

APPLIED SCIENCE (APSC)

APSC 100 Engineering Practice 1 Units: 9.00

This course introduces fundamental professional engineering skills and provides an opportunity to apply engineering science and mathematics content in situations emulating professional practice. It consists of three modules: Module 1. Problem analysis and modeling; Module 2. Experimentation and measurement; Module 3: Engineering design. The course provides an introduction to personal learning styles, team dynamics, oral and written presentation skills, laboratory data collection, analysis and presentation, project management, information management, problem analysis and modeling, numeric computation, economics, design methodologies, and workplace safety.

NOT OFFERED 2023-2024

K9(Lec: Yes, Lab: Yes, Tut: Yes)

Offering Term: FW

CEAB Units:

Mathematics 0

Natural Sciences 16

Complementary Studies 36

Engineering Science 24

Engineering Design 33

Offering Faculty: Smith Engineering

APSC 101 Engineering Design & Practice Units: 3.50

This course develops the ability to conceive, design, and implement solutions in an engineering context via team-based design projects. It develops complex problem solving, teaming, critical thinking, and communication skills, and provides guidance in incorporating safety, ethical, economic, and social factors in engineering problem solving.

Examples and project topics are chosen to complement instruction in other first year courses, specifically including programming and graphics.

K3.5(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Corequisites: Exclusions: APSC 100

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 18

Engineering Science 8

Engineering Design 17

Offering Faculty: Smith Engineering

APSC 102 Experimentation Units: 2.00

This course introduces concepts of planning and designing experiments to determine or measure particular system characteristics. The course content includes laboratory data collection, error analysis, data analysis and visualization, lab safety, occupational hazards, and the design of experimental investigation for simple systems.

K2(Lec: No, Lab: Yes, Tut: Yes)

Requirements: Prerequisites: Corequisites: Exclusions: APSC 100

Offering Term: FW

CEAB Units:

Mathematics 0

Natural Sciences 24

Complementary Studies 0

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering



APSC 103 Engineering Client-based Design Project Units: 3.50

This client-based team design project develops skills including design, project management, technical communications, and professionalism in an experience emulating professional practice. Students work in teams to define problems, gather and identify appropriate information, work effectively with teammates, generate ideas, select ideas, and implement a solution to a problem presented by a client.

K3.5(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: APSC 101 Corequisites:

Exclusions: APSC 100

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 18

Engineering Science 8

Engineering Design 16

Offering Faculty: Smith Engineering

APSC 111 Physics I Units: 3.30

This course is an introduction to Newtonian mechanics in the context of engineering applications. Lecture topics are: vectors, motion of a particle, particle dynamics, work and energy, statics and dynamics of rigid bodies, conservation of energy, momentum, and collisions.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 40

Complementary Studies 0

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 112 Physics II Units: 3.30

This course continues from APSC 111 to introduce electricity and further develop fundamental ideas of mechanics in the context of engineering applications. Lecture topics include: oscillations and waves, electric charge, electrical current and resistance, EMF, D.C. circuits and electrical measurements, electric field and potential, magnetic fields and their origin, and electromagnetic induction.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Requirements: Prerequisites: APSC 111 and APSC 171

Corequisites: Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 35

Complementary Studies 0

Engineering Science 5

Engineering Design 0

Course Equivalencies: APSC 112 APSC 114

Offering Faculty: Smith Engineering

APSC 114 Electricity and Magnetism Units: 3.30

This course continues from APSC 111 to introduce electricity and further develop fundamental ideas of mechanics in the context of engineering applications. Lecture topics include: oscillations and waves, electric charge, electrical current and resistance, EMF, D.C. circuits and electrical measurements, electric field and potential, magnetic fields and their origin, and electromagnetic induction.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Requirements: Prerequisites: APSC 111 and APSC 171

Corequisites: Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 30

Complementary Studies 0

Engineering Science 10

Engineering Design 0

Course Equivalencies: APSC 112 APSC 114

Offering Faculty: Smith Engineering

APSC 131 Chemistry of Engineering Materials and Processes Units: 3.30

This course introduces engineering materials and process thermodynamics, with particular emphasis on the central role of chemistry in society's pursuit of the United Nations Sustainable Development Goals. The first unit focuses on structure / property relationships of engineering materials such as metals, semiconductors, ceramics, glasses and polymers. In addition to mechanical properties, specific attributes such as conductivity, photovoltaic activity, viscoelasticity and chemical stability are examined in the context of engineering design decisions. The pressure-volume-temperature dependences of liquid and gas phase properties are also studied. The second unit focuses on the 1st and 2nd laws of thermodynamics as they relate to engineering processes involving heat and work. State functions such as internal energy, enthalpy and entropy are used to define efficiency limitations in energy conversion devices such as engines and heat pumps.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 32

Complementary Studies 0

Engineering Science 8

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 132 Chemistry of Natural and Engineered Systems Units: 3.30

This course introduces equilibrium thermodynamics, chemical process dynamics and electrochemistry in the context of sustainable engineering design. The first unit defines Gibbs energy as a means of describing the equilibrium state of multi-phase and reactive systems, including acid/base reactions in aqueous solution. The second unit focuses on the rate and mechanism of chemical reactions as well as the physical processes of heat and mass transfer. The third unit deals with principles of electrochemistry as they apply to corrosion and industrial galvanic / electrolytic cells.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Requirements: Prerequisites: APSC 131 Corequisites: Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 25

Complementary Studies 0

Engineering Science 15

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 137 Introductory Chemistry for Technology Students Units: 4.50

This course will examine the essential fundamentals of chemistry, as a basis for application to the various fields of engineering, drawing specific applications to current engineering practices in civil, mechanical, chemical, and mining engineering. The course will survey chemical fundamentals including stoichiometry, solution concentration, chemical equilibrium and acid-base equilibria. Physical chemistry content will include thermochemistry, behaviour of gases, chemical kinetics and electrochemistry. Students will explore organic chemistry principles including naming organic compounds, recognizing key organic functional groups, illustrate properties and study typical reactions, while highlighting the acquired knowledge to applied engineering scenarios. Special emphasis will be placed upon data manipulation and interpretation and proposing solutions/engineering designs to real world applications.

(Lec: 4, Lab: 0, Tut: 1)

Requirements: Prerequisites: Approval of Associate Dean (Academic) Corequisites: Exclusions: APSC 131, APSC 132

Offering Term: S

CEAB Units:

Mathematics 0

Natural Sciences 47

Complementary Studies 0

Engineering Science 7

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 141 Introduction to Computer Programming for Engineers 1 Units: 0.80

This course introduces concepts and practice of computer programming. The emphasis is on the design of correct and efficient algorithms, introducing variables, operators, flow control, and conditions. Applications are made to engineering problems.

(Lec: 0.7, Lab: 0.3, Tut: 0)

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 10

Engineering Design 0

Offering Faculty: Smith Engineering



APSC 142 Introduction to Computer Programming for Engineers 2 Units: 2.50

This course introduces concepts, theory and practice of computer programming. The emphasis is on the design of correct and efficient algorithms and on programming style, building from APSC 141. Applications are made to engineering problems.

(Lec: 1.5, Lab: 1, Tut: 0)

Requirements: Prerequisites: APSC 141 Corequisites:

Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 30

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 143 Introduction to Computer Programming for Engineers Units: 3.30

This course introduces concepts, theory and practice of computer programming. Implementation uses microcomputers. The emphasis is on the design of correct and efficient algorithms and on programming style. Applications are made to engineering problems. NOTE: This course is only available to students in the MRE program, and by permission to other students.

K3.3(Lec: Yes, Lab: Yes, Tut: No)

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 40

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 151 Earth Systems Engineering Units: 3.30

This course provides an introduction to the complex Earth System (the solid earth, hydrosphere, atmosphere, and biosphere) and our interactions with it. The science behind our exploration and understanding of our planet and its ongoing evolution is explored in combination with the engineering geology of geo-materials, geo-resources, geo-dynamics and geo-risk. The connection between the Earth System and human activity is explored in depth, including local and global-scale impacts of engineering works, geopolitics, and resource issues. Examples of the terrestrial sources of geo-materials used in engineering activities are highlighted along with the technical, social, economic and environmental challenges associated with their life cycle including sustainability, contamination, biodiversity loss, social impact and climate change.

(Lec: 2.8, Lab: 0.5, Tut: 0)

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 18

Complementary Studies 10

Engineering Science 12

Engineering Design 0

Course Equivalencies: GEOL 104/105 / APSC 151

Offering Faculty: Smith Engineering

APSC 161 Engineering Graphics Units: 3.50

The principal objectives of the course are (1) to develop the student's ability to visualize and communicate three-dimensional shapes and (2) to acquire the skills needed to use computer-aided design software. Topics covered are orthographic projection, isometric sketching, auxiliary and section views as well as dimensioning and working drawings. Computer-aided design software is used to create solid models of the parts and assemblies as well as to generate dimensioned drawings. Students apply their learning in a project where they design their own version of a consumer product. Students learn by hands-on exercises in free-hand sketching and computer-based drawing.

(Lec: 2, Lab: 1.5, Tut: 0)

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 37

Engineering Design 5

Offering Faculty: Smith Engineering

APSC 162 Engineering Graphics Units: 2.50

The principal objectives of the course are (1) to develop the student's ability to visualize and communicate three-dimensional shapes and (2) to acquire the skills needed to use computer-aided design software. Topics covered are orthographic projection, isometric sketching, auxiliary and section views as well as dimensioning and working drawings. Computer-aided design software is used to create solid models of the parts and assemblies as well as to generate dimensioned drawings. Students apply their learning in a project where they design their own version of a consumer product. Students learn by hands-on exercises in free-hand sketching and computer-based drawing.

(Lec: 1.5, Lab: 1, Tut: 0)

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 20

Engineering Design 10

Offering Faculty: Smith Engineering

APSC 171 Calculus I Units: 3.30

Graphs and derivatives of vector-valued functions; related applications. Implicit derivatives and related rate applications. Fundamental Theorem of Calculus, Riemann integral; applications to problems involving areas, volumes, mass, charge, work, etc. Integration by substitution, by parts, and partial fractions. Introduction to second-order differential equations and complex numbers.

K3.3(Lec: Yes, Lab: No, Tut: Yes)

Offering Term: F

CEAB Units:

Mathematics 40

Natural Sciences 0

Complementary Studies 0

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 172 Calculus II Units: 3.30

This course continues calculus concepts from APSC 171, including space curves, speed, and velocity. Functions of several variables, partial derivatives, differentials, error estimates, gradient, maxima and minima. Double and triple integrals, polar and cylindrical coordinates; applications to mass, center of mass, moment. Series, power series; Taylor polynomial approximations, error analysis.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Requirements: Prerequisites: APSC 171 Corequisites:

Exclusions:

Offering Term: W

CEAB Units:

Mathematics 40

Natural Sciences 0

Complementary Studies 0

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 174 Introduction To Linear Algebra Units: 3.30

Systems of linear equations; real vector spaces and subspaces; linear combinations and linear spans; linear dependence and linear independence; applications to systems of linear equations and their solution via Gaussian elimination; bases and dimension of real vector spaces; linear transformations, range, kernel and Rank-Nullity theorem; matrix representation of a linear transformation; composition of linear transformations and matrix multiplication; invertible matrices and determinants; eigenvalues and eigenvectors of square matrices. Applications of the course material to engineering systems are illustrated.

(Lec: 2.8, Lab: 0, Tut: 0.5)

Offering Term: WS

CEAB Units:

Mathematics 40

Natural Sciences 0

Complementary Studies 0

Engineering Science 0

Engineering Design 0

Course Equivalencies: MATH 110B/112 / APSC 174

Offering Faculty: Smith Engineering

**APSC 182 Applied Engineering Mechanics Units: 1.70**

Identification, visualization and quantification of forces on elements and forces within statically determinate engineering structures and systems. Two- and three-dimensional force equilibrium of rigid bodies; force distribution within engineering systems like simple trusses, frames and machines; internal shear forces and bending moments in force carrying elements; and engineering stress and strain. (Lec: 1.45, Lab: 0, Tut: 0.25)

Offering Term: FW

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 15

Engineering Design 5

Offering Faculty: Smith Engineering

APSC 199 English Proficiency for Engineers Units: 0.20

This course develops skills that are necessary to organize and present technical information in a professional context. At the end of the course students will demonstrate English proficiency in listening comprehension and written expression.

K0.2(Lec: No, Lab: No, Tut: No)

Offering Term: FWS

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 2

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 200 Engineering Design & Practice II Units: 4.00

In this course students will participate constructively on teams to create solutions to open-ended complex problems, using standard design methods and tools. This project-based course provides instruction primarily in the first 6 weeks of the semester focusing on problem scoping, creativity and idea generation, decision making incorporating technical, economic, societal, and environmental factors, safety, engineering codes and regulations, and engineering ethics. The final 6 weeks of the course centre around a design project delivered by each discipline. This course is integrated with APSC 293, and coordinated by the same instructor. K4(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: APSC 100 or APSC 103 ; APSC 199 or have passed the English Proficiency Test
Corequisites: APSC 293 **Exclusions:** APSC 202

Offering Term: FW

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 12

Engineering Science 0

Engineering Design 36

Offering Faculty: Smith Engineering

APSC 202 Engineering Design and Practice II: Client-Based Design Units: 4.30

In this course students will participate constructively on teams to create solutions to client-based open-ended design problems using standard design methods and tools. This project-based course provides instruction on problem scoping, creativity and idea generation, decision making incorporating technical, economic, societal, and environmental factors, safety, engineering codes and regulations, and engineering ethics. Students work in teams to define problems, gather and identify appropriate information, work effectively with teammates, generate ideas, select ideas, and implement a solution to a presented problem from a client. This course is integrated with APSC 293, and taught by the same instructor.

K4.3(Lec: 0, Lab: 0, Tut: 0)

Requirements: Prerequisites: APSC 101 and permission of the Associate Dean (Academic) **Corequisites:** APSC 293
Exclusions: APSC 100, APSC 103, and APSC 200

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 16

Engineering Science 0

Engineering Design 36

Offering Faculty: Smith Engineering

APSC 210 Engineering Design and Practice Units: 4.00

The objective of APSC-210 is to develop the professional skills used by engineers and demonstrate them by team-based project work. It addresses the objectives of APSC 101, APSC 103, and APSC 200 primarily for students who are transferring into engineering from an advanced diploma technology program. It focuses on developing complex problem solving, modeling, and professional skills in the context of the engineering profession, and integrates content knowledge in engineering science and mathematics. It includes instruction on problem scoping, creativity and idea generation, decision making incorporating technical, economic, societal, and environmental factors, safety, engineering codes and regulations, and engineering ethics and equity. Students work in teams to define problems, gather and identify appropriate information, work effectively with teammates, generate ideas, select ideas, and implement a solution to a presented problem.

K4 (Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Approval of Associate Dean (Academic) Corequisites: APSC 293 Exclusions: APSC 100, APSC 101, APSC 103, APSC 200, APSC 202

Offering Term: S

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 12

Engineering Science 0

Engineering Design 36

Offering Faculty: Smith Engineering

APSC 221 Economic And Business Practice Units: 3.00

This course will provide the student in the Engineering program with the ability to appropriately incorporate selected economic and business practices into the practice of engineering. The practices covered include: business planning for the enterprise, enterprise economic analysis, project management process, project economic analysis, risk analysis and management, quality management and change management. Assignments and examples are based on situations from engineering based industries.

Lec: 3, Lab: 0, Tut: 0

Requirements: Prerequisites: Corequisites: Exclusions: APSC 321, COMM 244

Offering Term: FWS

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 36

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 222 Engineering for Sustainability and Innovation Units: 3.00

Queen's Faculty of Engineering and Applied Science has partnered with the global How to Change the World social enterprise and other institutions to introduce a new multi-university course. Students are given the opportunity to work on an interdisciplinary and multi-university project focused on positively impacting the complex sustainability challenges faced by real world communities around the world. Throughout this course, students work in small (four or five person) teams to identify and understand a well-defined sustainability (social and/or environmental) problem faced by a real-world community, and then devise, design and propose

an implementable idea for positively impacting that problem. Limited places are available in the course and an application is required for consideration (program details will be shared by the Faculty during the Fall).

K3.0 (Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Permission of the Engineering Faculty Office Corequisites: Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 36

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 223 Global Project Management Units: 3.00

This course will cover the knowledge areas and processes of the globally-recognized PM Body of Knowledge: integration, scope, cost, time, risk, human resources, stakeholders and procurement management. The focus will be a practical, applied approach, utilizing the global city of London, its engineering firms, experts, practitioners and massive engineering undertakings (The Shard, Cross-Rail, the Eurotunnel, the Thames Barrier, etc.) to investigate the problems, challenges and successes of managing global engineering projects. Note that the first week of instruction for this course will be held at Queen's, prior to the start of the 6-week BISC-based workshop.

COURSE DELETED

K3(Lec: Yes, Lab: Yes, Tut: Yes)

Offering Term: S

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 36

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering



APSC 250 Biology Through an Engineering Lens Units: 3.50

This course provides an introduction to biology and biochemistry, and their applications in cell-based engineering systems and processes. Students will obtain a basic background in biology, including the biology of bacteria, fungi, viruses and human cells. These concepts will be related to applications relevant to modern engineering and will be taught from a systems engineering perspective through the lens of societal need. This will include such applications as; bioremediation for the treatment of waste water, production of vaccines, biomedical and biomechanical devices, and regenerative medicine. While taught from an engineering perspective, the course would be relevant to any student interested in the application of biology, and is designed to provide relevant examples across multiple disciplines. The course assumes basic first year level science knowledge.

NOT OFFERED 2022-2023

K3.5(Lec: Yes, Lab: No, Tut: No)

Requirements: Prerequisites: Corequisites: Exclusions: CHEE 229

Offering Term: FWS

CEAB Units:

Mathematics 0

Natural Sciences 30

Complementary Studies 0

Engineering Science 12

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 293 Engineering Communications Units: 1.00

This course provides an introduction to effective engineering writing and speaking skills with the emphasis on professional correspondence, engineering reports, oral briefings, and formal oral presentations. These skills are developed in lectures and small group tutorials. This course is integrated with APSC 200, and coordinated by the same instructor.

K1(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: APSC 100 or APSC 103
Corequisites: APSC 200 or APSC 202 or permission of instructor
Exclusions: APSC 292, CHEE 260, ELEC 291, ELEC 391, GEOL 291, GEOL 292, MECH 290

Offering Term: FWS

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 12

Engineering Science 0

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 301 Professional Internship Units: 3.50

The professional internship involves spending a minimum of twelve months and a maximum of sixteen months in a paid internship position in industry or government. Students in the 12-month internship must register in APSC 302, APSC 303 and either APSC 301 or APSC 304. Students in the 16 month placement take APSC 301, APSC 302, APSC 303 and APSC 304. The nature of the work must satisfy the criteria defining professional experience for licensure as a Professional Engineer in Canada. The course includes prior workshops on interviewing, resume preparation and work performance. Successful completion of the course requires submission of a report of high quality on the experience within thirty days of completion of the work period. Career Services manage the non-academic aspects of the course.

(Lec: , Lab: , Tut:)

Requirements: Prerequisites: APSC 199 and completion of second year courses
Corequisites: Exclusions:

Offering Term: S

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 21

Engineering Science 21

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 302 Professional Internship Units: 3.50

The professional internship involves spending a minimum of twelve months and a maximum of sixteen months in a paid internship position in industry or government. Students in the 12-month internship must register in APSC 302, APSC 303 and either APSC 301 or APSC 304. Students in the 16-month placement take APSC 301, APSC 302, APSC 303 and APSC 304. The Internship Coordinator must be satisfied that the work carried out has educational merit. The course includes workshops on interviewing, resume preparation and work performance. Successful completion of the course requires submission of a report of high quality on the experience within thirty days of completion of the work period. Career Services manage the non-academic aspects of the course.

(Lec: , Lab: , Tut:)

Requirements: Prerequisites: APSC 199 and completion of second year courses
Corequisites: Exclusions:

Offering Term: F

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 21

Engineering Science 21

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 303 Professional Internship Units: 3.50

The professional internship involves spending a minimum of twelve months and a maximum of sixteen months in a paid internship position in industry or government. Students in the 12-month internship must register in APSC 302, APSC 303 and either APSC 301 or APSC 304. Students in the 16-month placement take APSC 301, APSC 302, APSC 303 and APSC 304. The Internship Coordinator must be satisfied that the work carried out has educational merit. The course includes workshops on interviewing, resume preparation and work performance. Successful completion of the course requires submission of a report of high quality on the experience within thirty days of completion of the work period. Career Services manage the non-academic aspects of the course. Note that some programs may accept this course as part of their technical elective requirements. Credit may only be granted to students who have successfully fulfilled the necessary requirements to receive the Professional Internship designation.

(Lec: , Lab: , Tut:)

Requirements: Prerequisites: APSC 199 and completion of second year courses
Corequisites: Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 21

Engineering Science 21

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 304 Professional Internship Units: 3.50

The professional internship involves spending a minimum of twelve months and a maximum of sixteen months in a paid internship position in industry or government. Students in the 12-month internship must register in APSC 302, APSC 303 and either APSC 301 or APSC 304. Students in the 16-month placement take APSC 301, APSC 302, APSC 303 and APSC 304. The Internship Coordinator must be satisfied that the work carried out has educational merit. The course includes workshops on interviewing, resume preparation and work performance. Successful completion of the course requires submission of a report of high quality on the experience within thirty days of completion of the work period. Career Services manage the non-academic aspects of the course. (Lec: , Lab: , Tut:)

Requirements: Prerequisites: APSC 199 and completion of second year courses
Corequisites: Exclusions:

Offering Term: S

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 21

Engineering Science 21

Engineering Design 0

Offering Faculty: Smith Engineering

APSC 381 Advanced Design and Skills for Innovation Units: 3.50

This multidisciplinary project-based course will provide students with a broad range of knowledge and skills for design and innovation. Topics span the breadth of the innovation process, including advanced topics such as risk analysis, FMEA, reliability, and elements of six sigma methodologies. Elements of project management, market and economic analysis, and other professional practice topics are interwoven. Students work in multidisciplinary teams on relevant and realistic projects, simulating the real-world engineering environment. Students must apply for registration in the course, and that permission by the instructor is needed. Given the course load, it is not advisable to take APSC 381 and APSC 401 at the same time. NOT OFFERED 2023-2024

K3.5 (Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Permission of the instructor
Corequisites: Exclusions:

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 0

Engineering Science 0

Engineering Design 42

Offering Faculty: Smith Engineering



APSC 400 Technology, Engineering & Management (TEAM) Units: 7.00

Multidisciplinary teams of engineering, commerce, law, and/or science students, as appropriate, undertake consulting projects with industrial, government, and not-for-profit clients. Typical project types include Process Improvement, Feasibility & Design, Business Strategy/Marketing, Environmental, Start-ups, Blue-Sky, or a combination of topics which are selected based on prevailing industry trends. Following a phase of self-directed problem and scope definition, students will execute their projects in groups, guided by experienced professionals. Students will receive formal training in project management and participate in guest lectures by industry experts. Students interact regularly with clients at a technical and management level. The course concludes with a comprehensive report and presentation to the client. Participation in the course is by selection. Students must apply for admission into the course by providing a copy of their resume, unofficial transcript, and a cover letter substantiating their interest in the course. More information can be found on the course website: <http://team.appsci.queensu.ca/>

NOT OFFERED 2023-2024

K7(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Completion of 3rd year core courses and permission of the instructor. Corequisites:

Exclusions: APSC 401

Offering Term: FW

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 42

Engineering Science 0

Engineering Design 42

Offering Faculty: Smith Engineering

APSC 401 Interdisciplinary Projects Units: 4.50

Multidisciplinary teams of engineering, commerce, law, science, social science, and humanities students, as appropriate, undertake consulting projects with industrial, government, and not-for-profit clients. Typical project types include social innovation, process improvement, business strategy/marketing, environmental, start-ups, blue-sky, or a combination of topics which are selected based on societal and industry interests. This is a winter term course, but students will meet with their teams and client at the end of the fall term. Following a phase of self-directed problem and scope definition, students will execute their projects in groups, guided by experienced professionals. Students will receive formal training in project management, effective teaming, client interaction, and communication in professional environments. Students interact regularly with clients at a technical and management level. The course concludes with a comprehensive report and presentation to the client. Participation in the course is by selection. Students must apply for admission into the course by providing a copy of their resume, unofficial transcript, and a cover letter substantiating their interest in the course. This course is co-taught with instructors teaching the equivalent courses in other Faculties.

K4.5(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Completion of 3rd year core courses and permission of the instructor. Corequisites:

Exclusions: APSC 400

Offering Term: W

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 27

Engineering Science 0

Engineering Design 27

Offering Faculty: Smith Engineering

APSC 480 Multi-disciplinary Industry Units: 9.00

This course will enhance student's design, innovation, critical thinking, and professional skills by experiencing real-time industry-funded projects. Working in multidisciplinary teams, students are guided by experienced engineering professionals both internally and externally. Teams interface frequently with the client, including occasional external site visits. Projects cover a broad range of engineering disciplines, and often incorporate the development of physical prototype(s) or digital models/simulations for evaluation and testing, as well as techno-economic elements. Students will integrate elements of engineering design, innovation, and professional practice from prior courses, with enhancements from occasional lectures, workshops, and guest speakers. Project funding supports all necessary travel, communication, software, equipment, prototyping components and related services. Professional engineering skills such as communication, teamwork, project management, engineering economics, ethics, and safety will be integral to the projects. Students must apply for registration in the course, and that permission by the instructor is needed.

K9(Lec: Yes, Lab: No, Tut: Yes)

Requirements: Prerequisites: Enrolment may be requested by contacting the Instructor. Corequisites: Exclusions:

Offering Term: FW

CEAB Units:

Mathematics 0

Natural Sciences 0

Complementary Studies 28

Engineering Science 0

Engineering Design 80

Offering Faculty: Smith Engineering