IMDS

Industry-Relevant Measurement Demo System

ELECOMP Capstone Design Project 2026-2027

Sponsoring Company:

DEWETRON, Inc.
2850 South County Trail
East Greenwich, RI
www.dewetron.com

Company Overview:

DEWETRON develops high-precision, synchronized data acquisition and measurement systems that help engineers and scientists convert complex test data into actionable insight. Its modular hardware and intuitive OXYGEN measurement software support demanding applications across automotive and mobility, aerospace and aviation, renewable and green energy, and manufacturing and industrial markets. DEWETRON combines configurable measurement solutions, technical expertise, and a commitment to precision, reliability, and continuous improvement.

Technical Director(s):

Corey Clark
Senior Product Specialist
corey.clark@dewetron.com

Joseph Parenteau
Quality and Technical Manager
joe.parenteau@dewetron.com

Project Motivation:

DEWETRON seeks a student team to design and build fully functional, trade-show-ready demonstration systems that showcase practical measurement and data-acquisition solutions for the industries DEWETRON supports, including aerospace and aviation, automotive and mobility, energy, and industrial applications. Each demonstration should translate a relevant

real-world engineering challenge into an engaging, repeatable experience that allows visitors to see live sensor inputs, synchronized data acquisition, visualization, analysis, and clear results. The project will give students experience integrating electrical hardware, sensors, software, and user-focused presentation while creating reusable demonstration assets for DEWETRON.

Anticipated Best Outcome:

Two successful, fully functional demonstration systems that are safe, reliable, portable, repeatable, and suitable for operation by DEWETRON personnel at trade shows and customer events. Each demo should include an intuitive user workflow, documented setup and operating instructions, source code and configuration files, a bill of materials, and validation results demonstrating that the system performs as intended.

Project Details:

Overall system concept: The team will work with the Technical Directors to select two industry-relevant use cases and define measurable success criteria for each. Each system should combine representative sensors or signal sources, appropriate signal conditioning and data-acquisition hardware, synchronized measurement, real-time visualization and analysis, and a polished operator interface. The demonstrations should be compact, durable, easy to transport, quick to set up, and understandable to both technical and non-technical trade-show audiences.

Block Diagram: For each demo, document the complete signal path from the physical input or simulated source through sensors, signal conditioning, DAQ hardware, communications, OXYGEN software, analysis, visualization, and final user output. Include power, safety, grounding, and data-flow interfaces.

Hardware/Electrical Tasks:

- Select and integrate sensors, transducers, signal sources, cabling, connectors, and appropriate DEWETRON data-acquisition hardware.
- Design safe power distribution, grounding, shielding, protection, and enclosure or mounting provisions suitable for repeated public demonstrations.
- Create schematics, wiring diagrams, connector pinouts, and a complete bill of materials.

- Assemble, troubleshoot, calibrate as applicable, and verify measurement accuracy, repeatability, and system reliability.
- Design for portability, rapid setup, serviceability, and safe operation in a trade-show environment.

Firmware/Software/Computer Tasks:

- Configure data acquisition, channel scaling, synchronization, recording, visualization, and analysis using DEWETRON OXYGEN software.
- Develop any required scripts, code, interfaces, automation, or simulated signals needed to create a complete and interactive demonstration.
- Create a clear operator workflow with startup, run, reset, shutdown, and fault-recovery functions.
- Perform software validation, version control, error handling, and end-to-end system testing.
- Prepare source code, configuration files, user documentation, demonstration talking points, and a brief training package for DEWETRON personnel.

Composition of Team:

1 Electrical Engineering student and 1 Computer Engineering student

Skills Required:

Electrical Engineering Skills Required:

- Fundamentals of circuits, sensors, signal conditioning, data acquisition, grounding, shielding, and electrical safety.
- Ability to read and create schematics and wiring diagrams and to build, solder, troubleshoot, and test integrated hardware.
- Familiarity with test equipment, measurement uncertainty, calibration concepts, and structured verification.

Computer Engineering Skills Required:

- Software configuration and development skills; coding or scripting experience in Python, C/C++, .NET, or a similar language is a plus.
- Understanding of data communication, hardware/software interfaces, real-time data visualization, file handling, and basic user-interface design.
- Experience with debugging, version control, test planning, technical documentation, and collaborative engineering workflows.

AI Usage:

The AI Use Policy for this project is defined in Appendix A at the end of this proposal. Technical Directors: complete the checklist in Appendix A to indicate which AI uses are permitted on this project. Any item left unchecked is not allowed.

Anticipated Best Outcome's Impact on Company's Business, and Economic Impact

Successful demos will give DEWETRON reusable, customer-facing tools that communicate product capabilities through practical, industry-relevant examples. The systems can support trade-show engagement, technical discussions, customer education, and sales demonstrations while reducing the effort required to prepare a new demonstration for each event.

Broader Implications of the Best Outcome on the Company's Industry:

The project can demonstrate how integrated, synchronized measurement systems help engineers evaluate complex physical and electrical behavior across aerospace, automotive, energy, and industrial applications. A well-documented and reusable approach may also provide a foundation for future demonstrations, training exercises, and student-industry collaboration.

Appendix A: AI Use Policy - Industry-Relevant Measurement Demo System

Allowed

- Students may use AI tools for
  - ☐ brainstorming support
  - ☐ concept development
  - ☐ literature and publicly available documentation review
  - ☐ software development
  - ☐ debugging
  - ☐ data analysis
  - ☐ test development
  - ☐ non-proprietary paragraph editing
  - ☐ non-proprietary single-slide formatting
  - ☐ preparation of project deliverables
  - ☐ note taking or transcription of meetings
  - ☐ Others: _____

Not Allowed

- Using AI in violation of university policies, applicable laws, or course-specific rules identified by capstone instruction team and project-specific rules identified by the technical directors.
- Entering proprietary, confidential, personally identifiable, security-sensitive, or otherwise restricted information into an AI system without authorization.
- Submitting AI-assisted work without understanding, reviewing, verifying, and appropriately disclosing its use.
- Submitting entire documents or presentations to an AI system for editing or formatting.
- Any unchecked items from the allowed list above.

Requirements

- If any use is allowed, AI tools may only be used to enhance, but not replace, students' technical reasoning, engineering judgment, and understanding. Students must be able

to explain, justify, and defend all submitted designs, code, analyses, test results, documentation, and conclusions.

- During the first two weeks of the project, the student team shall work with the Technical Directors to: identify any proprietary or confidential information that may be involved in the project; determine what information may or may not be shared with AI systems; identify the AI tools, models, accounts, and configurations approved for project use; and document any project-specific restrictions or approval requirements.
- Students shall transparently document the uses of AI using the URI CYPHER AI Usage Marking guidelines (https://web.uri.edu/cypher/ai-marking/). A workshop is planned for September to familiarize students with these guidelines.
- Students retain full professional responsibility for all design decisions, analyses, implementations, testing, documentation, presentations, and final deliverables, regardless of whether AI tools contributed to the work.