

Industry Sponsored Research and Product Design Lab

Industry Sponsored Research and Product Design Lab has been established by Dr. Rajiv Kapoor, Professor at Department of Electronics and Communication Engineering. The lab has been setup to design and commercialize self-designed products for the Indian Ministry of Micro, Small and Medium Enterprises (MSMEs). More than 40 industries have been associated with this lab wherein every year, an industry meet is conducted to cater the requirements of academia and industry for product design and innovation. The funding agencies of the lab include Indian industries, multi-national industries, and Indian research organizations like Defence Research and Development Organisation (DRDO), Department of Science and Technology (DST), Ministry of Communication and IT, All India Council for Technical Education (AICTE), MSMEs. The lab offers various positions and internship to budding engineers, research scholars, post-graduate and undergraduate students. The lab focusses on identifying the user needs and preferences of the target audience for a particular product category or market segment, creating user-centered designs, developing prototypes, refining its concepts, and gathering user feedback to improve the product concepts. Overall, the objective of a product design research lab is to create innovative products that meet the needs and preferences of users while also achieving commercial success in the market. The lab has various state-of-the-art equipment's like 3D printer, raspberry pi, jetson-nano, soldering kits, arduino-uno, light IR sensor, and pressure transducers, stepper motor, drilling machine kits, microwave filter, digital clippers, clamp meters, active and passive electrical components with connecting wires. The lab has published fourteen granted patents and four awarded patents by the Govt. of the India and developed six products meeting industry standards. One of them has been commercialized, one is in Technology Readiness Level (TRL) 9 stage, one in TRL 5 stage and others are in TRL-3 stage. Important products developed by the lab include dental ultrasound in collaboration with Maulana Azad Institute of Dental Sciences, automatic tuning of microwave filters with Erricson Estonia and Tallinn University, wireless EV charger (10KWatt) for Indian MSME, railway accident avoidance system sponsored by Indian MSME.

List of H/W's

S.No	Item	Quantity	Specification	Photo's
1.	3D printer	1	PLA supported, memory card reader, AC 220 V, printdimension:15*15*25, attached Display	
2.	DSO	1	1GS/S, Keysight	
3.	Soldering kit a. Hot iron b. Hot air	02	450 degrees Celsius, 8 air speed controller, 220 V.	
4.	Raspberry -pi	04	HDMI support, AVR microcontroller, GPIO supported, SPI, I2C bus supported, 4 USB port, LANport, Bluetooth, WIFI card, USB power supply.	
5.	Jetson-nano	03	HDMI support, GPIO supported, SPI, I2C bus supported, 4 USB port, LAN port, NVIDIA-MAXGPU with 128 CUDA core.,	
6.	Arduino-Uno	5	ATmega328 SMD, operating voltage-5V, 1-12 DC power supply, 6AIP, 14 DIP, 6 PWM output, falsh memory 32KB, SRAM 2KB, EEROM 1KB, clockspeed 16MHZ	
7.	Light IR-sensor	10	VCC-VCC, GND-GND, OUT-IO, 3-5 volt power supply, 3.1cmX1.5cm	

10.	Human-JAW, teeth	1	-	
11.	Pressure-transducers	110	3x3 mm, 3x4 mm, central frequency-3MHZ and 5 MHZ.	
13.	Connecting wires	20	M-M, M-F, F-F.	
14.	Passive electrical component.	500 pics.	Different values.	
15.	Active electrical component	200 pics.	Different types.	
16.	Electrical cable	1000 meters	different Gauge and materials like, PVC, Teflon, varnished, tined.	
17.	Stepper motors		NEMA-series	

19.	Drilling machine kit	1	BOCH, 500 watts, 2600 RPM, 26.5x7.2x25.5	
20.	PCB cleaner.		220V 5000 RPM	
21.	Microwave filter	1	9 GHz central frequency,	
22.	Multimeter.	3	Digital, resistance, voltage (AC/DC), Current(AC/DC).	
23.	Clamp-meter	2	500A & 1000A.	
25.	Wire cutter	1		
26.	Digital Clipper			

27.	Optical fibre wire			
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**Department of Electronics
and Communication Engineering
DELHI TECHNOLOGICAL UNIVERSITY**

INDUSTRY SPONSORED RESEARCH AND PRODUCT DESIGN LAB

Dental
Ultrasound





ESTABLISHED BY
Prof Rajiv Kapoor, ECE-Department, DTU

Automatic Microwave
Filter Tuner



LIST OF PROJECTS

S. No.	NAME OF THE EXPERIMENT
1	Real-time Infrared Image enhancement for vehicle detection sponsored by DRDO worth 50 Lacs. (Completed)
2	VOIP using SIP sponsored by Ministry of Communication and Information Technology worth 1.5 Cr. (Completed)
3	Railway Track and Human Detection sponsored by Logic Tech Pvt. Ltd worth 1 Cr. (Completed)
4	Terrain lounging for locomotive drivers of foreign objects debris detection Logic Tech Pvt. Ltd worth 80 Lacs. (Completed)
5	Ultrasonic 3-D video generation by DTU-Maulana Azad Institute of Dental Sciences (MAIDS) Dental Research Hub sponsored by DST worth 30 Lacs.
6	Intelligent Dental Robotics Kiosk by DTU-Maulana Azad Institute of Dental Sciences (MAIDS) Dental Research Hub sponsored by DST worth 40 Lacs.
7	Real Time Video Anomaly Detection for Tactical Surveillance using Deep Learning sponsored by DRDO worth 29.772 Lacs.
8	Dental Ultrasound sponsored by AICTE (RPS) worth 10 Lacs. (Patent Published)
9	Intelligent, Automatic tuning of high power microwave filters sponsored by Ericson and Tallinn University Estonia worth 20 Lacs.
10	Pulp Vitality Tester by DTU-Maulana Azad Institute of Dental Sciences (MAIDS) Dental Research Hub sponsored by DST worth 40 Lacs.
11	Wireless Power Transmission sponsored by Arka Wireless Pvt. Ltd worth 20 Lacs. (Patent Filed)
12	Wireless Charging Electric Vehicles sponsored by Arka Wireless Pvt. Ltd worth 25 Lacs.