ABOUT THE PROGRAM
The wind energy industry is the fastest growing segment of new energy production. Employers seek skilled technicians for operation and maintenance activities in wind farms. There is also a demand for advanced technicians with U.S. and international wind turbine manufacturers; these include: installation technicians, quality control technicians, and warranty and commissioning technicians. Operation and maintenance positions generally remain with a given wind farm location; other technicians travel extensively with the construction of new wind farms and repair/retrofitting of wind turbines around the world.

PROGRAM OUTCOMES
• Install, inspect, test, service, and repair wind turbine components.
• Wear proper Personal Protection Equipment, identify hazards, mitigate said hazards, and safely climb towers.
• Cognitively think and use deductive reasoning as well as manufacturer information while troubleshooting or maintaining a wind turbine.
• Clearly and responsibly communicate appropriate information with stakeholders under minimal supervision.
• Practice the basics of self-evacuation and rescue.

CAREER AND EDUCATION ADVANCEMENT OPPORTUNITIES
LTC credits transfer to over 30 universities. For more information visit gotoltc.edu/future-students/transfer.

ADMISSION TO DO’S
• Work with Career Coach to:
  - Submit application and $30 fee.
  - Submit official transcripts (high school and other colleges).

PROGRAM TO DO’S
• Work with Academic Advisor to:
  - Complete an assessment for placement (Accuplacer or ACT).
  - Complete Technical Standards form.
  - Meet to plan your first semester schedule, review your entire plan of study, discuss placement assessment results and complete any additional enrollment requirements.

APPROXIMATE COSTS
• $136.50 per credit tuition (WI resident) plus $8.10 per credit student activity fee. $10 per credit online or hybrid fee. Material fee varies depending on course. Other fees vary by program. Visit gotoltc.edu/financial-aid/tuition-and-fees for details.

FINANCIAL AID
This program is eligible for financial aid. Visit gotoltc.edu/Financial-Aid or talk with your Career Coach about how to apply for aid.

SPECIAL NOTE
This program is an official shared program with students from FVTC, MPTC, and NWTC. Students attend electro-mechanical and general education classes at their local technical colleges. These students attend Wind Energy Technology specific courses at LTC in Cleveland and may graduate with both a degree from their respective colleges as well as a degree in Wind Energy Technology from LTC. LTC welcomes transfer students who are graduates of electro-mechanical and other energy-related programs. Interested transfer/dual-degree students are encouraged to contact the LTC program advisor at 920-693-1378.

CONTACT
LTC Career Coach
920.693.1162 • CareerCoach@gotoltc.edu

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AC FUNDAMENTALS... prepares student to analyze electrical circuits using AC math, analyze AC waveforms, measure and analyze AC power, analyze capacitors and inductors in DC and AC circuits, analyze AC circuits containing reactance and calculate resonance, apply the equation for power and perform troubleshooting circuits with transformer characteristics. PREREQUISITES: 10620105 DC Fundamentals or 10661015 DC Fundamentals.

COLLEGE TECHNICAL MATHEMATICS 1A... prepares student to solve linear, quadratic, and relational equations; graph; formula rearrangement; solve systems of equations; percent; proportions; and operations on polynomials. Emphasis on the application of skills to technical problems. REQUIRED: 10634110 Elem. Students w/ Apps or 1049107 College Math or 31457318 Ind Mtnc Trades Math or 31420320 Mach Tool Math or placement exam assmt equv.

D.C. FUNDAMENTALS... prepares student to convert values to scientific and engineering notations; calculate math quantities; describe basic atomic theory; identify basic electrical terms; use standard test equipment to describe DC voltage characteristics and current sources and electrical resistance; measure & analyze electrical quantities in series and parallel circuits; desolder/solder single lead components. COREQUISITE: 10804113 College Tech 1A or 10804115 College Tech 1.

ECONOMICS... provides the participant with an overview of how a market-oriented economic system operates, and it surveys the factors which influence national economic policy. Basic concepts and analyses are illustrated by reference to a variety of contemporary problems and public policy issues. Concepts include scarcity, resources, alternative economic systems, growth, supply and demand, monetary and fiscal policy, inflation, unemployment and global economic issues. COREQUISES: 10838105 Intro Reading & Study Skills or Reading placement assessment equivalent or CONDITION: 610052 AgBusiness/Financial Basic prog admets.

ELECTROMECHANICAL SYSTEMS... prepares the student to communicate with, tune, run, and troubleshoot Allen-Bradley servos; utilize electrical control of hydraulic systems, explore PID control of motor speed; and investigate open and closed loop control systems. PREREQUISITES: 10620104 Fluid Power 2 and 10661040 AC Fund C or 10661010 AC Fund C.

ENERGY AND POWER LAB... applies the laws and theories that govern motion and power and power generation to the design and operation of electric power generation and distribution and its relationship to the renewable energy industry. Various types of electric power systems are compared and contrasted. Solar Energy and its differing applications, including solar hot water and passive solar, are explored. Students will measure the output of a photovoltaic array and learn how a PV system can be integrated into the existing infrastructure.

ENERGY POWER AND FORCE... studies laws and theories of electric power generation that govern motion and how to apply them to a range of concepts including rotional inertia, acceleration, velocity, force, and torque. This understanding of the concept of force and atomic theory and how these concepts apply to electric power generation. The use and function of simple machines, and how they relate to electric power generator function, is also explored.

ENERGY POWER AND FORCE LAB... applies the laws and theories that govern motion to energy power and force concepts including rotational inertia, acceleration, velocity, lift, force and torque. Exploration of basic atomic theory and how it applies to electric power generation is conducted. In addition, the law of conservation of energy is applied in the lab activities. The use and function of simple machines, and how they relate to generator function is also examined. COREQUISITE: 10482135 Energy Power & Force

FLUID POWER 1...prepares the learner to identify hydraulic and pneumatic component symbols; adjust a pressure relief valve; analyze the operation of a pilot operated relief valve; analyze Pascal's law; evaluate flow, velocity, work and power in industrial hydraulic and pneumatic control systems; analyze meter-in, meter-out, and bypass flow control circuits; identify basic hydraulic and pneumatic control valves; and assemble hydraulic and pneumatic control circuits. COREQUISITES: 10804115 College Tech Math 1 or 10804114 College Tech Math 1A.

FLUID POWER 2...enhances the learner’s ability to read schematics containing fluid power component symbols; identify negative feedback elements in feedback systems; analyze, sketch, and design hydraulic systems using a schematic; evaluate the general characteristics and terms of fluids under pressure; fluid conditioning, condensers, reservoirs, accumulators, pressure control; and troubleshoot malfunctions. PREREQUISITE: 10620103 Fluid Power 1 or 10620155 Industrial Maintenance Hydraulics and Pneumatics.

INDUSTRIAL CONTROLS AND MACHINES... prepares learner to select control devices by function and operation; illustrate electrical circuits using symbols, diagrams, and abbreviations; explain the operation of magnetic solenoids and apply motor control techniques and introduces the student to three-phase power motor circuits for industrial applications. PREREQ: 10620122 Indus Wiring and COREQ: 10620110 AC Fund C or PREREQ: 10661010 AC Fund C.

INDUSTRIAL TROUBLESHOOTING... prepares the learner to conduct effective machine control troubleshooting techniques with an understanding of preventive maintenance methods designed to minimize motor and controls issues between preventive maintenance measures. PREREQUISITE: 10620141 Industrial Controls and Motors.

INDUSTRIAL WIRING... prepares the learner to follow safety procedures; maintain a safe and healthy work environment; learn basic electrical circuits; measure electrical quantities using a VOM and/or DVM; analyze measured values using electrical circuit laws; construct typical industrial control circuits; and analyze typical industrial control circuits.

INTRODUCTION TO PSYCHOLOGY...introduces students to a survey of the multiple aspects of human behavior. It involves a survey of the theoretical foundations of human functioning in such areas as learning, motivation, emotions, personality, deviance and pathology, physiological factors, and social influences. It directs the student to an insightful understanding of the complexities of human relationships in personal, social, and vocational settings. REQUIRED: 10482105 Writing placement assessment equivalent or COREQUISITE: 10831015 Intro to Reading and Study Skills.

MECHANICAL DRIVE SYSTEMS...prepares the learner to use tools and fasteners safely; identify belt and chain drive components; install and adjust belt and chain drives; apply bearing and bushing principles; perform installation and remedial operation of a variety of roller and V-belt drives, gear, and dial indicator and laser methods; identify various gear drives; calculate gear ratios; and analyze first-, second-, and third-class levers.

ORAL/INTERPERSONAL COMMUNICATION... provides students with the skills to develop speaking, verbal and nonverbal communication, and listening skills through individual speeches, group activities, and other projects. COREQUISITE: 10838105 Intro Reading and Study Skills or Reading placement assessment equivalent.

SOLAR TECNICIAN 1 LAB...provides hands-on lab-based environment where you learn basic parts of photovoltaic systems, complete a solar site assessment, and learn how to size a solar system for desired power output, as well as to work safely around solar electric equipment.

TURBINE MAINTENANCE...prepares learners to climb, inspect and service wind turbines; use torque fasteners; check gearbox lubrication; add grease to moving and exposed parts; verify good electrical connections; perform an overall “system check” and routine maintenance on a wind energy system; in addition to fault determination and troubleshooting. Students will incorporate wind industry best safety practices, must be prepared to climb multiple times in a day and operate outside in the elements. PREREQUISITES: 10620110 AC Fundamentals, 10620138 Programmable Controllers-Allen Bradley, 10620104 Fluid Power 2 and 10604113 College Tech Math 1A or 10804115 College Tech Math 1 and COREQUISITE: 10482124 Wind Technician 3 Lab.

WIND SYSTEMS INTRODUCTION...prepares the learner to assess the global energy picture, analyze the causes of wind flow and wind flow properties, write a site assessment, explore small, medium, and large wind turbine designs, assess the environmental effects of wind turbines, perform business assessments for wind energy projects, plan a wind energy project, and define the requirements of wind turbines and their components. Analyze the wind flow and energy of the turbine.

WIND SYSTEMS NETWORKING...introduces the wind technician to the applications of SCADA, SCADA control processes, remote connections of generation assets, remote monitoring and remote control. IP addressing, installing and removing programs on PC’s, downloading programs on PLC’s, proper removal and replacement of communication and control components, as well as connecting to various components for troubleshooting, testing, and component addressing. PREREQUISITE: 10482124 Wind Technician 3 Lab and 10602138 Programmable Controllers - Allen Bradley.

WIND TECHNICIAN 1 - RESCUE AND TOOLS...prepares students for work at height and to perform equipment inspections on climbing and fall arrest gear; wear required PPE, inspect, clean, and repair while working on wind turbine systems. Students will be SAFER certified in safe tower access, climbing, rescue, and confined space rescue, and will demonstrate proper knot tying and display professionalism and safe working habits during all tasks. Students are trained in the use of hand tools and torque tools. COREQUISITE: 10482101 Wind Systems Technician 1 - Rescue & Tools.

WIND TECHNICIAN 2 - SAFETY AND MAINTENANCE...familiarizes learners with OSHA regulations related to the wind industry and proper methods to eliminate and control hazards. Students receive training in First Aid, CPR, rigging, and confined space and receive the 10-hour OSHA for General Industry and the Tools at Height certifications. Participants develop skills in repair and maintenance of commercial wind turbines. Industry standards, training manuals, and field experience course standards. COREQUISITE: 10482104 Wind Systems Technician 2 - Safety & Maintenance.

WIND TECHNICIAN 3 LAB...certifies learner in torque tool techniques with Snap-on tools. Students will apply safe and proper techniques while using various styles of torque wrenches and adapters including hand torque and hydraulic torque wrenches. Students will demonstrate proficiency in performing a variety of torque wrench techniques including oil filter changes, generator brush maintenance, and brake pad replacement while following proper safety and OSHA procedures. COREQUISITE: 10482106 Wind Systems Technician 2 - Safety & Maintenance.

WIND TECHNICIAN 4... reviews arc flash requirements, power quality, power factor correction, transformer calculations, electrical distribution, and transmission systems. Student will learn the components and functions of a gearbox; how to inspect bearings and gears, troubleshoot the cooling system, and replace various gearbox components. Student will perform projects involving the detection and repair on the GE 1.5 Nacelle. The student will be responsible for completing troubleshooting/maintenance on the campus’s wind turbines. PREREQUISITES: 10482124 Wind Tech 3, 10620141 Industrial Controls & Motors, 10620130 Mech Mech Intro, 10620139 Prop Cont-Allen Bradley and COREQUISITES: 10482132 Turbine Mtnc or 10482103 Wind Farm Intern & 10482128 Wind Tech 5 and 10620140 PLC Adv.

WIND TECHNICIAN 5 LAB... familiarizes the students with schematic reading and prepares the student to use schematics for troubleshooting and LOTO. The student will demonstrate proficiency in troubleshooting motors and safely changing out motors. In this capstone course, students will responsibly perform troubleshooting and maintenance on the wind turbines on LTC’s campus. COREQUISITE: 10482126 Wind Technician 5 - Electrical Installation, COMMUNICATIONS... teaches the writing process, which includes prewriting, drafting, revising, and editing. Through a variety of writing assignments, the student will analyze audience and purpose, research and organize ideas, and format and design documents based on subject matter and content. Keyboarding skills are required for this course. A variety of writing assignments and a project comprised of a variety of written documents. PREREQUISITE: 10831013 Intro to College Wrtg or Writing placement assessment equivalent and COREQUISITE: 10831015 Intro Rdy & Study Skills or Reading placement assessment equivalent.