COURSE OUTLINE: MCH256 - INTRO THERMO DYNAMIC

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Course Code: Title	MCH256: INTRODUCTORY THERMO DYNAMICS
Program Number: Name	4039: MECH. ENG. TN-MANUFA
Department:	MECHANICAL TECHNIQUES PS
Academic Year:	2024-2025
Course Description:	The general objective of this course is to give students destined for the mechanical trades an introduction to thermodynamics. The course covers temperature, pressure, volume relationships for gases, specific heat, the relationship between heat and work, heat engines and heat transfer
Total Credits:	3
Hours/Week:	3
Total Hours:	45
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Substitutes:	MCH130
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 3 Comply with current health and safety legislation, as well as organizational practices and procedures. VLO 4 Apply sustainability best practices in workplaces. VLO 5 Use current and emerging technologies to support the implementation of mechanical engineering projects. VLO 6 Analyze and solve mechanical problems by applying mathematics and fundamentals of mechanical engineering. VLO 10 Verify the specifications of materials, processes and operations to support the design and production of mechanical components. 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.
General Education Themes:	Science and Technology
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:	Hand outs Hand outs provided by instructor

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Behavior of Gases	Potential Elements of the Performance: 1.1 Demonstrate an understanding of perfect gases under the following conditions: a. Constant temperature (Boyle`s Law) b. Constant volume (Charles Law) c. Constant pressure (Gay-Lussac`s Law) d. Varying temperature, volume and pressure (General Gas Law)

	e. Mixed gases (Dalton`s Law of Partial Pressures)
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Specific Heat	Potential Elements of the Performance: 2.1 Define and calculate specific heats under conditions of constant volume and constant pressure.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. 1st and 2nd Laws of Thermodynamics	Potential Elements of the Performance: 3.1 Explain the concept of heat 3.2 Explain the first and second law of thermodynamics to demonstrate an understanding of the relationship between heat, energy and work.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Work	Potential Elements of the Performance: 4.1 Calculate the work done under the following conditions: a. Constant pressure b. Constant Temperature c. Adiabatic expansion and compression d. Polytrophic Compression and expansion
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5. Practical Thermodynamic Cycle - Heat Engines	Potential Elements of the Performance: 5.1 Explain the concept of a heat engine. 5.2 Identify the application for each of the following thermodynamic cycles: a. Carnot b. Rankine c. Otto d. Diesel e. Brayton
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Heat Transfer	Potential Elements of the Performance: 6.1 Explain the concepts of heat transfer through conduction, convection and radiation. 6.2 Utilize the equations for heat transfer.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Tests	100%

Date: August 19, 2024

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