IC201P Design Practicum 2019
IIT Mandi

Introduction to Course

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Design Practicum (DP)

- Uniqueness of this course
  - Multidisciplinary
  - Team work
  - Hallmark course of IIT Mandi
- *Group of 6 students (randomly chosen) from B.Tech second year, working to make a prototype for solving some problem of society.*
- "Innovative low cost product that helps society"
- Interdisciplinary team work (CS, EE, ME, CE)
- Time frame -> one semester (~ 3 months) (Tentative dates - 18th Feb – 20th May - DP Open House).

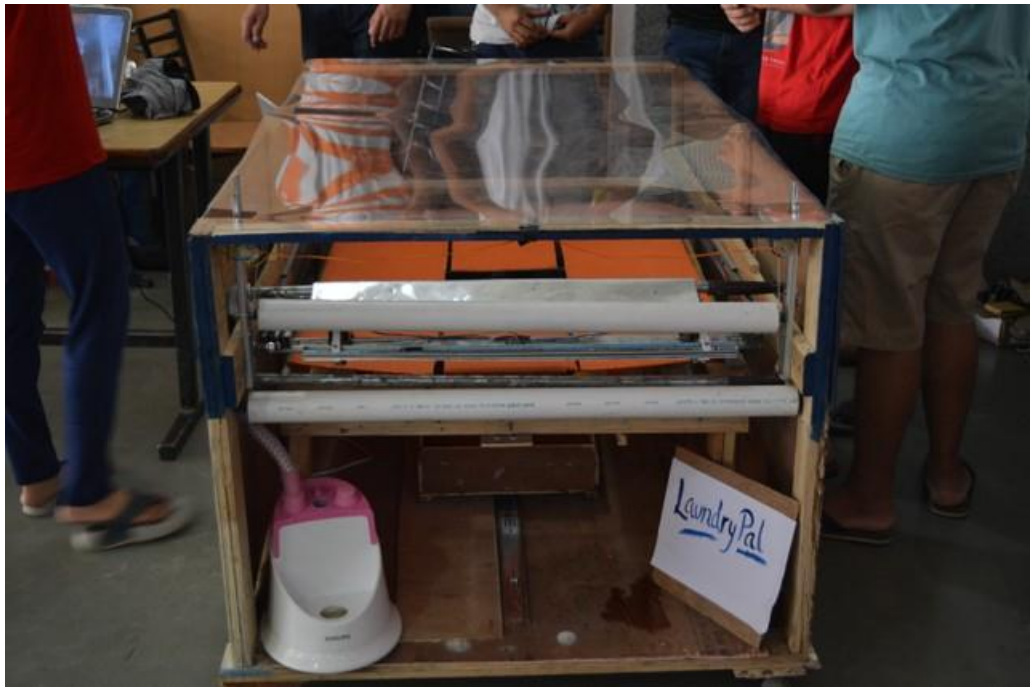
Design Practicum

- Budget – Each team is provided 30,000 Rs + TA/DA (as per norms)
- Each team will have a student group/team leader.
- Each team is mentored by one/two faculty mentor.
- Problem can be from students side/faculty side.
- Meet your mentors (Drop an email and ask for time). Make a list of 100 things that bug you! - Assignment 1. (maintain a separate diary/copy)
- Within two weeks, finalize the problem and solution methodology.

Know your needs

- Selected lectures “Steps of product design through case studies” - Monday 2:00 – 4:00 PM.
- Weekly meeting with mentors – (every Friday or any other convenient fixed day) for around 30 – 45 mins.
- Consultation – all faculties of IIT Mandi.
- Design of product.
- Procure parts, Manufacture, Assemble, Test and Display in Open House.
- Open House (~end of May) – Display your product to faculties, students, staff from IIT Mandi and visitors, experts from outside.

Some Past Examples


LaundryPal

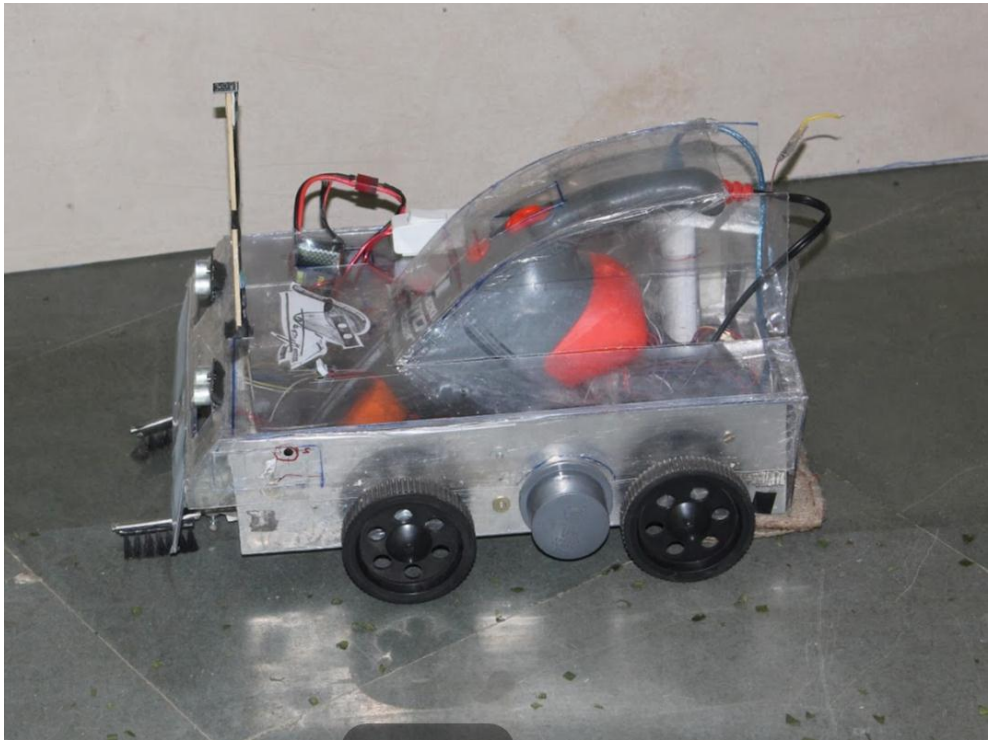

CORE
TEAM


BLINDLE

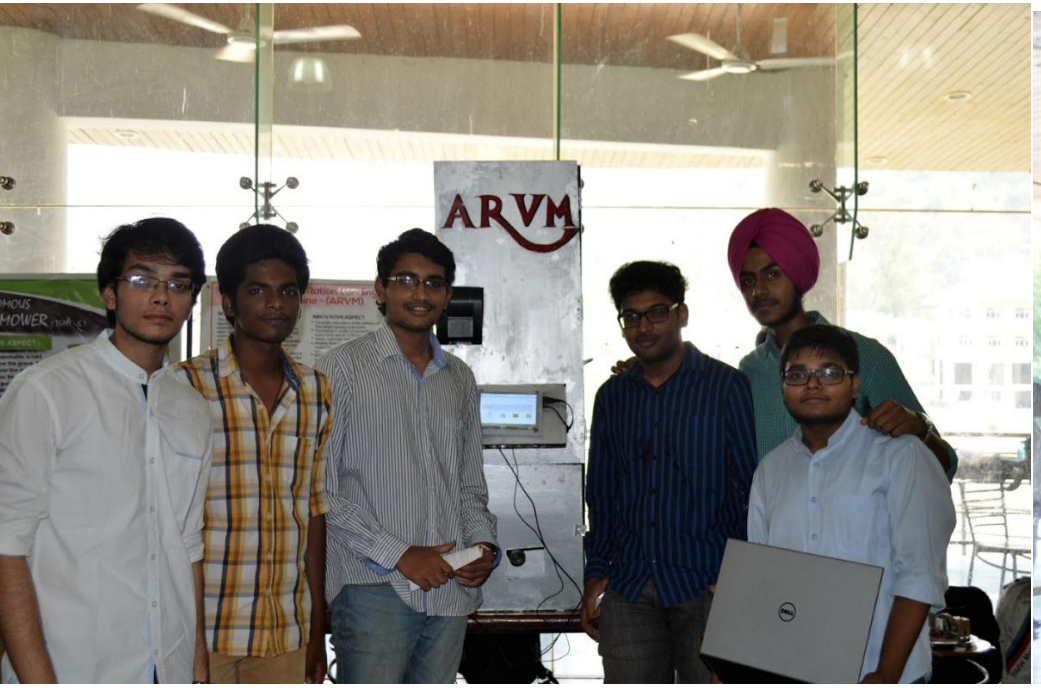

Design Practicum
OPEN

Some Past Examples

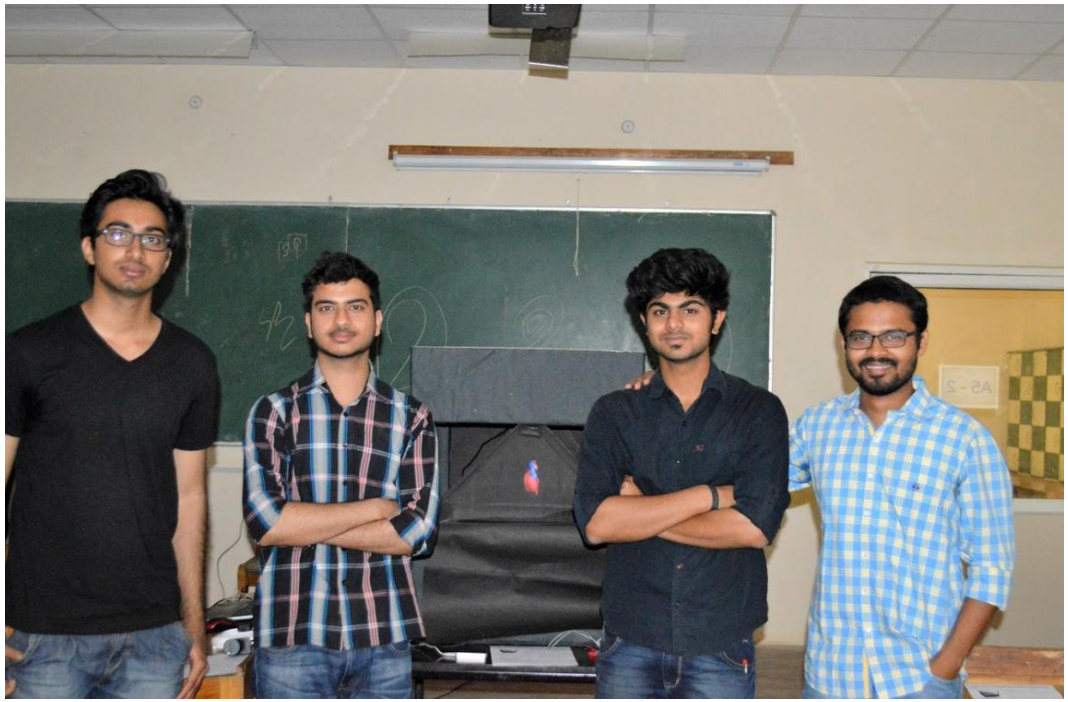
- Robomop

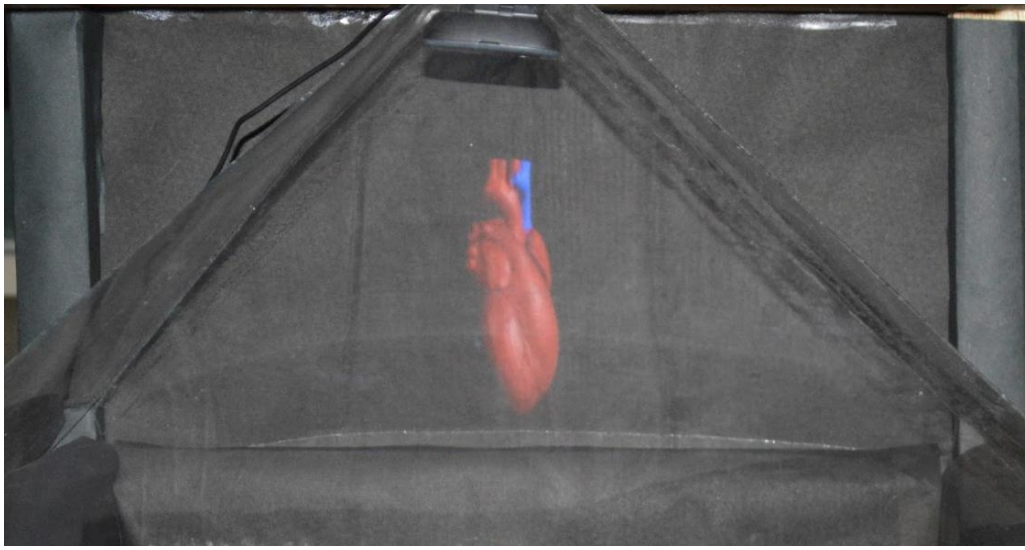


Automatic Ration Vending Machine

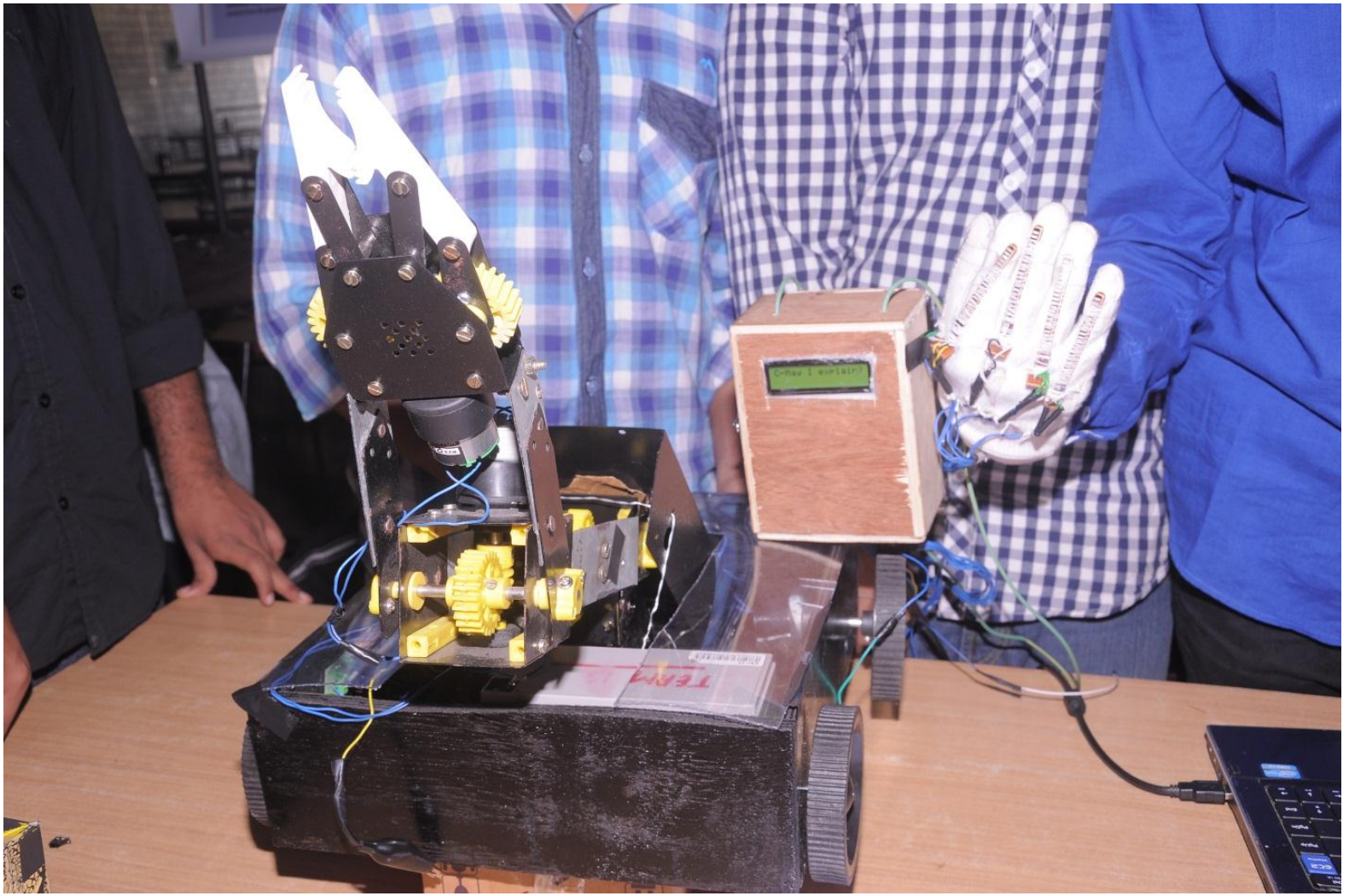


3-D Holographic Projector





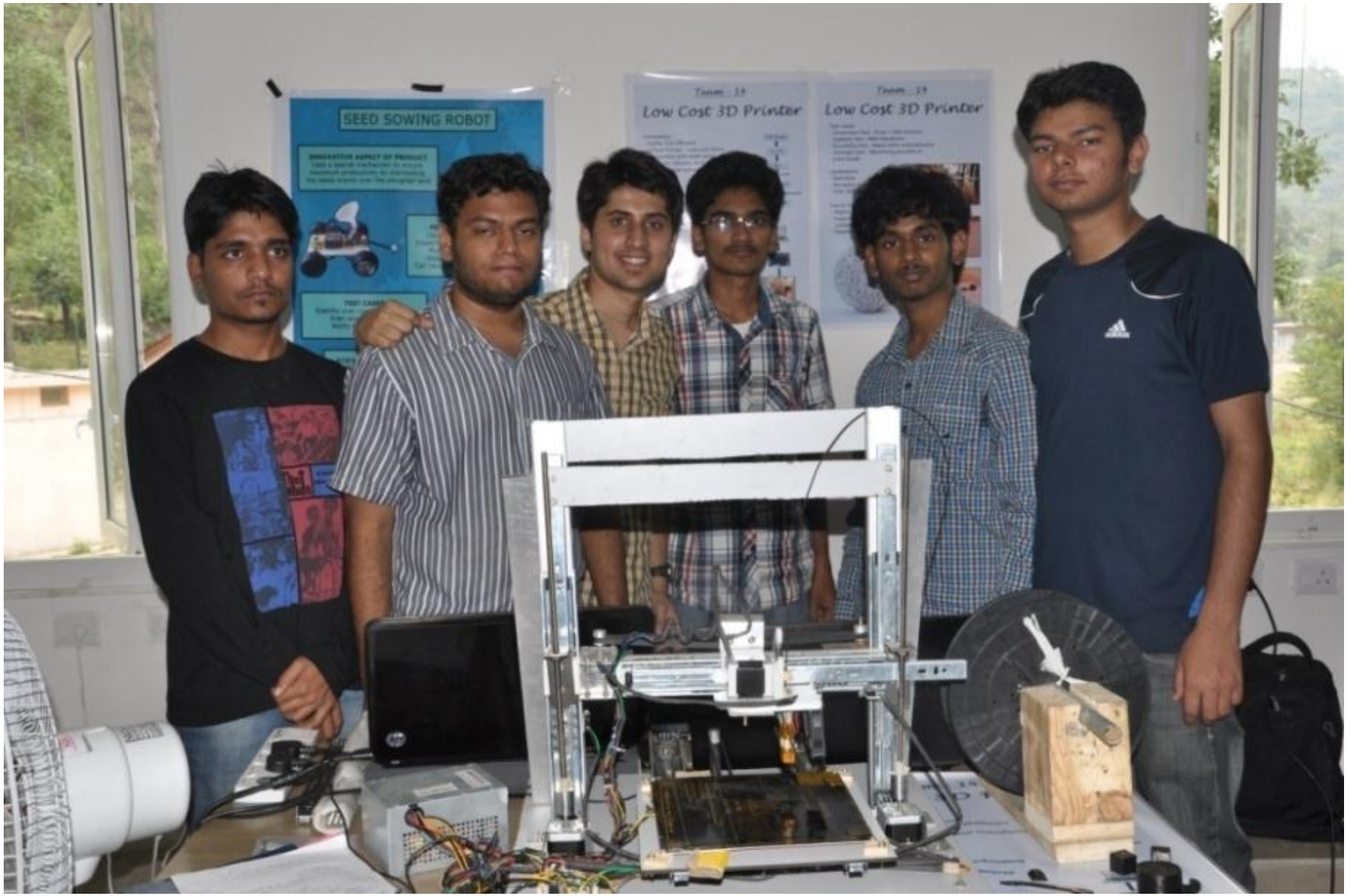
Hand Gesture Simulation System



BCI - Brain computer interfacing

Biometric Voting Machine

3D Printer



All season’s jacket

Expected Learning Outcomes

- Work in interdisciplinary teams.
  - Communication
  - Coordination
  - Delegation
  - Leadership
  - Technical learning
- Planning and Integrity
- Learning by mistakes
- To be a realist!
- Honesty
- To be a social being

Lecture Topics

- Identifying Problem and Developing Idea
- Steps of Product Design through case studies – ME, EE, CS, CE
- Prior art
- Overall design
- Component selection
- Detailed design
- Manufacturing, prototyping and testing
- Societal aspect in design - Economics, Psychological aspects, Ergonomics etc.
- Sharing of Experiences by past year students.
- Student Presentation – Problem and solution plan. (3 parallel sessions).

Lecture Plan

Week	Date	Lecture session
1	Mon 18 Feb	Introduction to the course – SRC
2	Mon 25 Feb	Social aspects in product design – PS
3	Mon 11 Mar	Steps of product design – case study (Electrical perspective) SKS
4	Mon 18 Mar	Steps of product design – case study (Mechanical perspective) AG
5	Mon 25 Mar	Failure mode effective analysis RK
6	Mon 1 Apr	Sensors and actuators SS
7	Mon 8 Apr	Computing aspects of Design Practicum PR
8	Mon 15 Apr	Feedback from previous batch
9	Mon 2 Apr	
10	Mon 29 Apr	
11	Mon 6 May	
12	Mon 13 May	
13	Sun 20 May	Open House

Submissions

Mon 4 Mar	Proposal Report - Problem definition and Solution Methodology (Team Report)
Fri 8 Mar	Cost/Budget Estimate
Sun 24 Mar	Product Design Report (Team Report)
Sat25 May	Final closure report (Team Report)
	Final Bill file and validation of all components

Evaluation

- Final Open House – 40 %
- Attendance – 10 %

- Mentor evaluation – 40 % (individual for student)
  - Report submission – 25 %
  - Diary – 5 %
  - Peer evaluation – 10 %

- Student Presentations – 10 % (group of faculties)

Budget

- Max limit – 30 k INR.
- TA/DA - Travel allowance and Daily allowance - as per student norms.
- Non-Volvo bus fare for students
- TA – 150 Rs, DA – 150 Rs, Hotel – 300 Rs -> per person for one day. As per gov norms for B.Tech Student.
- We will allow maximum of two trips.
- TA/DA form http://insite.iitmandi.ac.in/insite_wp/wp-content/uploads/2015/09/Travelling-Allowance-Form.pdf
- TA/DA is apart from Max budget Rs 30,000

Team Formation

- Students in second year
- CS – 60
- EE – 40
- ME – 27
- CE – 20
- Total – 147

- Teams – 25 teams (approx. 6 students per team)

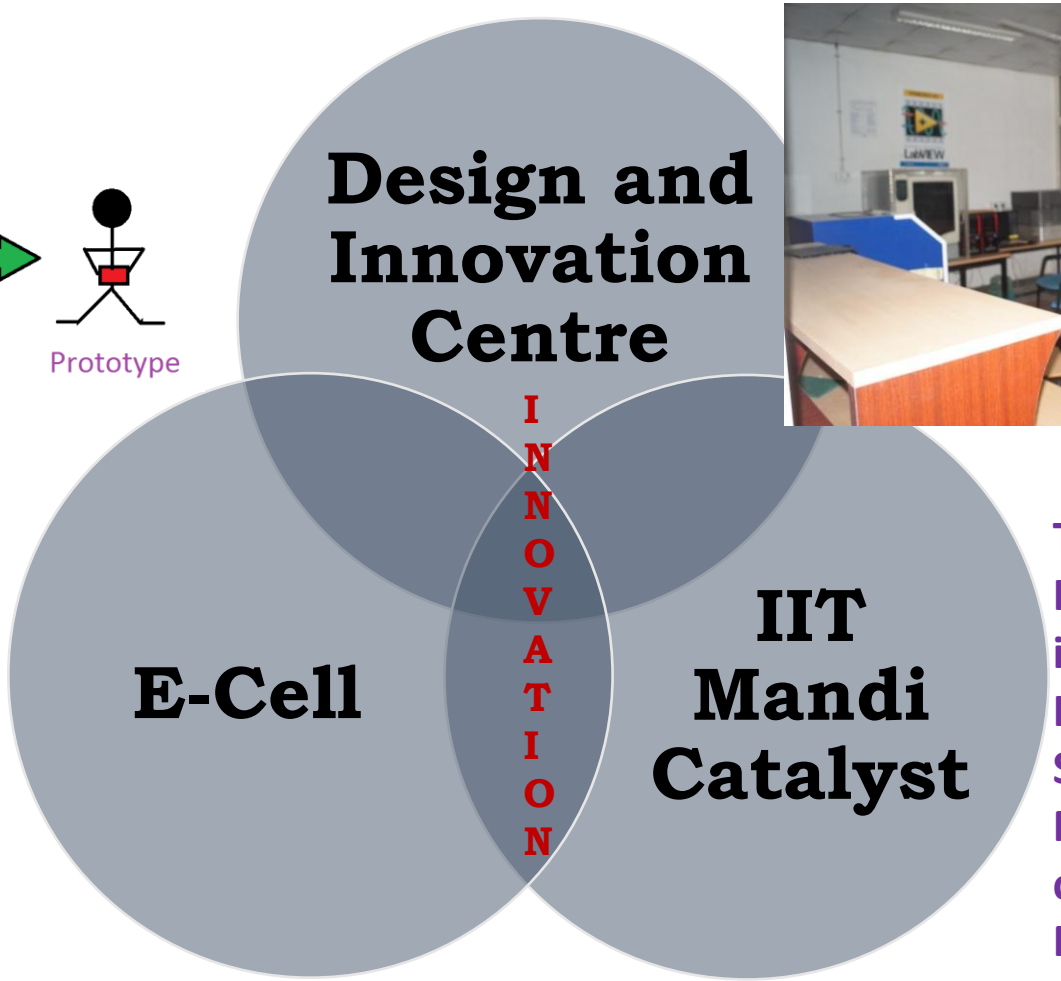
Important aspects of course

- Formation of teams and assigning mentors
- Lectures and activity session
- Weekly meetings – One/Two faculty members to guide Two teams of six student each.
- Design and Manufacturing - Tools/workspace arrangement
- Budget and Finance
- Open House

Responsibilities of Mentors

- Weekly meetings on Friday with student teams.
- Evaluating three milestone reports.
- Diary evaluation – at end, but weekly signature.
- Peer evaluation – at end.

Design and Innovation Centre (DIC)



The Design and Innovation Centre is a part of Innovation Eco-System at IIT Mandi. It is a 1.6 crore project of MHRD, Govt. of India

Infrastructural facilities at DIC

Double sided PCB fabrication unit

3D printer

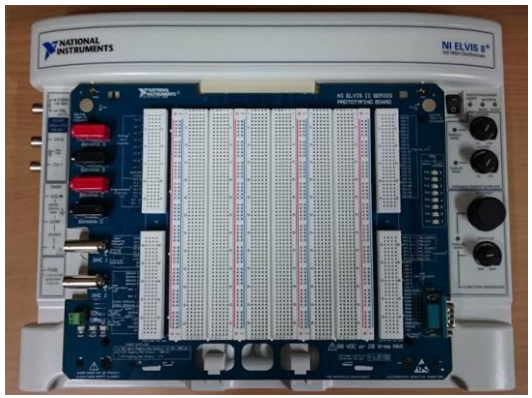
Magnetic Stirrer

pH meter

Weigh balance

Infrastructural facilities at DIC

FPGA board



NI Elvis Board

Arduino Board

Constant Power Supply

Other Facilities available:

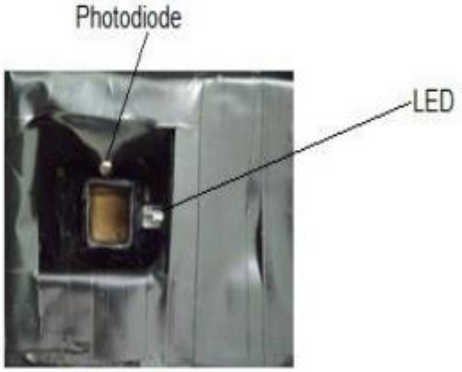
- Digital Multimeter
- DC power supplies
- Arduino Board
- Logic Probe
- Resistance box
- Capacitance box
- Inductance box
- IC chips
- Strippers
- Tap and die set
- Hand tools set
- pH probes
- Mass flow meter
- Soldering station
- Electrode materials
- Weighing Balance

Prototypes developed at DIC

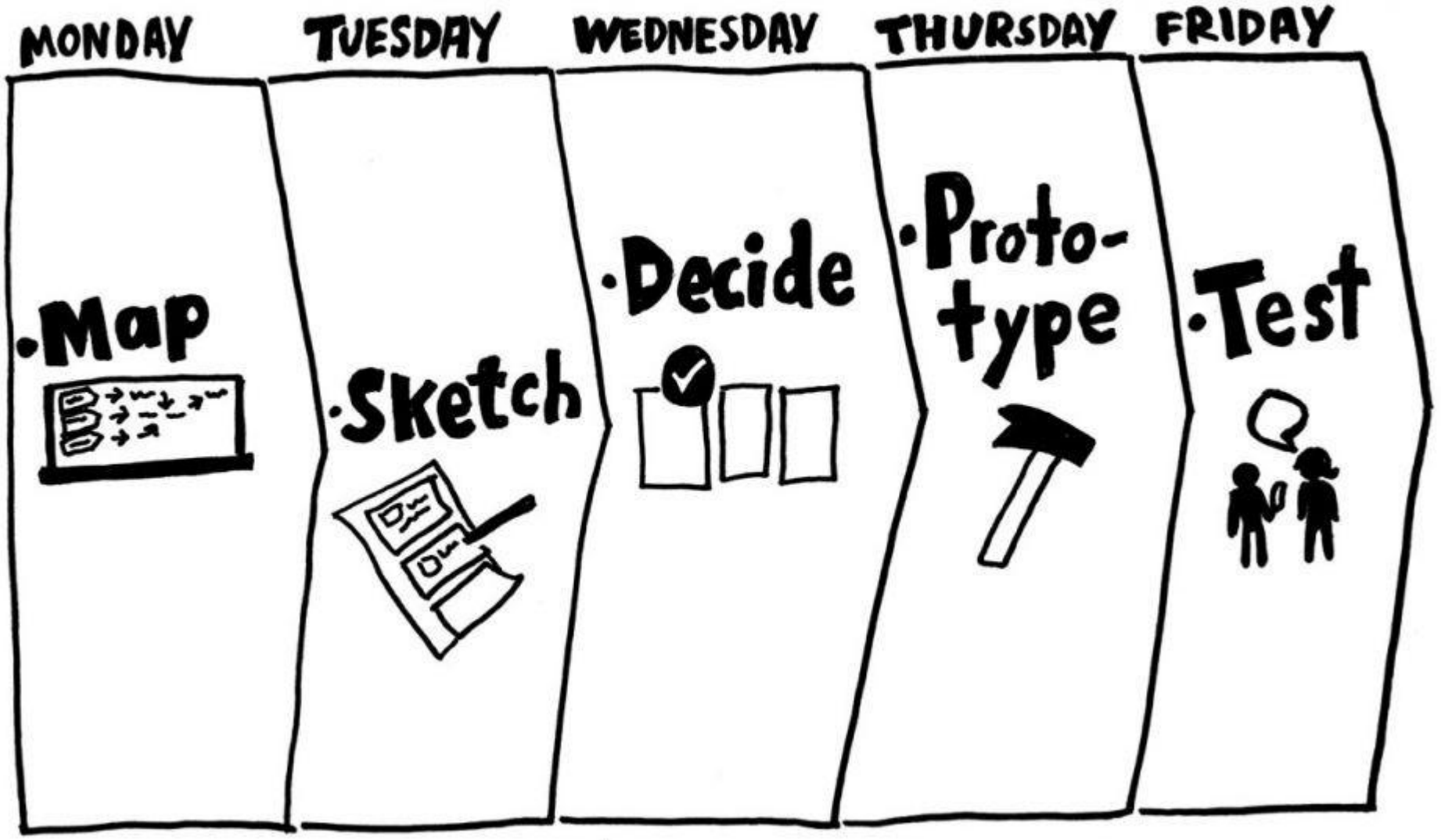
Ignis Bellator

Tea infusion kits, rhododendron chutneys and sauces

Automatic Ration Vending Machine



Urine Albumin Estimation Stystem



Adapted from Thomas Norsted

Thank you!