Plan proposal submitted to

State Planning Board, Govt. of Kerala

Facilitation Centre for Student Innovation and Entrepreneurship

![Sree Chitra Thirunal College of Engineering - [SCTCE], Thiruvananthapuram -  Admissions, Contact, Website, Facilities 2021-2022]()

Sree Chitra Thirunal College of Engineering

Thiruvananathapuram

Oct. 2023

**Executive Summary**

As society transforms and become more interconnected, educational models beyond conventional class rooms is a necessity. This aims to inculcate research, innovation and entrepreneurship in young minds. Disruptive technologies such as IoT, artificial intelligence, robotics and 3D printing prepare the students to become more open minded and collaborative with their design process which finds huge demand from industries. As one of the leading institute in this state running NBA accredited courses, Sree Chitra Thirunal College of Engineering (SCTCE) aims to expose the students to a global way of thinking, future technologies and working across disciplines.

The proposed Facilitation Centre for Innovation and Entrepreneurship was proposed as a platform which is interdisciplinary in nature which aims to nurture the creative output of the budding engineers of this state. It provides students the necessary platform for realizing their ideas towards fruition. A quality workspace stocked with ample inventory and expert guidance from faculty, industry professionals and alumni can make this an asset for the students. Over time, this aims to become an innovation hub which encourages creative thinking to generate novel ideas for their effective implementation.

**Vision**

To foster innovation and invention of technologies and their commercial realization enabling the preservation of nature and betterment of society.

**Aims and objectives**

* Address curriculum gaps and train students to become innovative and inventive in product development and design.
* Act as home to student clubs/competition teams.
* Lead and execute industry innovation projects
* Support academic and sponsored research
* Organize practical training programmes/workshops for different target groups
* Partnering with industry leaders for product development, design and commercial realization
* Incubate and nurture student startups.

The above goals can be achieved by the following:

* Envisioned to be a work place with an ambience that lacks clutter invigorating the inherent creativity of students.
* Competent and talented pool of students at SCTCE and outside with the zest for creativity can provide the right work force for creation of novel ideas and developing into an exciting product.
* Centre for innovation can provide the right environment to experiment their ideas into a useful product.
* The centre can be the right place for team projects/competitions by supporting them with the necessary tools.
* Industry innovation projects offered to students can be supported by the proposed facilities for product design, fabrication and testing.
* Guidance and support for student startups

**Outcomes**

* Technology solutions in different sectors.

This can include the development of agricultural implements, sustainable energy devices, sustainable transportation solutions, waste management technologies, connectivity solutions, IT solutions, disaster management etc.

* Industry innovation projects

Research and innovation projects can be executed based on MoUs with interested parties. Emphasis shall be given to agro based rural industries such as coir, cashew, bamboo, wood, food processing etc. which lack sufficient infrastructure and expertise for research and innovation.

* Curriculum projects at different levels.

The proposed facility can be effectively utilized for student projects in Diploma, UG and PG courses in allied disciplines. This can also be of good value for PhD scholars with similar interest.

* Student implements for different competitions

The facility can be of immense utility for students who are participating in national/international events in GO Kart, Robo, Product innovation challenges.

* Training programmes and workshops
* Publications and patents

**Operation and Management**

The facility can be steered by a committee consisting of students, lab staff and faculty members headed by the Principal/Senior faculty of the institute. The labs can be opened on all working days of the college, MON-SAT and the proposed timing will be 9.00AM -7.00 PM. Entry may be permitted for all outsiders who are interested to access the facilities based on a formal request to the Principal. A reasonable amount may be charged as fee for the outside users to meet the operational expenses of the facility.

**Proposed Infrastructure**

The major inventory proposed to be procured in connection with setting up the facility is given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sl. No. | Item | Specification | Cost | Total Cost |
| MACHINING & FABRICATION SHOP FLOOR |
| 1 | Scroll saw (1 No.) | 50W, Bevel cuts 45oL/15oR, Stroke=18 mm | 28,000 | 18,07,000 |
| 2 | Band saw (1 No.) | 900W , 305 mm, Quick release tension lever, dust coll,  | 70,000 |
| 3 | Belt and disk sander (1 No.) | 6” disc, 26” belt,3600 rpm | 24,000 |
| 4 | Bench top drill press (1 No.) | 580 to 3200 RPM, Class IIIA 2.5mW laser, overhead light, adjustable depth stop, table roller extension, beveling 9-1/2 by 9-1/2-inch work table,  | 1,00,000 |
| 5 | Bench top mini metal lathe (1 No.) | Centre dist-12”-22”, swing -7”-10”Variable speed  | 1,50,000 |
| 6 | Planer (1 No.) | 1650W,8500 rpm, feed-8.5 m/min | 70,000 |
| 7 | Sheet metal folder (1 No.) | 12”wide , 22 gauge, roll dia 1.5”, | 40,000 |
| 8 | Miter saw (1 No.) | 1650W, 47oR/52oL | 25,000 |
| 9 | Bench vices (10 Nos.) | 200 mm | 40,000 |
| 10 | Arc welding machine (1 No.) | Multiprocess welder, 200 A, MIG/TIG, weld upto 0.25”thickness MS | 80,000 |
| 11 | 2D modular welding table+ fixtures | Precision ground, CNC machined Clamps & fixtures | 4,80,000 |
| 12 | Pneumatic tools | \_ | 1,50,000 |
| 13 | Power tools | \_ | 80,000 |
| 14 | Hand tools | \_ | 50,000 |
| 15 | Air compressor | 2 HP, 50L suitable for spray painting and ratchet tools | 25,000 |
| 16 | Spray gun (1 No.) | \_ | 8,000 |
| 17 | Electric hoist (1 No.) | 250 kg | 10,000 |
| 18 | Pipe bending machine  | 16 ton manual, 22-60 mm (1 No.) | 25,000 |
| 19 | Consumables | \_ | 57,000 |
| 20 | Safety gear/ accessories | \_ | 95,000 |
| 21 | Furniture | Work Benches, Storage Shelves & Cabinets | 2,00,000 |
| DESIGN STUDIO |
| 1 | CATIA v5 Acad. License (10 lic.) Perpectual | Different CAD/CAM modules | 10,00,000 | 36,30,000 |
| 2 | Lab View (5 lic.) | Different modules | 8,00,000 |
| 4 | Workstations (10) | Intel i5-12th gen based | 10,00,000 |
| 5 | Desktop PCs (2) | Intel i3-12th gen based | 1,30,000 |
| 3 | Networking | CAT6 cabling and 24 port switch | 2,50,000 |
| 4 | UPS | 6 kVA single phase 55 dBA,45 minutes backup | 1,50,000 |
| 5 | Furniture & furnishing | Computer Tables, , Chairs, Storage Shelves & Cabinets | 3,00,000 |
| PROTOTYPING LAB |
| 1 | 3D printer (2 Nos.) | 270\*270\*300 mm3 21,870 ccPLA, PLA+, ABS, HIPS, PETG, Nylon, PVA, Flexible: (TPE, TPU), Composites: Wood, Metal (Aluminium, Brass, Bronze, and Copper) Layer Resolution 100 microns. | 3,30,000 | 47,00,000 |
| 2 | 3D scanner (1 No.)(For digitization and reverse engineer objects and design models from the scan data) | Handheld HD/rapid, Accuracy:0.05/0.1 mm,100,000 points per second (20 fps), distance 0.2-2 mm, white light LED, bundled CAD software | 7,50,000 |
| 3 | LASER Cutting machine (1 No.)(Suitable for cutting, scoring, and engraving a variety of hard and soft materials) | Laser: Class 4 40W CO2, Engraving Area: 18” x 12” (or equivalent area)UL approved, bundled with software  | 6,00,000 |
| 4 | Plastic vacuum forming machine (1 No.)(To prepare product prototypes, replicate designs and make moulds) | Form. Area=19”X17”, depth of draw=185 mm, 6 mm thickness, 4 heating zones, Quartz heater, 3.2 kW | 6,00,000 |
| 5 | Sensors | Pressure, Temperature, Level, Position, Motion, Vibration etc. | 5,00,000 |
| 6 | Actuators | DC motors, servo motors, stepper motors | 2,00,000 |
| 7 | Micro controllers | Arduino, Raspberry Pi, Other development boards | 2,00.000 |
| 8 | Virtual Instrumentation Suite (2 nos.) | Xilinx-Z-7020, 667 MHz, 2 cores, 1 GB, analog out-4, DIO ch-40, Features-Oscilloscope, Function generator, DMM, Pattern generator, Trigger | 7,00,000 |
| 9 | PCB prototyping equipment (1 No.) | DIW, min. trace width-0.2 mm, resolution-10 µm,  | 2,00,000 |
| 10 | Soldering station (1 No.) | Digital display, password function,5 preset temp, tip to ground pot <2 mV | 20,000 |
| 11 | Bench Power supplies | 400W Autoranging Dual Output Power Supply, 30V, 20A | 3,00,000 |
| 12 | Consumables | Filament rolls, electronics component kit, Metal pipes/rods etc | 3,00,000 |
| 13 | Furniture & furnishing | Tables, , Chairs, Storage Shelves & Cabinets | 2,00,000 |
| MEASUREMENT&TESTING LAB |
| 1 | Data acquisition system (with multiplexers) (2 nos.) | 3slots, 40ch, GPIB/RS 232, Built-in signal conditioning measures thermocouples, RTDs and thermistors, AC/DC volts and current; resistance; frequency and period | 600,000 | 41,53,000 |
| 2 | Universal Testing Machine (1 No.)Justification: Essential to meet present consultancy/ testing/research requirements. | 20 kN, Automatic, tensile testing, compression testing, 3 point bending testing, ISO 6892-2009 (precision strain-controlled testing)\* and JIS Z2241 compliant metallic materials tensile testing. color touch-screen, USB Memory Enabled | 20,00,000 |
| 3 | High speed camera for scientific imaging | 5 MP, 1300 Mp/s, 12 bit CMOS sensor,1080 p resolution  | 9,00,000 |
| 4 | Thermo couple welder | Capacitive discharge, 230 VAC, argon filled weld chamber | 3,00,000 |
| 5 | Digital microscope | 1200X Magnification, 1080P Video Microscope with Metal Stand, 12MP Ultra-Precise Focusing, PC View | 30,000 |
| 6 | Weighing scale | 200 kg | 13,000 |
| 7 | Basic Metrology tools | Caliper, micrometer, thread gauge tools | 1,50,000 |
| 8 | True RMS Multimeter (2 No.) | True rms ac voltage and current for accurate measurements on nonlinear signals | 70,000 |
| 9 | Furniture & furnishing | Tables, , Chairs, Storage Shelves & Cabinets | 2,00,000 |
| SMART CLASS ROOM |
| 1 | Multimedia projector | 2800 lum, XGA, 3 LCD | 40,000 | 4,00,000 |
|  | Digital podium:  | Metallic body, Touch Screen Monitor, Computer System (i3 processor), Complete Input/Output Ports, Motorized Tilt for Uplifting Monitor, Multimedia Controller, Complete PA System with External Speakers, Integrated Full HD Visualizer. | 3,60,000 |
| DISPLAY AREA & DOCUMENTATION CENTRE |
| 1 | Furniture & furnishing | Tables, Chairs, Display Shelves & Cabinets | 2,00,000 | 2,00,000 |

Total Estimated Cost: **Rs. 150,00,000**