Robot Drone League (RDL) × Massachusetts College, Career and Technical Education Robotics, Automation, Electronics, Advanced Manufacturing & Computer Science Standards

Alignment Guide

Overview

The Robot Drone League (RDL) immerses students and educators in robotics, drones, electronics, advanced manufacturing, and computer science through hands-on labs and integrated STEM learning. This alignment connects the **Massachusetts College, Career and Technical Education Robotics & Automation Engineering Technology**, **Electronics Engineering Technology**, **Advanced Manufacturing**, and **Grades 9–12 Computer Science** standards to the **Robot Drone League (RDL) Challenge and Curriculum**.

The Massachusetts College, Career and Technical Education standards referenced in this document can be found on the Massachusetts Department of Elementary and Secondary Education (DESE) website: https://www.doe.mass.edu/ccte/. The Massachusetts Digital Literacy and Computer Science Standards referenced here can be found at: https://www.doe.mass.edu/stem/standards.html.

Standards Crosswalk

Abbrev: Std = Standard; Skills = Key skills from MA frameworks; RDL Sections = related manual content; Evidence = artifacts for verification.

Safety & Health

Robotics Std 1 / Electronics Std 1 / Adv Mfg Std 1 / CS 9–12 CAS Safety & Security
Skills: PPE, ESD precautions, tool safety, LOTO, hazard ID, ergonomic setup, online safety.
RDL Sections: Safety briefings; Design & Safety Requirements; ESD in wiring labs; Flight safety.
Evidence: Safety logs; ESD mat use; inspection checklists; ergonomic workspace plans.

Electronics & Circuitry

Electronics Std 3–7
Skills: Component ID, schematics, DC/AC theory, analog/digital electronics, soldering, troubleshooting.
RDL Sections: ECP layout; crimping; continuity checks; Arduino integration.
Evidence: Wiring diagrams; assembled PCBs; oscilloscope captures; code linked to hardware.

Electronics Std 8, 11
Skills: Embedded systems, I/O protocols, sensors, actuators, programming.
RDL Sections: Arduino C labs; FTW coding; sensor integration.
Evidence: Code; functional prototypes.

Robotics & Mechanical Systems

Robotics Std 6–9 / Adv Mfg Std 8
Skills: Chassis assembly, drivetrain design, manipulator build, autonomous/teleop control.
RDL Sections: goBILDA chassis build; claw; Arduino drive code; scrimmage operations.
Evidence: Build photos; gear ratio calcs; code with comments.

Advanced Manufacturing

Adv Mfg Std 2–7
Skills: Blueprint reading, CAD modeling, CAM/CNC programming, machining, quality measurement.
RDL Sections: CAD review; Onshape parts; precision measurement of parts; additive manufacturing of drone/robot components.
Evidence: CAD exports; G-code; tolerance measurement logs.

Computer Science (Grades 9–12)

CAS (Computing and Society)
Skills: Cybersecurity, ethics, tech law, accessibility, positive web presence.
RDL Sections: Networked controller safety; drone flight data handling; creating accessible digital artifacts.
Evidence: Cyber safety plans; digital portfolios.

DTC (Digital Tools & Collaboration)
Skills: Selecting tools; online collaboration; advanced research; artifact creation.
RDL Sections: Google Suite documentation; team coding; collaborative mission planning.
Evidence: Shared docs; research summaries.

CS (Computing Systems)
Skills: Device selection, troubleshooting, network basics, system optimization.
RDL Sections: Arduino hardware troubleshooting; drone controller setup.
Evidence: Troubleshooting logs; network diagrams.

CT (Computational Thinking)
Skills: Abstraction, algorithms, data structures, programming, modeling/simulation.
RDL Sections: Arduino/FTW programming; autonomous mission simulation; data logging.
Evidence: Pseudocode; algorithm diagrams; data visualizations.

Credential Pathways

- **OSHA-10 General Industry**

- **ETA Basic Systems Technician (BST)**
- **NC3 Electricity Introduction & Precision Measurement Instruments**
- **MACWIC Level 1**, **NIMS Machining Level 1**
- **FAA Airframe/A&P**

Evidence Checklist

- Safety logs; PPE and ESD compliance
- CAD screenshots; wiring diagrams; CAM/G-code files
- Breadboard/PCB builds; soldering samples
- Arduino and FTW code with documentation
- Flight logs; inspection sheets; data visualizations

This crosswalk demonstrates how RDL integrates robotics, electronics, advanced manufacturing, and computer science, equipping students and educators with industry-relevant skills and credential readiness.

Note: The standards for the career pathway *Aviation Maintenance Technician*, which could potentially be aligned to RDL, will be coming soon as reported by the DESE.