

Proposed Senior Design Projects for Fall 2026

rev August 25, 2026

	Title	Sponsor	Description
1	Sound & Vibration Detection	John Deere	Using sound and vibrations, detect when a motor is off balance, has failing belt, has loose gravel, etc. Design an embedded system to combine vibration and acoustic sensors to determine when something is amiss with the motor.
2	Smart Nose	John Deere	Detect fire, smoke, or a slipping belt using a combination of olfactory sensors
3	Obstacle Detection	John Deere	Detect the presence of an obstacle in a high-dust environment. Develop an IR sensor to see through dust, either in the near IR range or far IR (heat) range.
4	Active Load Cell Tester	John Deere	Develop a test fixture for a 3-phase inverter (i.e. a 3-phase motor driver - such as a 100W quad-copter ESG controller). Use an inductive load (power factor close to 1.00) to draw current but not use power. Monitor the voltage, current, power factor, harmonic content and the load (current) varies from in to max rated value. Automate the test procedure so you can plug in an inverter and have the test proceed automatically.
5	Active Load Cell Tester 2	John Deere	Ditto - but using a 3-phase generator to provide a resistive load (power-factor close to 1.00). Create a closed-loop system using an electric generator to capture the energy from the 3-phase inverter and then return it - resulting is minimal actual energy being used (and minimal heat being generated).
6	Basic Power System Protection	Ulteig Engineering	Develop a protection scheme for a simple solar & battery NESS site with feeder, transformer, and transmission line zones of protection Deliverables would include written philosophy of scheme, relay settings using SEL proprietary software, and demonstration of feeder settings using RTDS and the SEL-751 relays.
7	Protection Scheme for IBR Blackstart	Ulteig Engineering	Similar, but for a substation with IBR Blackstart requirements at the IBR level.
8	SWIR Illuminator	NDeavor Foundry	Create an illuminator for an infra-red camera that works in the dark. Multiple LEDs in the range of 1200 - 2000nm are to be used to illuminate an object. Each wavelength can be turned on separately. Changes in the image at each wavelength help to identify the object in question.
9	SWIR Illuminator 2	NDeavor Foundry	Create an illuminator for an infra-red camera that works in daylight. Multiple LEDs in the range of 1200 - 2000nm are to be used to illuminate an object. Each wavelength can be turned on separately. Develop and test a way to differentiate between the image due to sunlight and the image due to the LEDs. Image subtraction, modulation at 100Hz, and similar methods are to be investigated.

Proposed Senior Design Projects for Fall 2026

rev August 18, 2026

	Title	Sponsor	Description
10	Automated Garden Hose	Fargo Sports Center Aaron Kabanuk	When making ice on a hockey arena, a hose is used. This project seeks to develop a motorized reel for the hose, allowing the operator to reel out or reel in the hose using their cell phone as well as adjust the speed of delivery.
11	Microscope Stage Temperature Controller	Dr. Ang NDSU Pharmacy	Develop a device which controls the temperature on a microscope well with 20cc / min fluid flow. Two heaters are to be used. The pre-heater warms the fluid going to the microscope to close to 37C. A second heater on the microscope well provides fine control of the temperature. The PID gains and temperature set point should be adjustable through a touch-screen graphics display.
12	Heart Cell Stimulator	Dr. Ang NDSU Pharmacy	Develop a device to stimulate heart cells in a petri dish. The device should be small enough to fit in an incubator, operate for 48+ hours on a charge, and be able to precise control the stimulation time (1ms) and duration (2s). A user friendly touch screen interface is desired.
13	Hydroponics Management & Automation	Dr. Jia NDSU ABEN	Develop an instrumented flower pot for Ag research. A microcontroller should monitor soil conditions (temperature, moisture, etc) as well as water at prescribed times. Watering times should be programmable to help automate experiments for research.
14	Sap Sensor	Jeff Erickson	Detect when sap is starting to run on maple trees. Sap runs when the daytime temperature is above 0C and nighttime temperatures are below 0C. Notify the user 30m away with a wireless message (WiFi, wireless, bluetooth, etc)
15	Rube Goldberg Machine	Jeff Eirickson	Design a device which does a simple task the hard way. Project must include seven basic tasks including 3xPLC, 2xPi-Zero, 2xPi-Pico devices within it.
16	Deer Alarm	Jeff Erickson	Develop a series of LED tubes for detecting and scaring away deer out in the field. When one of the tubes detects a deer (range sensor, motion sensor, etc), a series of LED flash. This should also trigger neighboring LED tubes to flash as well.
	Egg Bot 3	Jeff Erickson Jake Glower	Design a device which can color easter eggs using a sharpie pen. Insert a wooden egg, press start, and the Egg Bot automatically colors the egg. Intended target is Engineering Ambassadors for making and handout out trinkets when going out to high-schools.
	Robotic Tic-Tac-Toe	Jeff Erickson Jake Glower	Program a robotic arm to play tic-tac-toe with the user. Input your move using a touch screen. The robotic arm then places an X or O on a play surface. The computer then takes its turn either at random or following an algorithm.