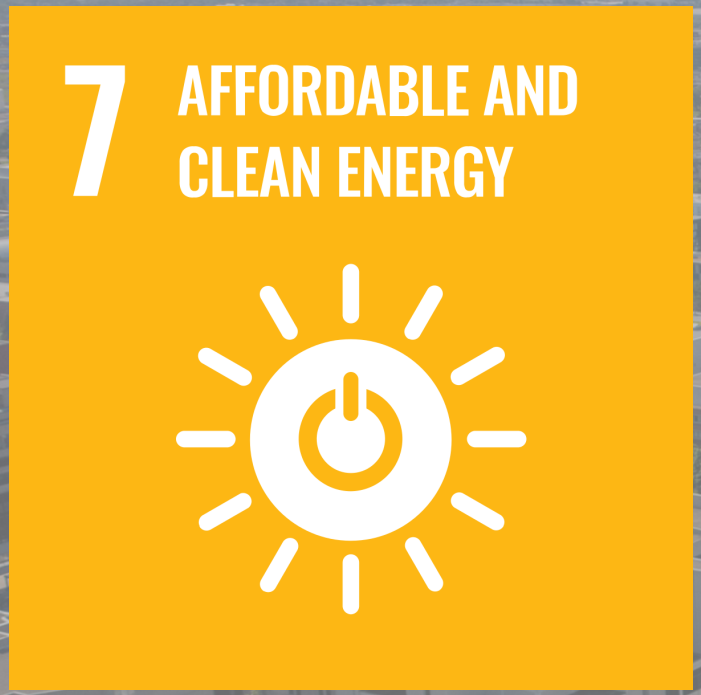
York University SDG Course Inventory

SDG 7 – Affordable and Clean Energy



SDG 7 Affordable and Clean Energy seeks to provide global access to affordable, reliable and renewable energy to world. Currently, 660 million people still lack access to electricity and billions more rely on insufficient, sporadic and polluting power sources. To remedy this, SDG 7 plans a massive electrification acceleration, increase investments in renewable energy sources and invest in improving electricity grids.

York University's SDG Course Mapping identified courses in the Faculty of Environment and Urban Change, the Faculty of Science, and Lassonde School of Engineering as advancing SDG 7. Topics include energy dynamics, thermodynamics, and energy conversion and storage, as well as the manufacture of sustainable power infrastructure.

Click Here to learn more about York's initiatives towards accomplishing SDG 7

Click Here to learn more about the United Nations' SDG 7 targets and goals

SDG 2 Courses at YU	Primary SDG	Secondary SDG	Ancillary SDG	Total Courses
	16	1	0	17

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York University 2022 SDG Course Mapping - SDG 7

COURSE TITLE	FACULTY	SUBJECT	CODE	CREDIT	DESCRIPTION	LANGUAGE	PRIMARY SDG	SECONDARY SDG	ANCILLIARY SDG
Topics in Materials Sciences	Faculty of Science	CHEM	4090	3	Exploring the chemistry behind novel materials relevant to electronics, alternative energy sources, life sciences and polymer sciences. One term. Three credits. Prerequisites: SC/CHEM 3021 3.00 and SC/CHEM 3030 3.00; SC/CHEM 3031 3.00 is strongly recommended.	en	SDG 7 Affordable and Clean Energy		
Electrical Circuits	Lassonde School of Engineering	EECS	2200	3	This course covers the basic principles of linear circuits. Kirchhoff's laws, circuit equations, RL, RC, and RLC circuits, three-phase circuits, power analysis and power factor, and magnetically coupled circuits. Prerequisites: cumulative GPA of 4.50 or better over all major EECS courses (without second digit""5"), SC/PHYS 1010 6.00 or SC/PHYS 1801 3.00. Course credit exclusions: SC/PHYS 3050 3.00.	en	SDG 7 Affordable and Clean Energy		
Electrical Systems for Mechanical Engineers	Lassonde School of Engineering	EECS	3505	3	Many mechanical systems today are integrated with electrical systems. This course will prepare students to work on electromechanical systems by introducing them to topics such as: The basics of circuit analysis and setup, as well as electronics; power systems including 3-phase; DC and AC motors; electro-mechanical actuators; and, time permitting, basics of communication protocols. Prerequisites: SC/PHYS 1801 3.00, LE/MECH 2502 3.00.	en	SDG 7 Affordable and Clean Energy		
Electromechanical Energy Conversion	Lassonde School of Engineering	EECS	3603	4	This course covers the basic construction and principles of operation of different types of electric machines; magnetic circuit analysis, single-phase and poly-phase transformers, principles of electromechanical energy conversion, DC machines, three-phase induction machines, synchronous machines, and special machines (stepper motors, linear motors and brushless DC (BLDC) motors). The transients and dynamics of machines are analyzed. Introduction of Solid-State control of motors. In addition to lectures and tutorials, field trip: six hours. Prerequisites: cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 2200 3.00, SC/PHYS 2020 3.00.	en	SDG 7 Affordable and Clean Energy		
Introduction to Power Systems	Lassonde School of Engineering	EECS	3622	4	The course discusses the basic modeling and analysis techniques in electrical energy systems including generation, transmission, and distribution systems. It covers the power system fundamentals consisting of 3-phase systems, complex and phasor quantities, single line diagrams and Per Unit system of calculations. Concept of complex power and active and reactive power are covered and reactive power compensation is also described. Functional descriptions and modeling of generators, transformers, transmission lines, motors and other loads are discussed. Various types of renewable energy systems are also introduced and basic functionality of the critical components of these systems are discussed. Prerequisites: Cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 2200 3.00. Course Credit Exclusion LE/EECS 4622 4.00	en	SDG 7 Affordable and Clean Energy		

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Power Electronics	Lassonde School of Engineering	EECS	4613	4	The objective of this course is to understand the basic operating principles of power conversion using advanced electronic devices. The structure and characteristics of several switching devices are reviewed. Basic power electronic converters and inverters such as AC/DC rectifiers, DC/DC switch mode converters and voltage source DC/AC inverters are studied. Resonant DC/DC converters are introduced. Computation of circuit quantities such as average and RMS value, average power, power factor, total harmonics distortion and power efficiency are also studied. Prerequisites: cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"), LE/EECS 2210 3.00. Corequisite: LE/EECS 3603 4.00.	en	SDG 7 Affordable and Clean Energy		
Energy and the Environment in Canada	Faculty of Environmental & Urban Change	ENVS	3130	3	The course focuses on relation-ships between socio-economic development, energy use, and the environment in Canada. Energy sources, energy end use, energy technology, and energy institutions as well as the social and ecological impacts of energy use are examined. Energy systems supportive of sustainable development are explored. Prerequisite: EU/ENVS 2400 6.00 or permission of Instructor. Prior to FALL 2020: ES/ENVS 2400 6.00	en	SDG 7 Affordable and Clean Energy		
Principles of renewable energy: theory, policy and practice	Faculty of Environmental & Urban Change	ENVS	4400	3	The course is designed to provide students with a critical understanding of key renewable energy options for electricity generation, heating and cooling of buildings and transportation. Students will be introduced to a critical analysis of renewable energy as a strategy for climate change mitigation, community empowerment, industrial development, and energy security. This course builds on EU/ENVS 3130 3.00. PRIOR TO FALL 2020: ES/ENVS 3130 3.00 Prerequisite: Fourth-year standing or by permission of the Instructor. Students with Third-year standing may have access subject to space availability and approval from the Faculty.	en	SDG 7 Affordable and Clean Energy		
Dynamics	Lassonde School of Engineering	MECH	2302	3	This course covers kinematics and kinetics of rigid body motion based on concepts of force, work, momentum and energy methods; impact; engineering applications are emphasized. Prerequisites: SC/MATH 1013 3.00, SC/MATH 1014 3.00, and SC/PHYS 1800 3.00.	en	SDG 7 Affordable and Clean Energy		
Engineering Thermodynamics	Lassonde School of Engineering	MECH	3201	3	This course continues the learning in thermodynamics, including topics such as: Analysis and application of energy compression cycles, vapor compression cycles and application to HVAC systems; combustion and/or compressible gas flow in conduits (adiabatic and isothermal). Students will examine the various implications of the laws of thermodynamics in complex systems relevant to mechanical engineering. Prerequisite: LE/MECH 2201 3.00.	en	SDG 7 Affordable and Clean Energy		

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Energy Conversion and Storage	Lassonde School of Engineering	MECH	4203	3	This course gives a comprehensive view of energy conversion processes and technologies in the context of the global energy system. A cohesive thermodynamic framework is developed to evaluate any energy conversion process or technology. The framework is used to understand how energy is transformed from a primary energy source to its ultimate end use. The concepts of primary energy, secondary energy, energy-use sectors (industrial, transportation, residential, commercial, and electric power sectors), energy transmission, and energy storage are illustrated. Electricity generation technologies, including fossil fuels, nuclear, solar, wind, and hydroelectricity, are analyzed and compared in terms of efficiency, cost, and environmental impact. End uses other than electricity, including space heating, industrial process heat, and transportation are emphasized. The requirements for transitioning the Canadian and global energy systems to a sustainable system based on renewable and carbon-neutral technologies are discussed. Prerequisite: LE/MECH 3201 3.00 and LE/MECH 3203 3.00	en	SDG 7 Affordable and Clean Energy		
Life-cycle Analysis and Sustainability	Lassonde School of Engineering	MECH	4504	3	This course discusses the notion of "triple bottom-line" or triple-E (energy, environment, economics), life Cycle inventory, computational structure of LC inventory, case studies and execution of a mini- LCA, as well as strengths, weaknesses and appropriate uses of LCA. Prerequisites: ES/ENVS 2150 3.00 or LE/ESSE 2210 3.00. Corequisite: LE/MECH 4401 3.00.	en	SDG 7 Affordable and Clean Energy		
Energy	Faculty of Science	NATS	1810	6	Conversion technology of current and possible future energy sources is described. The extent of the resource base of each and the environmental consequences of utilization are discussed, with emphasis on nuclear power and energy policies of Ontario and Canada.	en	SDG 7 Affordable and Clean Energy		
Technology and Civilization	Faculty of Science	NATS	1775	6	A study of the most important technological advances in the context of various civilizations throughout history. Selected important innovations (e.g. mechanized agriculture, wind, water, steam and nuclear power generation, aviation and railways and communications).	en	SDG 9 Industry, Innovation and Infrastructure	SDG 7 Affordable and Clean Energy	
Electricity and Magnetism	Faculty of Science	PHYS	2020	3	The elements of electric and magnetic fields are developed together with DC and AC circuit theory. Prerequisites: SC/PHYS 1011 3.00 and SC/PHYS 1012. 3.00 or SC/PHYS 1800 3.00 and SC/PHYS 1801 3.00, or SC/ISCI 1301 3.00 and SC/ISCI 1302 3.00, or a minimum grade of C in SC/PHYS 1411 3.00 and SC/PHYS 1412 3.00 or SC/PHYS 1421 3.00 and SC/PHYS 1422 3.00. Corequisite: SC/MATH 2015 3.00.	en	SDG 7 Affordable and Clean Energy		

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Electricity, Magnetism and Optics for Engineers	Faculty of Science	PHYS	1801	3	A survey of physics in which fundamental concepts in electricity, magnetism and optics are emphasized through engineering applications. This is a calculus-based course intended primarily for engineering students. Prerequisite: SC/PHYS 1800 3.00 and SC/MATH 1013 3.00 or equivalent. Corequisites: SC/MATH 1014 3.00 or SC/MATH 1310 3.00 or SC/MATH 1505 6.00. Course Credit Exclusions: SC/PHYS 1010 6.00, SC/PHYS 1012 3.00, SC/PHYS 1410 6.00, SC/PHYS 1412 3.00, SC/PHYS 1420 6.00, SC/PHYS 1422 3.00, SC/ISCI 1310 6.00, SC/ ISCI 1302 3.00.	en	**SDG 7 Affordable and Clean Energy**		
Physics Fundamentals 1	Faculty of Science	PHYS	1411	3	A calculus-based survey of physics. Topics include kinematics, dynamics, momentum and energy for linear and rotational motion; elementary kinetic theory and thermodynamics. This course is recommended for students unlikely to take 2000-level Physics courses.It is a prequel to SC/PHYS 1412 3.0 Prerequisites: 12U Physics or OAC Physics or SC/PHYS 1510 3.00; MHF4U Advanced Functions and MCV4U Calculus and Vectors, or 12U Advanced Functions and Introductory Calculus, or OAC Algebra and OAC Calculus, or SC/MATH 1505 6.00, or SC/MATH 1520 3.00. Course credit exclusions: SC/PHYS 1010 6.00; SC/PHYS 1011 3.00, SC/PHYS 1420 6.00; SC/PHYS 1421 3.00; SC/PHYS 1800 3.00; SC/ISCI 1310 6.00; SC/ISCI 1301 3.00.	en	**SDG 7 Affordable and Clean Energy**		