# PRESIDENCY UNIVERSITY
Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
Approved by AICTE, New Delhi

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

## Key Indicator - 7.3 Institutional Distinctiveness

**7.3.1 [QLM] Portray the performance of the Institution in one area distinctive to its priority and thrust within 1000 words**

## Title: Empowering Innovation through Project-Based Learning (PBL) at Presidency University

Presidency University introduced the concept of Project Based Learning through as a part of the Undergraduate Engineering Curriculum to encourage Critical-thinking and nurture Scientific and Technical ideas among First-year Students.

**Benefits of Project-Based Learning at Presidency University**

- **Encouraging Innovation:** PBL, using Arduino and Raspberry Pi, empowers students to nurture their innovative ideas. By engaging in hands-on projects, students learn to think creatively, identify problems, and devise innovative solutions.

- **Holistic Skill Development:** Through PBL, students at Presidency University develop a range of skills crucial for the future. They cultivate critical thinking, problem-solving, collaboration, communication, and project management skills, enabling them to excel in a rapidly evolving world.

- **Practical Application of Knowledge:** PBL allows students to apply theoretical knowledge to real-world scenarios. They gain a deeper understanding of concepts by implementing them in hands-on projects, bridging the gap between theory and practice and then, concepts and application.

- **Industry Relevance:** PBL using Arduino and Raspberry Pi prepares students for industry challenges. They gain experience in using tools and technologies widely employed in the fields of electronics, embedded systems, and IoT, enhancing their employability and competitiveness in the job market.

- **Creativity and Entrepreneurship:** PBL fosters a culture of creativity and entrepreneurship. Students at Presidency University have the opportunity to transform their innovative projects into viable products or startup ideas, fostering an entrepreneurial mindset and encouraging them to pursue their passion beyond the classroom.

These PBL courses provide a platform for students to execute their own Do-It-Yourself (DIY) projects, with the support of the university. By catching them young, PU aims to orient students towards innovation and empower them to showcase their ideas using Arduino and Raspberry Pi embedded boards. The Innovative Project Courses offer numerous opportunities for students,

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fostering interdisciplinary skills, teamwork, research abilities, and practical knowledge application.

## I. Platform for Interdisciplinary Collaboration
The Innovative Projects courses serve as a platform for students from various departments to interact and collaborate. This interdisciplinary approach facilitates peer learning and exposes students to diverse perspectives, enhancing their problem-solving abilities and broadening their horizons.

## II. Development of Essential Skills
These courses provide students with valuable experiences that contribute to their overall skill development. By working together in groups, students gain the necessary experience in teamwork, project planning, and execution. They learn to manage their projects independently and enhance their research abilities.

## III. Exposure to Tools and Instruments
Students are exposed to tools and instruments that they may not have been formally introduced to, yet. They gain hands-on experience with Arduino Boards, Raspberry Pi Boards, 3D Printers, PCB Printing Machines, Measuring Devices, Soldering Stations, Sensors, Actuators, and other Electronic Components commonly used in Innovative Projects.

## IV. Comprehensive Curriculum
The Curriculum includes two Courses:- **Innovative Project 1:** Arduino using Embedded 'C', offered during the Odd Semester, and **Innovative Project 2:** Raspberry Pi using Python during the Even Semester. Each course comprises 30 hours of Teaching Content, covering both the Programming and Hardware aspects of the Embedded Boards. Students carry out their Project Work after obtaining sufficient knowledge through guided training sessions.

## V. State-of-the-Art Innovation Laboratories
The University has established two dedicated Innovation Laboratories to provide students with access to essential resources. These labs offer facilities such as Arduino Boards, Raspberry Pi Boards, 3D Printers, PCB Printing Machines, Working Tools, Measuring Devices, Soldering Stations, Sensors, Actuators, and IT Infrastructure. These Resources are vital for Students' Innovative Projects and enable them to bring their ideas to life.

## VI. Comprehensive Evaluation Process:
Evaluation of the Innovative Projects course is based on a total of 100 marks. The assessment includes a C or Python programming lab test (25 marks), Phase-1 project presentation (20 marks), Phase-2 partial demo (25 marks), and the final project exhibition (30 marks). The evaluation criteria cover both theoretical knowledge and practical implementation, ensuring a comprehensive assessment of students' capabilities.

## VII. Innovation Project Expo
At the end of each semester, the University organizes a Two-day Innovation Project Expo where student project-works are displayed. On the first day, Internal Faculty Members evaluate all

projects and identify the top 100 based on criteria such as Innovation, Technical Complexity, Practical-implementation, Presentation Skills, and Overall-impact. On the second day, Industry Panellists evaluate the top 100 projects to determine the top 10. These Experts assess the projects based on Originality, Innovativeness, Viability, Real-world Application- potential, and Relevance to Society. The top 10 Projects receive recognition and suitable rewards, and the best projects are permanently displayed to inspire future batches.

**Some of the top-ranking projects are:**

- **Smart Home Automation**: Students developed a Project using Arduino and Embedded C, along with Raspberry Pi and Python Control Lights, Appliances, and Security Devices.

- **Environmental Monitoring:** In these projects, students developed sensors to measure air quality, temperature, humidity, and other parameters, and used Python to analyze and visualize the collected data.

- **Assistive Technologies**: Students developed Assistive Technologies for Individuals with Disabilities. These Devices included those which aid mobility, communication, or daily living activities, improving the quality of life for people in need.

## VIII. Celebrating Achievements

The Innovative Projects have garnered significant acclaim. Based on the experiences of the past two academic years, on 26th May 2023, the Students at Presidency University set a new record for the "World's Largest Innovation Expo by 2600 Freshmen" in the World Book of Records—an International Forum of Records, UK. This achievement highlights the creativity, technical skills, problem-solving abilities, and hands-on project experience gained by students during their first year at Presidency University.

## Conclusion

Project-based Learning using Arduino Boards with embedded C and Raspberry Pi Boards with Python at PU provides a fertile ground for Innovation, Creativity and Practical-application of Knowledge. By offering students the opportunity to execute their projects and engaging them in interdisciplinary collaboration, the University prepares its students to become innovative thinkers and problem solvers. With State-of-the-art Innovation Laboratories, Comprehensive Evaluation Processes, and recognition of exceptional achievements, this Project-based Learning-approach has been a resounding success.

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