KUMARAGURU
college of technology
character is life

Best Practices

Best practice -I

1. **Title of the Practice: Engineering Clinics**

Learning by doing

2. **Objectives of the Practice:**

A set of five courses from semester 1 through 5 is aimed to enable students to learn engineering concepts in an engaging and challenging environment. Students learn to design and build simple to complex devices on their own in teams. They are also provided opportunity to experiment with innovative ideas in design and fabrication.

3. **The Context**

Over the years a growing trend of low motivation has been observed in students, towards academic engagement. They have been analysed to be on account of various intrinsic and extrinsic factors. To address some of these factors, it was decided to bring changes in pedagogy, assessments and course goals. It was in this context, a set of hands-on, team based, tinkering lab based courses was introduced in 2017 as Engineering Clinics. The courses help students to:

- enhance the knowledge about the process involved in the generation of ideas and building prototypes and considering the possibilities in transforming the prototype into viable commercial products through open innovation.
- Learn effective project planning as well as technical communication by preparing reports and demos in hackathons

4. **The Practice**

The first course provides students with an opportunity to gain a basic understanding of computer controlled electronic devices and apply the concepts to design and build simple devices. As a practical project based embedded course, the students are able to learn the concepts using a variety of reference material available in the public domain. While the course starts with formal instruction on hardware, programming and applications, the major portion of the course will provide the students with ample opportunity to be innovative in designing and building a range of

products from toys to robots and flying machines. It also helps the students to build a prototype/project in their core domain easily. This course in the Project based learning mode enhances the creative thinking of the students and initiates them to learn in a self-learning mode.

The second course deals with the product development cycle, starting from ideation stage to prototyping. The other courses builds on these and students work on real-world problems. Higher semester courses are based on problems that have real impact on society as well as in generation of IPR

5. **Evidence of Success**

- Renewed interest in engineering
- Wide spectrum of projects chosen and completed by students
- Marked improvement in ability of students to take up challenging tasks, over students who took traditional practical based courses
- Each group has a faculty coordinator/Instructor who will guide/evaluate the overall group as well as individual students. The students display their model in the 'Engineering Clinics Expo' at the end of semester. The progress of the course is evaluated based on reviews and final demonstration of the prototype.

6. **Problems Encountered and Resources Required:**

- Separate course plan /training resource for non-circuit branches
- Need to encourage adoption of equivalent open source tools/software's
- More organized and continuous / sustained evaluation throughout the semester

Best practice –II

1. Title of the Practice: Protosem

"Right PROTOTYPE, Prototype RIGHT"

2. **Objectives of the Practice**

- To build permanently deployable solutions to test value, and validate market potential for UG engineering students
- To impart necessary skills to student innovators for solving localised problems in interdisciplinary teams and build minimum usage prototypes.

3. **The Context**

ProtoSem curriculum and course at its core has the focus on enabling students to work on real-world problems, supplied by partner industries/ organizations. Students are selected based on

selective criteria. The learn the skills and the competencies necessary to achieve progress in prototyping their innovative ideas. Guided by the mantra “Right PROTOTYPE, Prototype RIGHT”, students learn the significance of prototyping and understand that building the Minimum Usable prototype(MUP) is the first and foremost milestone in their innovation pursuits

4. **The Practice**

Protosem, a 20 - week immersion program that embeds an innovation centred approach to engineering education right into the core of the engineering curriculum. This first-of-its-kind program aimed at engineering tech enabled solutions for real world problems using tools offered by creative technologies covering IOT sensors and networks, 3D printing, desktop fabrication, industrial automation, robotics, low- volume electronics manufacturing and assembly, artificial intelligence and machine learning, big Data analytics cloud computing etc.

The goal is to impart necessary skills to student innovators for solving localised problems in interdisciplinary teams and build minimum usage prototypes through various means such as expert training, tech and innovation mentoring, adaptive learning, thinking and exploration.

5. **Evidence of Success**

Based on the progress / merit of students upon graduation they are offered extended pre - incubation support to complete customer trials, to develop a business execution model, and to get ready for seed capital and business acceleration. Young engineering / science students solve the real - world challenges using the tools enabled by hardware, software and in computer technologies, to create graduate innovation engineers- fully rounded professionals with more balanced skills in the innovation, Technology and Engineering talent dimensions. The program imparts sound practical as well as conceptual knowledge in key skill areas in order to enhance their employability across several sectors, to secure immediate term employment as well as to achieve faster career growth.
