COURSE OUTLINE: MCH257 - MACHINE TECHNOLOGY

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Course Code: Title	MCH257: MACHINE TECHNOLOGY
Program Number: Name	4039: MECH. ENG. TN-MANUFA
Department:	MECHANICAL TECHNIQUES PS
Academic Year:	2024-2025
Course Description:	This course will deal with Material Handling Systems, Prime Movers Pollution control and Wind power generation. Specific Materials Handling topics covered will include, belt, bucket, screw, pneumatic, roller, chain, apron, slurry, and food handling conveyors. Specific Prime Mover topics will include various combustion engines, Gas and steam turbines, with mention to fans, blowers and electric motors. Specific pollution control will include Treatment systems for Water and Air, collectors and precipitators. Specific Wind energy topics include a breakdown of each component required to produce energy using a wind turbine.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4039 - MECH. ENG. TN-MANUFA** VLO 1 Complete all work in compliance with current legislation, standards, regulations and guidelines. VLO 2 Apply quality control and quality assurance procedures to meet organizational standards and requirements. VLO 4 Apply sustainability best practices in workplaces. VLO 5 Use current and emerging technologies to support the implementation of mechanical engineering projects. VLO 7 Interpret, prepare and modify mechanical engineering drawings and other related technical documents. VLO 8 Contribute to the design and the analysis of mechanical components, processes and systems applying fundamentals of mechanical engineering. VLO 10 Verify the specifications of materials, processes and operations to support the design and production of mechanical components. VLO 11 Contribute to the planning, implementation and evaluation of projects. VLO 12 Develop strategies for ongoing personal and professional development to enhance work performance.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.

	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail) 49% and below 0.00 CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar`s office. W Student has withdrawn from the course without academic penalty.
Books and Required Resources:	Millwright Manual Publisher: Queen`s Printer Government Publication Services Edition: 2nd ISBN: 0-7718-9473-2 Millwright Manual Study Guide by Ronald A. Fournie Publisher: Ministry of Finance ISBN: 7960003066
Course Outcomes and Learning Objectives:	

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Select a Belt Conveyor for the correct application.	Potential Elements of the Performance: 1.1 Apply various types of belts used for conveyors

	1.2 Apply belt repair practices commonly used 1.3 Classify various parts and accessories of a conveyor system 1.4 Select the correct style of Belt take-up to be used 1.5 Explore the various Drive styles used 1.6 Document belt inspections, maintenance and other repairs
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Select a Bucket, Screw or Roller systems	Potential Elements of the Performance: 2.1 Identify the various types of bucket elevators used 2.2 Identify the bucket elevator components 2.3 Identify the various Screw conveyor components 2.4 Explore drive assemblies and shaft couplings for conveyors 2.5 Identify screw conveyor designations 2.6 Explain gravity roller conveyors 2.7 Explain live roller conveyors 2.8 Classify roller conveyor components
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Select Pneumatic conveyors(including fans and blowers)	Potential Elements of the Performance: 3.1 Identify the different vacuum conveying systems 3.2 Explain Low, Medium and High Pressure conveying systems 3.3 Compare combination vacuum-pressure conveyor systems 3.4 Explain air-slide gravity conveying systems 3.5 Classify centrifugal blowers and fans
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Explain various styles of conveyors and material handling systems including, but not limited to apron feeders, chain conveyors and food handling conveyors.	Potential Elements of the Performance: 4.1 Classify conveyors with various types of supports, styles of buckets, chains, components, bearings, belting for different applications 4.3 Explain transfer tables and other means of changing direction of material flow
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5.Analyze Internal combustion engines	Potential Elements of the Performance: 5.1 Identify Diesel, Gas and High-compression engines 5.2 Explain Four-stroke engine design 5.3 Explain Two-stroke engine design 5.4 Explore the thermodynamic cycles 5.5 Apply maintenance procedures to each style of engine
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Classify AC and DC motors	Potential Elements of the Performance: 6.1 Identify major motor components 6.2 Explain AC motors 6.3 Explain single and three phase 6.4 Explain DC motors 6.5 Classify various windings
Course Outcome 7	**Learning Objectives for Course Outcome 7**

7. Explore Steam turbines and their uses in industry, their components and principles of operation.	Potential Elements of the Performance: 7.1 Explain principle of operation 7.2 Identify various Castings and flows 7.3 Explain back-pressure, and condensing turbines 7.4 Identify and explain each functioning component 7.5 Recognize thermodynamic principles across the turbine 7.6 Analyze the need for the Pre-start up procedure
Course Outcome 8	**Learning Objectives for Course Outcome 8**
8.Explore Gas turbines and their uses in industry, their components and principles of operation.	Potential Elements of the Performance: 8.1 Explain principles of operation 8.2 Identify various types of gas turbines 8.3 Identify each component, control style and auxiliary system 8.4 Analyze the need for the Pre-start up procedure
Course Outcome 9	**Learning Objectives for Course Outcome 9**
9. Identify the correct type of Ventilation or Pollution Control system for use in industry	Potential Elements of the Performance: 9.1 Classify treatment systems for Water 9.2 Classify treatment systems for Air 9.3 Explain Cyclone principles 9.4 Explain Collectors and their differences 9.5 Explain Precipitators and their differences
Course Outcome 10	**Learning Objectives for Course Outcome 10**
10. Identify major components and Explain operating principles for a wind energy turbine.	Potential Elements of the Performance: 10.1 Identify and explain each functioning component 10.2 Explain principle of operation 10.3 Explain electrical power generation from a wind turbine 10.4 Apply maintenance procedures to each style of turbine
Course Outcome 11	**Learning Objectives for Course Outcome 11**
11. Develop ability to extract information and use manufacturer`s manuals	11.1 Examine and identify machine components & parts from drawings / sketches included in manufacturer`s installation and maintenance manuals. 11.2 Read and extract necessary information from manuals to order replacement parts. 11.3 Apply information from manuals to build, rebuild, install and maintain equipment to specifications.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Participation	20%
Tests (4)	80%

Date: August 19, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.