

Mechanisms

Mechanical and Transportation Technology

Course Number: ELN9206	Contribution to Program: Vocational	Normative Hours: 30
Applicable Program(s): 0550X01FWO EME Technician - Robotics	AAL: 4	Core/Elective: Core
Prepared by: Stephen Ryan Coordinator/EMET-Robotics		Approval Date: 15/06/2012
Co-Requisites N/A		Approved by: Misheck Mwaba, PhD., P.Eng. Chair, Mechanical & Transportation Technology
Pre-Requisites N/A		Approved for Academic Year: 2012-2013

COURSE DESCRIPTION

Students are exposed to a variety of mechanical components found in almost all machines. These components include bearings, seals, shafts and keys, couplings, brakes, and clutches and threaded fasteners. Types of friction and lubrication are introduced.

RELATIONSHIP TO VOCATIONAL LEARNING OUTCOMES

This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

EME Technician - Robotics 0550X01FWO

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| 2 | Interpret and produce electrical, electronic, and mechanical drawings and other related documents and graphics to appropriate engineering standards.(A,CP) |
| 6 | Assist in the specification of manufacturing materials, processes, and operations to support the design and production of mechanical components.(T,A,CP) |
| 10 | Maintain and troubleshoot automated equipment including robotic systems.(T,CP) |
| 12 | Select for purchase electromechanical equipment, components, and systems that fulfill the job requirements and functional specifications.(T,A) |

T: Teach **A:** Assess **CP:** Culminating Performance

ESSENTIAL EMPLOYABILITY SKILLS

The course contributes to your program by helping you achieve the following Essential Employability Skills:

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| 6 | Locate, select, organize and document information using appropriate technology and information systems.(T,A,CP) |
| 7 | Analyze, evaluate and apply relevant information from a variety of sources.(T,A,CP) |
| 10 | Manage the use of time and other resources to complete projects.(CP) |
| 11 | Take responsibility for one's own actions, decisions and consequences.(A,CP) |

T: Teach **A:** Assess **CP:** Culminating Performance

COURSE LEARNING REQUIREMENTS/EMBEDDED KNOWLEDGE AND SKILLS

COURSE LEARNING REQUIREMENTS When you have earned credit for this course, you will have demonstrated the ability to:	EMBEDDED KNOWLEDGE AND SKILLS
1. Understand Fasteners	<ul style="list-style-type: none"> 1 Awareness of the evolution of standardization relating to fasteners. 1 Identification of the parts of a screw head, including the helix, root, crest, pitch and thread angle. 1 Compare the advantages and disadvantages between coarse vs. fine threads. 1 Interpret fastener specifications, for metric and SAE bolts.

	<ul style="list-style-type: none"> 1 Recognize common industrial threaded-type fasteners. 1 Awareness of the common methods used to remove a damaged fastener
2. Investigate the types of friction and lubricants. Evaluate suitability of lubricants to control friction.	<ul style="list-style-type: none"> 1 Awareness of the role that lubricants play in the reduction of friction, the prevention of wear and corrosion and to protect against contamination 1 Understand how lubricants work and be aware of the roles that additives and inhibitors play in factors such as viscosity, temperature, shearing etc. 1 Analyze an application and correctly determine whether grease or oil is the best choice of lubricant. 1 Recognize various methods of lubricant application.
3. Explain the differences between friction and antifriction bearings and how they are maintained.	<ul style="list-style-type: none"> 1 Understand the role that bearings play in the reduction of friction. 1 Describe the two basic categories of bearings. 1 Explain why bearings need lubrication. 1 Understand the importance of choosing a suitable bearing type to suit radial, axial or combinational load applications. 1 Understand the function of bearing seals. 1 Describe the common methods to install and troubleshoot industrial bearings.
4. For any given application, identify the appropriate seal, and provide rationale for the choice.	<ul style="list-style-type: none"> 1 Describe different types of seals. 1 Based on specific criteria, choose either a dynamic or static sealing. 1 Describe and explain the role of a gasket when assembling a machine part. 1 Describe and know the application for a stuffing box. 1 Knowledge of the differences between mechanical seals and packing seals.
5. Determine the principles of belt drive operation.	<ul style="list-style-type: none"> 1 Understand the theory of belt drive power transmission. 1 Knowledge of the difference between friction drive and positive drive belts. 1 Identify belt sizing and type by coding on belt. 1 Awareness of the importance of tension and alignment of belts to pulleys in replacement or overhaul.
6. Understand the use of different types of couplings.	<ul style="list-style-type: none"> 1 Comprehend the principle of connecting rotating shafts through the use of couplings. 1 Identify and know the advantages and disadvantages of commonly used industrial couplings. 1 Identify the class and individual parts of a coupling. 1 Determine and identify the different types of misalignment.
7. Understand the use of different types of clutches and brakes.	<ul style="list-style-type: none"> 1 Appreciate the differences of clutches and brakes. 1 Identify and describe common types, operation and application of clutches. 1 Familiarization with basic maintenance and troubleshooting methods for clutches and brakes.

LEARNING RESOURCES

Industrial Mechanics and Maintenance/Larry Chastain.-3rd edition. ISBN-13: 978-0-13-515096-2

Various types of online sources (refer to Blackboard and the CSI for specifics)

LEARNING ACTIVITIES

During this course, you are likely to experience the following learning activities:

On-line exercises

Internet research

Online quizzes and tests for each of the seven course learning requirements.

EVALUATION/EARNING CREDIT

The following will provide evidence of your learning achievements:	This activity validates the following Course Learning Requirements and/or Essential Employability Skills:
<p>There are seven online quizzes, one for each of the CLRs. They are based on various online information sources. Each quiz is worth 6% for a total of 42% of your final mark.</p> <p>There are also seven online tests, one for each of the CLRs. They are based on your textbook readings. Each test is worth approximately 8.3% for a total of 58% of your final mark.</p>	<ul style="list-style-type: none"> 1 Understand the use of different types of couplings. - [CLR 6] 1 Understand Fasteners - [CLR 1] 1 Investigate the types of friction and lubricants. Evaluate suitability of lubricants to control friction. - [CLR 2] 1 Explain the differences between friction and antifriction bearings and how they are maintained. - [CLR 3] 1 For any given application, identify the appropriate seal, and provide rationale for the choice. - [CLR 4] 1 Determine the principles of belt drive operation. - [CLR 5] 1 Understand the use of different types of clutches and brakes. - [CLR 7] 1 Take responsibility for one's own actions, decisions and consequences. - [EES 11] 1 Manage the use of time and other resources to complete projects. - [EES 10] 1 Locate, select, organize and document information using appropriate technology and information systems. - [EES 6] 1 Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7]

COLLEGE GRADING NUMERICAL EQUIVALENT TABLE

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90-100%	4.0	C+	67-69%	2.3
A	85-89%	3.8	C	63-66%	2.0
A-	80-84%	3.6	C-	60-62%	1.7
B+	77-79%	3.3	D+	57-59%	1.4
B	73-76%	3.0	D	53-56%	1.2
B-	70-72%	2.7	D-	50-52%	1.0
			F	0-49%	0
			FSP	0	0

OTHER COURSE INFORMATION

Students are required to respect the confidentiality of employer, client and/or patient information, interactions, and practices that occur either on Algonquin College premises, or at an affiliated clinical/field/co-op placement site. Concerns regarding clients, patients, and/or employer practices are to be brought to the attention of the program coordinator, or designated field/clinical/co-op placement supervisor so that they may be resolved collaboratively. Such concerns are not to be raised publicly either verbally, in writing, or in electronic forums. These matters are to be addressed through established program communication pathways.

PRIOR LEARNING ASSESSMENT AND RECOGNITION

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- 1 Portfolio

- 1 Challenge Exam
- 1 Performance Test
- 1 Project/Assignment

RELATED INFORMATION

The following information is course-specific:

As this course is totally "on-line" learning in nature, communication with the professor is crucial. Bb (BlackBoard) is the essential means of communication. The student must ensure that they are aware of the time constraints to complete the online evaluation quizzes and tests. The evaluation tools will only be available on specific dates at set times.

The following information is school/department-specific:

GENERAL CLAUSES - School of Advanced Technology

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether towards a professor or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policy - HR22.

Harassment means one or a series of vexatious comment(s) or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/ unwanted, offensive, intimidating, derogatory or hostile.

This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, academic penalties, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

The Use of Electronic Devices, with the sound turned on, during classes is strictly prohibited. In particular, cell phones are not to be used to communicate during a class. The use of any electronic devices during exams and mid-term tests, other than those sanctioned by the faculty in charge of the examination, is strictly prohibited.

Anyone caught using a prohibited device will be considered to have plagiarized, and will be treated as such in accordance with College Plagiarism Policy. For further details on this directive, consult the Algonquin College Policy AA32 on the use of Electronic Devices in Class and Exams.

The School of Advanced Technology' s Standard Operating Procedure on Plagiarism and Academic Honesty defines plagiarism as an attempt to use or pass off as one's own idea or product, work of another without giving credit. Plagiarism has occurred in instances where a student either directly copies another person's work without acknowledgement; or, closely paraphrases the equivalent of a short paragraph or more without acknowledgement; or, borrows, without acknowledgement, any ideas in a clear and recognizable form in such a way as to present them as one's own thought, where such ideas, if they were the student's own would contribute to the merit of his or her own work.

Plagiarism is one of the most serious academic offenses a student can commit. Anyone found guilty will, on the first offense, be given a written warning and an F on the plagiarized work. If the student commits a second offense, an F will be given for the course along with a written warning. A third offense will result in suspension from the program and/or the college.

For further details on this directive, consult the Algonquin College Policy - AA20 and the School of Advanced Technology' s Standard Operating Procedure on Plagiarism and Academic Dishonesty.

Respect for Confidentiality

Students are required to respect the confidentiality of employer, client and/or patient information, interactions, and practices that occur either on AlgonquinCollege premises, or at an affiliated clinical/field/co-op placement site. Concerns regarding clients, patients, and/or employer practices are to be brought to the attention of the program coordinator, or designated field/clinical/co-op placement supervisor so that they may be resolved collaboratively. Such concerns are not to be raised publically either verbally, in writing, or in electronic forums. These matters are to be addressed through established program communication pathways

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well-being of other members of the College community. It will not be tolerated.

Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make very effort to protect that right.

Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold hearings to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details consult the Algonquin College Policy - SA07.

June 15, 2012

The following information is College-wide:**Email**

Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

Centre for Students with Disabilities (CSD)

If you are a student with a disability, it is strongly recommended that you identify your needs to the professor and the Centre for Students with Disabilities (CSD) by the end of the first month of the semester in order that any necessary support services can be arranged for you.

Academic Integrity* & Plagiarism*

Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18 <http://www2.algonquincollege.com/directives/files/2012/04/AA18.pdf> and AA20 <http://www2.algonquincollege.com/directives/files/2011/08/AA20.pdf>

Student Course Feedback*

It is Algonquin College's policy to give students the opportunity to complete a course assessment survey in each course that they take which solicits their views regarding the curriculum, the professor and the facilities. For further details consult Algonquin College Policy AA25 <http://www2.algonquincollege.com/directives/files/2011/10/AA25.pdf>

Use of Electronic Devices in Class*

With the proliferation of small, personal electronic devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32 <http://www2.algonquincollege.com/directives/files/2011/11/AA32.pdf>

Transfer of Credit

Students, it is your responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

* College policies (previously called directives) are under review and redesign. The term *directives* is being retired. As such, the policy classification nomenclature is in transition. Students, it is your responsibility to refer to the Algonquin College Directives/Policies website for the most current information available at: (<http://www2.algonquincollege.com/directives/>)