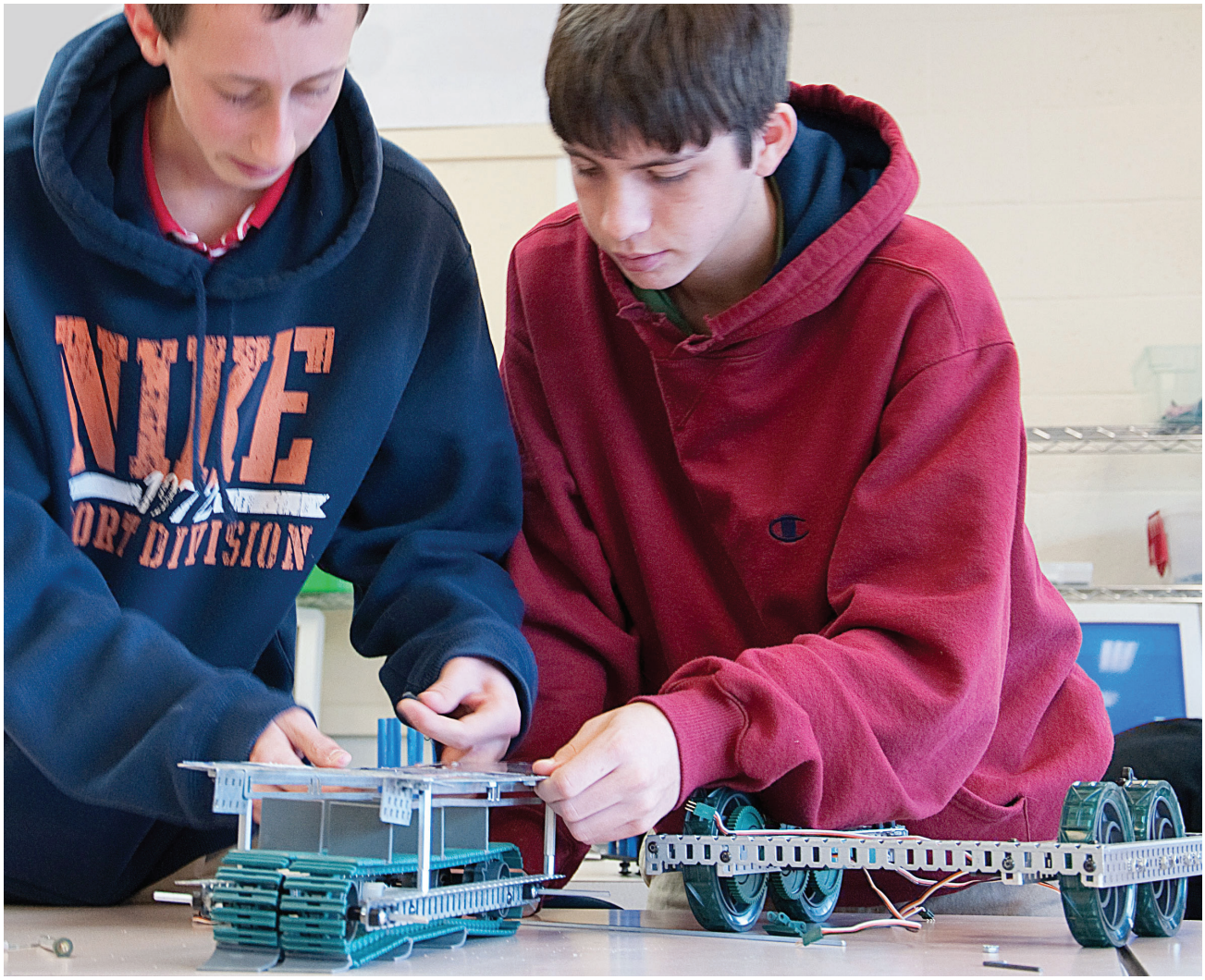
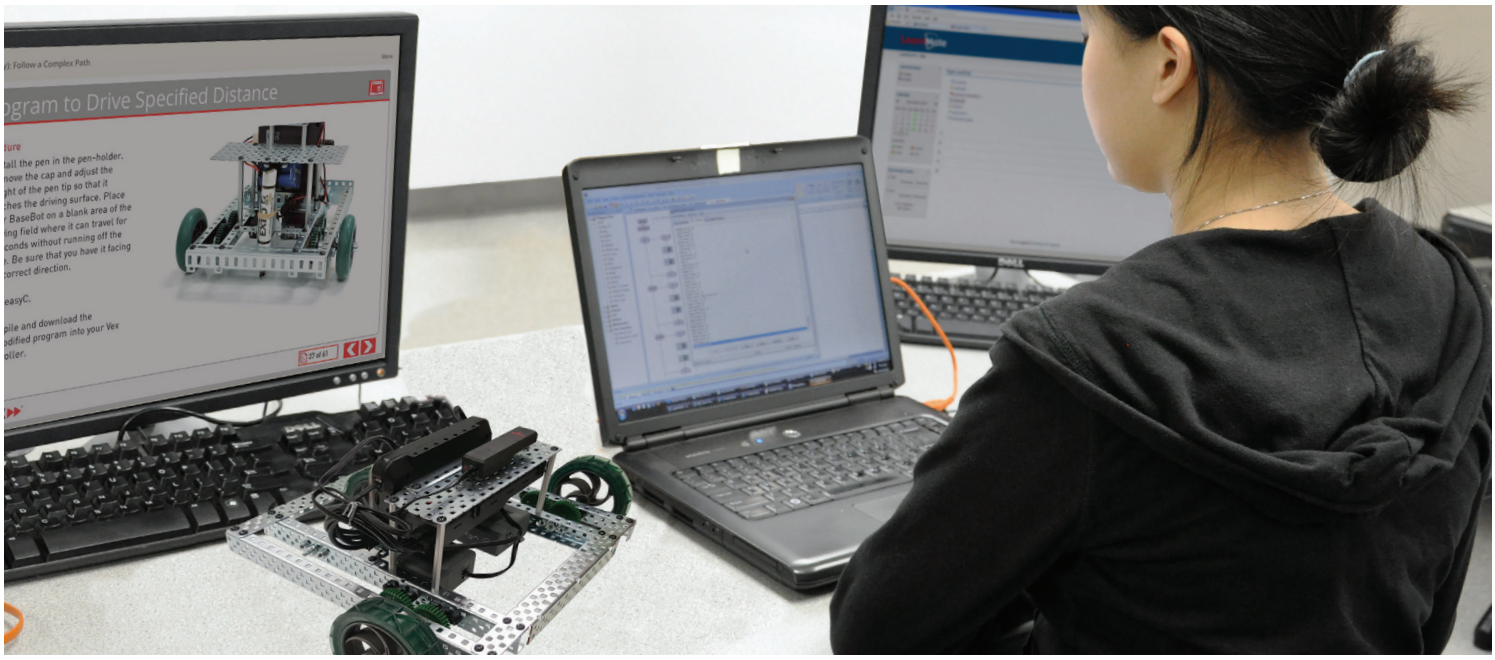
Robotics Engineering Curriculum (REC) for VEX V5

A validated STEM program providing a pathway to industry careers!



- RELEVANT AND ENGAGING CURRICULUM
- CLASSROOM FRIENDLY RESOURCES
- ALL-INCLUSIVE STEM SOLUTION
- INTRODUCING STUDENTS TO CAREERS

intelitek®



Deliver robust and relevant STEM education in a format that engages digital-native students

Robotics Engineering Curriculum (REC) provides a comprehensive study of engineering concepts including

- Physics
- Programming
- Mechanical systems
- Electrical and electronics systems

These core concepts are delivered through relevant activities and projects using robotics as a vehicle to convey the principles of engineering. Using the award winning VEX® Robotics hardware and VEX Coding Studio robotic programming software, REC generates excitement and enthusiasm for engineering.

REC's hybrid curriculum is aligned to STEM standards recognized nationwide, including Atlas of Science, ITEEA and NCTM. When combined with Intelitek's LMS, you can map and report on the performance of your students, school or district to any set of standards!

Provide an immersive instructional experience with project-based learning

REC delivers instruction in a format today's digital learners thrive in: blended learning with interactive online delivery, simulations and team-based activities.

Project-based learning is an essential learning strategy throughout REC

With authentic activities, scenarios and in-class competitions as capstone projects, REC creates an educational experience that is relevant to students. Working in groups with a common goal, students use their imagination and inquiry to develop individual solutions. Competitions and projects motivate students and solidify the concepts learned in the classroom. Students develop communication, teamwork and leadership skills while also learning core engineering principles.

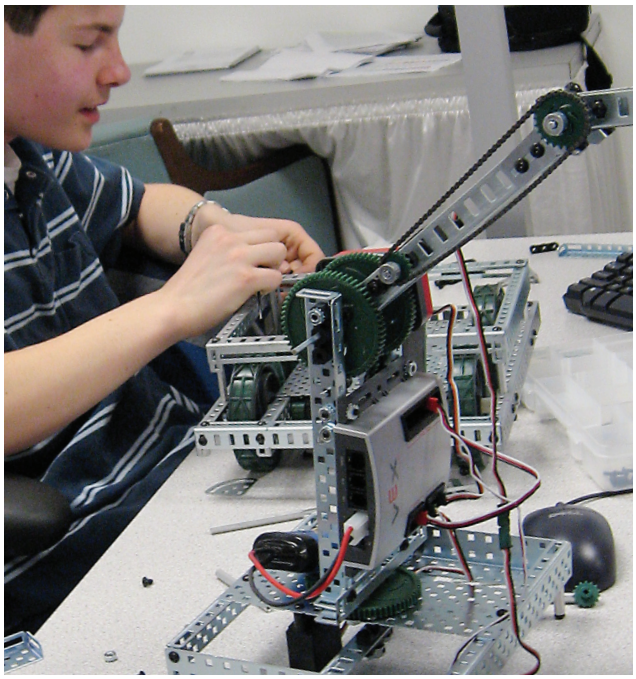
Flexible curriculum provides differentiated instruction for diverse learners

Multiple instructional strategies enable students with varying knowledge, abilities and interests to become active and involved. REC immerses students in exciting scenarios to reinforce concepts and help connect the educational experience with relevant interests in the world around them.

Empower teachers to succeed

With REC, your instructor can succeed without any prior knowledge or experience as an engineering instructor. The step-by-step format provides everything needed for a successful program out-of-the-box, ready to use. REC includes full support for instructors, including detailed activity instructions, teachers guides, sample solutions and program code.

REC provides structure to enhance the effectiveness of novice instructors, with flexibility for experienced and creative instructors to build on. Whether a new teacher or an engineering pro, REC allows teachers to put the focus where it deserves to be: on student progress.



Flexible implementation for any size program

REC is available in packages tailor-made for any program size. Whether you need just e-learning content to enhance your program, or a full-blown all-inclusive 2-year program, we have an option that will work for you.

Quality components for STEM Classrooms

REC is built on quality content, award-winning hardware and intuitive software, all tied together by an LMS developed specifically for career and technology classrooms. The result is a truly integrated solution with hardware and software fully harmonized with the content.

Curriculum Mapped to National Standards

- ATLAS of Science Literacy
- ITEEA Standards for Technological Literacy
- NCTM Principles & Standards for School Mathematics
- Next Generation Science Standards
- GA - Foundations of Engineering Technology

LearnMate® LMS

Intelitek's learning management system (LMS) automates time-consuming classroom administration, freeing teachers to focus on teaching. Classes are easily set up, content is delivered consistently across multiple classes, school-wide or district-wide. Student progress is tracked in real-time with robust reporting that enables you to identify skills gaps, report on outcomes and validate your program!

- Deliver consistent content across multiple classes.
- Grade students online, view and access grades anytime, anywhere.
- Produce reports on student progress, grades and outcomes

VEX® Coding Studio (VCS) Robotic Programming Software

VEX Coding Studio is a classroom friendly coding environment for VEX EDR V5 hardware. VCS contains multiple languages and coding styles, allowing students to start programming with blocks, smoothly move to textual programming, and eventually to advanced object oriented concepts. VCS contains features specifically built for education and learning as a student evolves in their coding expertise.

Other features include:

- Program your robot with Modkit Block + Text, VEX C++, or VEX C++ Pro
- Common User Interface across all the Languages allowing users to move to a new language without learning an entirely new program
- Compatible with Windows, MAC, Chromebook, iPad, and Android Tablet

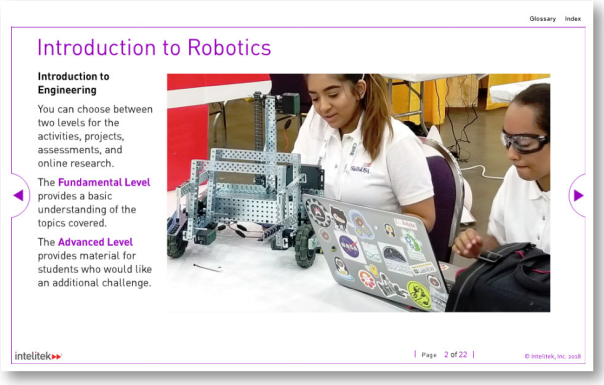
VEX® V5 Robotics Hardware

The VEX V5 System is the most advanced level of mobile robotics. The VEX V5 Robotics Design System offers students an exciting platform for STEM education. VEX is the most classroom friendly platform for robotics instruction with safe components in easily managed kits, perfect for team activities. The kit below Includes all necessary components for REC 1, Semesters 1 and 2.

Qty	Description	VEX Part Number
1	V5 Classroom Starter Kit	276-6500
1	Line Tracker (3-Pack)	276-2154
1	Ultrasonic Range Finder	276-2155
1	Gear Kit (Low Strength Gear Kit)	276-2169
1	4" High Traction Tire (4-Pack)	276-1489
1	Metal and Hardware Kit	276-2161
1	Wheel Kit	276-2164
1	Limit Switch (2-pack)	276-2174
1	3.00" Standoff (4-pack)	275-1020

"Everything is laid out for you - your curriculum, your equipment. I don't have to create the lesson, I don't have to get the inventory. Just put me in the classroom and let me teach."

Mechelle Welch, Technology Applications Instructor



Put the advantages of Robotics Engineering Curriculum to work for you:

For Students

- Relevant content connects educational experience to their interests.
- Interactive curriculum conveys instruction for digital native students.
- Blended learning, projects and competitions make learning fun.
- Multimodal strategies connect with all learning styles, enabling differentiated instruction.
- No prerequisite knowledge required, helping learners of all levels to succeed.
- Supports range of student outcomes, from immediate employment to adv. education.
- Self-paced curriculum allows students to progress at their own pace.
- Access curriculum anywhere, anytime.
- Obtain a portable, industry-based credential to validate skills and advance career goals.
- Develop essential 21st century skills like teamwork, problem solving and communication.

For Teachers

- Step-by step curriculum provides full support for less experienced teachers.
- Comprehensive packages provide everything needed for your program.
- Self-paced curriculum enables your advanced students to progress while you focus on those needing attention.
- Employ any teaching strategy: self-directed, instructor-led, or collaborative.
- Automated classroom administration frees teachers to focus on students.
- Real-time tracking and reporting of student progress.
- Certification provides measurable results to validate your program.
- Flexible curriculum provides a framework for experienced teachers to build on.
- Immediate support available via email, phone or through your local distributor.
- Factory training and ongoing professional development maximize your success.

For Administrators

- Enable sustainability year-over-year, even with faculty and other changes.
- Ensure content is delivered consistently classroom-wide, department-wide, even district-wide.
- Implement a program aligned to existing STEM standards.
- Embrace changing state standards with custom standards-mapping.
- Open doors to funding and articulation by offering certification.
- Validate your program at multiple levels - student, classroom, state or district - with aggregated reports.
- Obtain a full program solution from one source, including all-inclusive curriculum, installation, support, training and professional development.
- Partner with an organization with proven after-sale support.
- No annual costs.

Course Outlines

Year 1, Semester 1

- Unit 1: Introduction to Robotics
  - 1.1 (Core): Introduction to Robotics
  - 1.2 (Core): The Design Cycle
  - 1.3 (Activity): Engineering Notebook
  - 1.4 (Core): Safety
  - 1.5 (Core): The VEX Robot
  - 1.6 (Activity): Vex Components
  - 1.7 (Core): Fasteners
  - 1.8 (Activity): Chassis Construction
  - 1.9 (Core): Drive Train
  - 1.10 (Activity): Drive Train Construction
  - 1.11 (Core): Robot Controller
  - 1.12 (Activity): Wiring the Vex Controller and Battery
  - 1.13 (Core): Wireless Control
  - 1.14 (Activity): Using Wireless Control
  - 1.15 (Core): Dual Joystick Control (Tank)
  - 1.16 (Activity): Tank Control
  - 1.17 (Core): Single Joystick Control (Arcade)
  - 1.18 (Activity): Arcade Control Operation
  - 1.19 (Core): Robot Systems Design
  - 1.20 (Activity): Adding Components to the BaseBot
  - 1.21 (Project): Motion Path Challenge.
- Unit 2: Intro to VEX Programming with VEX V5
  - 2.1 A (Core): Basic Motor Control
  - 2.1 B (Activity) Programming Components
  - 2.2 (Activity): Draw a Line
  - 2.3 (Core): Pseudocode and Turns
  - 2.4 (Activity): Make a Square
  - 2.5 (Core): Variables, Constants and Comments
  - 2.6 (Activity): Apply Constants, Variables, and Comments
  - 2.7 (Core): Tools in VEX Coding Studio (VCS)
  - 2.8 (Activity): Using VCS Tools
  - 2.9 (Core): Dead Reckoning and User Functions
  - 2.10 (Activity): Follow a Complex Path
  - 2.11 (Core): Conditional Statements
  - 2.12 (Activity): Modifying the GoForward Function
  - 2.13 (Core): Loops
  - 2.14 (Activity): Make Multiple Squares
  - 2.15 (Core): Simplified Symbols, Logical Operators, and Integer Math
  - 2.16 (Activity): Drawing Shapes
  - 2.17 (Project): Fine Motor Control
- Unit 3: Physics and Robotics
  - 3.1 (Core): Motors and Motor Speed
  - 3.2 (Activity): Angular Velocity
  - 3.3 (Core): DC Motors: Types and Uses
  - 3.4 (Core): Gears and Gear Trains
  - 3.5 (Activity): Gear Trains
  - 3.6 (Core): Fundamentals of Linear Motion
  - 3.7 (Activity): Linear Motion
  - 3.8 (Core): Rotational Dynamics
  - 3.9 (Activity): Linear and Angular Velocity
  - 3.10 (Core): Newton's Laws
  - 3.11 (Activity): Weight
  - 3.12 (Core): Friction and Traction
  - 3.13 (Activity): Coefficients of Friction
  - 3.14 (Core): Torque
  - 3.15 (Activity): Test Motor Torque
  - 3.16 (Core): Gear Ratios and Torque
  - 3.17 (Activity): Hill Climb
  - 3.18 (Core): Power
  - 3.19 (Project): Tractor Pull

Year 1, Semester 2

- Unit 4: Sensors
  - 4.1 (Core): Introduction to Sensors
  - 4.2 (Activity): Open-Loop vs. Closed-Loop Navigation
  - 4.3 (Core): Open-Loop vs. Closed-Loop Systems
  - 4.4 (Core): Introduction to Vex Kit Sensors
  - 4.5 (Activity): Bumper Car
  - 4.6 (Core): Ultrasonic Sensors
  - 4.7 (Activity): Ultrasonic Rangefinder
  - 4.8 (Activity): Warn and Avoid with Speaker
  - 4.9 (Core): Following Lines
  - 4.10 (Activity): The Line-Following Sensor
  - 4.11 (Activity): Line Following
  - 4.12 (Unit Project): Bumper Books
- Unit 5: Arms and End Effectors
  - 5.1 (Core): Introduction to Robotic Arms, Degrees of Freedom
  - 5.2 (Activity): Robotic Arm Construction
  - 5.3 (Core): Mass, Weight, Center of Weight & Torque
  - 5.4 (Activity): Center of Weight of BaseBot
  - 5.5 (Core): Relationship of Torque, Gear Ratio and Weight of Payload
  - 5.6 (Activity): Stall Torque
  - 5.7 (Core): Remote Control; Limit Switches
  - 5.8 (Activity): Windshield Wiper
  - 5.9 (Core): End Effectors
  - 5.10 (Activity): End Effector
- Unit 6: REC 1 Project
  - 6.1 (Project): Ultrasonic Trainyard Challenge

Ordering Information

REC Curriculum

REC I - Semester I for use with VEX V5, Units 1-3.	REC1-CUR5-SEM1
REC I - Semester 2 for use with VEX V5, Units 4-6.	REC1-CUR5-SEM2

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