

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
OFFICE OF THE MEMBER SECRETARY OF THE COMMITTEE FOR
ADVANCED STUDIES & RESEARCH, BUET, DHAKA.

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Application form (Guide lines) for approval of PG. Dip. Project proposal by the CASR. All the items, which are applicable of the following list, must be mentioned and filled in properly. **Please submit eighteen (18) copies in the full script plain paper with soft copy** [one original and other 17 photocopies]. You can submit your soft copy to **Email:** casr@daers.buet.ac.bd

Date :22.05.2019

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| 1. Name of the student: SK. MD. ZUBAYER-AL-MAHMUD
Roll No: 1017311014 | Status: Full-Time
Session: OCTOBER-2017 |
| 2. Present Address: 367, Shaikhhati Adarsho para, Sadar; Jessore | Cell: 01749034567 |
| 3. Name of the Department/Inst.: IICT | Program: PG Diploma (ICT) |
| 4. Name of the Supervisor: Dr. Md. Liakot Ali
Supervisor Cell: 01766924290 | Designation: Professor |
| 5. Name of the Co-Supervisor (if any): N/A | Designation: N/A |
| 6. Date of First Enrolment in the Program: OCTOBER-2017 | |

7. Tentative Title(Block Letters):

Development of a Low Cost Indoor Air Quality Monitoring System

8. Background and present state of the problem:

In recent years countries all over the world pay more and more attention to air quality monitoring and control. According to the World Health Organization, air pollution is one of the biggest health risks nowadays [1]. Air pollution is caused due to the presence of particulate matter, harmful materials and biological molecules in the air. It has adverse impact on living organisms such as humans, animals, food crops and may result in allergies, harmful diseases such as cardio vascular diseases, lungs diseases and can also cause death. Many researches have been carried out to develop air quality monitoring system for different environments. Literature[2] provides the framework for monitoring the city environment. Low cost Raspberry pi is used for implementing the system. Parameters like carbon monoxide, carbon dioxide, temperature and air pressure are measured. Literature [3] presents a system for monitoring the environmental parameters, modeling and manipulating microclimate of urban areas. The system is implemented for the adaption of efficient urban infrastructure for analyzing the urban micro-climate. Literature [4] monitors environmental parameters using sensors and gas sensors (infrared) using the PIC18F87K22 microcontroller. Sensor nodes are set up in different areas for real time monitoring of environment. The results are displayed on the city map. Literature [5] presents air quality monitoring system using Zig Bee network for a city environment. At present, the air quality of Dhaka has been ranked as a 3rd most polluted City in the world[6]. In Bangladesh in most of the big cities, the indoor air quality is not healthy in most of the places. However less attention has been paid to monitor the air quality over there. So there are scopes of research to develop an indoor air quality monitoring system for a big city in Bangladesh. A laboratory in the basement of ECE Building will be the case study of this project.

9. (a) Objectives with specific aims:

The objective of the project is to develop a micro controller based low cost indoor air quality monitoring system for a big city in Bangladesh. To achieve this objective, the following aims will have to materialize:

1. To design an micro-controller based electronic system for interfacing with different sensors and displays
2. To develop firmware for the system
3. To implement the system in the PCB and calibrate it properly.

4. (b) Possible outcome:

The outcome of this project will be a prototype of a low cost indoor air quality monitoring system.

10. Outline of Methodology/ Experimental Design:

The following steps will be followed to develop the Air Quality Monitoring device in the proposed project.

1. First the system requirement specification (SRS) will be prepared according to need analysis.
2. Then architecture of the system will be defined and figured out necessary modules for the system.
3. Next the schematic diagram of the circuit will be designed using Eagle software. Then the circuit will be implemented in the breadboard.
4. ATmega32, LCD display and necessary sensors such as DSM501, MQ135, MQ9, MQ2, MQ5, DHT22 will be the core components of this project.
5. Then the firmware will be developed using open source software for the said micro controller.
6. Then the Printed Circuit Board (PCB) will be designed for the circuit and the proposed system will be implemented in the PCB.
7. Finally in the testing and Modification stage, the total system will be extensively tested and if required, modification will be done accordingly.

11. References:

- [1] World Health Organization (WHO), "7 million premature deaths annually linked to air pollution," Mar. 2014. [Online]. Available: <http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/>
- [2] Kumar, Somansh, and Ashish Jasuja. "Air quality monitoring system based on IoT using Raspberry Pi." In *2017 International Conference on Computing, Communication and Automation (ICCCA)*, pp. 1341-1346. IEEE, 2017.
- [3] Shete, Rohini, and Sushma Agrawal. "IoT based urban climate monitoring using Raspberry Pi", *IEEE International Conference In Communication and SignalProcessing (ICCSP)*, pp. 2008-2012, 2016.
- [4] Jha, Mukesh, Prashanth Reddy Marpu, Chi-Kin Chau, and Peter Armstrong, "Design of sensor network for urban micro-climate monitoring", *First IEEE International Conference In Smart Cities(ISC2)*, pp.1-4, 2015.
- [5] Kwon, Jong-Won, Yong-Man Park, Sang-Jun Koo, and Hiesik Kim. "Design of air pollution monitoring system using ZigBee networks for ubiquitous-city." In *2007 International Conference on Convergence Information Technology (ICCIT 2007)*, pp. 1024-1031. IEEE, 2007.
- [6] <https://www.thedailystar.net/city/air-pollution-in-bangladesh-dhaka-air-ranked-world-3rd-most-polluted-who-1570399>

12. List of courses so far taken with course no, name of the courses, credit hours, Grade, Grade Points and G. P. A (To be verified and signed by the Tabulator)

Course no.	Course name	Credit	Grade	Grade point	GPA
ICT 5100	Project	3	X	-	2.83
ICT 5101	Programming Concepts	3	B+	3	
ICT 5102	Data Structure and Algorithm	3	B+	3	
ICT 5103	Database Design and Management	3	B+	3	
ICT 5104	Introduction to Telecommunications	3	B+	3	
ICT 5105	Data Communications	3	A	3.5	
ICT 5301	Information System and Network Security	3	B+	3	
ICT 5304	Digital Communications	3	B	2.5	
ICT 5307	Embedded System Design	3	C	2	
ICT 5309	Optical Communication	3	B	2.5	

Signature of the Tabulator: _____

13. Cost Estimate: (Invoice / Quotation of material/equipment must be provided for every item which cost Tk. 10,000/- or more)

(a)	Cost of Material (components, PCB design)	Tk. <u>6500.00</u>
(b)	Field works (if applicable)	Tk. _____
(c)	Conveyance/ Data Collection (With Breakup)	Tk. _____
(d)	Typing, Drafting, Binding & Paper etc.	Tk. <u>3000.0</u>
Total		9500.00

14. Approximate time (in hour) for BUET workshop facilities (if required) :-----

15. Justification of having Co-Supervisor: N/A

16. Thesis/Project Proposal Approved by Doctoral Committee/BPGS/RAC reference:
Meeting no. -----Resolution No.-----Date :-----

17. Time extension (if any):
a) 1st Time extension (if any) up to: -----
Meeting no. -----Resolution No.-----Date :-----
b) 2nd Time extension (if any) up to: -----
Meeting no. -----Resolution No.-----Date :-----
c) Further time extension (if any) up to: -----
Meeting no. -----Resolution No.-----Date :-----

18. Appointment of Supervisor & Co-Supervisor Approved by the CASR Meeting No. (For Ph. D):-----
Resolution No.-----Date-----

19. Appointment of Doctoral Committee Approved by the CASR Meeting No. (For Ph. D):-----
Resolution No.-----Date-----

20. Result of the comprehensive examination for Ph. D (Photocopy of the result should be enclosed)
Date :----- Satisfactory/Unsatisfactory.

21. Number of Post-Graduate Student(s) working with the Supervisor at Present:

	Names and signatures of the members of the Doctoral Committee (if applicable)	
----- Signature of the Student	1.	
	2.	
----- Signature of the Supervisor	3.	
	4.	
----- Signature of the Co-Supervisor	5.	
	6.	
----- Signature of the Head / Director	7.	
	8.	