Course Descriptions - Mechanical Engineering Technician

Semester 1 - 26 hours

CS 007 Persuasive Writing
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.

MX 121 Mechanical Practices
The student will demonstrate safe and proper use of hand and power tools such as drill presses and grinding machines. The learner will be exposed to safe hoisting and rigging, layout methods, fasteners, the evolution of tools (with an emphasis to Northern Ontario) and rope use and care. Trade calculations and relevant shop projects will be included.

MX 131 Machine Shop I
Machine Shop safety and procedures will be applied, as well as precision measurements and accurate trade calculations, layout tools and techniques, safe and proper use of lathes and milling machines, and vertical and horizontal band saws.

MX 111 Engineering Graphics
Designed to provide students with basic fundamentals of drafting and related numerical applications, line work, scales, orthographic projections, dimensioning; as well as, to understand blueprint reading and drawing interpretation.

MX 141 Welding Practices I
Students are introduced to safe soldering methods (hard and soft) solders, safe welding procedures in both oxyacetylene and manual arc welding, application and selection of electrodes, types and applications of structural steels, pipes and tubing, various weld layouts and fastening, techniques used in flat and horizontal welding for both manual arc welding and gas metal arc welding.

MA 115 Applied Math for Technology 1
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, algebra, simple equations, inequalities, ratio and variation. 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 133.

SC 110 Pre-Tech Physics I
This course is designed to develop an understanding of fundamental concepts and applications in basic mechanics. After successful completion of this course, the student will be able to solve problems involving motion, forces, momentum, work and energy. Vectors will be introduced at a conceptual level. This course also provides the student with the basis for student success in subsequent mathematically oriented physics courses. SC110 is suitable for anyone wishing to review basic scientific concepts and problem-solving skills prior to entering a specific technology or trades program. Successful completion of this course (minimum C grade) and SC210 (minimum C grade) is a credit to the first semester technology science course, PH 210.

MC 165 Microsoft Office
This course introduces students to the use of Microsoft Office 2016 applications and Windows 10. Specifically, students will use introductory features of Windows 10, Microsoft Word 2016, Excel 2016 and PowerPoint 2016 to perform tasks commonly expected in the workplace. The lectures are delivered in a

laboratory environment using textbook exercises and assignments. Home assignments will require the learner to acquire the MS Office suite of programs in order to complete and submit their assignments.

Semester 2 - 27 hours

MX 231 Machine Shop II

This subject covers machining techniques using milling machines as well as lathe techniques, tool set-ups and sequencing of machine operations. The selection of work-holding devices are reviewed. Machining of non-ferrous metals, alloy and hardened steels are performed.

MX 241 Welding Practices II

The student is introduced to safe welding procedures in manual arc welding methods, application and selection of electrodes for position welding, identification of ferrous and non-ferrous metals, steel numbering system, types and uses of sheet and structural steels, uses of various fastening methods used in steel and sheet metal fabrication, techniques in vertical position. Students will also be introduced to gas metal arc welding procedures in a fabrication set-up.

GE General Elective

MX 261 Power Transmission I

This subject allows the student to understand basic installation blueprints for machinery layout, levelling and coupling alignment. Students will be able to apply mathematical concepts relative to layout methods, identify couplings, shafts and keys, and examine the various types of fasteners, various types of bearings, lubrication and seals.

MX 271 Industrial Design II

The goal of this course is to teach students how to use the SolidWorks mechanical design automation software to build parametric models of parts and assemblies and how to make simple drawings. The course is designed around a process or task based approach to training. By utilizing case studies to illustrate these processes, you will learn the necessary commands, options and menus in completing a task.

MA 215 Applied Math for Technology II

This course is a continuation of its pre-requisite course MA115. Students will 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 factoring, algebraic fractions, functions, graphing, geometry, trigonometry and vectors. Successful completion of MA115 (minimum C grade), and this course (minimum C grade) is an equivalent credit to the first semester technology mathematics course, MA133.

SC 210 Pre-Tech Physics II

This course is a continuation of SC110 and it is designed to develop a further understanding of concepts and applications in basic mechanics. After successful completion of this course, the student will be able to solve problems involving vectors with the use of right angle trigonometry, concurrent and parallel forces, torque, rotational motion, simple machines, and fluid mechanics. This course also provides the student with the basis for student success in subsequent mathematically oriented physics courses. Along with SC110, SC210 is suitable for anyone wishing to review basic scientific concepts and problem-solving skills prior to entering a specific technology or trades program. Successful completion of this course (minimum C grade) and SC110 (minimum C grade) is a credit to the first year technology science course, PH210.

MX 460 Introduction to Electricity

This course is designed to introduce and develop basic knowledge of Electrical Theory and safe practices. It presents an overview of electrical instruments, devices, principles, operation, theory and controls of industrial use.

Semester 3 - 24 hours
MX 371 Industrial Design II
The first part of this course introduces students to the techniques involved in producing drawings by computer. The students gain basic knowledge in selecting menu items to create and edit a drawing and set the parameters necessary to produce the desired plotted output.

MX 381 Fluid Power
The student will learn the basic characteristics of fluids and the laws regarding pressure, force, fluid/air flow, hydrostatics and hydrodynamics. Hydraulic and pneumatic components will be examined, including reservoirs, pumps, filters, control valves and accumulators. Symbols, circuit interpretation, trouble shooting, installation and maintenance of systems will also be covered.

MX 361 Power Transmission II
This course is a system approach to industrial drive components that includes couplings, sprockets, chain drives, belt drives, gear drives, clutches and brakes. The student will also explore the trouble shooting and diagnosing equipment.

MX 301 Statics
This physical science course introduces the learner to a branch of Mechanics that deals with the state of rest of bodies under the action of external forces. This first Mechanics course; of a series, forms the foundation for most engineering principles and is an indispensable prerequisite to any technical analysis and design. In this course, the learner will examine in detail the relationship of the equilibrium of rigid bodies subjected to external forces. This concept forms the basis of the expression of Newton?s 3rd Law: ?For every action, there is an equal and opposite reaction?. Newton?s other Laws of Mechanics will also be applied.

MX 341 Strength of Materials
This course forms the second of a series of courses that introduces the student to Mechanics, a general science dealing with bodies subjected to forces. Statics deals with the Mechanics of Forces, whereas this course deals with the Mechanics of Materials. Through this field of study, the learner will examine the behaviours that loaded objects in equilibrium go through, depending on their type of material. This is a microscopic view of what is happening within the object due to external forces distributed internally, creating a cross-sectional phenomenon called stress. The course also examines how the object or structure reacts, resulting in another dimensional change called strain. This course will further expand the learner?s awareness to analyze complex structures and introduce other concepts of Advanced Structural Design.

CS 219 Communications for Technology
This course emphasizes the importance of oral and written communication in an industrial and business setting. In Communications for Technology, students will work on independent and group projects and apply problem-solving techniques to develop both their individual and team building skills. Students will apply computer-technology and a variety of resources for researching, writing and presenting technical data into a clear and concise format.

GE General Elective

MA 231 Mathematics II
This mathematics course continues from where its prerequisite, MA133, ends. Much of the content continues to review further fundamental concepts and skills necessary for a wide range of technology programs. Topics covered include: complex numbers; radian measure; sine and cosine graphs; trigonometric identities and equations; special algebraic products and factoring; algebraic fractions; quadratic equations; exponents; radicals; and exponential and logarithmic functions.

Semester 4 - 22 hours
MX 481 Fluid Mechanics

This course is an introduction to fluids, their properties, and coherent units of measurement. Pressure, vapour pressure, vacuum, and Pascal's Law will be studied with an emphasis on pressure measuring devices. Buoyance, Bernoulli's equation, flow of fluids, velocity and flow measuring instruments will also be explored.

MX 475 Advanced Structural Design
This course completes the introductory concepts of Statics and Strength of Materials. The course will allow the student to examine a structural assembly in order to design structural and machine components to withstand applicable loadings by applying the appropriate principles and associated formulae.

GE General Elective

MA 331 Mathematics III
In this intermediate technical mathematics course, students will solve problems involving the conic sections and the fundamental principles of calculus. The course content explores concepts and skills necessary for a wide range of technology programs. Course competencies include: analytical geometry of the conic sections and applications; curve sketching and use of equations in rectangular and polar forms; binomial expansion; limits for functions; meaning of the derivative; derivatives and applications; and introductory integration.

MX 431 Introduction to CNC
This course is an introduction to CNC machines and manual and software programing techniques. This course will also include an introduction to CNC part production, tooling and fixtures. Solid Works will be used in this course to assist in CNC projects and assignments.

MX 471 Power Transmissions III
In this course students will continue to build on their knowledge using technical and manufactureres manuals in rebuilding and maintaining various equipment and techniques not covered under Power Transmission one and two. Equipment includes items such as laser alignments, material handling, prime movers, pumps, compressors, and fans.

MX 410 Introduction to Thermodynamics
The object of this course is to give the students destined for the mechanical trades an introduction to thermodynamics. This course covers temperature, pressure, volume relationships for gasses specific heat, the relationship between heat and work, heat engines, and heat transfer.