Creating Engineering Pathways for Military-Connected Learners

INTRODUCTION

The primary purpose of this project is to develop accessible pathways into accredited engineering education for military-connected learners, enabling them to build upon their existing skills and pursue careers in the engineering profession.

This project team explored pathways into accredited engineering programs for military-connected learners and identified the academic, administrative, and personal supports needed to ensure their success.

By recognizing the skills, training, and experience acquired through service in the Canadian Armed Forces (CAF), Lakehead University aims to expand access to Bachelor of Engineering (BEng) programs accredited by the Canadian Engineering Accreditation Board (CEAB). Graduates of CEAB-accredited engineering programs satisfy the academic requirements to become licensed professional engineers in Canada.

The project focused on four key objectives:

1. Understanding the needs, aspirations, and barriers experienced by military-connected learners pursuing post-secondary education.
2. Identifying Canadian and international best practices for supporting military learners.
3. Exploring opportunities to recognize military education, training, and experience within existing engineering pathways.
4. Developing recommendations for admissions processes, student supports, and outreach activities tailored to current and former members of the Canadian Armed Forces.

The project aligns with Lakehead University's longstanding commitment to creating accessible pathways into engineering education, including its established post-diploma pathway for engineering technology graduates.

The proximity of CFB Borden to the new Barrie STEM Hub, and a growing defence and advanced manufacturing sector, creates a unique opportunity to connect military talent, engineering education, and future employment opportunities.

Ontario continues to face demand for engineering and technical professionals across infrastructure, manufacturing, defence, transportation, and technology sectors. Many members of the Canadian Armed Forces acquire highly specialized technical skills through military trades training, occupation specific courses, deployments, exercises and leadership experience. However, translating these competencies into civilian professional credentials can be challenging.

This project seeks to bridge that gap by creating pathways that enable military personnel and veterans to build upon existing expertise and pursue accredited engineering degrees.

In doing so, the initiative supports both student success and broader workforce development objectives by helping skilled individuals transition into professions that contribute to Ontario's economic growth, innovation capacity, and the continued development of defence, advanced manufacturing, infrastructure, and technology sectors.

This document provides an overview of the project, including its rationale, research findings, pathway design, recommended supports, promotional activities, and key outcomes.

The key aspects of the project outlined in this document are as follows:

1. **Research & Analysis**

- In-depth research to understand the needs and aspirations of members of the military, and the barriers that need to be overcome.
- Analysis of existing initiatives offered at other institutions in Canada and globally.
- Comprehensive assessment of the technical trades within the Canadian Armed Forces, to identify potential alignments with BEng programs offered at Lakehead University.
- Review of the entry programs currently available at Lakehead University, to determine opportunities to make use of existing academic pathways where possible.

2. Engineering Pathway and Supports for Military Learners

- Overview of the academic pathway developed for military learners, including flexible delivery methods, informed by the research and analysis undertaken.
- Outline of the admissions and enrolment process.
- Recommended supports to ensure student success, based on proven models developed at other institutions.

3. Promotion & Marketing

- Development of content for in-person and online information sessions for CAF members, as well as stakeholders, to explain the pathways and supports we offer.
- Dedicated web presence to explain and display pathways available.
- Design and production of printed materials that can be displayed and distributed to military institutions and organizations supporting veterans.

In addition, the document concludes with a summary of the next steps planned by Lakehead University to build upon the outcomes of this project and to potentially expand opportunities for military-connected learners in the future.

1. RESEARCH & ANALYSIS

a) Understanding the needs of military veterans and reviewing existing initiatives

This project used ONCAT's R1927 report titled 'Examining the Profiles and Pathways of Military Veterans in Ontario', current research on student veterans, and examples from "military connected" colleges and universities in Canada and abroad to understand how military-connected learners can realistically enter and complete accredited Bachelor of Engineering programs at Lakehead.

The work confirmed the same pattern across all sources: veterans face predictable, structural barriers (fragmented admissions/PLAR and funding processes, math/physics gaps, rigid engineering sequences, isolation on campus, and financial risk), and institutions that are genuinely veteran friendly use a small, common toolkit, central points of contact, transparent recognition of military learning, short STEM bridge/refresher programs, visible veteran communities, and targeted supports.

Veterans pursuing post-secondary education often face barriers including complex admissions processes, cultural adjustment, family responsibilities, and financial considerations. The review of best practices identified a range of supports that can help address these challenges and improve student success.

Based on previous studies, (R1927 Algonquin and Loyalist college project final report, Cable et al (2021) and Main et al (2025), Veterans who want to attend post-secondary education face several barriers and inconveniences that should be addressed. In this study, such barriers and some of the best practices in North America and Europe are being analyzed.

The best practices research report is provided in Appendix A. In addition, Appendix A contains an overview of the process used to develop the report.

b) Assessing the technical trades within the Canadian Armed Forces to identify program alignments

The pathway recognizes the diverse education, training, and experience acquired through military service. As an engineering pathway this program will allow trades that align with engineering programs to utilize that experience as an asset in the degree program of their choice.

Military training courses are evaluated by review boards on a regular basis and quality is ensured via AF9000+ compliance, and each course has a designated Standards Officer who is responsible for ensuring compliance with policy. Additionally, military training courses are reviewed by Training and Development Officers who develop the curriculum documents and ensure they are compliant.

The following trades can be looked at for transfer experience credits that could give them advanced standing:

i. **Civil Engineering:**
   - Construction technician

ii. **Electrical Engineering:**
   - Avionics Technician
   - Electro-Optical Technician
   - Aerospace Telecommunications and Information Systems Technician

iii. **Mechanical & Mechatronics Engineering**
   - Aircraft Structures Technician
   - Aviation Technician
   - Materials Technician
   - Marine Technician
   - Electro-Optical Technician

iv. **Software Engineering**
   - Aerospace Telecommunications and Information Systems Technician

While this list does not preclude other trades from applying to the engineering programs listed above, these specific trades are laid out as best fit for success within these programs. This list is provided so that when marketing these programs to the CAF, Lakehead University will know which trades to target moving forward.

The analysis confirmed that many CAF occupations develop technical competencies that align closely with engineering disciplines. This presents an opportunity to support military personnel in translating existing skills and experience into engineering credentials while addressing workforce needs in key sectors of the economy.

For more information on trade specific training that is conducted within the Canadian Armed Forces reference can be found in Appendix B.

c) Review of University of Manitoba framework for military transfer credit

The project team undertook a review of the University of Manitoba framework for military transfer credit that makes military members eligible for transfer credit on the basis of select military courses and training. This includes Military Transfer Credit Database that is available on the University's website.

The University of Manitoba's framework operates as a structured system for assessing military learning and assigning academic credit based on demonstrated competencies and learning outcomes. At its core, the framework evaluates three principal sources of military learning:

- Formal military education and training, including occupational qualification courses, leadership training, professional development programs, and specialized technical instruction.
- Military occupational experience, where extensive workplace learning and applied competencies may be recognized.
- Military-acquired certifications and credentials, particularly where they align with university-level knowledge and skills.

Faculty members assess military education, training, and occupational qualifications and map them to university learning outcomes and degree requirements.

The resulting credits generally fall into three categories:

- Direct course equivalencies, where military learning is deemed substantially equivalent to a specific university course.
- Discipline-specific credit, where learning aligns with a particular subject area but not a single course.
- General elective credit, which recognizes university-level learning without a direct disciplinary match.

This framework enables military learners to receive meaningful credit while ensuring academic standards are maintained.

The detailed review of the University of Manitoba's framework can be found in Appendix C.

d) Reviewing existing academic pathways and entry programs offered at Lakehead University

The project team conducted a review of all the existing pathways, entry programs, and transition supports offered by Lakehead University. This was designed to determine whether we can utilize existing pathways - with modifications made to recognize the specific needs of these learners - or whether an entirely new pathway would be required.

Post-Diploma Bachelor of Engineering Pathway

Lakehead's Post-Diploma transfer pathway provides graduates of eligible Engineering Technology Diploma programs from across Canada with the opportunity to complete a post-diploma Bachelor of Engineering (BEng) in two academic years, following completion of an 8-week online Summer Diploma-to-Degree program.

Each student transferring to a post-diploma BEng program undertakes the Summer Diploma-to-Degree Program. This is an 8-week full-time intensive online program designed to prepare students to enter into their post-diploma BEng. This is delivered synchronously via Zoom, with

in-class participation and online tests/quizzes embedded in the learning experience. Upon completion of the 8-week online program, students enter directly into Year 3 of the Bachelor of Engineering program that is aligned with their diploma.

Common Year in Applied Science

The new Common Year in Applied Science offers a one-year pathway for students who do not currently meet the admissions requirements to enter any of Lakehead's Bachelor of Engineering (BEng) programs. This includes students without the prerequisites from high school, and students without access to Grade 12 Calculus and Vectors or Grade 12 U Physics at their educational institution. The Common Year is open to students from a variety of backgrounds, including high schools in Ontario and across Canada, international students, and mature students.

This program made up of eight courses (see Appendix D) provides a broad understanding of the foundations of engineering including mathematics, physics, chemistry and design, and offers students the opportunity to decide which field of engineering they wish to enter when they enroll in their BEng program. The Common Year includes two specific courses (with no lectures, only labs and tutorials) designed to help students discover the best engineering discipline for them when they enter their BEng following completion of the Common Year.

A certificate of completion of the Common Year of Applied Science will be awarded to students upon completing the program with a grade of at least 60 per cent in each course. With their certificate of completion of the Common Year of Applied Science, students will be eligible to be admitted to Year 1 of a Bachelor of Engineering in the program of their choice at Lakehead University.

In consultation with the Undergraduate Admissions team, students can also pick specific courses from this program to meet missing requirements in order to enter specific Bachelor of Engineering (BEng) program at Lakehead University.

General Lakehead University Admissions Requirements

- Completion of the Ontario Secondary School Diploma (OSSD);

- A minimum of 6 Grade 12 U or M courses, or equivalent, including program specific prerequisite courses;
- A minimum 70% overall final average

Common Year Admissions Requirements

- 6 Grade 12 U or M Courses, Chemistry (SCH3U or SCH4C), English (ENG3U or ENG4C), Mathematics (MCF3M or MCR3U), Physics (SPH3U or SPH4C)

Academic Support Access Program (ASAP)

Lakehead University's Academic Support Access Program (ASAP) acts as an entryway for students whose academic average falls slightly below the required admission average. This program provides students with the opportunity to pursue university studies, with access to enhanced resources to support a successful transition into studies at Lakehead University. Supports include: individual academic advising sessions, with connection to resources and services; opportunity to participate in workshops and skill building sessions; and mentorship opportunities with upper year students.

Key Findings

- Many CAF occupations develop competencies that align closely with engineering disciplines.
- Existing pathways at Lakehead can be adapted to support military learners without creating a new accredited engineering program.
- Flexible online delivery is particularly well suited to serving members and veterans.
- Recognition of military training and experience can reduce barriers to entry.
- Dedicated supports and community-building initiatives are important to student success.

2. ENGINEERING PATHWAY & SUPPORTS FOR MILITARY LEARNERS

The research and environmental scan demonstrated that military personnel possess significant technical expertise and that existing Lakehead pathways can be adapted to support their transition into engineering education.

After analyzing the research undertaken as outlined in Section 1, the team decided that the optimal approach is to make use, where possible, of existing entry pathways and to adapt them to meet the needs that we have identified.

There are clear advantages to this approach, including: 1) faster implementation without the necessity of an approvals process for an entirely new program or pathway; 2) making use of existing academic programming and course materials; 3) negating the need for a review of the program by the CEAB; and, 4) allowing us to leverage existing expertise in the admissions team in working with mature students to offer them tailored entry pathways.

Pathway into Bachelor of Engineering Programs for Military-Connected Learners

Lakehead University recently developed a Common Year entry program, approved by Senate, that emerged as the strongest pathway option identified through this project.

Applicants with military experience still have the option to apply for entry into Year 1 of one of our six Bachelor of Engineering (BEng) programs if they meet the entry requirements, or into Year 3 via our post-diploma pathway if they are a graduate of an eligible engineering technology diploma program.

The project identified the Common Year in Applied Science as the preferred entry pathway for most military learners because it provides flexible delivery, reduced entry barriers, and opportunities for prior learning recognition while maintaining the integrity of CEAB-accredited engineering programs.

Even if a student already meets the requirements for Year 1, we still recommend they consider this option as it provides a strong grounding and preparation for the demands of the undergraduate degree program. As outlined below, the flexible structure of the program, and

online delivery, make it particularly suitable for military veterans who have recently left (or are planning to the leave) the Canadian Armed Forces. This option also provides greater scope to tailor the learning experience to the needs of each learner, and to offer academic credit without impacting accreditation, as it is an entry pathway and not a BEng program in itself.

Students entering through the Common Year pathway will also be eligible for credits toward the courses in this pathway based on their military training.

Post-Diploma Bachelor of Engineering Pathway

The Post-Diploma pathway is to be only open to military-connected learners who have previously graduated from an eligible Engineering Technology Diploma. This will be an option for some, but would likely not be suitable for all.

The project recommends modifying the admissions requirements, for those who do qualify for this pathway, in order to recognize their military experience.

The following are the minimum requirements for admission to any of the six post-diploma Bachelor of Engineering (BEng) programs offered by the Faculty of Engineering:

1. Applicants must have a Diploma in Engineering Technology from a community college or the equivalent with; (a) an average of at least 70 per cent (GPA = 3.0 on 4 point scale, B grade) in the final year of their program, or (b) a cumulative average of at least 70 per cent (GPA= 3.0 on 4 point scale, B grade) in their program to be eligible for admission consideration.
2. Applicants must have one or more years of relevant industrial experience acquired after the completion of a Diploma in Engineering Technology from a community college or equivalent with; (a) an average of at least 65 per cent (GPA = 2.5 on 4 point scale, C+ grade) in the final year of their program, or (b) a cumulative average of at least 65 per cent (GPA= 2.5 on 4 point scale, C+ grade) in their program to be eligible for admission consideration.

The second option of a 65 per cent requirement for “Applicants must have one or more years of relevant industrial experience”, will be extended to include those who have at least one year of military experience.

Credits for Complimentary Studies & Engineering Electives

The Complementary Studies component of the Bachelor of Engineering Degree programs at Lakehead University consists of three parts (see Appendix C). Students are required to complete the equivalent of five term courses (total credit weight 5 x 0.5 full course equivalent (FCE) = 2.5 FCE) from:

- Sociology 2755: Technology, Society and the Indigenous People in Canada (credit weight: 0.5 FCE)
- Engineering 4539: Professional Practice and Law (credit weight: 0.5 FCE)
- Complementary Studies Electives (credit weight: 1.5 FCE)

Based on the Review of University of Manitoba framework for military transfer credit outlined above and in Appendix C, the project recommends offering credit for current or former members of the Canadian Armed Forces who have completed military trades training, not less than 54 hours (combination of two or more related trainings).

These military trainings/trades will be transferred into course credits for engineering electives and complementary studies elective courses based on the evaluation of an academic advisor.

Admissions Process

Military connected applicants will apply via the Ontario Universities Application Centre (OUAC), and will then submit their Military Personnel Record Resume (MPRR) to Lakehead University's Admissions team, along with any post-secondary transcripts they have obtained previously.

Lakehead University's Admissions team will assess whether a military-connected applicant is eligible for Year 1 or Year 3 entry, or alternatively, they will be offered entry into the Common Year.

The principles of Prior Learning Assessment and Recognition (PLAR) will be applied to recognize their previous military experience, as well as any other post-secondary experience, to determine

whether they need to take the two semesters (8 courses) of the Common Year in Applied Science, or whether they can take a streamlined set of courses.

The Common Year includes two specific courses (with no lectures, only labs and tutorials) designed to help students discover the best engineering discipline for them when they enter their BEng following completion of the Common Year. We anticipate that CAF members and veterans, particularly those with a specialized trade such as those listed in Appendix B, may be offered an exemption from these courses as they will have a clear idea of the BEng program they intend to embark upon following completion of this pathway. For example, construction technicians will likely have the skills and intention to pursue Civil Engineering, while avionics and electro optical technicians will be expected to enter the BEng in Electrical Engineering following completion.

Flexible Delivery Model

Another key feature of the Common Year pathway, that will now be open for military-connected learners, is the mode of delivery via online programming. The online Common Year program is delivered synchronously via Zoom through D2L sites with classes taking place in the evenings (Eastern Standard Time).

This provides a much more flexible learning opportunity. The flexible delivery model also creates opportunities for serving CAF members to begin the Common Year before leaving military service. For those who have already left the CAF, it provides a chance for them to re-engage with formal academic learning and to determine whether they want to continue along the path to gaining a degree. It means they only need to commit to a one-year (or less) online program, with lower costs and less disruption to their professional and family lives as they would not need to learn on campus during this period.

Prior to beginning the online Common Year, these students will also have the opportunity to take a free online Engineering Mathematics refresher course. This self-guided, at-your-own-pace, non-credit, non-certificate course reviews basic math functions and their graphs, trigonometry, lines, coordinate systems, logarithms and exponentials, domain and range, and sequence and

series across six different modules. It includes six modules and instructional lessons, examples, and problem questions with solutions to reinforce learning.

Dedicated Supports

Creating a truly military-friendly campus requires looking beyond academic admission; it demands integrating military culture into the fabric of daily institutional life. Military-connected students - including active-serving members, veterans, and their families - frequently seek a sense of community and belonging within post-secondary institutions.

While establishing a PLAR pathway is a critical foundational step, a comprehensive support ecosystem is essential for long-term student success. To fully realize this pathway program, the following phased initiatives are recommended by this project:

- Dedicated Military-Connected Hub: Establish a centralized location at the Barrie STEM Hub with a designated point of contact equipped to navigate PLAR processes, credit transfers, and unique military-to-civilian academic transitions.

- Military-Connected Student Peer Network: Create an institutional club welcoming active personnel, veterans, and military dependents to foster peer support and community integration.

- Targeted Financial Awards: Investigate the creation of a military-specific scholarship program dedicated to supporting the dependents of active and retired Canadian Armed Forces (CAF) personnel.

These initiatives will be implemented progressively as enrolment grows and the military and veteran student community expands.

In the interim, we will put in place a series of measures to ensure that military-connected learners have the support they need, including:

- Access to all the Student Services supports available at the Barrie STEM Hub, and the nearby Orillia campus, as well as Lakehead University's Community Zone that is the central

point for cultivating and accessing the breadth of programming and services offered by Lakehead University in support of community learning, professional development, and training.

- Developing an initial informal group / network of military-connected students, with the intention to build this into a sustainable peer network over time as we expand our military and veteran community.
- Ensure that these students have access to, and are aware of, all the existing sources of financial aid that are available. This includes Lakehead's scholarships, awards, and bursaries, as well as external funding sources, including:

    - Veterans Affairs Canada (VAC) - Education and Training Benefit
    - Non-Commissioned Member Subsidized Training and Education Plan (NCMSTEP)
    - Canadian Armed Forces (CAF) - Individual Learning Plan (Self-Development Program)
    - SISIP Financial - Vocational Rehabilitation Program
    - Department of National Defence (DND) - Education Reimbursement (civilian employees)
    - Army, Navy and Air Force Veterans in Canada Scholarships
    - Royal Canadian Legion (Ontario Command) Bursaries

3. PROMOTION & MARKETING

Our overall approach to offering this pathway and specialized supports will be to begin with a small cadre of students, which will allow us to ensure they receive the level of attention and support they should expect. As experience with the pathway grows, Lakehead University will be able to expand recruitment while ensuring students continue to receive appropriate levels of support. We will only do so once we are confident that we have the resources, capacity and expertise to ensure that we can successfully accommodate an expanded intake.

Initial participants will play an important role in shaping the future development of the pathway by providing feedback on their experiences and helping identify opportunities for improvement.

Therefore, initially our marketing will be very focused on current and former CAF members with technical trades training, based on the analysis included in Appendix B. This identified Aircraft Structures Technicians and Electro-Optical Technicians as a strong fit, and Aviation Systems Technicians and Construction Technicians as a moderate fit.

At this stage given we are focused on a small initial cadre of students, we will work closely with Base Borden, located in close proximity to the new Barrie STEM Hub, to promote the pathways directly to qualified applicants in the trades we have identified as strong or moderate fits.

This project recommends working with our partners, the City of Barrie, who recently announced their ambition to become a hub for Canada's military defence. The announcement by the Mayor of Barrie includes adding a Sovereign Defence Investment Readiness Program to the City's Employment Development Community Improvement Plan (CIP) program, to reduce development charges for sovereign defence industries backed by an initial $50 million incentive to attract investment and accelerate development.

As Barrie seeks to attract inward investment from defence, security, and advanced manufacturing sectors, there is clearly an opportunity to help provided the highly-skilled talent they will need including former members of the Canadian Armed Forces who have the expertise but often lack the necessary credentials.

This means that instead of embarking on an extensive digital marketing campaign to promote the offerings, we will focus on targeting prospective military-connected learners in the Barrie and Simcoe County area with a background in the priority trades we have identified.

This will include: 1) developing a presentation deck delivered at in-person or virtual information sessions to select groups of qualified applicants identified by partners at Base Borden; 2) printed marketing collateral (see Appendix E) to distribute at information sessions; 3) dedicated web presence - initially this will be shared with attendees at information sessions so they can follow up to learn more, and over time as the project scales up it will be promoted more widely to prospective students all over Canada as the primary source of information about the pathways and supports we offer.

Web Presence

The project team opted for a strong presence on the Faculty of Engineering website engineering.lakeheadu.ca to feature pathways and supports instead of a standalone website. This includes a section on the homepage, and a dedicated set of pages that will expand over time:

https://www.lakeheadu.ca/programs/faculties/engineering/initiatives/military-connected-learners

We decided this was a better solution to avoid confusion and fragmented information. It will ensure that the Faculty's commitment is front and centre - on the front page of the site - and is an integrated part of the Faculty's mission to offer professional engineering education that's designed to be open and accessible to everyone.

This web presence will be built over time to include all the relevant information that these prospective students need including the pathways, the admissions process, and the dedicated supports available.

In addition, this project recommends information for on these pathways be featured on Lakehead's recently launched transfer website www.lakeheadu.ca/programs/transfer-pathways

to ensure that as many prospective students as possible are made aware of these opportunities.

4. PROJECT OUTCOMES

This project resulted in:

- Identification of a preferred pathway into accredited engineering programs.
- Recommendations for recognizing military education and experience.
- A framework for admissions and prior learning assessment.
- Recommendations for dedicated student supports.
- Marketing and outreach materials tailored to military audiences.
- A foundation for future collaboration with CFB Borden and community partners.

5. CONCLUSION

This project demonstrated that many military occupations develop technical knowledge and competencies that align closely with engineering disciplines and that existing pathways can be adapted to create accessible routes into accredited engineering education.

By leveraging existing pathways, introducing flexible delivery models, recognizing prior learning, and developing dedicated supports, Lakehead University has established the foundation for a sustainable pathway into accredited engineering programs for military learners:

- Supporting military personnel transitioning to civilian careers.
- Expanding access to accredited engineering education.
- Helping employers access highly skilled technical talent.

The initiative aligns with Lakehead University's commitment to accessibility and innovation while supporting workforce development priorities in Ontario and the economic development ambitions of the City of Barrie and surrounding region.

The next phase will focus on:

- Recruitment of an initial cohort.

- Implementation of admissions and PLAR processes.
- Continued development of military transfer credit recognition.
- Strengthening partnerships with CFB Borden and community stakeholders.
- Evaluating outcomes and identifying opportunities for future expansion.

Future phases of this initiative may explore partnerships with employers in the defence, aerospace, advanced manufacturing, infrastructure, and technology sectors to support co-op placements, experiential learning opportunities, and employment pathways for military learners pursuing engineering degrees.

APPENDICES

APPENDIX A

- A study on military to university best practice models

APPENDIX B

- CAF trades to engineering programs report

APPENDIX C

- Review of University of Manitoba framework for military transfer credit
- List of Engineering Complementary Studies Elective Courses
- List of Engineering Elective Courses

APPENDIX D

- Common Year in Applied Science Course Descriptions

APPENDIX E

- Sample marketing brochure / rack card

APPENDIX A

A study on best practice models to develop a military-to-university pathway

Abstract

Following their release from service, veterans often decide to continue their education through post-secondary institutions (PSIs) which require specific support structures. Beyond financial constraints, veterans face significant barriers such as complex administrative procedures for admission, cultural adjustment and existing family responsibilities. Therefore, this study analyzes current best practices to propose a strategic pathway and consequently some recommendations to develop a pathway for veteran students to be able to continue their higher education in engineering departments at Lakehead university.

Introduction

Based on previous studies, (R1927 Algonquin and Loyalist college project final report, Cable et al (2021) and Main et al (2025), Veterans who want to attend post-secondary education face several barriers and inconveniences that should be addressed. In this study, such barriers and some of the best practices in North America and Europe are being analyzed.

What are the barriers and why do they exist?

1. **Administrative and structural barriers**
    - Credit transfer frustration: This is a primary deterrent. Veterans possess high-level technical training but find that institutions lack standardized mechanisms to recognize military rank/trades for academic credit. The R1927

report explicitly notes that while 58% of surveyed veterans had prior training, less than 25% attempted transfer because of “administrative red tape” and a lack of awareness.

- Bureaucratic complexity: Navigating admissions, funding (like the VAC Education and Training Benefit) and course registration simultaneously is overwhelming. Veterans often cite getting the administrative run-around as a major stressor.
- Lack of “military-friendly” policies: Unlike the US, Canada lacks widespread “military-friendly” designations or a centralized support office (like the one at University of Manitoba) to guide veterans through these specific hurdles.

2. **Academic and skills differences**
    - Math/science struggle: Engineering specifically requires high proficiency in math and physics. Veterans often have a gap of several years since their last formal mathematics-based courses. This could create anxiety and a barrier to entry for rigorous engineering programs (Main et al., 2025).
    - Strict Curricula: Engineering programs often have very structured, sequential curriculums that don't easily accommodate the "non-linear" pathways of veterans who may need to start mid-year or take breaks.
3. **Cultural and identity barriers**
    - Identity crisis: Transitioning from a military identity (collective, hierarchical, mission-oriented) to a student identity (individualistic, unstructured, younger peers) is profound. Veterans often feel they "don't belong" on campus or that

their life experiences are not understood by faculty and civilian peers (Thompson, 2017; Cable et al., 2021).

- Separation: The R1927 report found that 90% of respondents had *never* accessed a student veteran organization. This suggests a lack of visible community or "identity-safe" spaces on campus, leading to isolation.
- Stigma: Veterans with "invisible injuries" including but not limited to post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) may avoid seeking help or disclosing their status due to fear of stigmatization or being seen as "broken" (Rattray et al., 2019).
- Maturity and bonding: For veteran students, it is common to naturally connect with other veterans regardless of branch (Coast Guard, Army, Navy, etc.). Their shared military background creates a strong sense of camaraderie. Because of this, participants noted that they did not gravitate toward civilian students as easily, feeling they had little in common. This, along with perceived differences in age and life stage, made it challenging for them to build networks with non-veteran peers in their program. (Johnson et al. 2020)

4. **Financial and life constraints**

- Off-campus responsibilities: Veterans are often older, mature and have families and dependents, requiring work while studying. The intensity of engineering programs sometimes conflicts with these responsibilities.
- Funding Gaps: While the ETB helps veterans it may not cover everything and the delay in benefits payments can cause financial problems.

Successful military-to-university transfer models solutions:

Based on comprehensive analysis of established frameworks, this section examines the roadmaps from select PSIs and their implementations to tackle the abovementioned barriers. According to empirical data including surveys, and institutional assessments, these institutions create a more supportive environment for transitioning veterans that can serve as a model for Lakehead University's future initiatives.

1. **University of Manitoba: The centralized office model**

   In this university the most robust administrative support system is servicing veteran students for their transfers. They recognized that veterans are struggling to navigate through different sections of university and developed an efficient support center for all their inquiries.

   The mechanisms of University of Manitoba practice:

   - The military support office (MSO): A dedicated physical office that serves as the single point of contact. Veterans do not call the general admissions line; they call the MSO. The MSO staff are trained to handle admissions inquiries, course registration, and VAC funding paperwork.
   - The military transfer credit database: They provide a course-by-course prior learning assessment recognition (PLAR) and maintain a searchable public database. A veteran can look up their specific military course and find exactly what credits it grants before applying.

- Flexible academic policy: If a student is deployed or has an unforeseen military training obligation; they can withdraw without financial penalty or academic failure. This directly addresses the "fear of wasting benefits" cited in the R1927 report. In the University of Manitoba there exist policies for such authorized withdrawals.
- Reduced residence requirements: They reduced the "residency requirement" (the number of credits you must take at University of Manitoba to get a degree) for military members, acknowledging their mobile lifestyle.

2. **University of Alberta: The Consortium and research model**

University of Alberta focuses on high-level institutional change and creating a veteran-friendly brand identity. They treat veteran status as a distinct diversity category requiring specific inclusion strategies.

The mechanisms of University of Alberta practice:

- The CMVF3C consortium: University of Alberta founded and leads the Canadian Military, Veteran and Family Connected Campus Consortium. This is a network of institutions that agree to a shared charter of best practices. By joining, an institution gets a toolkit for implementation and instant credibility.
- Research-Led interventions (HiMARC): They host the Heroes in Mind, Advocacy and Research Consortium (HiMARC). They use data tools like the VMOAT (Veteran Military Occupational and Environmental Exposure Assessment Tool) to clinically understand the invisible injuries (PTSD, TBI)

of their students, ensuring campus mental health services are actually relevant to veterans.

- Targeted financial aid: They offer specific scholarships like the Alex Decoteau Award of Honour ($5,000) specifically for soldiers, which signals institutional respect.

3. **University of Pittsburgh: The ELeVATE program**

   To overcome the math anxiety of veterans who were on service for a period of time and might forget the concepts and fundamentals, the University of Pittsburgh in the USA created a program called ELeVATE. Veterans are paid to work in engineering labs (experiential learning) and meanwhile they attend a series of math/physics refreshers during a 10-week summer research experience before the semester starts. It also creates a cohort of peers who start engineering school together replicating the military unit (Main et al 2025).

4. **Syracuse University (IVMF): The career-first model**

The institute for veterans and military families (IVMF) is an interdisciplinary institution right on campus at Syracuse. They focus on entrepreneurship and supply chain management (boots to business) linking degrees directly to veteran-friendly corporate partners (e.g., JPMorgan, Boeing). In a two-day program they lead the participants through the key steps for evaluating business concepts and provides them with the fundamental knowledge required to develop a business plan. This strategy, while perhaps not an immediate draw for veterans considering post-secondary education, could spark initial interest and encourage program

completion by providing a clearer vision of future opportunities and a brighter professional future.

5. **Texas A&M: The Veteran Resource Center (VRC) Hub**

   The Don and Ellie Knauss veteran resource and support center in TAMU is a massive physical location on campus which hosts aggie veteran networking events, peer mentoring and study groups. This valuable space fixes the invisibility issue. The R1927 report found 90% of veterans never accessed a student group because they mostly find bureaucracy and office work very confusing and couldn't find and initiate supportive communication through networks, groups and people with common experiences.

Synthesized recommendations for best practice at Lakehead university

1. **Leverage the "Common Year" as the Bridge (The "ELeVATE" Adaptation)**

Inspired by the common year as a bridge, which resembles the ELeVATE program, Lakehead university can create a pre-common year module. This module can range from 4 to 6 weeks prior to transfer program with intensive math/physics refresher for a non-negotiable Engineering success. This directly addresses the academic skill preparation without extending veteran student's time.

2. **Creating a military support zone**

Create a military support office in accordance with the University of Manitoba. To reduce the financial needs for an actual office, as a temporary solution, an existing office can provide such service on the side. The only important requirement is to train and assign existing staff for engineering student services as the military hub administrative. This person should be able to read the military personnel record resume (MPRR) and have authority to grant block transfer credits based on the R1927 recommendations. Consequently, the red tape barrier will be eliminated.

3. Join CMVF3C Consortium

Led by university of Alberta, this consortium provides a toolkit to audit Lakehead's current policies. Policies like permission to withdrawal for deployment, exceptional rules for veterans on service and supporting veteran students who cannot be present on campus temporarily due to their duties. Also, joining a unified consortium is more likely to harmonize and justify a standardized PLAR matrix which can resemble the robustness of US practices.

Conclusion

In conclusion, effectively supporting veterans in post-secondary education requires a pathway that explicitly acknowledges their unique barriers and addresses their primary needs with targeted solutions. The analysis of established frameworks across North America and UK demonstrates the practicality and success of such practices. Based on these findings, this study recommends implementing a similar pathway at Lakehead University, potentially inspired by the structure of the existing

Common Year program. To ensure long-term viability, future research must investigate the feasibility of this proposal through expanded surveys and pilot cohorts, allowing for the refinement of the model based on empirical feedback.

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Process Used to Develop the Best Practices Report – Outline

1. Purpose and Scope

- Purpose: Identify key barriers faced by military veterans in accessing post-secondary education and analyze existing best-practice models in order to propose a pathway into Lakehead University's engineering programs.
- Scope:
    - Population: military veterans seeking post-secondary study.
    - Focus: transitions into undergraduate engineering at Lakehead University.
    - Geography: primarily Canada, with selected examples from the United States and Europe where relevant practices are documented.

2. Evidence Base

- **Type of study**: Desk-based, narrative, document-based review of existing literature and institutional practices.
- **Key sources**:
    - ONCAT R1927 final report: Examining the Profiles and Pathways of Military Veterans in Ontario.
    - Peer-reviewed literature on veteran transitions and higher education (e.g., Cable et al. 2021; Main et al. 2025; Rattray et al. 2019; Thompson et al. 2017; Hunter-Johnson et al. 2020; Klaw et al. 2021; Cooper et al. 2016).
    - Institutional documentation for University of Manitoba, University of Alberta, University of Pittsburgh (ELeVATE), Syracuse University/IVMF, Texas A&M (Veteran Resource Center).
    - Lakehead documentation on the Common Year, BEng structures, and existing transfer/post-diploma entry routes.

3. Analytical Steps

1. **Problem definition and objectives**
    - Reviewed R1927 and core journal articles to clarify main barriers for veterans and their implications for engineering education.

- Set objective: describe barriers and identify institutional practices that can inform a military-to-engineering pathway at Lakehead.

2. **Barrier categorization**
    - Organized findings into four barrier categories, based on R1927 and the literature:
        - Administrative/structural (credit transfer, bureaucracy, lack of military-friendly policies).
        - Academic/skills (math/science gaps, time away from study, rigid engineering curricula).
        - Cultural/identity (transition in identity, isolation, stigma, maturity/peer differences).
        - Financial/life constraints (family/work responsibilities, funding gaps and timing).
3. **Selection of institutional models**
    - Identified a focused set of institutional examples cited in the literature or visible in practice:
        - University of Manitoba (centralized military support office and transfer-credit database).
        - University of Alberta (CMVF3C consortium, HiMARC, targeted awards).
        - University of Pittsburgh (ELeVATE engineering-focused bridge program).
        - Syracuse University/IVMF (career-oriented model and corporate partnerships).
        - Texas A&M (veteran resource and support center).
4. **Description of mechanisms in each model**
    - Reviewed institutional websites and referenced articles to document:
        - Organizational structures (offices, consortia, centers).
        - Program components (one-stop shops, PLAR tools, bridge programs, cohort structures, resource centers).

        - Policy features (deployment withdrawal policies, residency adjustments, targeted scholarships).

5. **Barrier–mechanism mapping**
    - Mapped each model's features to the barrier categories, for example:
        - Manitoba: centralized office and credit database

          → administrative/structural barriers.
        - Pittsburgh ELeVATE: paid summer labs + math/physics refreshers

          → academic/skills barriers.
        - Texas A&M VRC: veteran-specific space and community

          → cultural/identity barriers.
        - Alberta and Syracuse: awards and career linkages

          → financial and transition-to-career issues.
6. **Translation to Lakehead-specific recommendations**
    - Used the barrier–mechanism mapping and Lakehead's existing structures (Common Year, BEng programs, transfer routes) to derive contextualized recommendations, including:
        - Leveraging a Common Year-style bridge for veterans.
        - Establishing a dedicated military support function.
        - Considering consortium participation and structured PLAR use.
    - Ensured that each recommendation corresponds to:
        - At least one identified barrier category, and
        - At least one observed practice in another institution.

4. Limitations

- Evidence is secondary: published reports, articles, and institutional websites; no interviews or surveys were conducted.
- Publicly available documents contain limited outcome data; the analysis focuses on program structures and alignment with barriers rather than detailed impact metrics.



A study on military to university best practice models

And strategic Recommendations for Lakehead University Engineering

Why current Pathways struggle
Insight from ONCAT R1927

58% of veterans

- Have transferable training and skills

Less than 25%

- Attempt to transfer credits

90%

- Never access student veteran groups
- **(isolation)**

- Administrative red tape
- Lack of awareness

The barrier



- Repeated learning they've already mastered
- Wasting VAC funding and time

The result



- Credit transfer transparency
- Information stations

The opportunity



Barriers that veterans face to continue education
(Except the health conditions)

Administrative	Credit transfer frustration (no standard) Bureaucratic complexity (admission, funding, registration)
Cultural and identity	Identity crisis: (transitioning from a military (collective, hierarchical, mission) to a student (individualistic) Separation: (feeling “don’t belong”) Maturity and age Stigma: invisible injuries like PTSD and TBI may cause fear of seen as broken
Skills difference	Math/science struggle Gap of several years Strict curricula in Engineering programs (can’t easily accommodate non-linear pathways of veterans)
Life constraints	Off-campus and family responsibilities Funding gaps by ETB and financial needs Urgent deployments for service and lack of access

Models of success

US and Canadian best practices

Academic Bridging (Pittsburgh University, US)

- The ELeVATE model
- Math bootcamps

To fix the skill fade

Centralized Admin (University of Manitoba, CA)

- The military support office
- A single point of contact for admission and funding

To better address the concerns

Institutional Advocacy (University of Alberta, CA)

- The consortium model
- Using policy and research to signal “veteran friendly” status.

To standardize the transfers and support

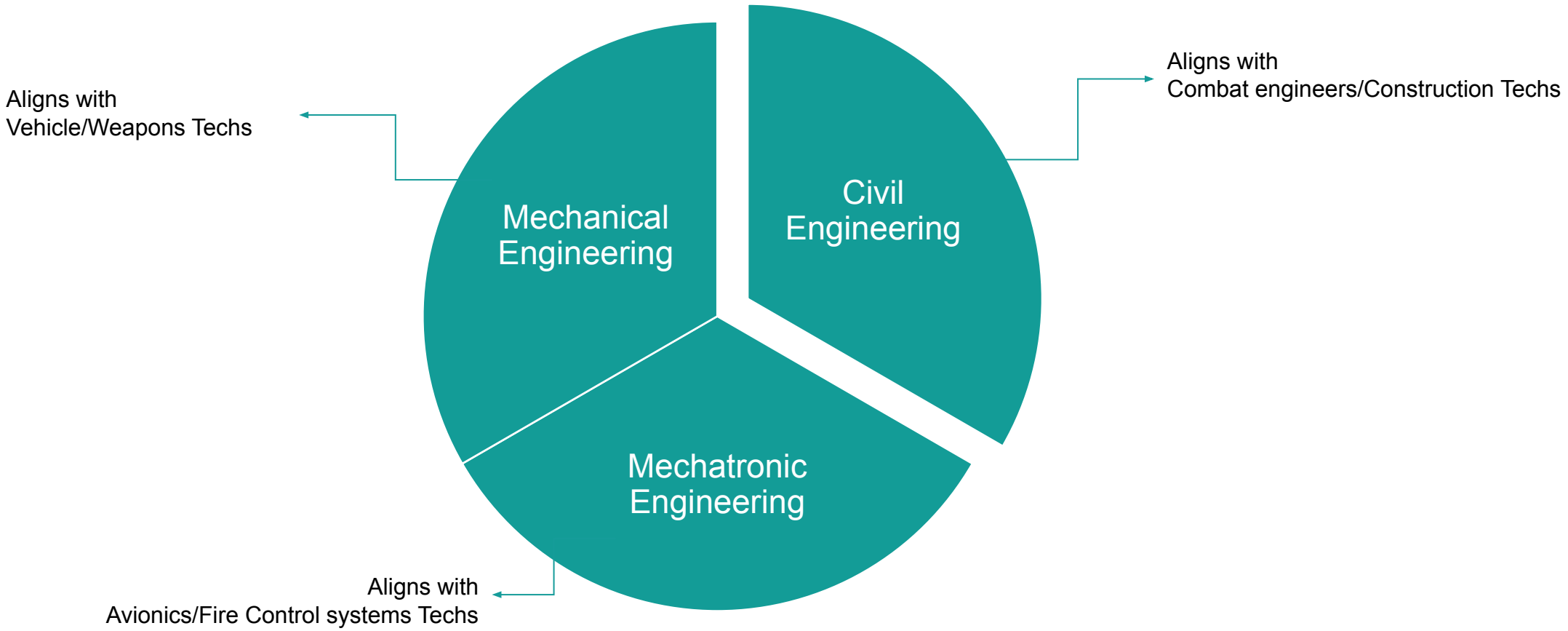
Recommendations

Moving to a more “veteran-friendly” environment



Develop the credit transfer program	• Create a transparent matrix for transferring trades to credits
Designate a veteran navigator	• One centralized office • One trained engineering/registrar staff to assess military transcripts
Cultural/skill competence	• Train assigned faculty on military culture to reduce frictions • Designate a “camaraderie zone” • Plan for “summer math refresher” course
Join the Consortium	• Align with national network for credibility • Access a unified standard

Where do we start?
Top tier disciplines to consider



Decisions and next steps

Questions to be answered

- Who will lead the academic review of military trades?
- Can continuing education host the summer math refresher, where and by who?
- Is it within the assigned budget to designate a central office for veteran administrations, veteran camaraderie events, support zone?
- How long does it take to train the staff and faculty to be learn veteran culture?
- How flexible can the transition program be to accommodate veterans' life constraints?

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Thank you!

Navid Nassir
Nov. 2025

APPENDIX B

1. ELECTRICAL & COMPUTER ENGINEERING PATHWAY

Best-Fit Trades

Aerospace Telecommunications & Information Systems Technician (ATIS)

Why it fits:

Circuits, digital systems, radar, communications, computers

Advanced: fibre optics, network design, radar systems

Lakehead Match:

Electrical Engineering

Computer Engineering

Software Engineering (partial)

Avionics Systems Technician

Why it fits:

Digital logic, radar, navigation, communication systems

Computer architecture + signal systems

Lakehead Match:

Electrical Engineering

Computer Engineering

Electro-Optical Technician

Why it fits:

Electronics + optics + computer systems

Advanced: fibre optics, lasers, surveillance systems

Lakehead Match:

Electrical Engineering

Mechatronics / Engineering Physics-type pathway

2. MECHANICAL ENGINEERING PATHWAY

Best-Fit Trades

Aircraft Structures Technician

Why it fits:

Metallurgy, machining, composites, structural repair

CNC machining, non-destructive testing (advanced)

Lakehead Match:

Mechanical Engineering

Materials Engineering (if available pathway)

Materials Technician

Why it fits:

Welding, metallurgy, machining, materials science

Advanced: non-destructive testing, advanced machining

Lakehead Match:

Mechanical Engineering

Materials / Manufacturing focus

Marine Technician

Why it fits:

Mechanical + electrical systems

Thermodynamics-like systems, propulsion, maintenance

Lakehead Match:

Mechanical Engineering

Aviation Systems Technician

Why it fits:

Flight systems, hydraulics, propulsion, controls

Lakehead Match:

Mechanical Engineering

Mechatronics (if applicable)

3. CIVIL ENGINEERING PATHWAY

Best-Fit Trades

Construction Technician

Why it fits:

Structural systems, concrete, surveying, drawings

Lakehead Match:

Civil Engineering

GENERAL / ENGINEERING SCIENCE PATHWAY

These trades are strong but cross-disciplinary.

Best Options:

ATIS

Avionics

Electro-Optical

Marine Technician

These support:

Engineering (Undeclared / Common First Year) at Lakehead

Then specialization after Year 1

BEST OVERALL TRADES (RANKED)

If your goal is max transfer credits + best prep for Lakehead Engineering, here's the ranking:

Best fit:

ATIS (Aerospace Telecommunications & Info Systems Tech)

Avionics Systems Technician

Materials Technician

Marine Technician

Strong fit:

Aircraft Structures Technician

Electro-Optical Technician

Moderate fit:

Aviation Systems Technician

Construction Technician

If your goal is Engineering at Lakehead, choose:

Electrical Path:

ATIS

Avionics

Electro-Optical

Mechanical Path:

Materials Tech

Marine Tech

Aircraft Structures

Civil Path:

Construction Tech

1. **Aerospace Telecommunications and Information Systems Technician**

Basic Occupational Qualification Training

Aerospace Telecommunications and Information Systems Technicians attend the Canadian Forces School of Communications and Electronics in Kingston, Ontario, to complete the Performance Oriented Electronics Training course which includes the following topics:

- Circuits Theory
- Electro-Mechanical and Solid-State devices
- Power sources
- Amplifier, Oscillator and Digital circuits
- Multistage electronic circuits
- Conductors and cables
- AM/FM Theory
- Audio/Video equipment
- Computers and peripherals

They continue with 20 weeks of training specific to their duties:

- Technical administration
- Automated information systems
- Switchboards and terminal equipment
- Cable distribution systems
- Data communication systems
- Audio and video systems
- Airfield navigational aids and meteorological systems
- Communications and crypto systems
- Radar systems

Available Specialty Training

Aerospace Telecommunications and Information Systems Technicians may be offered the opportunity to develop specialized skills through formal courses and on-the-job training, including:

- Airport Secondary/Surveillance Radar
- Communications Control Systems
- Precision Approach Landing Aids
- E3A AWACS Airborne Equipment
- Microwave Radio Systems and Associated Equipment
- Instructional Techniques
- Communications/Information Security

- Meteorological Systems
- Cryptographic Equipment Maintenance

Available Advanced Training

As they progress in their career, Aerospace Telecommunications and Information Systems Technicians who demonstrate the required ability and potential will be offered advanced training. Available courses include:

- Fibre Optics Communications Systems
- Design Building Network for Communication Systems
- Computer System Management
- Advanced Radar Maintenance
- Advanced Communications Operations
- Management and Leadership Training
- Deployed Communications Systems

2. **Aircraft Structures Technician**

Basic Occupational Qualification Training

Aircraft Structures Technicians attend Canadian Forces School of Aerospace Technology and Engineering (CFSATE) in Borden, Ontario where they complete Common Core which includes common mechanical and aircraft servicing training over 8 weeks. After some time at a Squadron they will return to CFSATE and take their occupational training over 26 weeks and includes:

- Shop mathematics and the use of measuring tools
- Interpretation of mechanical drawings and blueprints
- Metallurgy and identification of base metals, alloys and composite materials
- Fabrication of aircraft parts and aircraft sheet metal repair
- Performing cutting and drilling operations
- Machining external and internal surfaces using engine lathe and milling machines
- Installation of non-permanent fasteners
- Refinishing metal, synthetic and composite surfaces
- Identification of types and use of paints, sealants, epoxies and mixing agents
- Welding
- Aircraft servicing
- Maintenance of life-support equipment, ejection seats, fire suppression and oxygen systems

Applicants who enrol under the Non-Commissioned Member Subsidized Training and Education Program (NCMSTEP) will have the opportunity to complete a portion, or all of their Basic

Occupational Qualification Training at an approved Canadian college, university, other postsecondary establishment.

Available Specialty Training

Aircraft Structures Technicians may be offered the opportunity to develop specialized skills through formal courses and on-the-job training, including:

- Quality Assurance – Special Metal Welding
- Advanced Composite Repair
- Technical Writing
- Non-Destructive Testing
- Life Cycle Material Management
- Computer Numerical Control (CNC) Turning Centre
- CNC Machining Centre – Operation
- CNC Machining Centre – Programming
- Helicopter Rotor Blade Repair
- Advanced Selective Brush Electroplating
- Aircraft-specific courses
- Cryogenic Bulk Storage and Handling
- Recovery and Salvage Team Member

Available Advanced Training

As they progress in their career, Aircraft Structures Technicians who demonstrate the required ability and potential will be offered advanced training. Available courses include:

- Technical Administration
- Leadership and management courses

3. **Aviation Technician**

Basic Occupational Qualification Training

Aviation Systems Technicians attend training at the Canadian Forces School of Aerospace Technology and Engineering (CFSATE) in Borden, Ontario where they complete Common Core which includes common mechanical and aircraft servicing training over 8 weeks. After some time at a Squadron, they will return to CFSATE and take their occupational training over 24 weeks and includes:

- Theory of flight (fixed and rotary wing)
- Basic electrical
- Aircraft structures

- Propulsion systems
- Wiring and soldering
- Aircraft servicing
- Aircraft instrumentation
- Aircraft publications
- Aircraft safety
- Flight controls
- Hydraulic, fuel, brake and de-icing systems
- Environment control systems

Applicants who enrol under the Non-Commissioned Member Subsidized Training and Education Program (NCMSTEP) will have the opportunity to complete a portion, or all of their Basic Occupational Qualification Training at an approved Canadian college, university, other postsecondary establishment.

Available Specialty Training

Aviation Systems Technicians may be offered the opportunity to develop specialized skills through formal course and on-the-job training, including:

- Instructional Technique
- Aircraft Specific Type Courses
- Aircraft Engine Type Courses
- Life Cycle Materiel Management
- Aircraft Fluid Handling
- Corrosion Identification and Control
- Technical Writing
- Technical Inspection and Quality Assurance
- Flight Safety Investigators Course

Available Advanced Training

As they progress in their career, Aviation Systems Technicians who demonstrate the required ability and potential will be offered advanced training. Available courses include:

- Technical Administration
- Leadership and Management Courses

4. **Avionics Technician**

Basic Occupational Qualification Training

Avionics Systems Technicians attend Canadian Forces School of Aerospace Technology and Engineering (CFSATE) in Borden, Ontario where they complete Common Core which includes common mechanical and aircraft servicing training over 8 weeks. After some time at a Squadron they will return to CFSATE and take their occupational training over 32 weeks and includes:

- Solid-state devices
- Digital logic
- Aircraft wiring
- Magnetron, Klystron, Travelling Wave Tubes and Microwave theory
- Computer techniques and architecture
- Inspection and repair of Avionics (AVS) and combined Avionic (AVS)/Aviation (AVN) multi-purpose display systems
- Pitot static systems
- Flight instruments
- Compass
- Aircraft flight recorder and locator
- Air data computer
- Automatic flight control
- Electronic warfare systems
- Navigation systems
- Radar systems
- Communication systems
- Aircraft data processing

Applicants who enrol under the Non-Commissioned Member Subsidized Training and Education Program (NCMSTEP) will have the opportunity to complete a portion, or all of their Basic Occupational Qualification Training at an approved Canadian college, university, other post-secondary establishment.

Available Specialty Training

Avionics Systems Technicians may be offered the opportunity to develop specialized skills through formal courses and on-the-job training, including:

- Instructional techniques
- Calibration technician
- Computerized fault diagnosis and analysis
- High reliability soldering
- Aircraft specific type courses

Advance aircraft maintenance course

- Instructional Technique
- Life Cycle Materiel Management
- Aircraft Fluid Handling
- Corrosion Identification and Control
- Technical Writing
- Technical Inspection and Quality Assurance
- Flight Safety Investigators Course

Available Advanced Training

As they progress in their career, Avionics Systems Technicians who demonstrate the required ability and potential will be offered advanced training. Available courses include:

- Technical administration
- Leadership and management courses

5. **Construction Technician**

Basic Occupational Qualification Training

Construction Technicians attend the Canadian Forces School of Military Engineering in Gagetown, New Brunswick. Training takes approximately 29 weeks and includes:

- Environmental skills such as defensive tactics and firearms
- Care and use of common and special purpose tools and test equipment
- Application of occupational codes and regulations
- Interpretation of drawings and schematics
- Constructing/hardening structures
- Concrete/masonry
- Roofing systems
- Wood and steel framing
- Painting
- Construction survey
- Physics principles

Available Specialty Training

Construction Technician may be offered the opportunity to develop specialized skills through formal courses and on-the-job training.

6. **Electro-Optical Technician**

Basic Occupational Qualification Training

Electronic-Optronic Technicians will attend the Royal Canadian Electrical and Mechanical Engineers School in Borden, Ontario, for training specific to the roles and responsibilities of the Electronic-Optronic Technician. The training takes about 33 weeks but may be less for those with civilian qualifications in the field. Using a combination of classroom instruction, demonstrations and practical work, it covers the following material:

- Basic electrical and electronic theory
- Repair of electrical and electronic equipment
- Basic optical and optronic theory
- Repair of mechanical and optical equipment
- Repair of vehicle-mounted optronic and electronic devices
- Basic computer theory and architecture
- Repair of night-observation devices
- Repair of surveillance equipment
- Repair of surveying equipment
- Basic soldiering skills, including field-craft and battle-craft
- On-the-job training

Electronic-Optronic Technicians are initially posted to a unit on a CAF Base for about 18 months of on-the-job training, which is similar to an apprenticeship program. During this period, you practice and build on your previous training. You are then eligible for additional training at the Royal Canadian Electrical and Mechanical Engineers School to bring your knowledge, skills and experience to that of a civilian journeyman.

Applicants who enrol under the Non-Commissioned Member Subsidized Training and Education Program (NCMSTEP) will have the opportunity to complete a portion, or all of their Basic Occupational Qualification Training at an approved Canadian college, university, other postsecondary establishment.

Available Specialty Training

Electronic-Optronic Technicians may be offered the opportunity to develop specialized skills through formal courses and on-the-job training, including:

- Maintenance of the electrical, electronic and optronic systems of the Leopard tank
- Maintenance of artillery computers
- Air-conditioning equipment
- Simulators and trainers

Available Advanced Training

As they progress in their career, Electronic-Optronic Technicians who demonstrate the required ability and potential will be offered advanced training. Available courses include:

- Maintenance of digital computers
- Maintenance of thermal sights
- Maintenance of advanced surveillance equipment, lasers, and fibre-optics
- Maintenance of simulators and trainers
- Maintenance of Small Unmanned Aircraft Systems (SUAS)
- Maintenance of Ground Based Air Defence
- Maintenance of Main Battle Tank (vice Leopard)
- Maintenance of TOW Missile Systems
- Leadership and tactics
- Supervisor-level training
- Manager-level training

7. Materials Technician

Basic Occupational Qualification Training

Materials Technicians attend the Canadian Forces School of Electrical and Mechanical Engineering in Borden, Ontario for about a year. Using a combination of instruction, demonstrations and practical work, they learn the following skills:

- Shop mathematics
- Interpretation of mechanical drawings and blueprints
- Power and hand tools
- Metallurgy and heat treatment
- Pattern development and layout
- Welding:
    - Oxy-acetylene
    - Gas Metal Arc
    - Gas Tungsten Arc
    - Shielded-metal Arc
- Plasma arc cutting
- Metal surface refinishing
- Auto body repair and refinishing
- Rust-proofing and retreatment
- Spray-painting
- Drilling, threading and reaming
- Textile repair

- Sewing-machine repair
- Respirator repair
- Repair of fibreglass and composite materials
- Identification of metals, alloys and plastics

On-the-job training

Materials Technicians are posted to a CAF Base for about 18 months of on-the-job training, which resembles a civilian apprenticeship program.

Available Specialty Training

Materials Technicians may be offered the opportunity to develop specialized skills through formal courses and on-the-job training, including a 27-week intermediate training course. At the end of this training phase, a materials Technician's trade knowledge, skills and experience are comparable to those of a civilian journeyman.

There is also the possibility to take training to reach supervisor and manager levels. The supervisor level course takes about 13 weeks, and the manager level course takes about nine weeks.

Available Advanced Training

As they progress in their career, Materials Technicians who demonstrate the required ability and potential will be offered advanced training. Available courses include:

- Advanced machining
- Advanced welding
- Non-destructive testing techniques
- Military bridging inspection
- ISO sea container inspection
- Occupational health and safety

8. **Marine Technician**

Basic Occupational Qualification Training

Marine Technicians attend training at Naval Fleet School Pacific in Esquimalt BC and Naval Fleet School Atlantic in Halifax, NS. Training takes approximately 14 weeks to complete and includes:

- Basic mechanical, electrical and hull systems theory
- Basic preventive and corrective maintenance for marine systems
- The conduct of propulsion and ancillary rounds

- Equipment flash-up and shut-down procedures
- Basic emergency responses to equipment failures
- Emergency burning and welding equipment and procedures
- Repair of watertight and non-watertight closures

Applicants who enrol under the Non-Commissioned Member Subsidized Training and Education Program (NCMSTEP) will have the opportunity to complete a portion, or all of their Basic Occupational Qualification Training at an approved Canadian college, university, other postsecondary establishment.

Available Specialty Training

Marine Technicians may be offered the opportunity to develop specialized skills through formal courses and/or on-the-job training, including:

- Helicopter Crash Rescue Firefighting
- Welding
- Fabrication / Machining
- Diesel Inspection
- Gas Turbine Maintenance

Available Advanced Training

As they progress in their career, Marine Technicians who demonstrate the required ability and potential may be offered advanced training. Available courses include:

- Advanced mechanical preventive / corrective maintenance
- Advanced electrical preventive / corrective maintenance
- Plant operation and watch supervision
- Advanced firefighting / damage control
- Refit management
- Equipment lifecycle management
- Maintenance management

Specific Navy Training

Naval recruits attend the Naval Environmental Training Program at Naval Fleet School Pacific in Esquimalt, British Columbia or Naval Fleet School Atlantic in Halifax, Nova Scotia for approximately five weeks. Training includes the following topics:

- Perform General Duties in the Naval Environment

- Perform as a Member of the Force Protection Team
- Perform as a Member of the Damage Control Organization
- Carry Out Survival Drills

Jason Kerr

CAF TRADES TO ENGINEERING PROGRAMS

ELECTRICAL AND COMPUTER ENGINEERING PATHWAY

Best-Fit Trades

Aerospace Telecommunications & Information Systems Technician (ATIS)

Why it fits:

- Circuits, digital systems, radar, communications, computers
- Advanced: fibre optics, network design, radar systems

Lakehead Match:

- Electrical Engineering
- Computer Engineering
- Software Engineering (partial)

ELECTRICAL AND COMPUTER ENGINEERING PATHWAY

Avionics Systems Technician

Why it fits:

- Digital logic, radar, navigation, communication systems
- Computer architecture + signal systems

Lakehead Match:

- Electrical Engineering
- Computer Engineering

ELECTRICAL AND COMPUTER ENGINEERING PATHWAY

Electro-Optical Technician

Why it fits:

- Electronics + optics + computer systems
- Advanced: fibre optics, lasers, surveillance systems

Lakehead Match:

- Electrical Engineering
- Mechatronics / Engineering Physics-type pathway

MECHANICAL ENGINEERING PATHWAY

Best-Fit Trades

Aircraft Structures Technician

Why it fits:

- Metallurgy, machining, composites, structural repair
- CNC machining, non-destructive testing (advanced)

Lakehead Match:

- Mechanical Engineering
- Materials Engineering (if available pathway)

MECHANICAL ENGINEERING PATHWAY

Materials Technician

Why it fits:

- Welding, metallurgy, machining, materials science
- Advanced: non-destructive testing, advanced machining

Lakehead Match:

- Mechanical Engineering
- Materials / Manufacturing focus

MECHANICAL ENGINEERING PATHWAY

Marine Technician

Why it fits:

- Mechanical + electrical systems
- Thermodynamics-like systems, propulsion, maintenance

Lakehead Match:

- Mechanical Engineering

MECHANICAL ENGINEERING PATHWAY

Aviation Systems Technician

Why it fits:

- Flight systems, hydraulics, propulsion, controls

Lakehead Match:

- Mechanical Engineering
- Mechatronics (if applicable)

CIVIL ENGINEERING PATHWAY

Best-Fit Trades

Construction Technician

Why it fits:

- Structural systems, concrete, surveying, drawings

Lakehead Match:

- Civil Engineering

GENERAL / ENGINEERING SCIENCE PATHWAY

These trades are strong but cross-disciplinary.

Best Options:

- ATIS
- Avionics
- Electro-Optical
- Marine Technician

These support:

- Engineering (Undeclared / Common First Year) at Lakehead
- Then specialization after Year 1

BEST OVERALL TRADES (RANKED)

If your goal is max transfer credits + best prep for Lakehead Engineering, here's the ranking:

Best fit:

- ATIS (Aerospace Telecommunications & Info Systems Tech)
- Avionics Systems Technician
- Materials Technician
- Marine Technician

BEST OVERALL TRADES (RANKED)

Strong fit:

- Aircraft Structures Technician
- Electro-Optical Technician

BEST OVERALL TRADES (RANKED)

Moderate fit:

- Aviation Systems Technician
- Construction Technician

Lakehead Engineering

If your goal is Engineering at Lakehead, choose:

Electrical Path:

- ATIS
- Avionics
- Electro-Optical

Mechanical Path:

- Materials Tech
- Marine Tech
- Aircraft Structures

Civil Path:

- Construction Tech

APPENDIX C

University of Manitoba's Military Transfer Credit Framework: A Canadian Best Practice

The University of Manitoba has developed one of Canada's most comprehensive and longstanding military transfer credit frameworks, designed to recognize the academic value of Canadian Armed Forces (CAF) training, education, leadership development, and occupational experience. Through its Military Support Office, serving members, reservists, and veterans can receive university credit for military learning, reducing both the time and cost required to complete a degree.

Overview

The foundation of the University of Manitoba's approach is the recognition that military training often achieves learning outcomes comparable to those delivered through university courses. Rather than requiring military personnel to repeat learning they have already completed, the university evaluates military education and experience and translates that learning into academic credit. The model has been refined over approximately 30 years and is widely regarded as the most mature and comprehensive military credit recognition framework in Canada.

Military Transfer Credit Framework

The University of Manitoba's framework operates as a structured system for assessing military learning and assigning academic credit based on demonstrated competencies and learning outcomes. At its core, the framework evaluates three principal sources of military learning:

- Formal military education and training, including occupational qualification courses, leadership training, professional development programs, and specialized technical instruction.
- Military occupational experience, where extensive workplace learning and applied competencies may be recognized.
- Military-acquired certifications and credentials, particularly where they align with university-level knowledge and skills.

Faculty members assess military courses and training packages by reviewing course outlines, learning objectives, instructional hours, assessment methods, and competency requirements. Military learning is then mapped against university courses and degree requirements.

The resulting credits generally fall into three categories:

- Direct course equivalencies, where military learning is deemed substantially equivalent to a specific university course.
- Discipline-specific credit, where learning aligns with a particular subject area but not a single course.
- General elective credit, which recognizes university-level learning without a direct disciplinary match.
- This framework enables military learners to receive meaningful credit while ensuring academic standards are maintained.

How the System Was Developed

The framework was developed through a rigorous academic review process. Faculty members examined actual military course materials, training curricula, occupational qualification standards, and professional development programs to determine equivalencies with university-level learning outcomes. Once these assessments were completed, proposed credit mappings were submitted through the university's formal academic approval processes before being implemented.

Over time, these assessments have been compiled into a comprehensive database of pre-approved military equivalencies, allowing future applicants with similar military backgrounds to receive consistent and efficient evaluations.

The University of Manitoba now offers a wide range of both program-specific and elective credits for military service. The resulting framework functions similarly to a transfer credit system, providing established pathways rather than requiring every learner to undergo an individual assessment.

Key Features

- Program-specific and elective credits.
- Pre-assessed military learning pathways.
- Faculty-reviewed course and occupational equivalencies.
- A centralized military transfer credit database.
- Dedicated military learner support services.
- Flexible pathways to degree completion.
- Faculty-governed quality assurance and academic oversight.

National Recognition

The University of Manitoba's military PLAR and transfer credit framework is widely recognized as the Canadian benchmark for recognizing military learning. Its influence extends beyond Manitoba. The University of New Brunswick adopted the same military credit recognition framework and equivalency system, demonstrating confidence in the academic rigor and transferability of Manitoba's approach. According to University of Manitoba staff, this decision was accompanied by a comment from UNB leadership that, "If it's good enough for U of M, it's good enough for us."

Military Transfer Credit Recognition in the Canadian Context

While the University of Manitoba is widely recognized as the most mature example of military transfer credit recognition in Canada, interest in recognizing military education and training is growing across the Canadian postsecondary sector.

Historically, most institutions have relied on Prior Learning Assessment and Recognition (PLAR) processes that evaluate military learning on an individual basis. In recent years, however, several institutions have begun exploring more systematic approaches that move beyond case-by-case assessments toward pre-approved equivalencies, advanced standing pathways, and institution-wide recognition frameworks.

University of New Brunswick

The University of New Brunswick has adopted the University of Manitoba's military credit recognition framework, extending the reach and influence of Manitoba's model. This adoption demonstrates the scalability of the approach and its applicability across different institutional contexts.

Royal Military College of Canada

The Royal Military College (RMC) has long recognized military education and training through formal prior learning assessment processes. As Canada's military university, RMC provides an important example of how military professional development, leadership training, and occupational qualifications can be translated into academic credit while maintaining institutional academic standards.

Athabasca University

Athabasca University supports military learners through flexible distance education and recognition of prior learning. Its approach is particularly valuable for serving members who require online and part-time study options while continuing military service.

University of Winnipeg

The University of Winnipeg has developed recognition pathways for military training and service through its Recognition of Prior Learning program, allowing military personnel to receive academic credit for documented learning and experience.

Memorial University of Newfoundland

Memorial University has established processes to assess military education and experience for academic credit, reflecting a growing recognition of military learning within Canadian universities.

Conclusion

The University of Manitoba's military transfer credit framework demonstrates how universities can systematically recognize non-traditional learning while maintaining academic integrity. Built through faculty-led assessment, refined over three decades, and recognized nationally as a leading practice, the framework provides a mature and scalable model for recognizing military education and experience as university-level learning.

Engineering Complementary Studies Elective Courses

BEng Programs -Thunder Bay

Effective July 1, 2025

The Complementary Studies component of the Bachelor of Engineering Degree programs at Lakehead University consists of three parts.

Students are required to complete the equivalent of five* term courses (total credit weight 5 x 0.5 FCE = 2.5 FCE) from;

a) **Sociology 2755: Technology, Society and the Indigenous People in Canada (credit weight: 0.5 FCE)**
b) **Engineering 4539: Professional Practice and Law (credit weight: 0.5 FCE)**
c) **Complementary Studies Electives from Course List 1 and/or Course List 2 (credit weight: 1.5 FCE):**
    - **Course List 1: 1 to 3 equivalent term courses (0.5 to 1.5 FCE)**
    - **Course List 2: 0 to 2 equivalent term courses (0 to 1.0 FCE)**

***Students in the BEng (Software) program should consult their Chair regarding the total credit weight of Complementary Studies Electives required in their program. Please note; all BEng students are required to take at least 0.5 FCE of Complementary Studies Electives from Course List 1.**

On occasion, students may find it convenient to interchange the position of their Complementary studies and engineering elective from one term to another in their program in order to accommodate course selection. Complementary Studies courses may also be taken during the Spring and Summer terms if available.

Students may obtain counselling on Complementary Studies electives from the Chair of their Department. The responsibility for prerequisites and other course restrictions rests with the student.

Lakehead University's distance education, web-based and video-conferenced courses are acceptable in the Complementary Studies program. Courses from other Universities may be acceptable but require a formal Letter of Permission approved by your Engineering Department Chair. Information about the Letter of Permission is available from Student Central, on myInfo, and from your Engineering Department Office.

(a) Impact of Technology on Society

- **Sociology 2755: Technology, Society and Indigenous Peoples in Canada**
  Normally this course is taken in the term and year specified in the University Calendar.

(b) Professional Ethics, Equity, and Law

- **Engineering 4539: Professional Practice and Law**
  Normally this course can only be taken by fourth year students in the last term of the program.

(c) Complementary Studies Electives

Students must select a total of 3* term courses (1.5 FCE) from the following lists approved by the Faculty of Engineering at the time of registration. Not all courses are offered each year. Consult the Lakehead University course timetable for details. Note, for example, full (two term) courses are indicated by YA, YB, etc; FA is used for fall term courses and WA for winter term courses. Additional information about course numbering is available in the Lakehead University Calendar.

It is the student's responsibility to consult the Lakehead University Calendar for official information about credit weight, prerequisites and restrictions for all courses listed.

List 1: Humanities and Social Sciences

At least one term course (0.5 FCE) MUST be selected from this list. Alternatively, two or three courses could be taken from this list.

Anthropology:

- Anthropology 1034 - World Cultures
- Anthropology 2116 - Gender in Cross-Cultural Perspective
- Anthropology 2151 - Ancient Peoples and Places
- Anthropology 2332 - Peoples and Cultures of Africa
- Anthropology 3811 - Anthropology of Sexuality (Special Topics Course-Restricted to this course title only)

Criminology:

- Criminology 1010 - Introduction to Criminology
- Criminology 2030 - Gender and Crime
- Criminology 4070 - Trafficking

English:

- English 1115 - Foundations of Literary Study
- English 1116 - Native and Newcomer Literatures in Canada: Contact Zones
- English 1117 - Introduction to Popular Culture
- English 1118 - Introduction to Film Studies
- English 2115 - Shakespeare
- English 2510 - Global Literatures in English
- English 2717 - Indigenous Literature in Canada
- English 2810 - Gender, Sexuality and the Body in Literature and Culture
- English 2817 - Creative Writing: Nonfiction
- English 2916 - Popular Texts and Forms
- English 2917 - Children's Literature
- English 2950 - Science Fiction

Geography:

- Geography 1150 - The Environment
- Geography 2811 - Cultural Geography
- Geography 3411 - Resource Management and Sustainability
- Geography 3631 - Geography of Canada
- Geography 3633 - Geography of the Lake Superior Basin
- Geography 3693 - Geography of Northern Europe
- Geography 3731 - Urban Residential Structure
- Geography 3751 - Retail Location

History:

- History 1100 - The Making of the Modern World
- History 2110 - Modern Europe I, 1789-1914
- History 2111 - Soviet Union and Russia Since 1917
- History 2112 - Imperial Russia to 1917
- History 2116 - Germany, 20th Century
- History 2130 - Modern Europe II, 1914-1990
- History 2138 - Revolutionary France, 1789-1870
- History 2139 - Republican France, 1870-1983
- History 2201 - Greek History
- History 2203 - Roman History
- History 2350 - Modern Canada
- History 2511 - The United States after the Civil War
- History 2512 - The United States to the Civil War
- History 2513 - Colonial Latin America and the Caribbean
- History 2515 - Modern Latin America and the Caribbean
- History 2611 - Chinese
- History 2619 - Modern South Asia
- History 2811 - Heritage and the Built Environment (Special Topics Course-Restricted to this course title only)

Indigenous Learning:

- Indigenous Learning 1314 - Indigenous Peoples and the Issues
- Indigenous Learning 2312 - Indigenous Peoples and the North
- Indigenous Learning 2313 - Indigenous Peoples and the Urban Community
- Indigenous Learning 2433 - Indigenous People and the Government
- Indigenous Learning 2805 - Indigenous Canadian World Views
- Indigenous Learning 2811 - Corporations and the Status Indian
- Indigenous Learning 3435 - Indigenous People and the Land
- Indigenous Learning 3811 - The Rights of Aboriginal People in S.35

Languages:

- Finnish 2401 - Finnish Civilization
- French 2417 - Writing Strategies through Francophone Culture and Civilization
- Italian 2510 - Italian Civilization and Culture
- Linguistics 0300 - Introduction to Language
- Linguistics 0510 - An Introduction to Etymology

Music:

- Music 1010 - Music Appreciation (NEW)
- Music 1310 – Rudiments of Music (NEW)
- Music 1312 - Music History I (Before 1600)
- Music 1313 - Music History II (1600-1800)
- Music 1350 - Theory I
- Music 1351 - Theory II
- Music 2314 - Music History III (1800-1900)
- Music 2315 - Music History IV (After 1900)
- Music 3313 - Topics in Music I
- Music 3317 - Music in Canada
- Music 4915 - Music Criticism (NEW)

Philosophy:

- Philosophy 1110 - Introduction to Philosophy: Origins
- Philosophy 1111 - Introduction to Philosophy: Modern Developments
- Philosophy 1118 - Philosophy of the Occult and Paranormal
- Philosophy 1119 - Philosophy Through Popular Culture
- Philosophy 1571 - Contemporary Moral Issues
- Philosophy 1573 – Philosophy and the Human Condition
- Philosophy 2013 - Environmental Philosophy
- Philosophy 2014 - Witch Hunts
- Philosophy 2311 - Ancient Greek Philosophy
- Philosophy 2330 – Philosophy Goes to the Movies
- Philosophy 2413 - A Defense against the Dark Arts
- Philosophy 2614 - Early Modern Philosophy
- Philosophy 2913 - Philosophy and Science Fiction
- Philosophy 3514 - Cyberethics

Political Science:

- Political Science 1100 - Introduction to Political Science
- Political Science 2311 - Criminal Law
- Political Science 2313 - Human Rights and Civil Liberties
- Political Science 2410 - Media and Politics **OR** Media, Film and Communications 2411 Media and Politics
- Political Science 2510 - Ancient and Medieval Political Thought
- Political Science 2611 - World Politics
- Political Science 3311 - Third World Politics and Society
- Political Science 3113 - Law and Politics of the Family
- Political Science 3250 - The Politics of Food
- Political Science 3314 - Global Terrorism
- Political Science 3351 - Indigenous Peoples and the Law

Psychology:

- Psychology 1112 Foundations of Psychology: Social and Individual Differences (NEW)
- Psychology 2011 - Child Development
- Psychology 2015 - Social Psychology
- Psychology 2211 - Health Psychology

Religious Studies:

- Religious Studies 1100 Introduction to World Religions (NEW)
- Religious Studies 2715 - Introduction to Islam (Special Topics Course-Restricted to this course title only)
- Religious Studies 2715 - Abrahamic Religions (Special Topics Course-Restricted to this course title only)
- Religious Studies 2715 – South Asian Religions (Special Topics Course-Restricted to this course title only) NEW

Sociology:

- Sociology 1100 - Introduction to Sociology
- Sociology 2011 - Youth and Canadian Society
- Sociology 2110 - Food, Culture and Society
- Sociology 2111 - Perspectives in Social Thought
- Sociology 2112 - Friendship@facebook.Com (Special Topics Course-Restricted to this course title only)
- Sociology 2112 - Palestine & International Relations (Special Topics Course-Restricted to this course title only)
- Sociology 2221 - Crime and Society
- Sociology 2501 - Family Sociology
- Sociology 2817 - Sociology of the North
- Sociology 3113 - Special Topics in Sociology
- Sociology 3513 - Sociology of Aging
- Sociology 3515 - Life Course Studies
- Sociology 3613 - Canadian Population

Visual Arts:

- Visual Arts 0510 - Design Elements and Principles
- Visual Arts 1090 - Prehistory to the Middle Ages
- Visual Arts 1091 - Renaissance to the Contemporary Period
- Visual Arts 2211 - Critical Studies in Early Twentieth Century Art
- Visual Arts 2212 - Critical Studies in Late Twentieth Century Art

Gender and Women's Studies:

- Gender and Women's Studies 1100 - Madonna to Madonna: Women's and Gender Studies
- Gender and Women's Studies 2113 - Women, Popular Culture and Counter Culture
- Gender and Women's Studies 2114 - Ecofeminism
- Gender and Women's Studies 2116 - Gender in Cross-Cultural Perspective
- Gender and Women's Studies 2711 - Women's Action for Social Change

List 2: Other Complementary Studies Courses

Up to two term courses MAY be selected from this list. Note: A minimum of 1 term course (0.5 FCE) MUST be selected from List 1.

Business:

- Business 1511 - Basics of Management **OR** Business 1011 - Introduction to Management (enrolment restricted)
- Business 2514 - Basics of Marketing
- Business 2538 - Basics of Organizational Behaviour

Economics:

- Economics 1010 Principles of Microeconomics (NEW)
- Economics 1011 Principles of Macroeconomics (NEW)
- Economics 2017 - Microeconomics I
- Economics 2212 - Environmental Economics
- Economics 2511 - Locational Economics **OR** Geography 2511- Economic Geography
- Economics 3111 - Labour Economics
- Economics 3114 - International Finance
- Economics 3133 - Regional Economics
- Economics 3211 - Economic Development
- Economics 3214 - History of Economic Thought
- Economics 3215 - Money and Banking
- Economics 3231 - Health Economics
- Economics 3313 - Public Finance
- Economics 3412 - Industrial Organization

Languages:

- Finnish 1000 - Elementary Finnish
- Finnish 2001 - Intermediate Finnish
- French 0500 - French for Beginners
- French 1000 - Elementary French
- French 1200 - Intermediate French
- French 1204 - Français Intermédiaire
- German 1000 - Elementary German
- Italian 1000 - Introductory Italian
- Italian 1510 - Language and Culture
- Mandarin 1000 - Introductory Mandarin
- Ojibwe 1013 - Introduction to Severn Ojibwe I
- Ojibwe 1014 - Introduction to Western Ojibwe I
- Ojibwe 1015 - Introduction to Severn Ojibwe II
- Ojibwe 1016 - Introduction to Western Ojibwe II
- Spanish 1000 - Introductory Spanish

Northern Studies:

- Northern Studies 1112 - An Introduction to the Canadian North

Electrical Engineering Elective Courses

Chemical Engineering

- ECHE 0334: Specific Topics in Chemical Engineering (Thermophysical Properties of Materials)
- ECHE 0335: Air Pollution Control Methods and Analysis
- ECHE 0339: Process Optimization
- ECHE 0631: Bioprocess Engineering (offered in Fall 2024)
- ECHE 0653: Fundamentals of Petroleum Recovery (offered in Winter 2025)
- ECHE 0671: Pulp and Paper Manufacture
- ECHE 0673: Biological Treatment Processes
- ECHE 0674: Design and Analysis of Experiments
- ECHE 0676: Mineral Processing

Civil Engineering

- ECIV 0637: Geotechnical Engineering Topics
- ECIV 0553: Traffic Engineering
- ECIV 0652: Wood Structures Design
- ECIV 0336: Special Topics in Civil Engineering (Water Treatment)
- ECIV 0233: Structural Design Topics
- ECIV 0534: Construction Engineering
- ECIV 0235: Water Resources and Hydropower Development

Electrical Engineering

- EELE 0138: Control Systems III (Offered Winter 2026)
- EELE 0139 Analog CMOS Design (Offered Fall 2025)
- ESOF 0151: Large Scale Data Analytics (Offered Fall 2025)
- EELE 0438: Electric Power Systems II (Offered Fall 2025)
- EELE 0554: Power Electronics II (Offered Fall 2025)
- EELE 0651: Computer Organization (Offered Winter 2026)
- EELE 0654: Advanced Electronic Devices (Offered Winter 2026)
- EELE 3312: High Performance Embedded Systems (Offered Winter 2026)

Mechanical Engineering

- EMEC 0450: Finite Element Method in Mechanical Engineering
- EMEC 0538: Topics in Mechanical Engineering: Renewable Energy Conv. in Mech
- EMEC 0538: Topics in Mechanical Engineering: Modeling and Control of Mechanical Systems
- EMEC 0575: Engineering Design Synthesis and Analysis
- EMEC 0579: Computational Methods in Mechanical Engineering
- EMEC 0656: Analysis and Application of Composite Materials
- EMEC 0657: Energy Conversion Engineering
- EMEC 0659: Signal Processing for Mechanical Systems
- EMEC 0670: Combustion and Emissions

Mechatronics Engineering

- COMP 4313: Programming & the Internet of Things
- EELE 4054 - Digital VLSI Circuit Design
- EMEC 0537 - Manufacturing Processes and Production Systems
- ESOF 0153 - Natural Language Processing
- ESOF 4011 - Applied Computational Intelligence
- METR 0538 - Special Topics in Mechatronics Engineering
- METR 4013 - Big Data & Cloud Computing
- EMEC 4436 - Mechanical Vibrations

Software Engineering

- ESOF 0655 - Special Topics in Software Engineering
- ESOF 0151 - Large Scale Data Analytics
- ESOF 0152 - Agile Software Development
- ESOF 0130 - Blockchain Engineering Design
- ESOF 0131 - Advances in Web Technologies
- ESOF 0132 - Fog and Edge Computing
- ESOF 0133 - Cybersecurity in Internet of Things

APPENDIX D

Appendix D - Common Year in Applied Sciences Courses

Fall Term Courses

Engineering 1138 - Introduction to Engineering Math I
Radians and elementary trigonometry, complex numbers via quadratic equations and their manipulation, Euler's exp(i*theta) definition and its use in obtaining trigonometric identities, sets, functions – domain, range, one to one and onto functions, inverse functions, composition of functions, exponential and logarithmic functions, inequalities, elementary combinatorics, polynomials, binomial theorem, rational functions.

Engineering 1139 - Introduction to Engineering Math II
Vectors – dot and cross products with application to equations of planes and simple geometry, cosine and sine rules for triangles, linear equations, matrices, elementary matrix algebra and matrix inversion, the definition of Euler's number. Derivatives. Elementary application of derivatives in engineering as rate of change. Simple integrals. Elementary probability: Mean, variance, standard deviation concepts on data sets. Logarithms and exponential functions revisited.

Engineering 1153 - Taste of Engineering Design I
Mathematical and Laboratory explorations in Engineering Design. Students to choose 3 design problems approved by the faculty facilitator. The explorations are to be completed in groups, aided by the faculty facilitator with a technical report and audio-visual presentation. The problems students will choose will be from a list from the six major Engineering disciplines offered at Lakehead University: Civil, Chemical, Electrical and Computer Engineering, Mechanical, Mechatronics, and Software Engineering.

Engineering 1155 - Introduction to Engineering Science I
Elementary statics and particle dynamics relevant to engineering; energy – kinetic, potential; basics of heat.

Winter Term Courses

Engineering 1152 - Introduction to Computer Programming
Introduction to computer programming in Python. Programming exercises are related to computation in the areas of mathematics covered in Engineering 1150 and Engineering 1151.

Engineering 1154 - Taste of Engineering Design II
Mathematical and laboratory explorations in Engineering Design. Students to choose 3 design problems to be approved by the faculty facilitator. The explorations are to be completed in groups aided by the faculty facilitator with a technical report and audio-visual presentation. Problems from which students will choose will be from a list from our six major Engineering disciplines: Civil, Chemical, Mechanical, Mechatronics, Electrical and Computer, and/or Software.

Engineering 1156 - Introduction to Engineering Science II
Gas laws, reaction balancing, basic stoichiometry calculations in engineering and concepts of rates of reactions, equilibrium; pH scale, basic electrochemistry. The chemistry of elements such as Aluminum and Lithium. Basic ideas of organic chemistry – classification of the basic

organic compounds including simple isomeric compounds, basic organic chemistry reactions, physical properties of organic compounds within some classes of organic compounds.

Engineering 1157 - Introduction to Engineering Science III
Simple harmonic motion, sound, electromagnetics and light for engineering; modern physics - wave-particle duality and the uncertainty principle.

APPENDIX E

Lakehead UNIVERSITY | Faculty of Engineering

ENGINEERING PATHWAYS

DESIGNED FOR

MILITARY STUDENTS & VETERANS

- ONLINE ENTRY PATHWAY
- COURSE CREDIT ASSESSMENT FOR MILITARY TRAINING
- DEDICATED SUPPORTS

LEARN MORE

engineering.lakeheadu.ca/CAF

ENTRY PATHWAY

Current and former members of the Canadian Armed Forces can enroll in Lakehead's Common Year in Applied Science entry pathway:

- 8 courses (or less)
- Flexible online delivery
- Evening classes after 7PM

Students receive certificate of completion and direct entry into any of Lakehead's 6 Bachelor of Engineering (BEng) degrees accredited by the Canadian Engineering Accredition Board (CEAB):

- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering
- Mechatronics Engineering
- Software Engineering

All BEng degrees are available at the Thunder Bay campus and selected programs (Electrical, Mechatronics & Software) are now offered at Lakehead's new Barrie STEM Hub.

Military students are eligible for transfer credit for selected military courses and training based on review of Military Personnel Record Resume (MPRR).