

STEM U

PROGRAM DETAILS



Securing
highschoolers'
college and
career
readiness





INTRODUCING: YOUR 21ST CENTURY SCHOOL

Robotics is the fastest-growing and most advanced technology used in education, research and industry.

The **STEM-U** program utilizes robots in classes as they are the ideal partner for teaching **Science**, **Technology**, **Engineering** and **Math's** core concepts at all levels.

By using our award-winning standards-aligned curricula alongside the robots, instructors and teachers prepare students for career and college, engage them in the most complex STEM topics, drive excellence and stay current with major technological breakthroughs.

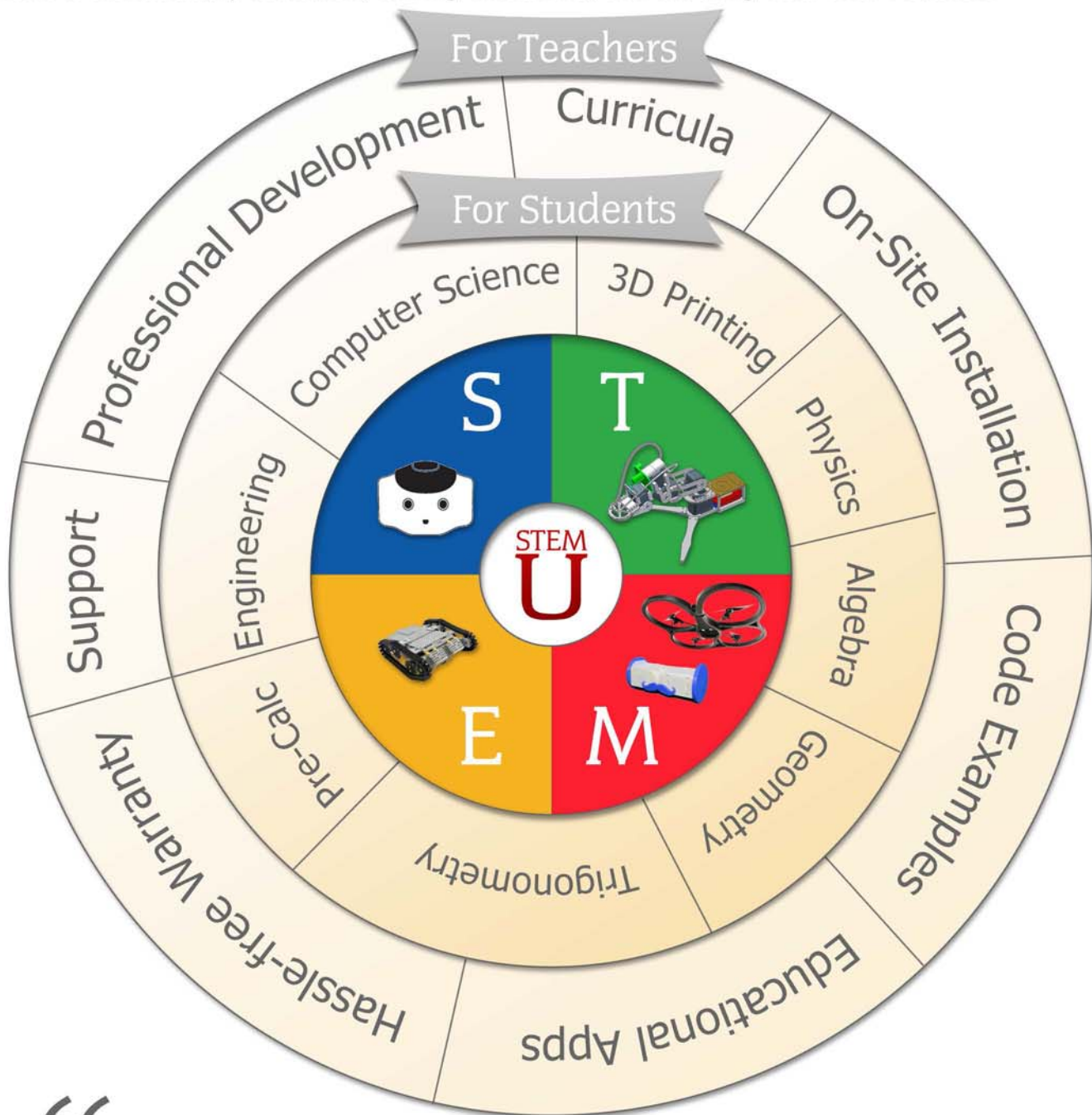
Together we create
Pathways to STEM



STEM-U is a unique program with a holistic and revolutionary view on STEM subjects, using robots.

Working in the intersection of robotics and education, RobotsLAB's team of Educators, Teachers, Professors, Engineers and Roboticists are introducing standards-aligned curricula using drones, rovers and other robots as a teaching-aid for middle and high school S, T, E and M classrooms.

RobotsLAB's mission is to augment educators and engage students using the most innovative tools available to 21st Century educators, driving excellence, and ensuring their future success.



“ ... Leadership tomorrow depends on how we educate our students today, especially in Science, Technology, Engineering and Math.

— President Barack Obama, *Ed.gov/STEM*

No robotics experience needed!

Watch the video



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I would like to say how impressed I was with the ability of the RobotsLAB BOX to generate immediate interest and its ability to captivate an audience. I used it to show how at the school of engineering and sciences we will be using different techniques and methods to learn mathematics through a hands on approach. [...] As soon as I showed them the quad copter, I had not only the parents' attention, but all the children in the classroom stopped and were enthralled by the demonstration. I had people ranging from 4 years old to 70 years old, and all of them were immediately engaged in my discussion, through the use of the robots as a manipulative . . . I could not ask for any higher engagement and interest level.

- Neil L. Math Department Chair, Sacramento USD, CA

“

My students struggle to understand these topics. By using these robots, my students find the math lessons more fun and engaging. Best of all, I didn't need to know about robotics in order to use the BOX in my classroom.

- April Cordry-Moore, Pre-Calculus Teacher, Cedar Hill ISD, TX

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Our goal [in selecting and equipping the district's high schools with RobotsLAB BOXes] is to develop students who use science, technology, engineering and mathematics to solve real-world problems and to provide them with exposure to additional career opportunities.

- John Shannon, CTE Director , Onslow County Schools, NC

RobotsLAB BOX

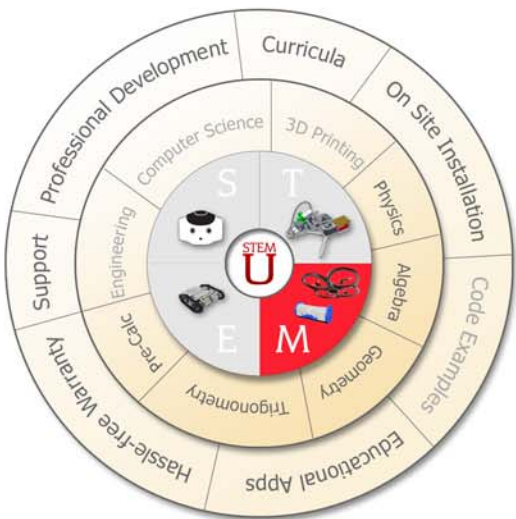
PROGRAM DESCRIPTION

RobotsLAB BOX is a revolutionary and award-winning teaching aid program demonstrating core concepts of Algebra, Physics, Geometry, Trigonometry, and Pre-Calculus **using robots**.

Math is everywhere, and a fundamental step to success in college and career. The easy-to-use tablet includes interactive lessons which bring the robots to life, helping students understand why math is relevant to their world. The teacher's additional resources include in-class quizzes, answer keys and instructional videos.

State-of-the-art lessons are strictly aligned with mandated standards. Imagined and **designed by teachers for teachers**, this affordable solution covers the important standards in math.

RobotsLAB BOX is a modular solution which was designed to answer the ever-changing needs of the 21st century classroom, and the most engaging solutions math classrooms have ever seen!



PROGRAM INCLUDES:

- A tablet pre-loaded with interactive lessons, quizzes, answer keys and instructional videos
- Four robots (quadcopter, robotic arm, rover and robotic ball)
- Accessories (mat, plastic bar, batteries chargers, projector dongle)
- Transport case
- DVD with teacher's book, quizzes, answer keys and videos
- One year warranty

DELUXE VERSION ADDS:

- Comprehensive warranty, including replacements and shipment
- One year subscription for additional lessons

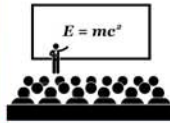
GRADE LEVEL



Middle and High School (7-12)

From linear and quadratic equations, geometry and trig to pre-calc.

NUMBER OF STUDENTS



Entire Class, School Wide

The teacher is using the included robots to demonstrate abstract math concepts. Multiple teachers can share a kit!

CURRICULUM DURATION



As Needed

Curriculum covers different subjects and is designed to show students how math is relevant to their lives.

EFFECT ON STUDENTS



Soothing the 'Math Pain'

By demonstrating abstract concepts in real-life students finally understand why they must learn and excel at math.

PROFESSIONAL DEVELOPMENT



Half Day - On Site

No robotics or computer science experience is needed. If you can browse the web on your iPad, you are ready!

IMPLEMENTATION FOOTPRINT



School Level

Regular version \$3,500
Deluxe version \$3,999
P.D. \$750
Shipping - US \$124

District Level

10 Regular version \$31,500
10 Deluxe version \$35,999
P.D. FREE
Shipping - US \$850

Want to learn more? Schedule a demo? Contact us:

math@RobotsLAB.com \ office: 415-702-3033 \ www.RobotsLAB.com/box

A 2014 Brand New Curriculum!

Watch the video



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Our new NAO robot enables precisely the kind of authentic learning that has permanence for students. Programming can be a rather abstract exercise that doesn't seem to have a tangible outcome, but not when students focus their efforts on this particular learning tool. I am quite confident that adding the NAO robot to our computer programming structure will result in enhanced student opportunity in college and the world of work.

- Dr. David Brown, Superintendent, Randolph Township Schools, NJ

“

One of the things that amazes me most is the draw that NAO has for students; it draws women and minorities that have never shown interest in programming or robotics to the table. Students are asking teachers to teach them math as opposed to just having it forced on them by the teacher.

- Mike Beiter, High School Computer Science teacher
at Central Career and Technical School, PA

NAO Olympics

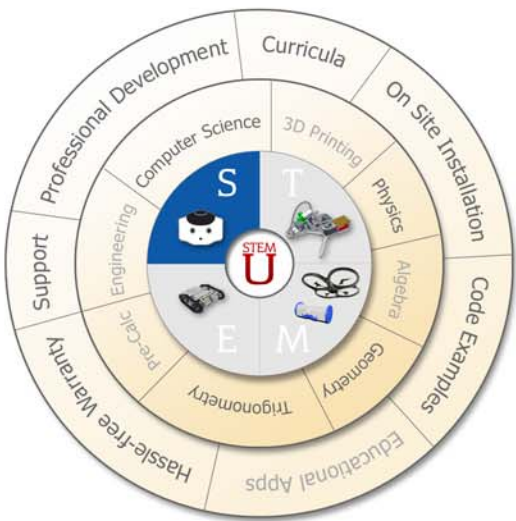
PROGRAM DESCRIPTION

NAO is the leading humanoid robot being used in education worldwide. The **NAO Olympics program** brings programming to real-world applications such as the Olympic Games, engaging students and enforcing all STEM subjects.

Students and educators around the world adore NAO for its ease of programming and versatility. The NAO Olympics program combines for the first time computer science, geometry, trigonometry, and physics with actual games, to prepare students for college and career.

The curriculum is designed to engage boys and girls in various programming challenges such as trajectories (basketball and bowling), depth analysis and motion prediction (air-hockey), triangulation and bipedal locomotion (soccer), navigation (on a mat with a printed maze) and much more!

The program comes with all the accessories the teacher needs in order to run the program, and with code examples to all the challenges.



PROGRAM INCLUDES:

- A NAO H25 robot
- 15 software licenses including simulator
- All NAO Olympic Games accessories (basketball football, bowling, air-hockey table, mat)
- Depth sensor
- A tablet, preloaded with the curriculum
- Transport case
- DVD with teacher's book, quizzes and answer keys
- One year warranty

BETTER TOGETHER ADDS:

- An additional NAO robot (Total two robots)
- 15 additional software licenses (Total 30)

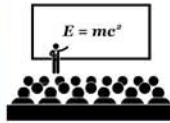
GRADE LEVEL



High School (9-12)

Basic understanding of geometry, trig and physics is needed. The program teaches Python programming.

NUMBER OF STUDENTS



Up to 15 students per robot

The program comes with a simulation software. Students can program a virtual robot before testing on a real one.

CURRICULUM DURATION



A School year

Ten modules can be spread around the year. Students will go from basic to advanced programming.

EFFECT ON STUDENTS



Highest level of engagement. Ever!

By working on a humanoid robot, students are working harder as they finally use STEM lessons in the real world.

PROFESSIONAL DEVELOPMENT



Two Days - On Site

Training includes how to program the robot, using its API and SDK, and program-specific training.

IMPLEMENTATION FOOTPRINT



School Level

Regular version \$18,500
Better together \$34,999
P.D. \$1,750
Shipping - US \$357

District Level

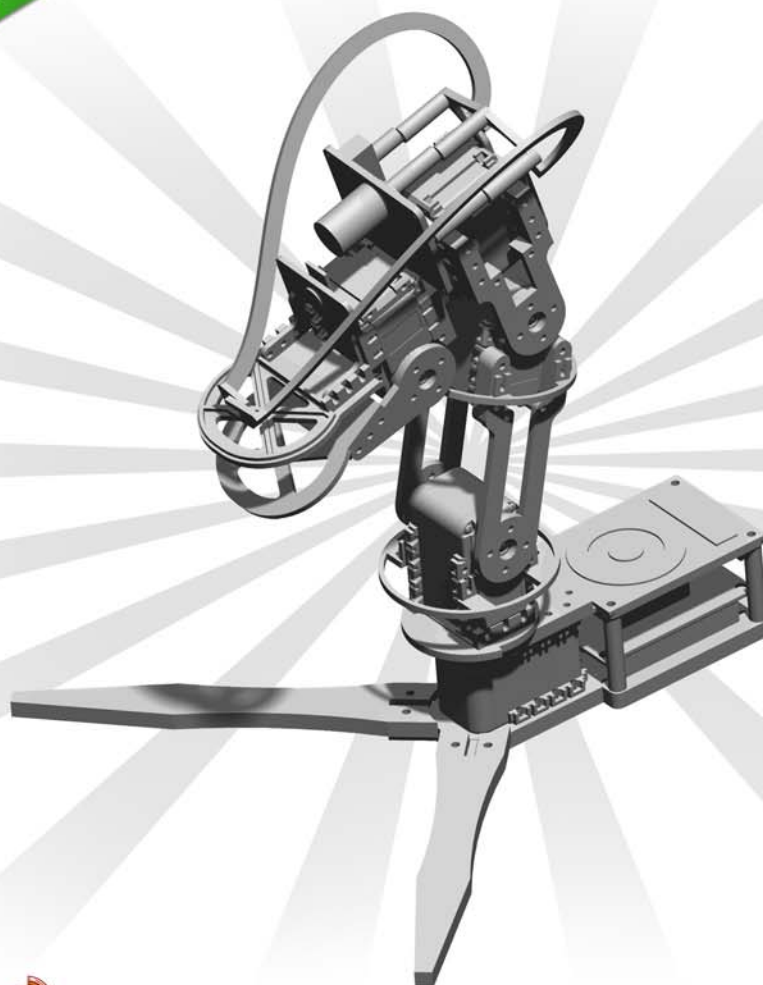
10 Regular version \$159,500
10 Better Together \$299,999
P.D. FREE
Shipping - US \$1,850

Want to learn more? Schedule a demo? Contact us:

CS@RobotsLAB.com \ office: 415-702-3033 \ www.RobotsLAB.com/nao

3D Print your robot program!

Watch the video



COMMON CORE
STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREERS



CURRICULUM CONTENT

FABRICATION / CONSTRUCTION:

HOW 3D PRINTING WORKS:

This section outlines the fundamentals of how a 3D printer works – specifically highlighting the process of Fused Deposition Modeling – or FDM for short. Essentially it is a process of extruding out a small bit of material in a melted form. As it hardens it fuses with the previous printed sections of material. Each printed part is initially broken down into thin slices and a 2D section is constructed for each layer. 3D printers deposit the material in the cross-section shape for each layer and as the process is repeated the part grows. An introductory part is printed for the classroom and they can see the part grow in front of their eyes!

PHYSICS OF MATERIALS:

Students are introduced to some of the basic physical properties of materials (state changes, volume, viscosity, heat transfer, etc) and how each property is used in the design of the printer. For FDM, the material must be heated into a liquid state so it can flow, but also be able to return back into its solid state without much deformation. The material must be heated to a temperature that it can flow, but not “run” too much... 3D printing demonstrates the use of these physical attributes of the material to generate a part. This can relate to water and ice for example, and the different states that a material can pose. As we can see, different states allow the materials to act very different.

MATHEMATICS BEHIND PRINTING:

In this section, the students are challenged to describe how they might think The mathematics behind printing can be very complex, however this is where we can begin to understand the importance of the Cartesian coordinate system. When you decide to print out a part on a 3D printer, the design is broken into a host of data points that are translated into positional movements of the table, the printer head, and the volume of material that is being extruded out of the print nozzle. Examples of printing something on an XY table – and how it directly relates to functions, and the Cartesian coordinate system. Bring in the Z axis – the height component and introduce how a part can be broken into a series of positions and points.

HANDS ON CONSTRUCTION:

Students will learn how to craft and assemble the projects they have printed out. This is an important step because they will quickly see the parts take shape into a cool looking robot! This section introduces the students into the idea of mechanical tolerances, interference fits, as well as friction, and the use of different methods of fasteners, the concepts of leverage, mechanical advantage, rigidity, and grain.

ELECTRONICS:

PRINCIPALS OF ELECTRONICS:

The basics of electronics are covered in this section. This includes Ohm's law, and then concepts of current, voltage, electrons, and how they are used to power electronic devices.

MOTOR FUNDAMENTALS:

An overview of how the servo motors are constructed and function is introduced in this section. Concepts of how the motor converts electricity into mechanical force is detailed here along with an explanation of what the differences between power and torque are as well as how they apply to the design and functionality of the robot. Gears are briefly introduced and an explanation of what they do is provided.

CONTROLLER BOARD OVERVIEW:

Students are introduced to the fundamentals of how the controller board works and the different circuits and parts on the controller board. The functionality of the software is gone over here in more detail and challenges the students to construct some simplistic routines in scratch to demonstrate what the controller is doing.

SENSORS & FEEDBACK:

Students are introduced to how feedback is sent back into the microcontroller and how it uses the data to understand and adjust to the world it's in. Feedback can be seen in many devices such as when your phones screen brightens when you go into a dark room, or how a garage door knows not to close on your car.

COMMUNICATION:

The communication process from the controller and the servos is detailed here, as well as how the controller board communicates with the host computer, Scratch, and other devices.

PROGRAMMING:

MATH & ROBOTICS:

In this section, the robots movement is related to geometry and trigonometry with mathematical relationships of SIN, COS, and TAN. The relating of the arm and its joints into triangles and the superimposing of position and angular rotation upon each joint is covered here.

FUNCTIONS:

Students are introduced to the concepts of a function and are challenged to generate a few different types of motions based on user input.

FEEDBACK:

Students are introduced to and then challenged to use the robotic feedback systems to generate a response from the robot.

STEM-BOT 3D

PROGRAM DESCRIPTION

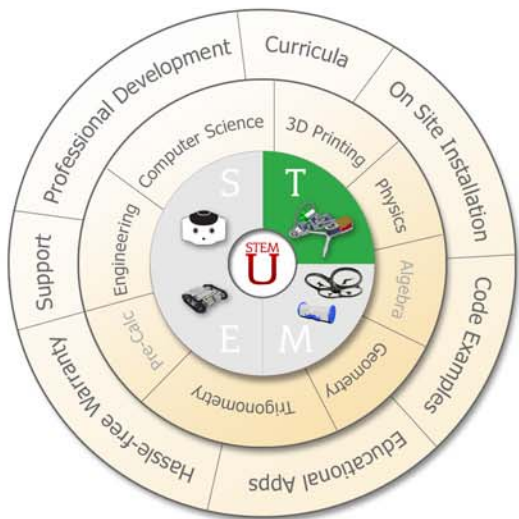
The STEM-BOT 3D program is a revolutionary approach to engineering and computer science education. The curriculum teaches students how to 3D print a robot, assemble it, work on the electronics, and finally program it using Scratch.

The program is modular - teachers can focus on assembly and 3D printing (by ordering motors and electronics only), on the programming (by ordering a pre-built robot), or everything in between.

The **job-creating curriculum** offered with the STEM-BOT 3D is vast and can be tailored to all levels of education and integrate into every classroom very quickly and effectively.

The curriculum is designed to introduce the students to the process of design, manufacturing, and construction of a complex robot. Once the STEM-BOT 3D is constructed, students are then challenged to use their creation to solve problems that are based around mathematics and physics.

Each chapter offers an engaging way to help students learn the mathematical, theoretical, and technical fields needed to succeed in an engineering career.



PROGRAM INCLUDES:

- STEM BOT Class: including 15 STEM BOTS
- 15 software licenses for programming
- All electronics and sensors, pre-assembled on the board
- All the wires and servo motors
- 3D printing files of all the parts
- Curriculum including teacher's and student's books
- Warranty on all the electronics, sensors
- Customizable skins

ADVANCED PACK ADDS:

- 3D Printer
- Filament enough for 3D printing 20+ STEM BOTS
- Half day 3D-printing professional development

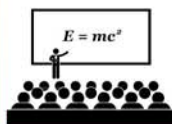
GRADE LEVEL



Middle and High School (7-12)

Curriculum can be adjusted to match different levels - from beginners to AP students.

NUMBER OF STUDENTS



1-3 students per robot

The program comes with all the needed parts and pieces to construct the STEM-BOT, 3D print and program it.

CURRICULUM DURATION



A School year

Thirteen modules are spread throughout the year. Students will go from fabrication to electronics to programming.

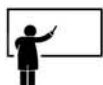
EFFECT ON STUDENTS



Highest level of engagement, ever!

Students are building their own robot and programming it. What could be more engaging than "my robot"?

PROFESSIONAL DEVELOPMENT



Two Days - On Site

Training includes how to fabricate, assemble and finally program the robot, using Scratch.

IMPLEMENTATION FOOTPRINT



School Level

District Level

STEM BOT Class	\$7,485	10 STEM BOT classes	\$69,499
Advanced Pack	\$9,989	10 Advanced Pack	\$88,799
P.D.	\$1,750	P.D.	FREE
Shipping - US	\$357	Shipping - US	\$1,850

Want to learn more? Schedule a demo? Contact us:

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Build and program up to 16 Models

Watch the video



The BIOLOID STEM system implements a new pedagogical approach. It is **project-based** with 7 projects in the STANDARD edition and 9 additional projects in the EXPANSION pack.

Each project has 3 phases – Basics, Applications and Practical. Each phase contains 7 stages:

- Think about it
- Introduce your robot
- Build your robot
- Programming
- Troubleshooting
- Problem Solving

Each phase ends with a review of the robot technology as well as underlying math and science.

The projects get more sophisticated as the student progresses through the manuals, allowing the student to master robotics with increasing complexity.

BIOLOID STEM

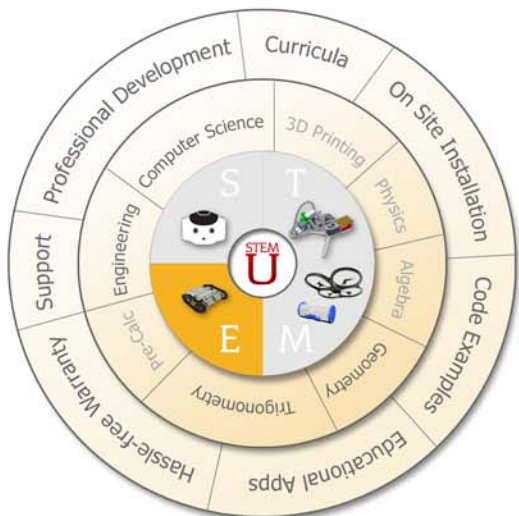
PROGRAM DESCRIPTION

BIOLOID STEM provides an organized learning system for Science, Technology, Engineering and Math.

The BIOLOID STEM curriculum from the Korean company Robotis is optimized for various robotics projects. The kit comes with instructions for 7 sample robots and 21 weeks of curriculum. It provides an organized learning system by blending Science, Technology, Engineering and Mathematics.

Each module challenges the students and engages them to think about the robot throughout the process of assembling it, designing, programming and troubleshooting.

This program develops critical thinking and problem solving, while working on building robots!



PROGRAM INCLUDES:

- BIOLOID Class: including 15 BIOLOID KITS
- 15 software licenses for programming
- All the parts to build 7 different robots
- All the wires and servo motors
- Curriculum including teacher's and student's books
- Warranty on all the electronics and sensors

EXPANSION PACK ADDS:

- More parts - doubles the number of robots that can be built

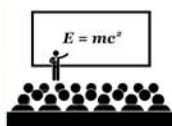
GRADE LEVEL



Middle and High School (7-12)

Curriculum can be adjusted to match different levels - from beginners to AP students.

NUMBER OF STUDENTS



1-3 students per robot

The program comes with all the needed parts and pieces to construct various robots using the BIOLOID kit.

CURRICULUM DURATION



21 weeks + 23 weeks expansion pack

Build and program 7 robots using the standard version, or 16 robots using the expansion version.

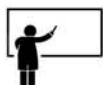
EFFECT ON STUDENTS



Highest level of engagement, ever!

Students are building their own robot and programming it. What could be more engaging than "my robot?"

PROFESSIONAL DEVELOPMENT



One Day - On Site

Training includes how to assemble and program the robots, using Robo Plus software - a C-based language

IMPLEMENTATION FOOTPRINT



School Level

District Level

BIOLOID Class	\$4,935	10 BIOLOID classes	\$45,499
Expansion Pack	\$3,599	10 Advanced Pack	\$31,299
P.D.	\$1,150	P.D.	FREE
Shipping - US	\$357	Shipping - US	\$1,850

Want to learn more? Schedule a demo? Contact us:

Engineering@RobotsLAB.com \ office: 415-702-3033 \ www.RobotsLAB.com

A Complete STEM solution

From the School to the District level



A team of experts, at your service



Elad Inbar, Founder, CEO

Passionate about robotics and education, Elad has shared his expertise with high schools, science museums, and research groups at prominent universities around the world; teaching algebra and physics using robots, and advanced robotics platforms. With parallel careers in academia and technology, Elad is uniquely qualified to bridge the cutting-edge robotics industry and the educational market. Based in San Francisco, Elad has lived on three continents and recruited teams speaking more than 10 languages. His current ventures in robotics and education received wide publication and recognition in the Time Magazine, The New Yorker, Tech Crunch, IEEE, NBC, Financial Times, Fast Company, CNET, San Francisco Chronicle and other media outlets.



Anna Sandler, CTO & Educational Services

As the head of R&D and product management, Anna is responsible for the design and software development aspects of RobotsLAB's products.

Under her supervision, the RobotsLAB's curricula were developed and translated to multiple languages. Her unique experience with educational technology development, robotics, hardware and software ensures that teachers can run the lessons provided by RobotsLAB without prior experience in robotics or computer science.



Ryan Wood, Head of Engineering

As the Head of Engineering, Ryan works with educators, constantly developing solutions to help teachers every day in the classroom.

He is responsible for the creation of the Arm-Bot, which is used in the RobotsLAB BOX to teach geometry, trigonometry and pre-calculus lessons. His latest development, the STEM BOT 3D, is the first-ever curriculum for a 3D printed robot that brings engineering, manufacturing, design, software-development and human-robot interaction into one program.



Prof. Peter Stone

founder and director of the Learning Agents Research Group (LARG) within the Artificial Intelligence Laboratory in the Department of Computer Science at The University of Texas at Austin.

Responsible for the pedagogical aspects of RobotsLAB curricula, Prof. Stone is an integral part of RobotsLAB team. He is also responsible for ensuring that RobotsLAB's curricula and products are aligned with educators' needs. His vast experience as an educator and his work with cutting-edge robotics programs are crucial building-blocks in the delivery of high quality programs and products.

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RobotsLAB
Teaching With Robots