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|  | **PES UNIVERISTY, Bengaluru**  **100 ft Ring Road, BSK III Stage, Bengaluru 560085, INDIA** |

**PROFORMA FOR SUBMITTING R&D PROJECT PROPOSAL**

**FOR SEEKING FINANCIAL SUPPORT**

**SUMMARY SHEET**

1. Title of Project: ***“Smart Classroom Systems”***
2. Organisation:
3. Name : PES University
4. Address :100 ft. Ring Road, BSK III Stage, Bangalore - 560085
5. Principal Investigator

Name :

Designation :

Department :

Address :

1. Co-Investigator-1 (if any)

Name :

Designation :

Department :

Address :

1. Co- Investigator-2 (if any)

Name :

Designation :

Department :

Address :

1. Nature of Project (Check one)
2. Research, Development & Engineering (R,D& E) leading to production capability ✓
3. Application oriented Research, Design and Development (R,D&D)
4. Basic R&D
5. Objective of the Project:

A proposal for an IoT-based intelligent environment, with the primary objective of energy optimization and an intelligent, yet reliable attendance system that focuses on reducing latency to give an enhanced learning experience.

1. Brief outline of the project with specific technology fallouts:

For a long time, attendance has always been taken manually. This has caused multiple discrepancies and has wasted useful class time. There have been attempts to automate them, but they haven’t been highly successfully. In addition to this, classroom equipment like fans, lights etc. have occasionally been left on thereby wasting considerable energy. Our project presents a solution to these two problems in specific and some other problems surrounding these two.

1. Expected outcome in physical terms (as applicable):

We are planning to firstly implement this project in our own campus and then extend it to other institutions.

1. Any specific industry / university collaboration link-up established / proposed (Details as applicable):

None

1. Duration of Project: 1 year.
2. Year-wise break-up of physical achievements with specific intermediate milestones (in terms of aims and objectives)

Timeline

Description automatically generated

1. Total Budget outlay (Provide all the necessary details in Part-III)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n | Item | BUDGET | | (in Rupees) |
| n |  | 1st Year | 2nd Year | Total |
| A. | Recurring | 32,500 | None | 32,500 |
| B. | Equipment | 22,11221 | None | 22,112 |
| n | Grand total (A+B) Total FEC\* | 54,612 |  |  |
|  |  |  | N Total (A+B) | 54,612 |

Signature of Principal Investigator Signature of

Designation Chairperson / Head of the Department

Date Date

Signature of Co-Investigator-1

Designation

Date

Signature of Co-Investigator-2

Designation

Date

Additional Information Required

1. Please indicate recent major achievements of in-house R&D carried out earlier and grants received either from PESU or external funding agencies
2. Any other information in support of the proposal.

**DETAILS OF THE PROPOSAL**

**PART 1 : BACKGROUND INFORMATION**

1. Title of Project: ***“Smart Classroom Systems”***
2. (i) Principal Investigator:
3. Co-Principal Investigators:
4. Other Investigators of the Project with their designations:
5. Brief Bio-data of Principal Investigator and other Investigators (including publications/patents)

(Please attach separate sheets)

1. Competence of Investigator in Project Area (Including Industry interaction/Technology transfer)

* Expertise of PI:
* Expertise of Co-PI (1):.

#### Expertise of Co-PI (2):

1. Other Commitments of the Principal Investigator and Co-Principal Investigators (including lectures, research projects responsibilities etc.) Indicate the percentage of time the Principal Investigator and Co-Principal Investigator would devote to the project.

Principal Investigator

Co-Principal Investigators:

Approximately \_\_\_\_\_hours per week per person.

1. Details on each of the ongoing/completed projects with the Principal Investigator/Co-Principal Investigator/R&D Team -
2. Project Title
3. Funding Agency (or Internal funding)
4. Brief Project Summary
5. Technical Status vis-a-vis objectives
6. Financial Status (Total Project outlay, expenditure to date)
7. Duration and year of initiation
8. Expected date of completion
9. Brief summary of other project proposals (submitted by any of the Investigators) awaiting consideration from other funding agencies like DIT, DBT, DST, DRDO, DSIR, MHRD, IMRC etc. -
10. Infrastructure and other facilities available at the institute for undertaking this project.-
11. List of major equipment along with model numbers, specifications etc.
12. Existing manpower and other personnel with names available for the project on full-time basis.
13. Expensive Equipment /facilities available elsewhere which could be made use of for the project.-
14. Details of collaborating agencies (As this would vary from project to project, necessary details may be given as appropriate)
15. Additional information, if any.

Detailed Bio-data of the Investigator(s)/Co-Investigator(s)

**BIO-DATA OF THE PRINCIPAL INVESTIGATOR**

* 1. Name:

|  |
| --- |
|  |

|  |
| --- |
|  |

* 1. Gender: Male Female
  2. Date of Birth:
  3. Designation & Affiliation:
  4. Postal Address:
  5. Phone Numbers:
  6. E-mail ID:
  7. Qualifications *(starting from University Level)*

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Degree | Institution | Year |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |

* 1. Employment Experience

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Position and Organisation | Nature of Job | Period |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |

* 1. List of Publications *(for the last 5 years only)*
  2. Journal Publications
  3. Conference Presentations

1.

2.

3.

* 1. Patents filed/granted with details -
  2. List of funded projects completed (Details) -

**BIO-DATA OF THE CO - PRINCIPAL INVESTIGATOR (1)**

1. Name:

|  |
| --- |
|  |

1. Gender: Male Female
2. Date of Birth:
3. Designation & Affiliation:
4. Postal Address:
5. Phone Numbers:

7. E-mail ID:

1. Qualifications *(starting from University Level)*

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Degree | Institution | Year |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |

1. Employment Experience

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Position and Organisation | Nature of Job | Period |
| 1. |  |  |  |
| 2. |  |  |  |
| 3. |  |  |  |
| 4. |  |  |  |

1. . List of Publications*(for the last 5 years only)*

10.1 Journal Publications:

1.

2.

10.2 Conference Publications:

1.

11. Patents filed:

12. List of funded projects completed (Details):

**BIO-DATA OF THE CO - PRINCIPAL INVESTIGATOR (2)**

1. Name:

|  |
| --- |
|  |

1. Gender: Male Female
2. Date of Birth:
3. Designation & Affiliation:
4. Postal Address:
5. Phone Numbers:

7. E-mail ID:

8. Qualifications *(starting from University Level)*

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Degree | Institution | Year |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |

9. Employment Experience

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Position and Organisation | Nature of Job | Period |
| 1. |  |  |  |
| 2. |  |  |  |
| 3. |  |  |  |
| 4. |  |  |  |

10.List of Publications*(for the last 5 years only)*

10.1 Journal Publications:

1.

2.

10.2 Conference Publications:

1.

2.

11. Patents filed:

12. List of funded projects completed (Details):

**PART II: TECHNICAL INFORMATION**

1. Aim and Scope of the project (in terms of specific physical achievement)  
   Aim: A proposal for an IoT-based intelligent environment, with the primary objective of energy optimization and an intelligent, yet reliable attendance system that focuses on reducing latency to give an enhanced learning experience.

Scope: We are planning to firstly implement this project in our own campus and then extend it to other institutions.

1. Detailed description of the Project

Irrespective of the significant advances in technology over the last decade, the conventional methods practiced in most of the institutions for attendance are by calling names or signing on papers, which is highly time-consuming and insecure. There exist many theoretical solutions for this, however reliability is a major setback.

In addition to this, it is a common sight that classroom equipment like fans and lights are left on thereby wasting considerable amount of energy. It is observed that education institutions are responsible for major portion of electricity consumption in our country, which is a major setback for its economy. This unchecked energy usage also puts a strain on our already dying environment.

Our attempt aims to tackle both these problems using IoT-based solutions in order to provide a better learning environment and usher the future generations into a sustainable tomorrow.

1. Need, forecast and urgency for the technology proposed to be developed with justification such as applications, importance of know-how, development of technology competitiveness, international alliances possibilities etc.

• The gross electricity consumption of India in 2019-20 was 1,208 kWh per capita, a huge portion of which is due to the unattended fans and lights in educational institutions.

• Our project aims to minimize this and create a sustainable solution to preserve our environment.

• Our project believes in developing a more environmentally aware and responsible generation of citizens and help every member of the education community to understand the scope and significance of the individual role in sustainable use of resources within the campus.

• Overhaul the age-old system of manual attendance in real-time in order to reduce efforts of the lecturers, increasing the active learning period. This is done keeping in mind the inadequacies of the many theoretical solutions such as RFID.

• Improved learning experience by creating a seamless, dynamic schedule that will reduce time lapses between classes and create a favourable condition that would benefit students and teachers alike.

1. Review of status of research and development in the international and national status:
2. International Status:
3. National Status:
4. Work Plan: (Give a detailed work plan of the project which includes Methodology, Important milestones, Impact Assessment etc.)

Diagram

Description automatically generated with medium confidence

1. Period required for completing the project: 1 year.
2. Details of work already done by present investigators/R&D team in this or other areas:
3. Successfully completed on schedule:
4. Currently in progress:
5. Abandoned:
6. Industry interaction:
7. Information regarding specific intermediate milestones (year-wise):

Year-1:

* Literature Survey: Going through all the important research papers required for this project.
* Architecture Proposal: Build a plan on how the final project will look like.
* Assembling Sensors: Collect all the different sensors required for the project.
* Working of Attendance System: This is the first part of our project. Implementation of this system would be our first goal.
* Working of Energy Consumption System: This is the second problem of our project. Hence, we would work on implementing this system in the second part.
* Integration with cloud server: The data collected from the sensors need to be stored. So, we use the cloud servers for the same.
* Final Testing: Testing out the entire project together and making the final desired changes if any.
* Demo: Presenting the final project to the panel.

1. a) Specific problems, hold-ups and difficulties foreseen in the implementation of the project:

* Availability of Raspberry Pico
* Server Systems in the Institutions
* Existing Wiring in Institutions

b) If the answer is not Nil to 10(a), how does Principal Investigator propose to overcome them?

1. Detailed PERT/BAR Chart (Separate Sheet)

**Year 1**

Timeline

Description automatically generated

1. Details of possible alternative arrangements if the Chief Investigator leaves institution or is unable for any other reason to continue on this project.

**PART III - FINANCIAL DETAILS**

**Table - 1 Yearly Break-up**

BUDGET ESTIMATES: (Please provide all the necessary details)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n | Item | BUDGET | | (in Rupees) |
| n |  | 1st Year | 2nd Year | Total |
| A. | Recurring (Mention Specifics) | 32,500 | None | 32,500 |
| N |  |  | None |  |
| B. | Equipment (Attach quotations or price) | 22,112 | None | 22,112 |
| N |  |  | None |  |
|  |  |  | Total (A+B) l | 54,612 |

BUDGET FOR CONSUMABLE MATERIALS (Please provide all the necessary details)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n | N | BUDGET | | (in Rupees) |
|  |  | 1st Year | 2nd Year | Total |
| Item | Food | 5,000 | None | 5,000 |
| Total |  | 5,000 | None | 5,000 |

BUDGET FOR TRAVEL (Do not include travel for conferences)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n | N | BUDGET | | (in Rupees) |
| n | N | 1st Year | 2nd Year | Total |
| n | Travel (Only inland travel) | 15,000 | None | 15,000 |

BUDGET FOR OTHER COSTS/CONTINGENCIES (Please provide all the necessary details)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n | N | BUDGET | | (in Rupees) |
| n | N | 1st Year | 2nd Year | Total |
| n | Other costs/Contingency costs | 10,000 | None | 10,000 |

BUDGET FOR EQUIPMENT (Please provide all the necessary details)

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No. | Generic name of the Equipment along with make & model | Imported/Indigenous | Estimated Costs  (in Foreign Currency also)\* |
| 1 | UART Capacitive Fingerprint Sensor. | No | Rs. 7,080 |
| 2 | Absolute Native Electronics W1209 50~100 digital temperature controller thermostat | No | Rs. 1,592 |
| 3 | Tolako 5v Relay Module | No | Rs. 1,300 |
| 4 | PIR Motion Detector Sensor Module HC-SR501 | No | Rs. 684 |
| 5 | Raspberry Pico | No | Rs. 300 |
| 6 | Raspberry Pi | No | Rs. 2685 |
| 7 | Transmitter and Receiver | No | Rs. 1260 |
| 8 | Wireless Connectivity (Wi-Fi Module) | No | Rs. 319 |
| 9 | IoT Platform: ThingSpeak License | No | Rs. 6892 |
|  | **Total** |  | Rs. 22,112 |

\* includes transport, insurance and installation charges.

**R& D Projects Funding**

**Terms and Conditions Governing Grant-in-aid**

i) The grant is for the specific project as approved by PES University and shall be subject to the following conditions:

          (a) The grant amount shall be spent for the project within the specified time,

1. Any portion of the grant which is not ultimately required forexpenditure for the approved purposes shall be duly surrendered to PES University.

ii) The grantee PI/ Co-PIs shall maintain a record in the form of a register in the for permanent, semi-permanent assets acquired solely or mainly out of PES University grant;

iii) The assets referred to in (ii) above will be property of PES University and should notbe disposed off or encumbered or utilized for the purposes other than those for which the grant has been sanctioned. An undertaking shall be given by the grantee PI / Co-PIs that they agree to be governed by these conditions;

iv) The grantee PI / Co-PIs shall render progress-cum-achievement reports at interval of not exceeding six months on the progress made on all aspects of the project including expenditure incurred on various approved items during the period.

v) The utilization of grant for the intended purposes will be looked into by the Auditor of the University according to the directives and the specific mention about it will be made in the audit report;

vi) The know-how generated by the project or patent, shall be governed by the policy of PES University.

vii) Application by grantee PI / Co-PIs for any other financial assistance or receipt of grant from any other Agency/Ministry/Department for this project should have the prior approval of the Dean of Research and/or Vice Chancellor of PES University.

viii) The Grantee PI / Co-PIsare not allowed to entrust the implementation of this project for which grant-in-aid is received to another institution or organization and to divert the grant-in-aid received as assistance to any other institute or organization.

ix) PES University shall / may appoint a Project Review Group (PRG) comprising of representatives from PESU and other external experts. PRG will periodically monitor the project in all respects including technical and financial.

x) The Grantee PI / Co-PIs will first make all efforts to protect intellectual property generated out of the project. The grantee PI/Co-PIs will examine [IPR](http://mit.gov.in/default.aspx?id=433) protection issues in consultation with Dean of Research office, PESU to file patents, register the copyrights etc. before making it public by publishing in the technical journals and books, presenting findings in Conferences etc.

xi) The Intellectual property and the rights associated with it shall be assigned to PES University, Bangalore. In cases where the fundinghas been done jointly with other organisations, the IP rights would be appropriately shared. The applicant will be PES University.

xii) Research misconduct is a failure to adhere to high standards of professional conduct and integrity and to the principles contained in this policy. All researchers must comply with the relevant laws, guidelines of regulatory agencies and University Research Policy. Failure to comply with this policy will be considered to be interpreted as research misconduct, and appropriate action will be initiated.

xiii) In case of any dispute on any matter, related to the project during the course of its implementation, the decision of Honorable Vice Chancellor, PES University shall be final and binding on the PI/Co-PIs.

**We Principal Investigator / Co-Principal Investigator(s) have read and understood the terms and conditions governing grant-in-aid for the project proposed *“ Title ”* and agree to abide by the same.**

1) Name: Signature:

2) Name: Signature:

3) Name: Signature: