



*Robotics Education & Competition Foundation
Inspiring students, one robot at a time.*

INDUSTRY CERTIFICATIONS RESOURCES GUIDE

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Related links

- [Industry Certifications](#)



Pricing Sheet for Industry Certifications ([PDF](#))

Overview

The Robotics Education & Competition Foundation is proud to provide schools, students, and communities with industry certifications in the subjects of Pre-Engineering and for Robotics. This document represents current pricing for certifications. **Please plan to have your payment or purchase order received and all proctor agreements completed and delivered to the REC Foundation a minimum of five working days prior to your scheduled testing dates to receive the certifications voucher codes and instructions.**

The Ordering Process

- Order and pay with credit card, purchase order, or check.
- Send email addresses for involved teachers and proctoring staff to complete proctor and non-disclosure agreement, which should be signed and signed electronically.
- Exam voucher codes sent to primary contact with proctor and student instructions.

Pre-Engineering Certification

Each Pre-Engineering certification purchased includes four separate voucher codes, one for each of the required three modules plus one extra for use as a practice test, a retake, or to accumulate for additional certifications. These include the “Fundamentals of Engineering Module,” which is required before proceeding to other engineering area modules, and any two of the eight engineering modules at www.roboticseducation.org/certification.

| Pre-Engineering Certifications | Price |
|--------------------------------|------------|
| 1 | \$40.00 |
| 10 | \$400.00 |
| 25 | \$1,000.00 |
| 50 | \$2,000.00 |
| 100 | \$3,500.00 |
| 200 | \$6,500.00 |

Robotics Certification

Each Robotics certification purchased includes five separate voucher codes, one for each of the required four modules plus one extra for use as a practice test, a retake, or to accumulate for additional certifications. These include the “Fundamentals of Engineering Module,” which is required before proceeding to other engineering area modules, and specifically three of the eight engineering modules in Electrical, Programming, and Mechanical at www.roboticseducation.org/certification.

| Robotics Certifications | Price |
|-------------------------|------------|
| 1 | \$50.00 |
| 10 | \$500.00 |
| 25 | \$1,250.00 |
| 50 | \$2,500.00 |
| 100 | \$4,500.00 |
| 200 | \$8,500.00 |

Note: Student earns BOTH the Pre-Engineering AND the Robotics Certification because the requirements for the Robotics Certification meet and exceed the Pre-Engineering Certification requirement.

Proctoring: After a purchase order or credit card is received, a proctoring agreement will be sent to the contact provided to be returned prior to the certification/voucher codes being released. Two proctors required, who are not the program instructors, a single designated testing staff member or as required by your state or district.

Contact

Robotics Education & Competition Foundation

P.O. Box 8276
Greenville, TX 75404
www.roboticseducation.org

Call: (903) 401-8010
Email: certifications@roboticseducation.org
www.robotevents.com



REC Foundation Pre-Engineering and Robotics Certifications

The REC Foundation is pleased to provide two industry certifications for schools, students in engineering related programs, and robotics clubs. These certifications were designed by a team of engineers from industry, college professors, and high school teachers from America's Space Coast in Florida. The REC Foundation's Certification Program is a response to a global need for more students in the Science, Technology, Engineering, and Mathematics (STEM) fields. The REC Foundation's Pre-Engineering and Robotics Certifications are based on the knowledge that students should demonstrate after 150 hours of high school-level coursework focusing on basic fundamentals. The content in both certifications is based around basic coursework and experience, not from any specific textbook, curricula, or software.



The Pre-Engineering Certification requires completion of the Fundamentals of Engineering module, in addition to two of the eight listed Engineering Modules. The Robotics Certification requires completion of the Fundamentals of Engineering Module in addition to the Mechanical, Electrical, and Programming Modules. The requirements for the Robotics Certification exceed the requirements of the Pre-Engineering Certification, as a result, students earn both the Pre-Engineering and the Robotics Certifications by completing all required modules for the the Robotics Certification.



Modules For Industry Certifications

Fundamentals of Engineering (required for both certifications)

Engineering Modules (students can choose any two modules for Pre-Engineering Certification and must select mechanical, programming and electrical for the Robotics Certifications):

- Mechanical
- Computer Science and Engineering (Programming)
- Electrical
- Chemical
- Aerospace
- Civil Engineering
- Engineering Technology
- Manufacturing Technology



For more information to provide these opportunities for your school or club contact:

<http://www.roboticseducation.org/certification/>

Phone: (903) 401-8010

Email: certifications@roboticseducation.org

REC Foundation websites: www.roboticseducation.org and www.robotevents.com



Robotics Education & Competition Foundation
P.O. Box 8276
Greenville, TX 75404

Robotics Education & Competition Foundation

Industry Certifications Overview



Note: Use presentation in Slide Show mode to use hyperlinks.

Overview

Pre-Engineering & Robotics Certifications

- Students expected to have at least 150 hours of pre-engineering or robotics classroom experience
- Each certification is broken into several modules
- Certain modules are required, but students are not limited to how many they take

Students earn both certifications when completing Robotics as those requirements exceed Pre-Engineering

Information: www.roboticseducation.org/certifications

Overview



- Information in this presentation is intended to aid preparation for the certification exams
- Provide greater understanding of appropriate supporting curricula
- Curricula can be teacher developed or samples include:
 - Carnegie Mellon, Intellitek, Project Lead The Way, Amatrol, DEPCO, VEX EDR etc.
- Review all content found on the certifications exams
- [Industry Certifications - Knowledge & Occupational Skills](#)
- [Sample Course Sequence](#)

Modules

Pre-Engineering Certification

- Fundamentals of Engineering (Required)
- Students choose two of the following:
 - Mechanical
 - Computer Science & Engineering (Programming)
 - Electrical
 - Chemical
 - Aerospace
 - Civil Engineering
 - Engineering Technology
 - Manufacturing Technology

Robotics Certification

- Required:
 - Fundamentals of Engineering
 - Mechanical
 - Computer Science & Engineering (Programming)
 - Electrical

Note: *Students earn both Certifications when completing Robotics Certification, as requirements exceed Pre-Engineering Certification.*

Pre-Engineering and Robotics Required Module Exams

- **Fundamentals of Engineering Module Exam**
 - This module is a pre-requisite for all other engineering modules
- **Pre-Engineering Modules**
 - Eight separate modules available
 - Fundamentals of Engineering plus “any” two of the eight modules earns the Pre-Engineering Certification
- **Robotics Modules**
 - Fundamentals of Engineering plus three “specific” modules – electrical, mechanical, computer science/programming
 - Earns BOTH the Pre-Engineering AND Robotics Industry Certifications.

The Fundamentals and Engineering Modules Exams Information

- [Fundamentals of Engineering](#)
- [Aerospace Pre-Engineering](#)
- [Chemical Pre-Engineering](#)
- [Civil Pre-Engineering](#)
- [Computer Science/Programming Pre-Engineering](#)
- [Electrical Pre-Engineering](#)
- [Engineering Technology](#)
- [Manufacturing Technology](#)
- [Mechanical Pre-Engineering](#)

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
- [Material and Processes](#)
- [Safety](#)
 - [General Lab](#)
 - [Power Tools](#)
- [Engineering Drawings](#)
- [CAD Tools](#)
- [Fundamentals of Electrical](#)
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- [Fundamentals of Robotic Systems](#)
- [Fundamentals of Aerospace](#)
- [Fundamentals of Civil Engineering](#)
- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
- [Go to The Pre-Engineering Modules](#)

The History of Engineering

- Early space programs of the US and USSR, the space race, and their technological impacts for today.
- Engineering and technology definitions
- Science definition
- The average work week, salary and wage calculations
- Types of engineering related careers, job outlook, salaries and education required:
 - Mechanical
 - Electrical
 - Chemical
 - Aerospace
 - Civil
 - Computer Science/Programming
 - Technical support for all areas
 - Machining trades: CNC machining, Laser, Rapid Prototyping
 - CAD 2D and 3D applications
 - Robotics

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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- [Fundamentals of Civil Engineering](#)
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- [Go to The Pre-Engineering Modules](#)

The Engineering Design Process

- Ability to apply multiple steps in logical sequence of the engineering design process.
- Ability to understand the proper sequence in various iterations of the engineering design process.
- Industry utilizes a wide variety, example below:
- 10-Step Engineering Design Process
 1. Identify the problem
 2. Design brief
 3. Research problem
 4. Brainstorm solutions
 5. Select a solution
 6. Design
 7. Build
 8. Test
 9. Redesign
 10. Implement solution/product

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
- [Go to The Pre-Engineering Modules](#)

Materials and Processes

- Materials analysis techniques
 - Tensile, hardness, oxidation
- Types of metals, properties and common applications
 - Ferrous, non-ferrous, precious; common alloys – i.e., brass, stainless steel
- Types of woods, properties and common applications
 - Hard (Deciduous), soft (Coniferous)
- Types of plastics, properties and common applications
 - Thermosets, thermoplastics, resins
- Types of epoxies, properties and common applications

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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Safety

- General Lab Safety:
 - Application of proper eyewear
 - Application of proper clothing and footwear
 - Application of proper safe practices in a laboratory
 - OSHA
 - Lab safety colors
- Power Tool Safety:
 - Band saw – basic band saw operations, application of specific safety procedures
 - Bench grinder – basic bench grinder operations, application of specific safety procedures.
 - Drill press – basic drill press operations, application of specific safety procedures
 - Portable power tools – portable drill operations, application of specific safety procedures

Fundamentals of Engineering Module Exam



Topics Covered

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- [Fundamentals of Civil Engineering](#)
- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
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Engineering Drawings

- Identify all six orthographic views
- Ability to read electrical schematics, blueprints
- Various common symbols and terminology
- Ability to find missing views in multi-view drawings by projection, identify the missing views of objects
- Isometric drawings
- Develop parts lists with tasks and deadlines
- Drawing objects to various scales

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
- [Go to The Pre-Engineering Modules](#)

CAD Tools

- Common lines and symbols used in engineering drawings
- 2D CAD software – Various common programs used in industry
- 3D CAD software – Various common programs used in industry
- Identify orthographic views
- Identify isometric views

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
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Fundamentals of Electrical Engineering

- Ohms Law – amperage, voltage, resistance identification and calculations
- Open and closed circuits
- Series Circuits
- Parallel Circuits
- AC Power
- DC Power

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
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Fundamentals of Mechanical Engineering

- Gear ratio calculations □
- Isaac Newton's laws □
- Kinetic and potential energy □
- Thermal systems – heating and cooling

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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Fundamentals of Robotics Systems

- Drive systems
 - 2, 4, and 6-wheel tank or arcade
 - Holonomic
 - Mecanum
 - Omni Swerve
- Microcontrollers
- Applications
- Power
- PWM (Power Width Modulation)
- Motor Controls: purpose, operation, function
- Manipulators: arms-wrist-shoulders and elbow-end effectors; degrees of freedom/axis
 - Types: Collectors and Grippers
- Special applications (limitless) □
- Autonomous control

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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Fundamentals of Aerospace Engineering

- Bernoulli's principle: Lift, thrust, drag
- Early Rocketry and Space History
 - Titan II
 - Saturn IV
 - Gemini
 - Mercury
 - Apollo
 - Soyuz
 - V1 and V2
- Common materials used in the aerospace industry

Fundamentals of Engineering Module Exam



Topics Covered

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- [Fundamentals of Manufacturing](#)
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Fundamentals of Civil Engineering

- Methods of transportation
 - Rail
 - Harbors/Ports
 - Roads
 - Bridges
 - Air
 - Rivers/Dams
- Application of bridge efficiency calculations

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
- [Engineering Design Process](#)
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- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
- [Go to The Pre-Engineering Modules](#)

Fundamentals of Computer Science and Programming

- Binary systems
- Hexadecimal systems
- Basic computer systems
- RAM, ROM FIFO Storage systems
- Processor speeds
- Common programming languages:
 - C and C+,
 - JAVA,
 - HTML

Fundamentals of Engineering Module Exam



Topics Covered

- [History of Engineering](#)
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- [Fundamentals of Computer Science](#)
- [Fundamentals of Manufacturing](#)
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Fundamentals of Manufacturing Technology

- Manufacturing techniques
- Cartesian coordinates calculations
- CAD/CAM systems capabilities
- Three dimensional (3D) printing

Pre-Engineering Modules Exams Information

- [Aerospace Pre-Engineering](#)
- [Chemical Pre-Engineering](#)
- [Civil Pre-Engineering](#)
- [Computer Science/Programming Pre-Engineering](#)
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- [Mechanical Pre-Engineering](#)

Aerospace Pre-Engineering Module Exam



Pre-Engineering Exam Modules

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[Civil Pre-Engineering](#)

[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Aerospace Pre-Engineering Module Requires Knowledge and Skills in the following areas:

- Basic aerodynamic principles:
- Types of clouds
- Bernoulli's law-fluid dynamics:
 - Flight surfaces, drag, wind resistance, lift and thrust

Rocket Design

- Staging Fuels:
 - solid, liquid, nuclear
- Control:
 - Fins, gyroscopes, thrusters (hypergolic and ion electric)
 - Basic airfoil designs and terminology
- Application problems
 - Newton's drag calculations
 - Wing aspect ratio calculations
 - Horse power to wattage calculations
 - Airspeed and velocity calculations

Chemical Pre-Engineering Module Exam



Pre-Engineering Exam Modules

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[Civil Pre-Engineering](#)

[Computer Science/Programing Pre-Engineering](#)

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[Mechanical Pre-Engineering](#)

Chemical Pre-Engineering Module Requires Knowledge and Skills in the following areas:

- Basic Chemical Topics:
 - Chemical reactions and related terms
 - Ideal gas law
 - Kelvin
 - Atmospheres
 - Stoichiometry
 - Solutions
- Periodic Table
- Chemical Bonding
- Basic Chemical Lab Safety
- Application Problems
 - Solutions calculations
 - Gas law calculations

Civil Pre-Engineering Module Exam



Pre-Engineering Exam Modules

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[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Civil Pre-Engineering Module Requires Knowledge and Skills in the following areas:

- Types of bridges
 - Arch
 - Suspension
 - Girder
- Truss:
 - Common bridge materials
 - Tension, compression
 - Tensile strength
- Methods of transportation
 - Rail
 - Harbors/Ports
 - Roads
 - Bridges
 - Air
- Rivers, Dams and Canals
- Surveying
- Application problems
 - Boat hull design and displacement applications
 - Surveying
 - Bridge and tower efficiency calculations

Computer Science and Programming Module Exam

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Pre-Engineering Exam Modules

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[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Computer Science Module Requires Knowledge and Skills in the following areas:

- Common programming languages
- C and C+
- JAVA
- HTML
- Oracle
- USB
- Common terminology
- IP internet protocol
- Array
- Floating Point Units (FPU)
- I/O (input/output)
- Infinite loop
- Memory access violation
- AND gate
- HTTP, HTTPS

Computer Science and Programming Module Exam

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Pre-Engineering Exam Modules

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[Civil Pre-Engineering](#)

[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Computer Science Module Requires Knowledge and Skills in the following areas:

- General understanding of the parts and workings of a computer, including various levels of software from BIOS through applications
- Input and output devices
- Central Processing Unit (CPU)
- RAM
- ROM
- Storage devices
- Familiarity with networks and inter-computer communication
- Routers and their function
- Internet, intranet
- Servers and their function
- Wireless – Radio and wifi
- Binary and hexadecimal representation of numbers

Computer Science and Programming Module Exam

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Pre-Engineering Exam Modules

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[Civil Pre-Engineering](#)

[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Computer Science Module Requires Knowledge and Skills in the following areas:

- Binary representation of 1, 2, 3, 15, etc.
- Hexadecimal representation of 10, 15, 16, 30, etc.
- Ability to understand simple programs written in C
- Loops
- Functions
- Run-time errors
- Compilation errors
- Variable types
- Debugging logic errors in a program
- Application problems
- Find solutions in basic C programming lines
- Solve binary and hexadecimal represent

Electrical Pre-Engineering Module Exam

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Pre-Engineering Exam Modules

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[Civil Pre-Engineering](#)

[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Electrical Module Requires Knowledge and Skills in the following areas:

- AM and FM radio frequencies
- Mechanical energy
- Motor windings
- Ohms law calculations – ability to calculate:
 - Amperage
 - Resistance
 - Voltage
 - Ohms
- Knowledge of basic computer hardware, i.e. storage devices, memory, RAM, ROM, FIFO

Electrical Pre-Engineering Module Exam

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Pre-Engineering Exam Modules

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[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

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[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Electrical Module Requires Knowledge and Skills in the following areas:

- Knowledge of and applications for sensors:
 - Potentiometers
 - Ultrasonic
 - Shaft encoders
 - Gyroscopic
 - Accelerometers
 - Optical shaft encoders
 - Line following
 - Light sensing
 - Limit switches
- Applications problems – ability to calculate:
 - Potential energy
 - Kinetic energy
 - Frequency
 - Kilowatt hours costs

Engineering Technology Module Exam

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Pre-Engineering Exam Modules

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[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Engineering Technology Module Requires Knowledge and Skills in the following areas:

- Engineering Design Process/Loop 10 step sequence:

| | |
|--------------------------------------|---------------------------|
| 1) Identify problem | 6) Design |
| 2) Design brief | 7) Build |
| 3) Research problem | 8) Test |
| 4) Brainstorm problem | 9) Redesign |
| 5) Select solution based on research | 10) Implement solution(s) |

- Engineering and Technology definitions
- Soft Skills
 - Ability to select appropriate technologies to solve problems
 - Written and oral communications
 - Problem solving techniques-brainstorming-critical think
 - Working as a team member
 - How to find and use information
- Manufacturing
 - Common manufacturing practices
 - Computer Numerically Controlled (CNC) applications
 - Three dimensional (3D) printing
- Aerospace
 - Lift, Thrust, Drag, Gravity

Engineering Technology Module Exam

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Pre-Engineering Exam Modules

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[Civil Pre-Engineering](#)

[Computer Science/Programming Pre-Engineering](#)

[Electrical Pre-Engineering](#)

[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Engineering Module Requires Knowledge and Skills in the following areas:

- Civil
 - Common types of trusses
 - Bridge and tower efficiency calculations
- Mechanical
 - Gear ratio calculations
 - Pneumatics systems
 - Hydraulic systems
- Programming
 - Binary representations
 - Hexadecimal representations
 - Input and output devices
- Engineering drawings
 - Common lines and representation
 - Dimensioning techniques
 - Orthographic projections
 - Isometric drawings

Engineering Technology Module Exam

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Pre-Engineering Exam Modules

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[Engineering Technology](#)

[Manufacturing Technology](#)

[Mechanical Pre-Engineering](#)

Engineering Technology Module Requires Knowledge and Skills in the following areas:

- Materials and Processes
- Hardwood and applications
- Softwood and applications
- Plywood characteristics and applications
- Plastics: thermosets applications
- Thermoplastics applications
- Composites and applications
- Ferrous metals
- Carbon in steel applications
- Alloys
- Non-ferrous metals
- Tensile strength
- Hardness testing techniques

Engineering Technology Module Exam

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[Engineering Technology](#)

[Manufacturing Technology](#)

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Engineering Technology Module Requires Knowledge and Skills in the following areas:

- Application problems
- Engineering design process. Synthesize steps in multiple configurations into a proper sequence. Apply proper sequence with multiple models.
- Select proper tool/equipment for specified tasks.
- Lab and tool safety situations.
- Engineering drawings.
 - Identify missing views for orthographic projections.

Manufacturing Technology Module Exam

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Manufacturing Technology Module Requires Knowledge and Skills in the following areas:

- Manufacturing methods
 - Plastic injection molding
 - Sand cast molds
 - Thermoforming
 - 3D printing
 - CNC (Computer Numerically Controlled):
water jet, milling, lathe, plasma cutting
- Engineering design
- CAD systems: 2D and 3D applications.
- Orthographic views: Number of available views,
number of common views
- Scaling objects
- Isometric views

Manufacturing Technology

Module Exam

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Manufacturing Technology

Module Requires Knowledge and Skills in the following areas:

- Quality assurance
- Application problems
- Tensile strength applications
- Rockwell hardness testing techniques
- Stress/strains curves: necking, yield strength and ultimate strength

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Mechanical Engineering Module Requires Knowledge and Skills in the following areas:

- Mechanical systems
- Rack and pinion
- Miter gears
- Worm gears
- Compound gears
- Chains
- Sprockets
- Pulleys
- Spur Gears
- Pneumatics
- Hydraulics
- Simple machines: inclined planes, wedges, levers, and pulleys

Mechanical Engineering Module Exam

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Mechanical Engineering Module Requires Knowledge and Skills in the following areas:

Applications problems-ability to calculate:

- Newton's Laws
- Thermodynamics
 - Acceleration
 - Gear ratios
 - Velocity
 - Engine displacement
 - Speed and torque
 - Compound gear ratios
 - Mechanical advantage

Thank You!

Visit our website for more information regarding curricula, pricing, suggested course sequences and exam proctoring requirements.

More Information

- [Sample/Practice Questions](#)
- [Professional Development Guide for VEX/STEM Educators](#)
- [Pricing Sheet for Certifications](#)
- [Informational Flyer](#)

Email: certifications@roboticseducation.org

Phone: (903) 401-8010



Overview of Common Questions for the REC Foundation's Industry Certifications

Q: Are the certifications on our states funded list for industry certifications?

A: Yes, in Florida and Virginia, with several in process. However, each state has separate requirements, or have no requirements. Contact your state's Department of Education to determine the correct process to add the REC Foundation's Industry Certifications for Pre-Engineering and Robotics for funding if it's available.

Q: What is the "state funded list"?

A: Many states have or are in the process of adopting legislation requiring CTE (Career and Technical Education) programs to have industry certifications for each program. States provide funding based on the number of students who complete industry certification. Some states require that teachers also pass the certification.

Q: Where do the students take the certification?

A: This is a web-based certification. The certifications are administered in a computer lab with two proctors recommended (and required in some states). We have a proctor agreement that the proctors must sign before the certification voucher codes for the web-based certifications can be released.

Q: Can teachers take the test for certification?

A: Yes. It must be in a computer lab administered by proctors not taking the test. Teachers taking the certification must ALSO sign the REC Foundation Proctor Agreement prior to taking the certification

Q: The REC Foundation offers Pre-Engineering and Robotics Certifications. Can we earn both?

A: Both REC Foundation certifications, Pre-engineering and Robotics, require passage of the Fundamentals of Engineering module. Pre-engineering then requires passing any two of the eight engineering area modules (Electronics, Computer Science/Programming, Mechanical, Chemical, Civil, Aerospace, Manufacturing, and Engineering Technology) offered. The Robotics Certification requires passing a third engineering area module, with the three being in the *specific* areas of Mechanical, Programming, and Electronics. Since the Robotics Certification exceeds the two engineering area modules required for a Pre-engineering Certification, the student earns *both* the Pre-Engineering and the Robotics certifications.

Q: What are the benefits for students of earning of industry certifications?

A: The REC Foundation Pre-Engineering and the Robotics Certification identifies students with the knowledge and experience needed for entering today's engineering workforce. Certifications also help students understand their strengths and weaknesses and understand the many areas of engineering to make wiser and more educated choices regarding their future education and career choices. Certificates can be recognized by employers following high school graduation. The students receive a physical certificate which shows their areas of strength in specific engineering area disciplines after at least 150 hours in a high school program.

Pre-engineering and Robotics Industry Certifications--see how your students and program stack up—info can be found at <http://www.roboticseducation.org/for-participants/certification>

We have several world renowned, internationally based engineering firms that endorse the REC Foundation Industry Certifications such as Harris and Northrop Grumman corporations as well as many US corporations such as Innovation First, Advanced Magnetic Labs, and many other organizations and firms. When your students do well on our pre-engineering and robotics industry certifications, you know they are gaining foundational skills and knowledge that are recognized as relevant internationally and will serve them well in their career endeavors right out of high school and for their continued education.

Q: Is there is specific curriculum or textbook associated with this or special lab and equipment needed?

A: These certifications were developed to provide opportunities suited to a school's lab, a teacher's expertise, as well as the school district's needs for local industry. There are many prepared curriculums available to prepare students for these certifications. The REC Foundation provides [a list](#) of some curriculum currently available that covers the content found in the REC Foundation's Robotics and Pre-engineering certifications. A list of the specific topics covered for each engineering area is at:

[Knowledge and Occupational Skills List](#)

[Sample Course Sequence](#)

Follow these topics covered to ensure you are covering the areas using the curricula of your choice.

Q: What are the costs for the RECF industry certifications?

A: REC Foundation as of January 1, 2016.

Pre-Engineering Certification:

Each Pre-Engineering Certification purchased includes four separate voucher codes, one for each of the required three modules plus one extra for retakes. These include the “Fundamentals of Engineering

| Pre-Engineering Certifications | Price |
|--------------------------------|----------|
| 1 | 40.00 |
| 10 | 400.00 |
| 25 | 1,000.00 |
| 50 | 2,000.00 |
| 100 | 3,500.00 |
| 200 | 6,500.00 |

Module” (required before proceeding to other engineering area modules) and any two of the eight engineering modules listed at www.roboticseducation.org/certification.

Robotics Certification: Each Robotics Certification purchased includes five separate voucher codes, one for each of the required four modules plus one extra for retakes. These include the “Fundamentals of Engineering Module” (required before proceeding to other engineering area modules) and

| Robotics Certifications | Price |
|-------------------------|----------|
| 1 | 50.00 |
| 10 | 500.00 |
| 25 | 1,250.00 |
| 50 | 2,500.00 |
| 100 | 4,500.00 |
| 200 | 8,500.00 |

specifically three of the eight engineering modules in Electrical, Programming, and Mechanical listed at www.roboticseducation.org/certification.

Note: The student earns BOTH the Pre-Engineering AND the Robotics Certification as the requirements for Robotics meet and exceed the Pre-Engineering Certification requirement by passing three modules over two required for Pre-engineering.

Proctoring: After a purchase order or credit card is received, a proctoring agreement will be sent to the contact provided to be returned prior to the certification/voucher codes being released.

Q: How can my school order the certification?

A: The ordering process has 3 steps:

1. Make payment arrangements
2. Sign the proctor agreement
3. Receive Certification Vouchers and instructions for the Certifications contact/proctors

Q: Who do I contact for payment information?

A: Please send an email to accounting@roboticseducation.org or call REC Foundation:

Phone Number: (214) 771-0975

Fax Number: (214) 481-6335

Mailing Address:

REC Foundation

P.O. Box 8276

Greenville, TX 75404

Q. Can we purchase certifications for all of our schools at once?

A: Yes, please refer to the REC Foundation's Certification Pricing Sheet and follow the three-step ordering process.

Q: Why is there a proctor agreement?

A: States require that schools, districts, or any entity providing certifications, sign a proctor agreement.

Q: Who can proctor the test?

A: Any adult that signs the proctor agreement. This can be a district official designated to ensure that all standards in the proctoring agreement are adhered to at all testing sites. It can also be an individual school site administrator, teacher, or home school staff. REC Foundation certifications MUST have approved Proctors with signed REC Foundation Proctor agreements.

Q: Can homeschool families give the certifications to their students?

A: Yes, provided they follow all regulations for certifications in their state and have a designated proctor(s).

Q: Are schools outside the US eligible?

A: Yes. They must have approved proctors to administer the certifications. The same rules apply in or out of country.

Q: Could middle school students be eligible?

A: Yes. There is no reason a middle school student cannot be advanced enough in knowledge and experience to earn these certifications.

Q: How soon can we begin administering the industry certifications?

A: Immediately following completion of our three step ordering process.

Q: Can we give the certifications one module at a time?

A: Yes.

Q. Can we give the modules over the course of a student's four years in high school?

A: Yes

Q: How do my students sign up?

A: Each proctor has their own specific testing URL that each proctor creates himself. The students are given this link by their proctor with instructions on how to setup their user account. Each Proctor is provided a proctor overview detailing the steps to create the proctor account with their unique URL for their students' certifications, and how to administer the certifications.

Q: Which engineering and robotics corporations and/or associations have endorsed these certifications?

A: Northrop Grumman, Harris Corporation, Advanced Magnetic Labs (AML), Innovation FIRST, VEX Robotics, and Aeronix Corporations.

Q: Who developed the certifications?

A: A team of engineers from multiple corporations, university professors, and high school engineering teachers working on the certifications over the course of four years.

Q: Who can I contact if I have more questions?

A: The REC Foundation's Certification Administrator can be reached at certifications@roboticseducation.org or by phone at [\(903\) 401-8010](tel:9034018010).