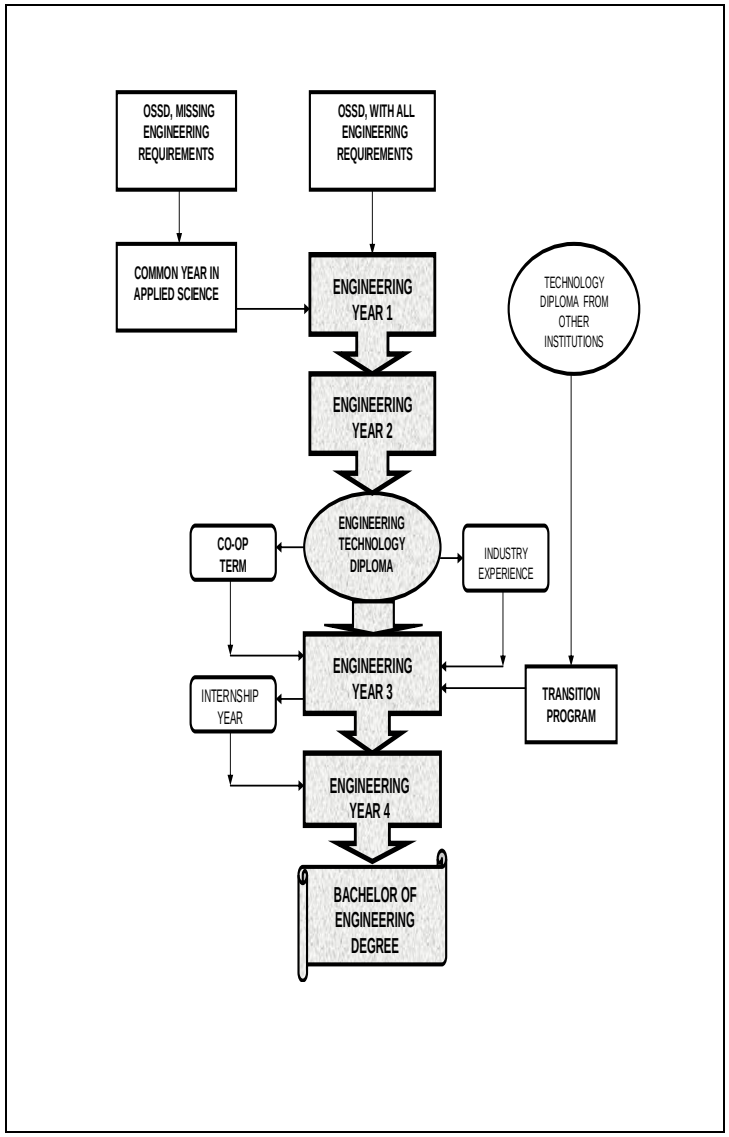
FACULTY OF ENGINEERING

The Faculty of Engineering at Lakehead University offers a unique combination of Bachelor of Engineering Degree programs and Engineering Technology in Chemical, Civil, Electrical, Mechanical and Software Engineering at the Thunder Bay Campus. The Bachelor of Engineering Degree programs offered at the Thunder Bay Campus are accredited by the Canadian Engineering Accreditation Board (CEAB). ***Lakehead University has the only Faculty of Engineering in Canada where you can earn a Bachelor of Engineering Degree AND an Engineering Technology Diploma in Four Years !***

A UNIQUE ENGINEERING PROGRAM – THUNDER BAY



Lakehead University's unique engineering programs are illustrated here. Students can enter the first year of the Bachelor of Engineering degree programs directly from high school, or if additional academic preparation is required, by successfully completing the Common Year in Applied Science.

The unique structure of Lakehead's Engineering programs permits students to complete the requirements of an Engineering Technology Diploma in their respective field by the end of their second year of studies and a Bachelor of Engineering degree in Chemical, Civil, Electrical, Mechanical or Software Engineering by the end of their fourth year of studies. Graduate Engineering Technologists may choose to enter the workplace or, after gaining pertinent work experience, may return to Lakehead University to complete the degree program.

Co-op/Internship option is available in all Lakehead's BEng programs. An integrated Bachelor of Engineering (BEng)/Master of Business Administration (MBA) is also available in all Thunder Bay campus BEng programs.

CONTACT US
WE WANT TO HELP YOU PLAN YOUR FUTURE!

Faculty of Engineering
Phone (807) 343-8252 or 343-8321
Fax (807) 343-8928
Website engineering.lakeheadu.ca

Student Central - Undergraduate Admissions
Phone (807) 343-8500
Toll Free (800) 465-3959
Website lakeheadu.ca/studentcentral/applying

Lakehead UNIVERSITY

CHEMICAL ENGINEERING

First Year- Fall Term
Introduction to Chemical Engineering Calculations
Electrical and Electronics Technology
Introductory Chemistry I
Introduction to Academic Writing
Vectors and Matrices
Calculus I for Engineers

First Year- Winter Term
Applied Chemical Thermodynamics
Unit Operations I
Fluid Mechanics
Introductory Chemistry II
Calculus II for Engineers
Computer Programming I

Second Year- Fall Term
Introduction to Industrial Chemical Processes
Unit Operations II
Unit Operations Laboratory
Analytical Chemistry I
Organic Chemistry I
Applied Analysis I

Second Year- Winter Term
Engineering Measurements and Instrumentations
Hydrocarbon Processes
Unit Operations Laboratory
Engineering Mechanics
Analytical Chemistry II
Applied Analysis II

Third Year- Fall Term
Material and Energy Balances
Mass Transfer Separations
Laboratory Investigations in Mass Transfer Separations
Materials Science
Vector Analysis and Power Series
One Engineering Elective Course
One complementary studies elective course

Third Year- Winter Term
Plant Design Economics and Management
Chemical Engineering Thermodynamics
Laboratory Investigations in Mass Transfer Separations
Chemical Reactor Design
Numerical Methods and Modeling
One engineering elective course
One complementary studies elective course

Fourth Year- Fall Term
Chemical Plant Design
Reactor Engineering and Process Control Laboratory
Process Control Fundamentals
Degree Project
Computer Aided Design for Chemical Engineering
One complementary studies elective course

Fourth Year-Winter Term
Professional Practice and Law
Process Control Applications and Process Safety
Degree Project
Reactor Engineering and Process Control Laboratory
Polymer Chemistry
One engineering elective course
Technology, Society and Indigenous Peoples in Canada

CIVIL ENGINEERING

First Year- Fall Term
Engineering Drawing
Statics
Mechanics of Materials I
Surveying
Introduction to Academic Writing
Calculus I
Vectors and Matrices

First Year- Winter Term
Dynamics I
Mechanics of Materials II
Theory of Structures
Fluid Mechanics
Civil Engineering Drawing
Elementary Computing
Calculus II

Second Year- Fall Term
Construction Practice
Highway Design
Steel and Reinforced Concrete Design
Electrical and Electronics Technology
Thermodynamics and Heat Transfer
Applied Analysis

Second Year- Winter Term
Water Supply and Waste Systems
Construction Materials
Soil Mechanics
Technology Project
Engineering Chemistry
Applied Analysis II

Third Year- Fall Term
Mechanics of Solids
Principles of Soil Mechanics
Structural Analysis
Hydrology
Probability and Statistics
One complementary studies elective course

Third Year- Winter Term
Foundation Engineering
Steel Structures
Finite Element Methods
Introductory Geology for Engineers
Numerical Analysis and Computing
One complementary studies elective course

Fourth Year- Fall Term
Materials Science
Open Channel Flow
Environmental Control
Reinforced Concrete Structures
Civil Engineering Analysis
One engineering elective course
One complementary studies elective course

Fourth Year- Winter Term
Engineering Economics and Project Management
Professional Practice and Law
Degree Project
Basic Scientific Methods in Geology
Two engineering elective courses
Technology, Society and Indigenous Peoples in Canada

ELECTRICAL ENGINEERING

First Year- Fall Term
Electric Circuit Theory I
Computer Logic Circuits
Computer Programming I
Vectors and Matrices
Calculus I
Semiconductor Physics

First Year- Winter Term
Introduction to Microcontrollers
Electric Circuit Theory II
Electronics I
Engineering Chemistry
Computer Communications and Networking
Calculus II

Second Year- Fall Term
Electronics II
Electronic Communications I
Electric Machines I
Control Systems I
Introduction to Academic Writing
Engineering Thermodynamics & Heat Transfer
Applied Analysis I

Lakehead UNIVERSITY

Second Year- Winter Term
Power Electronics I
Electronic Communications II
Electric Power Systems I
Technology Project
Principles of Engineering Mechanics
Applied Analysis II

Third Year- Fall Term
Circuit Theory & Design I
Circuit Theory & Design II
Digital VLSI Circuit Design
Vector Analysis
Probability and Statistics
One complementary studies elective course

Third Year- Winter Term
Control Systems II
Engineering Economics and Project Management
Numerical Methods and Modeling
Complex Functions and PDEs
Electromagnetic Theory
One complementary studies elective course

Fourth Year- Fall Term
Communications Systems
Electric Machines II
Degree Project
Materials Science for Electrical Engineers
Two Electrical Engineering elective courses
Technology, Society and Indigenous Peoples in Canada

Fourth Year- Winter Term
Professional Practice and Law
Digital Signal Processing
Degree Project
RF Circuits Design
Two Electrical Engineering elective courses
One complementary studies elective course

MECHANICAL ENGINEERING

First Year- Fall Term
Introduction to Engineering Design
Statics
Mechanics of Materials I
Materials and Processes
Introduction to Academic Writing
Vectors and Matrices
Calculus I

First Year- Winter Term
Dynamics I
Mechanics of Materials II
Fluid Mechanics
Mechanical Engineering Drawing
Computer Programming I
Calculus II

Second Year- Fall Term
Dynamics II
Electrical and Electronics Technology
Industrial Engineering
Thermal Sciences
Applied Analysis I

Second Year- Winter Term
Machine Design
Engineering Measurements and Instrumentations
Heating, Ventilating & Air Conditioning
Engineering Chemistry
Applied Analysis II

Third Year- Fall Term
Intermediate Mechanics of Materials
Fluid Dynamics
Engineering Thermodynamics
Materials Science
Vector Analysis and Power Series
One complementary studies elective course

Third Year- Winter Term
Dynamics of Machines
Applied Heat Transfer
Engineering Physics
Mechanical Engineering Design I
Complex Functions and PDEs
Computational Methods and Modeling for Mechanical Engineering
One complementary studies elective course

Fourth Year- Fall Term
Mechanical Vibrations
Mechanical Engineering Design II
Degree Project
Probability and Statistics
Two engineering elective courses
Technology, Society and Indigenous Peoples in Canada

Fourth Year-Winter Term
Engineering Economics and Project Management
Mechanical Engineering Laboratory
Professional Practice and Law
Degree Project
One engineering elective course
One science elective course
One complementary studies elective course

SOFTWARE ENGINEERING

First Year- Fall Term
Electrical & Electronics Technology
Computer Logic Circuits
Computer Programming I
Vectors and Matrices
Calculus I
Semiconductor Physics

First Year- Winter Term
Introduction to Microcontrollers
Engineering Chemistry
Basics of Management
Computer Programming II
Calculus II

Second Year- Fall Term
Data Management and Information Systems
Software Engineering
Data Structures
Introduction to Academic Writing
Applied Analysis I
One half course from Science Elective Course List

Second Year- Winter Term
Principles of Engineering Mechanics
Computer Communications and Networking
Object Oriented Graphical User Interface
Computer Hardware and Software Systems
Technical Project
Applied Analysis II

Third Year- Fall Term
Software Engineering Design
Principles of Operating Systems
Discrete Mathematics for Engineers
Compiler and Algorithm Design
Probability and Statistics
One complementary studies elective course

Third Year- Winter Term
Software Testing and Quality Assurance
Engineering Economics and Project Management
Performance Analysis of Software
Numerical Methods and Modeling
Database Systems
One half course from Science Elective Course List
One complementary studies elective course

Fourth Year- Fall Term
Software Safety and Security
Data and Digital Communications
Digital Signal and Image Processing
Degree Project
One half course from Engineering Elective Courses List
One half course from Engineering Elective Courses List
Technology, Society and Indigenous Peoples in Canada

Fourth Year- Winter Term
Embedded Systems
Applied Computational Intelligence
Professional Practice and Law
Degree Project
One half course from Engineering Elective Courses List
One complementary studies elective course

Lakehead UNIVERSITY

UNIQUENESS, QUALITY AND REPUTATION

Uniqueness, quality and reputation, that's why these specially designed programs attract Canadian students from Victoria to St. John's, as well as international students! When you choose engineering at Lakehead, you are assured to receive a quality education.

Lakehead's **Civil Engineering** Student Steel Bridge teams consistently rank well at the AISC/ASCE U.S. National Student Steel Bridge Competition (NSSBC). Our 2011 team competed in the 20th annual NSSBC at Texas A & M University and took home the title. They continued Lakehead's strong track record and winning tradition by placing first overall, as well as first in the categories of construction speed, lightness, and efficiency. The 2011 Steel Bridge Team was the first Canadian team to win first place in the historv of the NSSBC.

©Daniela Weaver Photography

First Canadian Team to Win the NSSBC

AISC/ASCE U.S. National Student Steel Bridge Competition Champions

Using the new Engineering Makerspace, two **Electrical Engineering** students placed third in Innovative Design at the 2017 Ontario Engineering Competition for their "Graphene Super Capacitor" degree project, and were awarded the discretionary Technical Excellence Award. They also won the 2017 Young Innovator of the Year at the 9th Annual RBC Northwestern Ontario Innovation Awards. Their graphene-based supercapacitor was selected for funding by Highway1, a Silicon Valley hardware start-up accelerator. A team of **Electrical Engineering** students won the 2014 IEEE Canada Student Paper Competition for the paper "A Novel Analog-Digital Hybrid Synthesizer Sequencer Design" based on their final year project.

2018 Canadian Engineering Competition

Senior Design Competition Winners

Four **Year 3 Lakehead Engineering** students won the 2018 Canadian Engineering Competition in Senior Design. The team designed and built a miniature prototype of a fire truck that could race to a flaming building and accurately deploy water bombs at multiple locations. The robot, operated through a wireless controller, had to navigate a 3D cardboard "city" without leaving the road, then extinguish simulated flames by launching ping-pong balls into openings cut into buildings at various heights and angles. In a competition against seven other schools, the apparatus gave the Lakehead team top prize in the Senior Design category. The teams went into the National competition without any previous knowledge of the problem. They had a total of eight hours to solve the problem and create their winning solution.

Lakehead University **Chemical Engineering** students won in both 2014 and 2015 the annual SNC-Lavalin Undergraduate Plant Design Competition hosted by the Canadian Society for Chemical Engineering (CSChE). Our 2014 team designed a hydrogen plant using a new process to reduce carbon dioxide emissions by 28% compared to existing plants. The 2015 winning team designed a chemical plant that converted 200,000 metric tons per year of waste plastic into high value hydrocarbons, including gasoline and kerosene.

Lakehead's students are involved in new and exciting initiatives. In 2014 **Mechanical Engineering** students designed and fabricated a human powered vehicle. Our students placed 5th overall and ranked first of all Canadian University entries at the American Society of Mechanical Engineers (ASME) Human Powered Vehicle Challenge (HPVC). The 2014 HPVC West competition was hosted by the Santa Clara University, California. A team of Lakehead University **Mechanical Engineering** students designed and built a radio-controlled plane. They competed in the 2015 SAE Aero Design West Regular Class Design Competition against 41 teams from all over the world. Our team placed 25th overall and 5th among all the Canadian entries.

William C. Mitchell Rookie Award

2009 Formula SAE® Michigan Competition

Lakehead's **Formula SAE® team** competes annually at the Formula SAE® Michigan Competition at the Michigan International Speedway. Our 2009 team won the William C. Mitchell Rookie Award competing against 120 teams from Europe, Asia, South America, and North America. In 2015, our team placed 57th overall and ranked 6th among all the Canadian University entries.

Our **Software Engineering** graduates are in demand, and our students compete with the best! A recent graduate has been appointed Account Manager with an international company within one year of graduation.

ADMISSIONS

All applicants to an Ontario university must apply through the Ontario Universities' Application Centre (OUAC). There is an application fee payable to OUAC. If you are an Ontario high school student you can apply on the General Application form, OUAC 101, available from your high school. If you are not currently a full-time Ontario high school student, visit the OUAC website at www.ouac.on.ca for the appropriate application form.

General admission requirements: Completion of the Ontario Secondary School Diploma (OSSD), or equivalent. A minimum of 6 Grade 12 U or M courses, or equivalent, including program specific prerequisite courses with a minimum 70% overall average.

Specific prerequisites for the Bachelor of Engineering degree program: 1 credit Grade 12 U in each of: Advanced Functions, Physics, Chemistry and English; 2 additional Grade 12 U or M credits; Grade 12 U Calculus & Vectors is strongly recommended; 1 credit in Grade 12 U or M Math, Science or Technological Education is recommended. Note: A 60% mark in Grade 12 U Advanced Functions is required. Students who have completed Grade 12 U Calculus & Vectors, with a minimum mark of 60%, will be exempted from MATH 1071 - Vectors and Matrices. Students who do not meet all of the above admission requirements will be evaluated on an individual basis.

OSSD graduates who do not meet the admission requirements to the first year of an engineering degree program may be considered for admission to the Common Year in Applied Science. Upon successful completion of the Common Year in Applied Science, with the required averages of 60% or better, they may apply to the Lakehead University Bachelor of Engineering Degree program of their choice. The admission requirements for the Common Year in Applied Science are available in the Lakehead University Calendar, on the Lakehead University website www.lakeheadu.ca or from the Office of Admissions and Recruitment. (09/2020)

Lakehead UNIVERSITY