Aerospace Manufacturing Engineering Technology

Confederation College is located in the city of Thunder Bay, a culturally diverse community that serves as the education and government hub of northwestern Ontario. Located in the heart of one of the finest outdoor recreation and tourism destinations in Canada, Confederation College students enjoy the benefits of living and learning in a community that provides a rich lifestyle right at your doorstep.

At Confederation College we change lives through learning. We are committed to meeting the needs of our learners, employers and communities, and we are here to help you succeed in meeting your life goals. To arrange for a Thunder Bay campus tour call (807) 475-6110 or book a tour online.

CAMPUSES

Thunder Bay »

1450 Nakina Drive
P.O. Box 398
Thunder Bay, ON
Canada P7C 4W1

Dryden »
Fort Frances »
Geraldton »
Kenora »
Marathon »
Red Lake »
Sioux Lookout »
Wawa »

ADMISSIONS

The minimum admission requirement for a postsecondary program is an Ontario Secondary School Diploma, or its equivalent, with minimally 2 senior credits at the college, college /university or university preparation level. Some programs have additional admission requirements. For specific admission requirements, please see the program descriptions included in this publication, visit the Admissions website or contact our Admissions Office at (807) 475-6213.

SERVICES FOR PROSPECTIVE STUDENTS

Click the title to visit Department webpage:

Admissions & Recruitment »	(807) 475-6213
Career & Placement Services »	(807) 475-6193
Centre for Continuing Education »	(807) 475-6550
Counselling Services »	(807) 475-6110
Distance Education »	1-800-563-9435
Financial Aid »	(807) 475-6637
Fitness Centre »	(807) 475-6239
General Inquiry »	(807) 475-6110
Health Centre »	(807) 475-6169
International Students »	(807) 475-6175
Learning Centre »	(807) 475-6618
Library Learning Commons »	(807) 475-6219
Negahneewin College of Academic & Community Development »	(807) 475-6465
Oshki Anishnawbeg Student Assoc. »	(807) 475-6314
Registration Services »	(807) 475-6265
Residence/Housing »	(807) 475-6381
Student Union »	(807) 475-6226

Aerospace Manufacturing Engineering Technology

Students will now have the option of graduating from the 2-year Aerospace Manufacturing Engineering Technician Program with a technician diploma or from the Aerospace Manufacturing Engineering Technology with an advanced diploma after completing of three years of study.

Canada's aerospace industry provides opportunities for enthusiastic individuals to pursue a career with a difference. A career in the aerospace industry is extremely rewarding, offering motivated individuals the opportunity to work in a productive team environment. The Aerospace Manufacturing Program at Confederation College has been developed in consultation with Canada's leading aerospace companies and teaches the student the diverse skills required to function effectively in a modern manufacturing environment. This recently renewed program is being offered at the Aviation Centre of Excellence of Confederation College, which is located at the Thunder Bay International Airport.

The design and manufacture of aerospace products requires the skills and inputs of many talented workers. An aerospace technologist works alongside engineers and shop floor personnel and will manage projects while resolving manufacturing problems as they arise.

Admission Requirements

- Ontario Secondary School Diploma (or equivalent) with courses from the College (C), University (U), University/College (U/C), or Open (O) preparation levels.
- or successful completion of the Mature Student Assessment.
- or appropriate credits from Academic and Career Entrance.

- Grade 12 English (College or University Preparation)
- Grade 11 MCF3M Functions and Applications **or** MCR3U Functions **or** Grade 12 MAP4C Foundations for College Math **or** MCT4C Mathematics for College Technology **or** University Preparation.

Applicants lacking Mathematics requirements might consider our Pre-Technology program, which will provide the necessary preparation to enter a Technology program.

FIRST SEMESTER

Course Number	Title	Credits
CS 007	Persuasive Writing	3
MA 115	Applied Mathematics for Technology I	4
MC 155	Microsoft Office 2007 Applications	3
TM 107	Physical Science for Aerospace & Mechanical Engineering	3
TM 111	Graphics Communication I	3
TM 121	Metal Fabrication Methods	3
TM 136	Machine Shop I	4
	Total	**23**

SECOND SEMESTER

Course Number	Title	Credits
CS 219	Communications for Technology	3
MA 215	Applied Mathematics for Technology II	4
TM 207	Statics	3
TM 211	Graphics Communication II	3
TM 221	Aircraft Assembly Techniques Methods I	3
TM 236	Machine Shop II	3
TM 241	Computer Aided Design (CATIA)	3
	General Education Elective	3
	Total	**25**

THIRD SEMESTER

Course Number	Title	Credits
TM 313	Strength of Materials	3
TM 321	Aircraft Assembly Methods II	3
TM 333	Chemistry of Metals, Polymers and Ceramics	3
TM 336	CNC Programming and Metal Cutting Theory	3
TM 346	Joining Processes	3
TM 347	Tool Design I	3
GE 569	Energy and Environmental Issues in an Industrial World	3
	Total	**21**

FOURTH SEMESTER

Course Number	Title	Credits
MA 315	Applied Math for Tech III	4

Course Number	Title	Credits
TM 436	CNC Programming	3
TM 443	Manufacturing Processes	3
TM 447	Tool Design II	3
TM 452	Metallurgy and Materials Testing	3
TM 453	Composites I	3
GE ...	General Education Elective	3
	Total	**22**

FIFTH SEMESTER

Course Number	Title	Credits
TM 526	Machine Design	3
TM 527	Introduction to Operations Management	3
TM 531	Fluid Mechanics	3
TM 539	Statistical Process Control	3
TM 552	Advanced Materials	3
	Total	**15**

SIXTH SEMESTER

Course Number	Title	Credits
TM 611	Operations Research	3
TM 626	Automated Systems Design	4
TM 628	Applied Operations Management	3
TM 651	Applied Project	2
TM 653	Composites II	3
	Total	**15**

Course Descriptions

Persuasive Writing

CS007

With a thematic focus on current issues, this course will help learners to express themselves clearly, correctly and persuasively in written form. Learners will also engage in analytical reading and critical thinking through assigned readings and discussions on a variety of topics. The course will also help learners to effectively compile and present research in essay form according to the APA style of documentation.

Communications for Technology

CS219

This course emphasizes the importance of oral communication in an industrial and business setting. In Communications For Technology, students use group methods to apply problem-solving techniques and team building skills. Students use computer-assisted methods for researching, writing and presenting their technical data in a clear and concise manner.

Energy and Environmental Issues in an Industrial World

GE569

This course will provide an overview of forms of energy, power generation, demands, limitations and conservation, as well as the moral, ethical and legal challenges facing society in a global industrialized economy.

Applied Mathematics for Technology I

MA115

This course is designed to emphasize the secondary school mathematics required for entrance into a post-secondary technology program at a community college level. Students will have the opportunity to further develop mathematical problem solving techniques as applied to the different technical areas. After successful completion of this course, the student will be able to solve applications involving numeracy, measurement and units, basic geometry and basic algebra. Successful completion of this course (minimum C grade) and MA 215 (minimum C grade) is an equivalent credit to the first semester technology mathematics course, MA 131.

Applied Mathematics for Technology II

MA215

This course is designed to emphasize the secondary school mathematics required for entrance into a post-secondary technology program at a community college level. Students will have the opportunity to further develop mathematical problem solving techniques as applied to the different technical areas. After successful completion of this course, the student will be able to solve applications involving basic algebra, graphing, geometry, trigonometry and vectors. Successful completion of MA115 (minimum C grade), the prerequisite for this course, and this course (minimum C grade) is an equivalent credit to the first semester technology mathematics course, MA131.

Microsoft Office 2007 Applications

MC155

This course introduces students to the use of Microsoft Office 2010 applications. Specifically, students will use basic and intermediate features of, Microsoft Word, Excel and PowerPoint to perform tasks commonly encountered in the workplace. A portion of this class will be independent study. Students must have access to a computer with Windows XP or greater and Microsoft Office 2010.

Physical Science for Aerospace & Mechanical Engineering

TM107

This course introduces the student to various concepts of physics as related to Aerospace Engineering and Mechanical Engineering. The student will be introduced to Newton's laws of motion, vectors, material properties, fluid properties, electrical fundamentals and laboratory test equipment used to measure the results of related experiments.

Graphics Communication I

TM111

This course introduces the student to the fundamentals of technical drawing. Sketching techniques, applied geometry, orthographic projection, drawing layout, sections/conventions along with dimensioning principles will be used to produce hand drawn sketches and simple working drawings for the manufacturing workplace.

Metal Fabrication Methods

TM121

This course introduces the student to basic workshop skills and sheet metal fabrication. Shop safety, blue print reading, layout techniques, materials handling and processing, use of hand tools, compilation of work orders and simple process plans will be topics of focus.

Machine Shop I

TM136

This course introduces the student to measuring instruments, hand tools and powered machine tools commonly found in a machine shop.

Statics

TM207

This course provides an introduction to the solution of force systems that act on rigid bodies.

Graphics Communication II

TM211

This course introduces the student to the more advanced principles and techniques of Technical Drawing. The use of advanced Dimensioning and Tolerancing Principles, Limits and Fits, Auxiliary Views, Welding Conventions, Thread Conventions and GD&T will be used to compile detail and working drawings.

Aircraft Assembly Techniques Methods I

TM221

This course introduces the student to intermediate level fabrication and assembly procedures for Sheet Metal components using Aircraft Standards. Topics of focus include an introduction to Assembly Tooling, the use of advanced Material Processing techniques, and Process Planning Procedures using the computer as a tool.

Machine Shop II

TM236

This course continues to improve the student's understanding and skill in the use of powered machine shop equipment, including lathes, milling machines, drilling machines and grinding machines.

Computer Aided Design (CATIA)

TM241

This course provides an introduction to Catia Cad/Cam software that will be used to develop computerized solid models, part assemblies and engineering drawings as used in the Aerospace and Manufacturing industries.

Strength of Materials

TM313

This course will introduce the student to the effect of forces acting on rigid bodies and the bodies' ability to resist these forces. Students will examine various structural members and jointed connections to determine their applicable strength characteristics.

Aircraft Assembly Methods II

TM321

This course introduces the student to the more advanced Fabrication, Assembly and Planning procedures for aircraft components. Working in teams, students will focus on Advanced Assembly Processes, Advanced Tooling Processes, Change Management principles and Configuration Control.

Chemistry of Metals, Polymers and Ceramics

TM333

This introductory chemistry course introduces the student to the periodic table, chemical bonding and molecular structure as an aid to explaining the composition and behaviour of metals, polymers and ceramics used in the aerospace industry.

CNC Programming and Metal Cutting Theory

TM336

This course is an introduction to CNC machines and manual programming techniques. Metal cutting theory including cutting forces, machining power requirements and control of surface finish will be studied.

Joining Processes

TM346

This course introduces the student to the wide spectrum of Joining Processes used in manufacturing. Gathering Information for process selection and presenting a case by case study of joining processes for specific applications will be the focus.

Tool Design I

TM347

This course introduces the student to the basic principles and applications of Tool Design. Using 3D CAD drafting (CATIA) students will focus on designing simple Jigs and Fixtures for the manufacturing workplace. Estimating Tool Cost, Locating, Supporting and Clamping along with Jig and Fixture construction principles will be topics of focus.

CNC Programming

TM436

This course is an introduction to computer aided CNC programming. Complex tool paths will be created with the aid of CAD/Cam software including CATIA machinist and ICAM CNC post processor.

Manufacturing Processes

TM443

This course introduces the students to the wide spectrum of manufacturing processes. Students will focus on honing their research and presentation skills while gathering information needed for selection, proof and specification of materials and processes for product design and manufacture.

Tool Design II

TM447

This course will introduce the student to the more advanced principles and applications of Tool Design. Using 3D CAD drafting (CATIA) students will focus on designing the more advanced tools used for manufacturing. Welding jigs and fixtures, progressive pierce blank and form dies, large assembly fixturing and master modeling will be topics of focus, along with more advanced economic evaluations of tooling.

Metallurgy and Materials Testing

TM452

The students will continue a study of metallic materials. The emphasis is placed on those materials used in the aerospace industry, properties, treatment and testing of light alloys and exotic material. Students are also introduced to quality control and inspection techniques as applied to the exacting requirements of the aerospace industry. Students will focus on the hands-on use of inspection principles including destructive and non-destructive testing (NDT) equipment.

Composites I

TM453

This course will expose the student to an overview of the manufacture of non-metallic structures. A basic understanding of composite materials technology, fiber/resin properties, lay-up and cure procedures, tooling concepts, process planning and materials handling concepts for advanced composite components and structures will be the focus.

Machine Design

TM526

This course will utilize the principles of strength of materials and beam theory to design machine elements, structures and components common to the aerospace manufacturing industry. Topics will include three dimensional force system analysis, beam and column design, combined stresses, static and dynamic friction analysis and machine efficiency.

Introduction to Operations Management

TM527

This course focuses on all aspects of careful management of the processes used to produce and distribute products and services. It will examine the concepts and techniques used to solve complex problems in areas such as inventory management, forecasting, and project management. This course includes substantial analysis of internal processes to determine efficiency and effectiveness of the management process.

Fluid Mechanics

TM531

This course will introduce the student to static and dynamic fluid properties. Pascal's law, Bernoulli's principle, Reynold's number and other concepts will be introduced. Simple industrial fluid power circuits using hydraulics and pneumatics will be designed in class and then tested in a laboratory setting.

Statistical Process Control

TM539

This course introduces fundamental concepts of statistical process control and the application of these concepts to issues arising in the Aerospace industry. It examines the practical application of quality principles. Emphasis is placed on the interpretation, understanding and use of quality principles and concepts throughout the problem solving process.

Advanced Materials

TM552

The objective of this course is to familiarize students with various types of engineering alloys and their application in the aerospace industry, so that they will be able to make better decisions for materials selection for engineering designs. The course will also provide some understanding of metallurgical structures, various heat treatment processes and how they relate to mechanical properties of alloys.

Operations Research

TM611

Operations research is applied to problems that concern how to conduct and coordinate the activities within an organization. The process begins by carefully observing and formulating the problem, including gathering all relevant data. The next step is to construct a model and obtain suitable solutions using mathematical techniques. This course introduces fundamental concepts of operations research and the application of these concepts to the issues arising in aerospace manufacturing.

Automated Systems Design

TM626

This course builds on the engineering and design skills acquired in earlier courses. Students will apply sound design concepts to design a working automatic system that will meet prescribed performance criteria. Hands-on lab work will reinforce the concepts presented in class. Team work is emphasized.

Applied Operations Management

TM628

Operations Management is responsible for orchestrating all resources needed to the final product. This includes designing the product, deciding what resources are needed, arranging schedules, equipment and facilities, designing the jobs to make the product and designing the work methods. Basically, operations management is responsible for all aspects of the process of transforming inputs into outputs. This course introduces the concepts of operations management and the application of these concepts to the issues arising in the aerospace industry.

Applied Project

TM651

The course introduces the students to relevant topics, not necessarily covered in the program, through independent research and study. The course is also aimed at improving the student's written and oral communication skills, research skills, and project management skills.

Composites II

TM653

This course will expand on the skills attained in TM 453, Introduction to Composites. Utilizing concepts learned in Computer Aided Design and Introductory Composites, the student will design, build and test suitable composite structures in a team/laboratory setting. Industry standard materials and procedures will be used to complete the project work.
