

TJHSST Needs List

For Use In	Equipment	Total Cost
Astronomy	Hydrogen Alpha Solar Telescope with accessories Provides students with the opportunity to safely observe the Sun in a different part of the spectrum. Our students can access solar databases online, but this will allow them to make their own observations, analyses, and compare their findings with other sources.	\$6,203.00
Automation & Robotics	Emotiv Epoc Neuroheadset Education Edition For students interested in developing assistive technology that might be controlled by an EEG headset, the Epoc Neuroheadset provides all the tools and software necessary to complete the task.	\$3,000.00
Automation & Robotics	Microsoft Kinect Sensors Students in the lab would be able to take advantage of the Kinect as a solution for robotic vision.	\$650.00
Automation & Robotics	FIRST Robotic Competition Supplies The students participating in the FIRST Robotics Competition will be able to use these structural, mechanical, and electronic parts to prototype designs in the off-season and possibly use them during the competition season as well.	\$5,000.00
Automation & Robotics	Computer Work Stations (12) Designing items using Computer Aided Design software is a necessary step in the engineering process. The computers must be capable of handling the complex graphics and computations required to effectively use the software.	\$15,240.00
Automation & Robotics	Laptops (3) These laptops will provide a source of mobile processing for sensor input.	\$1,950.00

BioTechnology	Refrigerated microcentrifuge By keeping samples chilled at 4C during extended required centrifugation, students will be able to isolate DNA, RNA and proteins with minimal breakdown and maximal recovery	\$6,500.00
BioTechnology	Gas Chromatography system This will allow students to quantify and determine identity of cell products	\$15,000.00
BioTechnology	Minus 80 C Freezer Keeps reagents, enzymes and some cells stable for long term storage	\$20,000.00
BioTechnology	Fixed Laptop Cabinet with 16 Laptops With the arrival of the DNA sequencer and special microscope camera, the Biotech lab needs a dedicated set of laptop computers with associated software installed that will capitalize better on the newly acquired high tech tools.	\$10,600.00
BioTechnology	Bio-Trac Course: Training for Epigenetics Research Projects at NIH Dr. Cobb will be able to train students and other lab directors to conduct research projects in this cutting edge field. We have much of the existing equipment needed to conduct such research already. This will also be a great option for Summer Biotech projects. Because the instructors are local, it may also afford contact points for our mentorship and senior research students.	\$900.00
CAD, Energy Systems Robotics & Protoyping	Solidworks Site License (100 seats with student licenses for home use) Solidworks is a CAD program with structural analysis, to run concurrently with Autodesk products. Students will learn the CAD program used by most engineering schools including MIT, Stanford, UVa, Va Tech.	\$13,405.00
Chemical Analysis	CCD Camera and Imaging System (ThorLabs)	\$9,400.00
Chemical Analysis	American Chemical Society Journals Online Database Subscription	\$1,400.00
Chemical Analysis	Deionized Water System	\$5,000.00
Chemical Analysis	Fourier Transform - Infrared Spectrometer Replace 2005 FT-IR, essential to all aspects of chemical analysis	\$45,000.00

Chemical Analysis	American Chemical Society, National Meeting and Exposition Teacher Training/Professional Development	\$2,200.00
Chemical Analysis	Shimadzu training for Fluorometer Teacher Training/Professional Development	\$1,000.00
Chemistry Labs	WLS-1759-71 Ohaus Adventurer Pro Analytic 260g x 0.1 mg Replace current balances which are beyond their life expectancy	\$4,089.00
Communications	WASPMOTE System Wireless sensor network for communications research; numerous individual components	\$4,372.00
Communications	Computer Work Stations (16)	\$20,320.00
Electronics	Audio Generators Kenwood AG-253 (12) Students in Analog Electronics classes will use these audio generators to test their amplifier designs. Students in Audio Electronics will use them for testing their audio chain circuitry (pre-amp, ADC, DAC, power amp). These 12 units will complete our set so that every student at every workstation has one available and ready to use.	\$7,980.00
Electronics	Stereo Preamplifier NAD C-165 BEE Students in Audio Electronics will use this unit as an amplifier standard against which their amplifiers may be compared. Some Senior R&D students will use this unit for hi-fidelity signal amplification.	\$950.00
Electronics	DC Power Supplies BK Precision #BK1680 (10) Students in all classes will use these rugged power supplies when there is a need to power difficult loads. These units will complete our set so that every student at every workstation will have a pair of them available and ready to use.	\$650.00
Electronics	Computer Work Stations (10)	\$12,700.00

Electronics	Bluetooth Communications Trainer Senior R&D students in the Electronics Lab would use this learning system to gain insights into Bluetooth wireless communications technology.	\$3,200.00
Electronics	Acoustic Reference Tone Generators (6) Students in all Electronics classes will use these acoustic tone generators to test their microphones and microphone-amplifier designs.	\$3,300.00
Energy Systems	Sandblasting System Model 4224 MSCDirect This tool will be used to clean and finish parts used in the elective and research courses. It will also be made available to those labs in need.	\$2,000.00
Energy Systems	Bench Top Power Supply XLN6024 (2) This power supply will allow my research classes to safely and effectively test and run their electrical experiments in ways not currently possible.	\$4,900.00
Energy Systems	Bench Top Electronic Load B&K 8510 (2) This load will allow my students to significantly increase the amount of testing that can be done on their electrical systems by safely controlling the available current.	\$4,500.00
Energy Systems	Computer Work Stations (12) Designing items using Computer Aided Design software is a necessary step in the engineering process. The computers must be capable of handling the complex graphics and computations required to effectively use the software.	\$15,240.00
Foreign Language	Wireless Computer Cart One small cart with 16 computers	\$23,000.00
Geosystems	Geosystems Graphic Adaptors (40) For running ArcMap 3D	\$6,760.00
Humanties	Wireless Computer Cart (2) Two small carts with 16 computers	\$46,000.00

Humanties	Wireless Computer Cart One large cart with 24 computers	TBD
Library	DVD/VCR Combination (5)	\$380.00
Library	Digital Video Cameras (2)	\$1,330.00
Library	Digital Still Cameras (2)	\$510.00
Math	Whiteboards (6)	\$3,000.00
Neuroscience	Halogen Dissection Lamps (2) New electrophysiology workstations required for increasing student numbers in lab	\$2,600.00
Neuroscience	Magnetic holders (2) magnetic stands for the halogen lights	\$800.00
Neuroscience	Neuroscience Consultant Lab consultant that works with students to facilitate research they would otherwise be unable to do	\$4,999.00
Neuroscience	Anti-Vibration Tables (2) Table that almost completely eliminates vibration interference during electrophysiology experiment	\$12,000.00
Neuroscience	Dissecting Scopes without Camera (2) Essential for our electrophysiology work with leeches, Aplysia, and cockroaches	\$8,800.00
Neuroscience	Journals: <i>Science, Nature, Science News</i> Used by students in all classes to stay abreast of the latest scientific activity	\$650.00
Neuroscience	Fiber-optic Dissection Lamps (2) Lamps specifically required for Aplysia and leech dissections	\$1,800.00
Neuroscience	Society of Neuroscience Annual Meeting Teacher Training/Professional Development	\$315.00

Oceanography	Buoy (Antenna Base and satellite Modem)	\$616.00
Oceanography	Buoy project equipment	\$614.00
Oceanography	Sonar Sensor	\$244.00
Oceanography	Low Speed Saw	\$4,850.00
Oceanography	Probe (YSI 6600) for conductivity, temperature, pH, dissolved oxygen, turbidity, depth Probe for field work. Stores data at your field site that can be uploaded to a computer for analysis. This probe is placed in the field and is used for long term data collection at a site.	TBD
Oceanography	Probe (YSI6920) for conductivity, pH/ORP, turbidity, NH4 and NO3 Probe for field work that stores data at your field site and then can be uploaded for analysis. This would be used for all field sites for on-going studies as well as new initiatives.	TBD
Oceanography	Thermo scientific Lindberg/Blue M Deluxe Heating and Drying Ovens Important to dry samples of sediment (marsh study) as well as algal samples (alternative energy project).	\$3,860.00
Oceanography	Millivac Vacuum Pump This would allow lab to filter the water more efficiently and quickly for the volume that we need. In previous years, a hand pump which was very slow for a smaller volume of specimens had to be used.	TBD
Oceanography	MiniRov Mini remotely operated vehicle is a 150 m depth system with video camera, lighting, auto heading, auto depth, audio, temperature sensors, control console, power supply, and 50 meters of umbilical cable. It has a grabber for specimen collection and sonar for navigation and object location. This would allow for environmental surveys at greater depth. It allows us to work, observe in the field as professional scientists. This would avail a whole new areas and topics of research for students.	\$7,495.00

Oceanography	Field Notebook Laptop	\$3,399.00
	Students could directly input data in the field (marsh, beach, or boat) as well as connect via webcam with the class or with a mentor. In addition, while not in the field, the computer could be used in our wet lab when necessary for collection of on-going data such as the heart monitoring system that we use (CAPMON). Currently, laptop computers are not made to withstand the corrosive effects of salt evaporation from surrounding tank systems.	
Optics and Modern Physics	Technical Assistance in Microwave Generation and Detection, experimental techniques, and use of Vector Network Analyzer (12 half days)	\$2,400.00
Optics and Modern Physics	Technical Assistance in Single Photon Detection, Optical bench experimental techniques (12 half days)	\$2,400.00
Optics and Modern Physics	Technical Assistance Applied CUDA programming, Tesla Based superComputer Programming and Architectures, Realtime Applications of Mathematica for Data Collection and Analysis (15 half days)	\$2,400.00
Optics and Modern Physics	Technical assistance in Acoustical Engineering, signal Process, and Phased Array Systems (12 half days)	\$2,400.00
Optics and Modern Physics	Experimental Station Laptops (4)	\$6,000.00
	Students will have a computer dedicated to the lab area with specialized software (e.g. LabView), the capability to collect video and audio experimental data and to perform signal processing and data acquisition in real time in sophisticated and varied lab environments. LabView in particular allows students to develop custom instrumentation control and data acquisition environments and requires outside ram memory.	
Optics and Modern Physics	Hi Def Webcams and Extension Cables (4)	\$268.00
	Students will be able to record images and video of experimental work in the 4 major lab group areas to enhance recording, collaboration, and outreach. Cameras will be mounted from ceiling over experimental areas. We will also experiment with sharing LIVE lab experiments between students and possibly over the web for outreach or posting into a CLOUD site.	

Optics and Modern Physics	Training/Assistance Support Funds - Quantum Optics (15 half days)	\$3,000.00
	Funds to support a part time graduate student /post doc or person with similar level of background using advanced instrumentation typically found in a quantum optics focused physics lab will allow students and the lab director to be trained in the use of this technology to explore applications of quantum optics , entangled states, quantum computing, and quantum encryption.	
Physics Lab	SensorDAQ 52 data acquisition and control interfaces	\$17,108.00
Prototyping	Storage Racks with Bins and Dividers (4) Storage Cabinets will be used to store small parts and open up more space for student projects. They will replace the rusting metal bins that are currently in use.	\$3,000.00
Prototyping	CNC Mill Probes (3) These probes will allow the milling machine to automatically locate and set up material on the table. This will reduce student error when setting up the CNC Mill	\$3,750.00
Prototyping	Vibratory Tumbler System The vibratory tumbler will allow students to quickly polish, deburr, and clean components they have machined on the CNC equipment.	\$3,000.00
Prototyping	CNC Mill Fixture Plates The fixture plates will increase the work envelope of the milling machine by increasing the size of the table. This will allow students to create larger projects on the CNC Mill.	\$3,700.00
Prototyping	Computer Work Stations (10) Designing items using Computer Aided Design software is a necessary step in the engineering process. The computers must be capable of handling the complex graphics and computations required to effectively use the software.	\$12,700.00