Equipment

The following equipment, curriculum, etc. is being put out for bid for the Manufacturing/STEM courses of Inventions and Innovations (7th Grade) and Technological Systems (8th Grade) at Warren County Middle School located at 200 Caldwell Street McMinnville TN 37110. The equipment and curriculum will be placed in the STEM classroom located in the related arts building at WCMS. Questions in regards to the equipment, curriculum, etc. should be directed to Tracy Risinger, Warren County Schools CTE Director at 931-668-5915 or risingert@k12tn.net

All equipment, curriculum, etc. bids are to include installation, teacher(s) orientation, teacher(s) professional development, assistance and support (on-site, phone, online, etc.), technical support (on-site, phone, online, etc.), warranties, etc.

The equipment and curriculum descriptions and specs are listed below:

1. **Project Lead The Way POW VEX Robotics Kits (equivalent)**
   4 Kits Total
   Installation
   Teacher Training
   Professional Development
   Warranty
   Support and Technical Support (on-site, phone, online, etc.)

Mechanical Components:

(1) Clawbot Kit

(1) Booster Kit
(2) 2-Wire Motor 393
(1) 3-Wire Servo
(1) 2.75" Wheel (4-pack)
(1) Drive Shaft 12" (4-pack)
(1) Advanced Gear Kit
(1) Gear Kit
(1) Tank Tread Kit
(1) Winch and Pulley Kit
(1) Linear Motion Kit
(1) High Strength Sprocket & Chain Kit
(1) Tank Tread Upgrade Kit
(1) C-Channel 1x2x1x35 (2-pack)
(1) Base Plate 30x15 (2-pack)
(1) Metal & Hardware Kit
(1) 3/32" Hex Key (8-pack)
(1) 5/64" Hex Key (8-pack)
(1) Heliocentris Alternative Energy Set

Power Components:

(2) Smart Charger with Power Cord
(2) 7.2V Robot Battery NiMH 2000 mAh

(1)Battery Strap (2-pack)
(1)AAA NiMH Rechargeable Battery (6-pack)
(1)8-Bay AA/AAA Smart Battery Charger

Logic & Control Components:

(2)VEX ARM® Cortex®-based Microcontroller
(1)VEXnet Joystick
(2)Motor Controller 29
(2)USB A-A Tether Cable
(2)VEXnet Key 2.0
(1)VEXnet Backup Battery Holder
(1)3-Wire PWM Cables (Large Bundle)
(2)Limit Switch (2-pack)
(1)Bumper Switch (2-pack)
(1)Potentiometer (2-pack)
(1)Optical Shaft Encoder (2-pack)
(1)Line Tracker Kit
(1)Ultrasonic Range Finder
(1)Light Sensor
(1)Flashlight
(1)LED Indicator Pack

2. Makerbot Replicator Desktop 3D Printer 5th Generation 1-3D Printer (equivalent) Including 2 additional true color large spools and 1 Year Makercare Protection Plan plus installation and training Professional Development and Warranty Support and Technical Support (on-site, phone, online, etc.)

App and cloud enabled

USB, Ethernet, or Wi-Fi connectivity ensures a seamless production workflow
New MakerBot Replicator Smart Extruder, motion controllers, and gantry design
On-board camera and diagnostics, and assisted build-plate leveling
Create realistic prototypes and models for demonstrations and presentations
Choose settings that range from fast draft to finer resolution
Build volume of 8 x 10 x 6 inches (456 cubic inches)
11% larger than the MakerBot Replicator 2 Desktop 3D Printer
Makes true-to-life objects quickly and easily
Enables you to manufacture on demand

PRINTING
PRINT TECHNOLOGY, FUSED DEPOSITION MODELING *BUILD VOLUME*
25.2 L X 19.9 W X 15.0 H CM [9.9 X 7.8 X 5.9 IN] 7,522 CUBIC CENTIMETERS [456 CUBIC INCHES]
LAYER RESOLUTION 100 MICRONS [0.0039 IN] *FILAMENT DIAMETER* 1.75 MM [0.069 IN]
FILAMENT COMPATIBILITY MAKERBOT PLA FILAMENT LARGE SPOOL 0.9 KG [2.0 LB]
NOZZLE DIAMETER 0.4 MM [0.015 IN]
PRINT FILE TYPE MAKERBOT
SIZE & WEIGHT
PRODUCT DIMENSIONS 52.8 L X 44.1 W X 41.0 H CM[20.8 X 17.4 X 16.2 IN]
PRODUCT WEIGHT 16 KG [35.3 LBS]
MECHANICAL
CONSTRUCTION PC ABS WITH POWDER-COATED STEEL REINFORCEMENT

BUILD SURFACE GLASS WITH BLUE TAPE
STEPPER MOTORS 1.8° STEP ANGLE WITH 1/16 MICRO-STEPPING
XY POSITIONING PRECISION 11 MICRONS [0.0004 IN]
Z POSITIONING PRECISION 2.5 MICRONS [0.0001 IN]
SOFTWARE
SOFTWARE BUNDLE MAKERBOT DESKTOP
SUPPORTED FILE TYPES STL, OBJ, THING, MAKERBOT
OPERATING SYSTEMS WINDOWS (7+) MAC OS X (10.7+) LINUX (UBUNTU, FEDORA)
ELECTRICAL
POWER REQUIREMENTS 100–240V, 50–60 HZ 0.76-0.43 A, 100 W
CONNECTIVITY WI-FI, USB, ETHERNET
CAMERA *CAMERA RESOLUTION* 320 X 240

3. **Soldamatic Augmented Reality Welding Trainer with/Work Stands (equivalent)**
   1 Soldamatic Welding Trainer
   Warranty, Installation, Teacher Training, Professional Development Support and Technical Support (on-site, phone, online, etc.)

   Specialized CPU
   Augmented Reality Welding Mask
   Welding Torches
   - Shielded Metal Arc Welding (Electrode)
   - Gas Metal Arc Welding (MIG/MAG)
   - Gas Tungsten Arc Welding

   Five Work Pieces
   - V-Butt Joint
   - Lap Joint
   - T-Joint
   - Pipe T-Joint
   - Pipe V-Butt Joint

   Soldamatic Learning Management System &Teacher Station
   Welding Gloves
   Welding Mat
   Heavy Duty Storage Cases

4. **Benchmill 6000, 3 AXIS Machining Center & Benchmill 6000 Lab Instruction—CNC Milling Technology with Benchmill 6000**
   1 Benchmill 6000 Machining Center & Instruction (equivalent)
   Versatile PC-Based bench top CNC machining center with CNC Base Software, CNC Motion, FANUC 21i Emulator, and CNC Curriculum
   Warranty, Installation, Teacher Training, Professional Development
   Support and Technical Support (on-site, phone, online, etc.)

Ethernet-based control, Brushless spindle motor, Full enclosure with automatic safety door lock, Automatic diagnostics and power cut off protection PC-based CNC software, Coolant-ready, Jog pendant-ready, 4th-axis ready, Pneumatic drawbar, Pneumatic door opener, Robotic integration-ready with6 inputs, 6 outputs, Pneumatic drawbar, Pneumatic door opener, Internal work light, One shot lubrication system, BenchMill accessory package:

- (1) 10-piece clamping kit
- (1) 4-flute, center-cutting HSS end mill - 3 mm
- (1) 4-flute, center-cutting HSS end mill - 1/8"
- (1) ISO 20 tool holder
- (1) ER16 collet - 4 mm
- (1) ISO 20 tool holder nut wrench
- (1) spindle wrench
- (1) Open end wrench set: 8/10 mm, 9/11 mm, 17/19 mm
- (1)Allenkeyset:3,4,5,6,8,10mm
- (1) 2M Ethernet cable
- (1) Storage box

Motor Type Brushless Motor power 1.34 hp, 1000 w Spindle speed 100– 5000 RPM Spindle taper ISO20 Max. tool diam. 10 mm Throat 150 mm 620 kPa (90 psi) 1/4" NPT female connection provided

Control Software EIA RS274-D standard G & M code compatible, Fanuc® compatible, CAD/CAM compatible, Advanced NC code editing, Real–time or simulated graphic tool path verification

Computer System Requirements

Intel / AMD Single Core 1.6GHz 512MB RAM 300MB Available Disk Space Windows XP SP3 / Vista / 7 - 32 or 64bit 1 available LAN port*

Power Requirements--**United States**115 VAC (+5%/-10%) 60 Hz, 20A

Accuracy Position accuracy 0.038 mm Repeatability 0.010 mm

Dimensions Machine size Width 1040 mm Depth 860 mm Height 940 mm

Weight (approximate) Machine weight 178 Kg Shipping weight 218 Kg

Air Supply Requirements

Hardware CNC BenchMill 6000 110V 220V

Software CNC Base, CNCMotion simulation software, FanucTM 21i Emulator

Curriculum CNC Milling with BenchMill 6000, Learn Mate Course, Lab Imperial

CNC Milling Technology with Benchmill 6000 course introduces students to the fundamentals of CNC (Computer Numerical Control) milling. Students learn the fundamentals of CNC milling by working with the Benchmill 6000 to accurately machine a series of complex parts. Activities challenge students to develop and edit programs and machine assorted parts.

Course Outline includes: Introduction and Safety, CNC Motion Control Software, Mounting the Workplace, Tooling, Reference Positions, Verifying a Program, Running a Program, Fundamentals of NC Programming, Programming the House, Machining Project #1, Arc Programming, Programming the Star—Project 2, Machining Project #2, Programming Your Initials Project #3, Final Project

4. **Introduction To STEM Pathways including all of the following curriculums:**
    a. **Introduction to Manufacturing (30 student)**
    b. **Introduction to Competitive Robots (30 student)**
    c. **Energy Systems (30 student)**
    d. **Innovation and Invention (30 student)**
    e. **Foundations of STEM (30 student)**
    f. **Installation**
    g. **Warranties**
    h. **Instructor Orientation**
    i. **Training/Professional Development**
    j. **Support and Technical Support (on-site, phone, online, etc.)**

The Foundations of STEM (30 student) course should include the following:

The Foundations of STEM is the prerequisite course in the Introduction to STEM Pathways program. Students are introduced to concepts of STEM through problem-based learning and hands-on activities. Engaging e-learning curriculum presents real-world challenges and explores STEM careers like design and engineering.

Materials: Learn Mate Learning Management System (LMS E-learning Content): Introduction to Engineering (Virtual), Mechanisms (Virtual), Introduction to Industrial Design (Lab), Engineering Application Series (EAS) Projects, Introduction to Industrial Design, Course Materials Package Engineering Application Series (EAS) Project Materials Package

Introduction to Engineering: Provides students an excellent overview of the field of engineering. Students explore the history of engineering, career choices, and the engineering design process. Multilevel hands-on activities involve product design career seeking and ethics. Course outline includes: Introduction to Engineering provides students an excellent overview of the field of engineering. Students explore the history of engineering, career choices and the engineering design process. Introduction to Engineering, Engineering in Society, Careers in Engineering, Engineering Approaches to Product Design, Engineering Education Planning, Exploring Engineering (Project)

Mechanisms: In the Mechanisms course, students examine various components of mechanisms including gears, pulleys, levers, and more. Course outline includes: Simple Machines - Inclined Planes, Wedges, and Screws, Simple Machines – Levers, Simple Machines - Wheels, Axles, and Pulleys, Gears, Forces Work Friction Building a Mechanism

Introduction to Industrial Design: In the Introduction to Industrial Design course, students explore the history and role of industrial designers. Course outline includes: What is Industrial Design? Technical Drawing History of Product Design & How Products are Made, Reverse Engineering, Patents, and the Engineer's Notebook Human Factors Engineering Rapid Prototyping

Engineering Application Series: The Engineering Application Series (EAS) is a collection of over 30 downloadable projects that you can add to your classroom. Downloadable EAS Projects include: Airplane Launcher Balloon Racer Bathroom Redesign, Movable Bridge Conveyor System - Automated Geothermal Heating/Cooling System Guitar Tuning Device Intelligent Green House Pneumatics Trainer Robotics Game/Event Smart House Solar Water Heater Sun Tracking Solar Panel Array Vending Machine Wind Turbine

The Introduction to Competitive Robotics (30 students) curriculum should include the following:

Introduction to Competitive Robotics: Students work in teams to program and build robots that can complete specific tasks and compete in classroom competitions.

Materials: E-learning Content: Introduction to Competitive Robotics & Programming (Lab). Course Materials: EasyC®V4 for Cortex Software, Introduction to Competitive Robotics VEX Materials Kit.

Topics covered include: Building the Bumper Bot, Writing Your First Program, Programming in Autonomous, User Functions, Programming Operator Control, Adding A Bumper Learn Mate Author, BumperBot with Operator Control, Multiple Autonomous Modes, Robotic Arm, Potentiometer, Line Followers Learn Mate Author, Ultrasonic Sensor Learn Mate Author, Wheel Encoders Learn Mate Author, Competitions.

The Energy Systems (30 students) curriculum should include the following:

Energy Systems: Students explore various technologies in the relevant context of sustainable and alternative energy and use experiment kits to generate electricity and extract hydrogen.

Materials: E-learning Content: Introduction to Green Technology, Resource Conservation, Green Transportation, Alternative Energy, Green Construction, Course Materials Renewable Energy Experiments, and Energy Systems Materials Package.

Topics Covered Include: Natural Resources and Environmentalism, Pollution and Its Effects, The Greenhouse Effect and Climate Change, The History of Transportation, Hydrogen and Electrolysis, Solar and Wind Energy in Transportation, Introduction to Energy, Energy Types and Electricity, Energy, the Environment, and Hydropower, Introduction to Energy Efficiency and Green Construction, Solar Home Planning, Thermal Mass, and Designing to Conserve Water

The Innovations and Invention (30 student) curriculum should include the following:

Innovation & Invention: Students learn about the history of various methods of transportation including land, sea, air and space and then connect with the technology through hands-on activities building gliders and rockets

Materials E-learning Content: Introduction to Transportation Technology (Lab), Aviation (Lab), Aerospace (Lab), R&D Automotive (Lab) Course Materials, Innovation and Invention Materials Package.

Topics include: Getting From Here to There: The Development of Roads, Water Transportation, The Mechanization of Transportation, Traveling with Freedom: The Automobile, Airplane Structure, The Physics of Flight, Flight Scenario Creation, Getting Off The Ground-Aerospace Engineering, How We Fly-Commercial Airlines and Military Aircraft, Designs on Space-Astronautics, The Design Loop and Design Briefs, Aerodynamics and Wind Tunnel, Automobile Racing

The Introduction To Manufacturing (30 students) curriculum should include the following:

Introduction To Manufacturing: Students explore manufacturing systems and processes using industry standard design software to create parts and learn about engraving as an introduction to concurrent engineering. Students explore automated manufacturing processes, manufacturing industries, and career options. Students learn about the structure of a manufacturing company rapid prototyping, 3D Printing, and concurrent engineering. Students learn how to use computer-aided design (CAD) software and apply design and manufacturing processes. Projects include planning a manufacturing company and designing prototypes and products and manufacturing parts.

Materials: Intro To Advanced Manufacturing (Virtual Format), Rapid Prototyping and Concurrent Engineering (Virtual Format), CAD with SpectraCAD Engraving (Virtual Format)(includes SpectraCAD/Engraving Software)

Topics Covered Include: Careers in Manufacturing, Manufacturing Processes, Automation in Manufacturing, Introduction to Prototyping, Creating Simple Prototyping, Advanced Subtractive Prototyping, Using SpectraCAD, Drawing the M, SpectraCAD Engraver

Warren County Board of Education
Bid Tab

Firm: _____

Signature: _____

Title: _____

E-Mail address: _____

Address: _____

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Telephone: _____

Total Package Price _____

Shipping/Handling _____

Rebates _____

Additional Comments:

One Team, One Goal, High Levels of Learning for All

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