collaborative and mutually beneficial set of community standards	Understanding Structures and Mechanisms: Strong and Stable Structures	Civil Engineering
		Gr. 5	Internal forces acting on a structure (compression, tension); external forces (wind, movement); building a stable structure to support a load; how structures are built to withstand forces; the role of citizens in a community; taking a leadership role in a time of crisis; working as a team; effective communication and the various forms it can take	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms; Social Studies: The Role of Government and Responsible Citizenship	Civil Engineering
		Gr. 7	Investigating the relationship between the design and function of various structures; factors that need to be considered in structure design; effective communication and teamwork in a time of crisis	Understanding Structures and Mechanisms: Form and Function	Civil Engineering
Toy Design	Students will look at the engineering design and innovation process on a smaller scale, examining all of the detailed decisions that must be made along the way and how they impact a final product.	Gr. 5	Examining forces acting on a mechanism to inform the design of an improved mechanism; rapid prototyping and the engineering design cycle; importance of giving and receiving constructive feedback as a leader in science and engineering; the engineering design process	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	Mechanical Engineering
		Gr. 7	Investigating the relationship between the design and function of a mechanism and the forces that act upon it; rapid prototyping and the engineering design cycle; importance of giving and receiving constructive feedback	Understanding Structures and Mechanisms: Form and Function	Industrial Engineering (Human Factors)

IN-SCHOOL WORKSHOPS 2018 BOOKING FORM

For online registration, please visit www.uoft.me/isw

CONTACT INFORMATION

MAIN CONTACT:

FIRST NAME

LAST NAME

PHONE NUMBER

EMAIL ADDRESS

SCHOOL:

SCHOOL NAME

BOARD

ADDRESS:

STREET NO. & NAME

CITY

POSTAL CODE

NEAREST INTERSECTION TO SCHOOL

PHONE:

PHONE

EXTENSION

WE OFFER IN-SCHOOL WORKSHOPS ON THE FOLLOWING DATES: MONDAY TO FRIDAY FROM MAY 9 TO JUNE 15, 2018.

To schedule workshops outside the May 9 to June 15 window, please email your preferred dates to workshop@ecf.utoronto.ca to check availability before submitting this form.

Which dates would you prefer us to visit your school?

REQUESTED DATE:

ALTERNATIVE DATE:

To help us schedule your workshops, please provide your school schedule:

START:

LUNCH:

END:

WORKSHOP REQUESTS

Please note: Each workshop can accommodate a maximum of 30 students and is offered at your school.

Please email us at workshop@ecf.utoronto.ca for more information.

TEACHER	GRADE	# OF STUDENTS	WORKSHOP TITLE	START TIME	END TIME
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

If you are not booking online, please email or mail this form to us. After we receive your form, we will send you a confirmation and invoice to the email address provided. Workshops are not officially booked until you receive confirmation. We look forward to hearing from you!

CONTACT IN-SCHOOL WORKSHOPS

In-School Workshops, University of Toronto 35 St. George Street, Room 173, Toronto ON M5S 1A4 Canada

Email: workshop@ecf.utoronto.ca | Online registration: www.uoft.me/isw | Tel: 416-946-0816



HOW TO BOOK AN IN-SCHOOL WORKSHOP

- 1 Select your workshops.** We offer a wide range of workshop topics that are grade-specific, fun and kid-friendly. Each half-day workshop is 2.5 hours in length, while full-day workshops are 5 hours in length. We are pleased to offer special pricing on workshop packages for schools. If other teachers in your school are interested in booking workshops, we encourage you to book together to save money. Please note, each workshop can accommodate a maximum of 30 students.
- 2 Complete the booking form.** We schedule workshops on a first-come-first-served basis. Book early for preferred dates!
- 3 Send your completed form to our office by mail:**

BY EMAIL: workshop@ecf.utoronto.ca **DOWNLOAD THE FORM:** www.uoft.me/isw

The University of Toronto's Faculty of Applied Science & Engineering is committed to inspiring young minds in the areas of science, technology, engineering and math (STEM). We achieve this through a wide range of year-round, hands-on programs for children of all ages. Last year, we reached more than 5,000 pre-university youth. Some of our programs include:

JR. DEEP (SUMMER, GR. 3–8)

GIRLS' JR. DEEP (SUMMER, GR. 3–8)

JR. DEEP SATURDAYS (FALL AND WINTER, GR. 3–8)

GIRLS' JR. DEEP SATURDAYS (FALL AND WINTER, GR. 3–8)

JR. DEEP AT MARCH BREAK (MARCH, GR. 3–8)

DEEP SUMMER ACADEMY (SUMMER, GR. 9–12)

DEEP LEADERSHIP CAMP (SUMMER, GR. 10–12)

After you receive your confirmation, leave the rest to us!

Our instructors will bring the necessary materials for all activities.



Engineering

ENGINEERING OUTREACH OFFICE, UNIVERSITY OF TORONTO

35 St. George Street, Room 173, Toronto, ON M5S 1A4 Canada

Email: workshop@ecf.utoronto.ca | www.outreach.engineering.utoronto.ca

Tel: 416-946-0816

WORKSHOP PACKAGES & PRICING

Booking In-School Workshops with other teachers in your school is the most cost-effective way to bring these enriching workshops to your classroom. Packages can be split among different grade levels and classrooms (maximum 30 students per workshop) within your school, but all workshops must occur on the same day.

SCHOOL PACKAGE I: FULL-DAY \$1,560

12 workshops @ 2.5 hrs each

SCHOOL PACKAGE II: HALF-DAY \$875

6 workshops @ 2.5 hrs each

INDIVIDUAL WORKSHOPS

1 workshop @ 2.5 hrs each **\$170**

1 workshop @ 5 hrs (full day) **\$310**

Priority will be given to schools with multiple bookings.



Actua provides training, resources and support to its national network of members located at universities and colleges across Canada in the delivery of science, technology, engineering and mathematics (STEM) education outreach programming. Each year, these members engage over 225,000 youth in 500 communities nationwide. Please visit Actua at www.actua.ca.

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