# ENGINEERING (ENG)

**ENG 1420 Engineering Processes for Non-Engineering Students 3 cr**
Develops a basic understanding of the engineering profession with emphasis on basic technical principles, Systems Engineering, and Project Management. Special emphasis will be placed upon the interface between management and engineering and the role management plays in the conduct of technical projects and manufacturing. NOTE: This course is not available for credit to students registered in the Price Faculty of Engineering.

**ENG 1430 Design in Engineering 3 cr**
(Lab required) The creative process; the design process; working in a team. The engineering profession from the perspective of students and professionals. Academic, legal and ethical considerations.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisites: [Pre-Calculus Mathematics 40S (60%) (or one of MATH 0401, MATH 1018, MATH 1230, MATH 1500, MATH 1501, MATH 1510, MATH 1524, MATH 1525, MSKL 0100, or the former MATH 1520, or the former MATH 1680)] and [Physics 40S (60%) (or PHYS 0900 (P) or PSKL 0100 (P) or PHYS 1018, PHYS 1050, or PHYS 1051)] and [Chemistry 40S (60%) (CHEM 0900 (P) or CSKL 0100 (P) or CHEM 1018, CHEM 1100, CHEM 1301, or the former CHEM 1300)] or their equivalents.
**Attributes:** Recommended Intro Courses

**ENG 1440 Introduction to Statics 3 cr**
(Lab required) Statics of particles; rigid bodies, equilibrium of rigid bodies; analysis of structures; distributed forces. Not to be held with ENG 1441.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisites: [Pre-Calculus Mathematics 40S (60%) (or one of MATH 0401, MATH 1018, MATH 1230, MATH 1500, MATH 1501, MATH 1510, MATH 1524, MATH 1525, MSKL 0100, or the former MATH 1520 or the former MATH 1680)] and [Physics 40S (60%) (or PHYS 0900 (P) or PSKL 0100 (P) or PHYS 1018, PHYS 1050, or PHYS 1051)] and [Chemistry 40S (60%) CHEM 0900 (P) or CSKL 0100 (P) or CHEM 1018, CHEM 1100, CHEM 1301, or the former CHEM 1300)] or their equivalents.
**Equiv To:** ENG 1441
**Attributes:** Recommended Intro Courses

**ENG 1450 Introduction to Electrical and Computer Engineering 3 cr**
(Lab required) Part I: Current, voltage, energy, potential, power Ohm's law; independent sources; capacitor, inductor, ideal diode, op-amp; Kirchoff's law; simple circuits (Resistive, RC, RL, OP-Amp; Diode); introduction to ac theory (Sinusoidal waveform, phase relations of voltage and current waveforms for R,L,C. RL and RC circuits). Part II: Applications (Digital Logic, motors).
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisites: [Pre-Calculus Mathematics 40S (60%) (or one of MATH 0401, MATH 1018, MATH 1230, MATH 1500 , MATH 1501, MATH 1510, MATH 1524, MATH 1525, MSKL 0100, or the former MATH 1520 or the former MATH 1680)] and [Physics 40S (60%) (or PHYS 0900 (P) or PSKL 0100 (P) or PHYS 1018, PHYS 1050 or PHYS 1051)] and [Chemistry 40S (60%) (or CHEM 0900 (P) or CSKL 0100 (P) or CHEM 1018, CHEM 1100 or CHEM 1301 or the former CHEM 1300)] or their equivalents.
**Attributes:** Recommended Intro Courses

**ENG 1460 Introduction to Thermal Sciences 3 cr**
(Lab required) Properties of pure substances; first law for closed systems; first law for open systems; second law; examples of power cycles and refrigeration cycles.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisites: [Pre-Calculus Mathematics 40S (60%) (or one of MATH 0401, MATH 1018, MATH 1230, MATH 1500, MATH 1501, MATH 1510, MATH 1524, MATH 1525, MSKL 0100, or the former MATH 1520 or the former MATH 1680)] and [Physics 40S (60%) (or PHYS 0900 (P) or PSKL 0100 (P) or PHYS 1018, PHYS 1050 or PHYS 1051)] and [Chemistry 40S (60%) (or CHEM 0900 (P) or CSKL 0100 (P) or CHEM 1018, CHEM 1100 or CHEM 1301 or the former CHEM 1300)] or their equivalents.
**Attributes:** Recommended Intro Courses

**ENG 1900 Occupational Health and Safety Awareness 3 cr**
Occupational health and safety will be discussed from the perspectives of various professions to understand 1) the issues relevant to individual professions and 2) how these individual perspectives may conflict. The overall goal for the course is to ensure that the student gains an appreciation for the importance of occupational health and safety to society.

**ENG 2022 Engineering CAD Technology for Biosystems 3 cr**
(Lab required) Instruction in the use of current CAD technology for conveying design through the use of graphics. Students will gain knowledge in technical drawing, 3D modelling techniques, production technology, and visual communication. Registration restricted to students in Engineering.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: BIOE 2900 or the former BIOE 2580.
**Mutually Exclusive:** MECH 2112

**ENG 2030 Engineering Communication: Strategies for the Profession 3 cr**
Students work in a team-based environment to produce deliverables comparable to the engineering workplace. In-class tutorials focus on the sharpening of individual students' writing skills through an analytical, problem-solving and critical thinking approach. Students are exposed to a variety of communicative scenarios and emphasis is placed on development of a repertoire of skills necessary for effective communication in the engineering profession. Not to be held with the former ENG 2010.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisites: ENG 1430 and one of the courses from the list of Written English Courses for Engineering Students.
**Mutually Exclusive:** ENG 2010

**ENG 2040 Engineering Communication: Strategies, Practice and Design 3 cr**
This team-based course focuses on a rhetorical approach, communication strategies and guided practice in the design of engineering communications. May not be held with the former ENG 2010.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisites: ENG 1430 and one of the courses from the list of Written English Courses for Engineering Students.
**Mutually Exclusive:** ENG 2010

**ENG 3000 Engineering Economics 3 cr**
This course offers an introduction to the economic aspects of the engineering discipline. It covers applied economic concepts such as: time value of money, taxation in cash flows, breakeven points, inflation of goods, cost/benefit ratios, income and depreciation, and general microeconomic concepts. The focus includes analysis techniques such as: cash flow analysis, cost-based analysis, rate of return analysis, sensitivity analysis, replacement analysis, and risk mitigation. Concepts are introduced in the context of sustainability and project management fundamentals in a professional practice setting. May not be held with CIVL 4050.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: MATH 1510 (or MATH 1230, or MATH 1500, or MATH 1501).
**Equiv To:** CIVL 4050

**ENG 3020 Technology, Society and the Future 3 cr**
Impact of technology and technological change on society-past, present, future; specific technologies, e.g. construction. machine power, computers, communications, medical, military: the process of technological change; invisible effects of technology; technology and resource use; sustainable development, limits to growth and the role of technology. May not be held with CIVL 4460 or ANTH 2430.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: ENG 2030 or ENG 2040 or BIOE 2900.
**Equiv To:** CIVL 4460
**Mutually Exclusive:** ANTH 2430

**ENG 4010 Practicing Professional Engineering in Manitoba 3 cr**
An introduction to the practice of professional engineering in Manitoba, including culture, professional organization and regulation, employability aspects, engineering ethics and law.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: Must be enrolled in the Internationally-Educated Engineers Qualification Program (IEEQ).
**Mutually Exclusive:** ENG 4020

**ENG 4012 IEEQ CO-OP ASSIGNMENT 1 cr**
Professional work assignment in business, industry, or government for cooperative education students in the IEEQ Program. Requires submission of a written report covering the work completed during a minimum 16-week work period. (Pass/Fail grade only).
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: enrolled in IEEQ Program with 80% of courses complete, including ENG 4010; good academic standing.

**ENG 4020 Professional Engineering Practice in Manitoba 4 cr**
(Lab required) An introduction to the practice of professional engineering in Manitoba. Professional culture, organization and regulation; industry topics; engineering ethics and law. Emphasis on professional communication development. Restricted to students enrolled in the IEEQ Program. May not be held with ENG 4010.
**Mutually Exclusive:** ENG 4010

**ENG 4100 Contemporary Topics in Engineering Practice 4 cr**
This course will cover contemporary topics relating to the practice of professional engineering. The specific topics and a detailed outline will be available prior to the start of the registration period for the session in which the course will be offered. As the course content will vary from year to year, students may take this course more than once for credit.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: Permission of the Centre for Engineering Professional Practice and Engineering Education.

**ENG 4110 Operational Excellence 4 cr**
(Lab required) Methodical application of operational excellence and engineering principles and theory to address real industry problems, with emphasis on the data and fact-based engineering method of problem solving. Grounded in the Plan-Do-Study-Act system. Covers the seven step problem solving method (problem definition, examine the current situation, root cause analysis, action planning and testing, study the results, standardize the changes, and draw conclusions), applied concepts (Lean Six Sigma Management) and the fundamentals of teamwork, team dynamics and change management. It is expected that students will be challenged in terms of their understanding of the method, concepts, analytics, and the tools, and their application to solving 'real' operational problems. Students must attend both lecture and tutorial. Students will be required to attend meetings at industrial partner facilities. May not be held with MECH 4342 where the topic is Operational Excellence.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Pre- or Co-requisites: STAT 2220 or (STAT 1000 and STAT 2000).

**ENG 4800 Co-operative Work 1 1 cr**
Work assignment in business, industry, or government for the Price Faculty of Engineering co-operative education stream students. Requires submission of a written report covering the work completed during the four- month professional assignment. Those registering for this course must apply for and be accepted into the Price Faculty of Engineering co-operative stream. May not be held with BIOE 2000, CIVL 2900, ECE 4720, MECH 2050 or ENG 4012. This course is graded on a pass/fail basis.
**Equiv To:** BIOE 2000, CIVL 2900, ECE 4720, ENG 4012, MECH 2050

**ENG 4810 Co-operative Work 2 1 cr**
Work assignment in business, industry, or government for the Price Faculty of Engineering co-operative education stream students. Requires submission of a written report covering the work completed during the four-month professional assignment. Those registering for this course must apply for and be accepted into the Price Faculty of Engineering co-operative education stream. May not be held with: BIOE 3000, CIVL 3910, ECE 4720, or MECH 3050. This course is graded on a pass/fail basis.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: ENG 4800
**Equiv To:** BIOE 3000, CIVL 3910, ECE 4720, MECH 3050

**ENG 4820 Co-operative Work 3 1 cr**
Work assignment in business, industry, or government for the Price Faculty of Engineering co-operative education stream students. Requires submission of a written report covering the work completed during the four-month professional assignment. Those registering for this course must apply for and be accepted into the Price Faculty of Engineering co-operative education stream. May not be held with: BIOE 4000, CIVL 4920, ECE 4720, or MECH 4050. This course is graded on a pass/fail basis.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: ENG 4810.
**Equiv To:** BIOE 4000, CIVL 4920, ECE 4720, MECH 4050

**ENG 4830 Co-operative Work 4 1 cr**
Work assignment in business, industry, or government for the Price Faculty of Engineering co-operative education stream students. Requires submission of a written report covering the work completed during the four-month professional assignment. Those registering for this course must apply for and be accepted into the Price Faculty of Engineering co-operative education stream. May not be held with: CIVL 4930, ECE 4720, or MECH 4060. This course is graded on a pass/fail basis.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: ENG 4820.
**Equiv To:** CIVL 4930, ECE 4720, MECH 4060

**ENG 4840 Co-operative Work 5 1 cr**
Work assignment in business, industry, or government for the Price Faculty of Engineering co-operative education stream students. Requires submission of a written report covering the work completed during the four-month professional assignment. Those registering for this course must apply for and be accepted into the Price Faculty of Engineering co-operative education stream. May not be held with: CIVL 4940. This course is graded on a pass/ fail basis.
**PR/CR: A minimum grade of C is required unless otherwise indicated.**
Prerequisite: ENG 4830.
**Equiv To:** CIVL 4940