






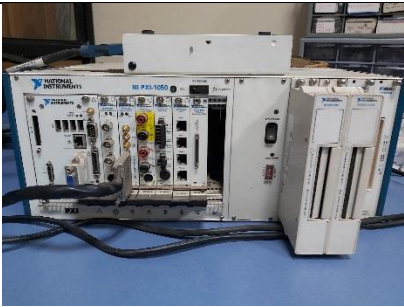






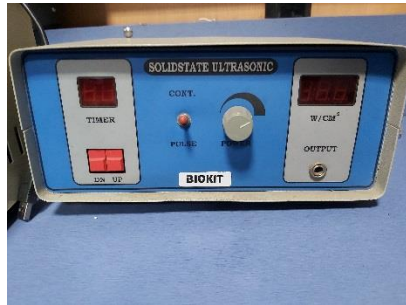
Name of Lab-: Analytical and sensor lab			
Sr. No.	Name and brief details about equipment	Make	Utility
1	UV – Visible Spectrometer (CHEMITO UV 2100) Wavelength range=190-1100nm; Spectral Bandwidth=0.1, 0.2, 0.5, 1.0, 2.0 nm; Light source= Tungsten halogen lamp and deuterium lamp 	CHEMITO	UV/Vis spectroscopy is routinely used in analytical chemistry for the quantitative determination of different analytes, such as transition metal ions, highly conjugated organic compounds, and biological macromolecules.
2	Gas Chromatography CHEMITO GC7610 	CHEMITO	Gas chromatography (GC) is a technique used for the analysis and quantification of volatile compounds. Compounds are injected onto the gas chromatograph and flash evaporated onto the column.
3	Oxygen Analysers (Model DF -150E & DF-130E) Ranges are available from 0 – 10 ppm to 25% 	Delta F Corporation	improved linearity and accuracy, 25% improvement in hardness/acid gas tolerance, 50% reduction in fluid-loss and accompanying maintenance
4	Spin Coating Machine SCM-6VT Spinning speed= 6000RPM max 	PRABHODH	It is use in coating process on various substrate including thin film
5	Digital Turbidity Meter (Model LT-33) Accuracy = +3% FS + 1 digit	LABTRONIX	Measurement of turbidity up to 1000NTU

			
6	<p>Ph and conductivity meter PICO+ Lab India Automatic temperature compensation by Pt.100 temperature sensor. Range 0° to 150°C. Automatic evaluation of CELL constant with standard solution</p> 	LABINDIA	Measure Ph and conductivity of solution
Name of Lab:- Biomedical Laboratory			
Sr. No.	Name and brief details about equipment	Make	Utility
1	<p>Multiparameter monitor -gives number of information on one screen</p> 		To check Patients vital parameter -BP, heart rate, oxygen etc.
2	PXI-1050-are used as a basis for building electronic test equipment, automation systems, and modular laboratory instruments	BIOKIT	It can be used for signal conditioning such as multiplexing, filtering, isolation, amplification, and switching

			
3	Syringe Pump 	SS Lab Equipment	Is used to gradually administer small amounts of fluid (with or without medication) to a patient or for in chemical and biomedical research
4	Electrosurgical Unit 	BIOKIT	uses electrical current at high frequency to cut, coagulate, desiccate, or fulgurate tissue
5	DAQ Card 	National Instruments	DAQ cards are high-speed data acquisition measurement hardware
6	ADC for Physiograph 	BIOKIT	Analog to digital converter for biopotential signal such as ECG, EEG, EMG etc.
7	High resistance meter-6517B	Keithley	Use to measure High Resistance

			
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8	Solidstate Ultrasonic	BIOCIT	used for ultrasound therapy
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Name of the Lab: Digital Signal Processing (DSP)

Sr No.	Name and brief details about equipment	Make	Utility
1.	<p>LCDK6748 TM320C6748 DSP Development kit:</p> <ul style="list-style-type: none"> LCDK, otherwise known as Low Cost Development Kit is an easy to use development tool for beginners and experienced users alike for creating low power and low cost embedded solutions for biometric, analytics, audio and communication based applications. The kit includes either a TMS320c6748 DSP or an OMAPL138 application processor with 456 MHz C674x Fixed/Floating point core. It has on chip TC, DDR2 running at 150 MHz, NAND FLASH and SD/MM Slot, USB serial Port, Fast Ethernet Port, B Host Port(USB1.1), USB OTG Port(USB 2.0), SATA Port, VGA Port, three Audio Ports, Composite IN(RCA Jack) and Leopard Imaging Camera Sensor Input. 	Texas Instruments.	<p>The programs provide hands-on examples of digital signal processing using actual real-time signals in a laboratory.</p> <p>The materials comprise a large number of simple program examples that may act as the starting points for further teaching exercises. Specifically, it is intended to demonstrate fundamental DSP concepts or building blocks;</p> <p>FIR and IIR filters, the FFT, LMS adaptive filters and audio frequency digital signal processing system comprises analogue to digital and digital to</p>




			<p>analogue converters as well as a processor.</p> <p>In the cases of the experimenter and the LCDK, such a system is provided by a TLV320AIC3106 codec [5] and the C6748 DSP side of an OMAP-LI38 device. The boards provide access via 3.5mm jack sockets to the analogue inputs and outputs on the codec, enabling them to be used with oscilloscopes, signal generators, PC soundcards, loudspeakers, mp3 players, etc.</p>
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Name of Lab-: Johnson Control Lab

Sr. No.	Name and brief details about equipment	Make	Utility
1	Metasys NCE Controller for AHU Panel 	Johnson Controls	AHU and CWS
2	Mechanical hardware for AHU 	Johnson Controls	AHU
3	Chilled water system panel	Johnson Controls	CWS

			
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Name of Lab-: Pneumatics and Hydraulics lab



Sr. No.	Name and brief details about equipment	Make	Utility
1	Micrologic 850 PLC 	Micrologic	Offers 24-point and 48-point controllers, includes 100 kHz speed high-speed counter (HSC) inputs on 24V DC models, Provides embedded communications via USB programming port, non-isolated serial port (for RS-232 and RS-485 communications) and Ethernet port.






Name of Lab-: Electronics Laboratory





Sr. No.	Name and brief details about equipment	Make	Utility
1	Xilinx-High performance DSP solutions Spartan 3A DSP video Kit	Xilinx	Picocell Basestation, Video Surveillance, Video signal processing
2	Xilinx-Virtex-5 XC5VLX50T FPGA Evaluation Platform Box	Digilent	General logic applications
3	Xilinx XUPV5-LX110T Evaluation Platform	Xilinx	Digital Signal Processing, Video and Image Processing, High Speed Serial I/O Transceivers
4	Spartan 3 Platform FPGA's Starter Kit	Xilinx	General logic applications
5	Zync Evaluation and Development (ZED) Board	AVNET	Embedded Vision, Industrial / IoT, Voice Processing
6	Digilent ALTYS	Digilent	Digital Signal Processing, Video and Image Processing, High Speed Serial I/O Transceivers Signal Processing

7	dSPACE KIT	Dspace	Electronic Control Unit
8	PsoC 3 Starter Kit	CYPRESS	Industrial / IoT, Serial Wire Debugging (SWD)
9	Cool Runner 2CPLD XC2C256 Starter Board	Digilent	Targeted Applications include intelligent handheld devices, remote monitoring, wireless interfacing, and
10	ASLK v2010 Starter Kit	CRANES	Instrumentation Amplifiers, Filters
11	Mixed Signal Oscilloscope	Agilent Technologies	Primary measurement application of mixed-signal oscilloscopes (MSO) involve verifying and
12	University Trainer Kit	CG-Corel	Traffic Light Controller,
13	Spartan 6 FPGA LX9 Micro-Board	Xilinx	High-volume logic designs, consumer-oriented DSP designs, and cost sensitive embedded applications

Name of Lab:- Advanced Process Laboratory




Sr. No.	Name and brief details about equipment	Make	Utility
1	Boiler and Heat Exchanger Pilot Plant 	Self-developed	Develop a control strategy for boiler to attain user steam demand and for outlet water temperature of heat exchanger as per user demand.
2	Evaporator Pilot Plant 	Self-developed	Implementation of control strategy for forced circulation evaporator pilot plant to achieve the desired density / concentration of milk
3	Bioreactor Pilot Plant	Self-developed	To provide a favourable environment for the micro-organisms to achieve the optimal

			growth and/or product formation
4	Batch Process and Bottle Filling Pilot Plant 	Self-developed	Batch Process Pilot plant is the application of batch process automation system and Bottle Filling pilot plant is the application of discrete automation system
5	Distillation Column Pilot Plant 	Self-developed	Attain the purity of ethylene as per the user's demand
6	Spray Dryer Pilot plant 	Self-developed	To make the power from of dense fluid
7	Flow Sensor Pilot Plant 	Self-developed	Measurement of flow using various flow sensors
8	Level Sensor Pilot Plant	Self-developed	Measurement of level of liquid in tank using various types of level sensors




			
9	Torque and Vibration Sensor Pilot Plant 	Self-developed	To test, characterise, analyse and select torque and vibration sensor as per the application.
10	Pressure and Vacuum Sensor Pilot Plant 	Self-developed	Measurement of pressure and vacuum as per application
11	Quadruple Pilot Plant 	Self-developed	For balancing and controlling the liquid level




Name of Lab-: Advanced Control Laboratory

Sr. No.	Name and brief details about equipment	Make	Utility
1	Quanser active suspension	Quanser	The Active Suspension experiment teaches cutting-edge technology that has brought a new generation of vehicles to life. Active suspension technology is used in the

			<p>automotive industry to continuously control the vertical movement of the vehicle wheel using an actively controlled actuator placed on the suspension axis. Similar technologies have also been used in train bogies to improve the curving modelling of the train and the decreased acceleration perceived by the passenger.</p>
2	<p>Unmanned ground vehicle</p>  <p>Fig. 6 Qbot physical figure</p>  <p>Fig. 7 Quanser Unmanned Vehicle Systems</p>	Quanser	
3	<p>2DOF modelling system</p>	Quanser	<p>The 2 DOF Helicopter experiment provides an economical test bed to understand and develop control laws for vehicles with dynamics representative of a tethered rigid body helicopter, spacecraft or underwater vehicle.</p>
4	<p>Magnetic levitation</p>	Quanser	<p>The Quanser Magnetic Levitation device is a single degree of freedom electromagnet-based system that allows users to levitate a ball</p>




	 <p>A blue vertical cabinet with a silver central panel. The top of the panel features a logo and the text 'Quanser Consulting Magnetic Levitation'. A metal ball is suspended in the air between two coils. At the bottom of the panel, there are two knobs labeled 'Offset' and 'Gain'.</p>		<p>vertically up and down. The overhead electromagnet generates an attractive force on the metal ball that initially sits on the post. The position of the ball is measured using a photo-sensitive sensor embedded inside the post. The system also includes a current sensor to measure the current inside the electromagnet's coil.</p>
5	<p>Quanser QUBE</p>  <p>A black rectangular box with a red top and a red knob. The front of the box has the Quanser logo and text: 'QUANSER INNOVATE · EDUCATE QUBE-Servo 2 ROTARY SERVO EXPERIMENT WWW.QUANSER.COM MADE IN CANADA'. A red cylindrical component and a red rod are shown next to it.</p>	Quanser	<p>The Quanser QUBE™-Servo 2 is a fully integrated, modular servomotor lab experiment designed for teaching mechatronics and control concepts at the undergraduate level.</p>
6	<p>2DOF flexible link</p>  <p>A black base with two servomotors and a flexible link. The link is a long, thin, black rod that can move in two degrees of freedom. The servomotors are mounted on the base, and the link is connected to them via wires.</p>	Quanser	<p>The 2DOF Serial Flexible Link is a simplified model of a robotic arm in which the links are designed as to exhibit visible harmonics during accelerations, while flexure in the joints is negligible.</p>
7	<p>Coupled tank system</p>	Quanser	<p>The Coupled Tanks system is a process control experiment ideal for teaching and research of control topics related to liquid level control.</p>




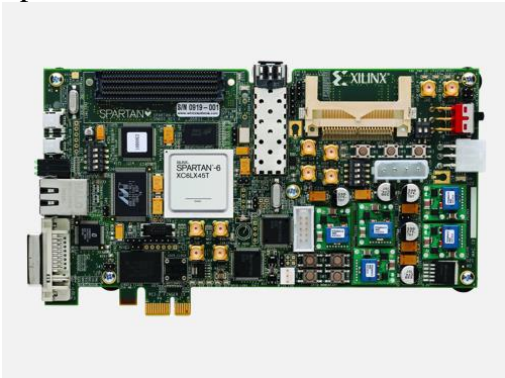

			
8	Antilock braking system 	Inteco	Antilock Braking Systems are designed to optimize braking effectiveness while maintaining car controllability. The ABS model is driven by a flat DC motor steered from a PC. There are three encoders measuring the rotational angles of two wheels and the lever angle of the car wheel suspension.
9	3 D Gyroscope 	Quanser	The principles demonstrated by the Quanser 3 DOF Gyroscope are relevant in technologies used to control orientation in sea, air and space vehicles. Extensive applications of the 3 DOF Gyroscope include altitude control, momentum wheel control, navigation, satellite orientation and auto-pilot systems. Furthermore, gyroscopic sensors are now found in a wide range of technical devices such as smart


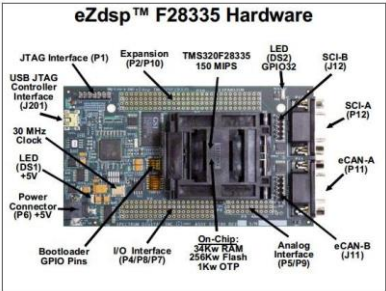
			phones, tablets, video game controllers, and so on. Your students can cultivate a deep understanding of control theories through real-life applications.
10	2 DOF flexible joint	Quanser	The 2DOF Serial Flexible Joint is a simplified model of a robotic arm in which the joints are designed as to exhibit visible harmonics during accelerations, while the links are rigid in comparison.
			
11	QNET DC trainer kit	Quanser	The Quanser QNET 2.0 DC Motor board is a versatile servo system designed to teach and demonstrate the fundamentals of DC motor control in a variety of ways. Designed exclusively for NI ELVIS platform and LabVIEW™ software, the system can be easily configured to control motor position and speed, as well as for 13odelling experiments.
			
12	Rotary servo base unit	Quanser	The Rotary Servo Base Unit is the fundamental element of the Quanser Rotary Control experiments. It is ideally suited to introduce basic control concepts and theories on an easy-to-use and intuitive platform. Use it on its own to perform several experiments or expand the scope of this unit by adding on other modules
			

			to teach an even wider range of control concepts. Instructors can thus expose students to a variety of rotary control challenges for a minimal investment. Real-world applications of the rotary servomotor include the autofocus feature in modern cameras, cruise control in automobiles, and speed control in CD players.
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Name of Lab: - Embedded Control System

Sr. No.	Name and brief details about equipment	Make	Utility
1	Xilinx Zedboard 	Xilinx	Research
2	Spartan 3A starter kit 	Xilinx	Lab Training
3	Spartan 3E FPGA starter kit 	Xilinx	Research

4	Virtex 4 ML402		Xilinx	Lab Training
5	Xilinx Spartan 3A DSP		Xilinx	Research
6	Virtex 6		Xilinx	Research
8	Spartan 6 SP605		Xilinx	Research
9	6 & 1/2 digit Multimeter		RIGOL	Lab Training

10	<div>Ulink 2 Emulator</div> <div></div>	Ulink	Lab Training
11	<div>eZDSP TMS320F28335 DSP Board</div> <div></div>	Digital Spectrum	Research