PCET's

Pimpri Chinchwad College of Engineering,

Nigdi, Pune-44

Department of Electronics & Telecommunication

MINI PROJECT LOG/WORK BOOK

Year 2020 - 2021

Project Title: EARTH TILE

Area of Project: Electronics

Name of the Faculty Guide:

Group Id. A1-05

Name of the student

1. Akash Biyani
2. Ashutosh Mithari

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Pimpri Chinchwad Education Trust's
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ISO 9001 Certified

Project Group Formation

Group No.A1-05

Sr. No	Name of the Student	Roll No.	Exam No	Mobile No	Email ID
1.	Ashutosh Mithari	TEETA102	T150333013	9175702844	ashutoshmithari7611@gmail.com
2.	Akash Biyani	TEETA111	T150333029	9359109196	akash.biyani20@gmail.com

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Course Objectives, Course Outcomes, Programme Outcomes and Mapping

Course Objectives:

- To understand the Product Development Process including budgeting through Mini Project.
- To plan for various activities of the project and distribute the work amongst team members.
- To inculcate electronic hardware implementation skills by -
- Learning PCB artwork design using an appropriate EDA tool.
- Imbibing good soldering and effective trouble-shooting practices.
- Following correct grounding and shielding practices.
- To develop student's abilities to transmit technical information clearly and test the same by delivery of Seminar based on the Mini Project.
- To understand the importance of document design by compiling Technical Report on the Mini Project work carried out.

Course Outcome :

On completion of the course, student will be able to

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CO1. Administer and implement a mini project through a group of students.

CO2. Correlate the 'Product Development Cycle' through mini project.

CO3. Plan and analyze the budget requirement of the project.

CO4. Develop electronic hardware implementation skills by-

a. Learning PCB artwork design using an appropriate EDA tool.

b. Imbibing good soldering and effective trouble-shooting practices.

c. Following correct grounding and shielding practices.

d. Knowing the significance aesthetics & ergonomics while designing electronic product.

CO5.Prepare and deliver technical seminar based on the mini project work carried out.

CO6.Validate the importance the document design by compiling technical report on mini project work carried out

Program Outcomes:

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of CO with PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	3	3	-	2	-	2	3	3	1	3
CO2	2	3	3	2	2	1	1	-	1	1	3	3
CO3	3	-	-	2	-	2	-	-	1	-	3	3
CO4	3	2	3	3	2	1	2	-	-	-	-	2
CO5	2	2	-	3	1	2	-	1	3	3	1	3
CO6	1	2	3	2	1	1	1	1	2	3	1	3

UNDERTAKING BY THE STUDENT

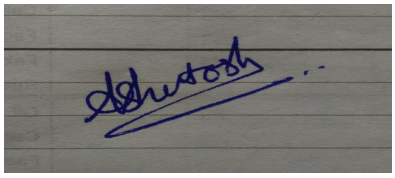
We, the students of TE (E&TC) hereby assure that we will follow all the rules and regulations related to the project activity for the academic year 2020-2021.

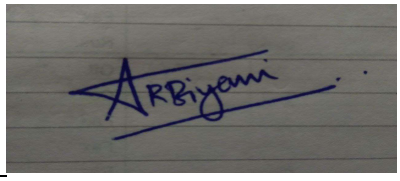
The project entitled-

EARTH TILE

Will be fully designed/ developed by us and no part of the project will be readymade purchased from outside parties. If it is observed that certain malpractices are done by our group then we will be responsible for further consequences.

Name of the student Signature

1. Ashutosh Mithari 

2. Akash Biyani 

ABSTRACT

Nowadays energy and power are the one of the basic necessities regarding this modern world. As the demand of energy is increasing day by day, so the ultimate solution to deal with these sorts of problems is just to implement the renewable sources of energy.

The objective of this work is power generation through footsteps as a source of renewable energy that we can obtained while walking on to the certain arrangements like footpaths, stairs, plate forms and these systems can be install elsewhere specially in the dense populated areas. We can implement this foot step power generation system by use of Piezoelectric sensor and efficient diode rectifier circuit along with filter circuit. As a result of completing the above procedure or technique we made ourselves able to design such compatible system through which we could run our home appliances through DC output. As our main purpose was to charge the battery through DC output.

Thus, as a result we have concluded that these types of designs and techniques of power generating systems are very useful and handy in order to match the supply and demand of energy globally as well.

1. Specifications:

3.1. Diode and Capacitor

To rectify the output signal coming from piezoelectric circuit an appropriate diode circuit is necessary. The Diode circuit will convert analog form of signal into pulsating DC form. Still this signal can not be used to charge batteries and hence it is further converted from pulsating Dc to Constant DC with help capacitor. The capacitor acts as filter.

PIV Rating of Diode – 25V

Electrolytic capacitor – 1000uF

3.2 Piezoelectric Sensor

Piezoelectric sensor is the main component in whole project. These crystal sensor are coin sized and very much useful. These sensors convert the pressure they sense into electric signal. The converted signal is in

Analog format Which then will be convertewd into Digital by rectifier circuit and capacitor filter combination.

3.3 PIC18F2550

PIC18F2550 is a High-Performance, Enhanced flash, USB Microcontroller with NANO-Watt-Technology. This is an 8-bit microcontroller popular among makers and engineers due its features and low cost. PIC18F2550 comes in various packages like DIP, QPF and QPN and can be selected according to the project requirement.

3.4 Battery

Lead acid batteries are a tested technology that has been used in off-grid energy systems for decades. While they have a relatively short life and lower DoD than other battery types, they are also one of the least expensive options currently on the market in the home energy storage sector. For homeowners who want to go off the grid and need to install lots of energy storage, lead acid can be a good option.

Required hardware and software:

Proteus Professional -

Proteus Design Suite (designed by Lab center Electronics Ltd.) is a software tool set, mainly used for creating schematics, simulating Electronics & Embedded Circuits and designing PCB Layouts. Proteus ISIS is used by Engineering students & professionals to create schematics & simulations of different electronic circuits. Proteus ARES is used for designing PCB Layouts of electronic circuits. Proteus is quite lenient in circuit designing and it works on ideal conditions i.e., if you don't add pull up resistors in Proteus simulation, then it won't
give garbage value

PSIM Student Version –

PSIM is an Electric circuit simulation software package, designed specifically for use in Power Electronics and Motor driver simulation but can be used to simulate any electronic circuit. Developed

by Power-sim, PSIM uses nodal analysis and the trapezoidal rule integration as the basis of its simulation algorithm. PSIM provides a schematic capture interface and a waveform viewer Sim view. PSIM has several modules that extend its functionality into specific areas of circuit simulation and design including: control theory, Electric motors, photovaltics and wind turbines PSIM is used by industry for research and product development and it is used by educational institutions for research and teaching.

Prominent Reference Books/ Papers:-

Books:

[1] Energy Engineering and Management – Amlan Chakraborti – PHI.

[2] Energy: Management, Supply and conservation – Dr. Clive Beggs.

[3] Energy Conservation: Success and Failures – John C. Sawhill, Richard Cotton – Brookings Institution Press.

[4] Handbook of Energy Conservation – H.M. Robert, J.M. Collins – Alken Publishing Unit.

Papers:

1. Y.-H. Kim, "A study of output characteristics for the generation panel using unimorph piezoelectric element," *Journal of the Korean Institute of Electrical and Electronic Material Engineers*, vol. 23, no. 3, pp. 250–259, 2010. 'Footstep Power Generation Using Piezo Electric Transducers. Kiran Boby, Aleena Paul K, Anumol.C.V, Josnie Ann Thomas, Nimisha K.K https://scholar.google.com/scholar_lookup?title=A%20study%20of%20output%20characteristics%20for%20the%20generation%20panel%20using%20unimorph%20piezoelectric%20element&author=Y.-H.%20Kim&publication_year=2010

2. Y.-H. Kim, "A study of output characteristics for the generation panel using unimorph piezoelectric element," *Journal of the Korean Institute of Electrical and Electronic Material Engineers*, vol. 23, no. 3, pp. 250–259, 2010. https://ieeexplore.ieee.org/document/1244755

3. Hindawi journal https://www.hindawi.com/journals/js/2018/7986438/

4. IARJSET Research paper https://iarjset.com/upload/2015/april-15/IARJSET%206.pdf

5. C. Xu, M. Akiyama, K. Nonaka and T. Watanabe, "Electrical power generation characteristics of PZT piezoelectric ceramics", *IEEE Trans. Ultrason. Ferroelect. Freq. Contr.*, vol. 45, no. 4, pp. 1065-1070, July 1998. https://ieeexplore.ieee.org/document/710589

Monthly Planning Sheet

Day and Date	Task	Discussion/Description	Action Point	Signature of Int/ Guide
Week1 19/1/2020 Tuesday	Formation of group	Formed group after discussing with each other	Discussion of different platform for exchanging information	
Week 2 26/1/2020 Tuesday	Finalization of Mini project & Distribution of work	Selection of topic and discussion with faculty, discussion with team members and assigning work	Finalization of topic and submitting it and submitting it to guide	
Week 3 2/2/21 Thursday	Collection of information for synopsis preparation	Searching of information for literature survey, discussion of different research paper And collection of information	Distribution of topics among group members and collecting the required information	
Week 4 17/2/21 wednesday	Synopsis	Combining of collected information through common platform	Making a synopsis ,containing all collected information	
Week 5 7/3/21 Sunday	PPT Presentation	Arranging all the collected information in the form of ppt presentation	Presenting to guide through common platform	

Monthly Planning Sheet

Day and Date	Task	Discussion/Description	Action Point	Signature of Int/ Guide
Week 6 7/5/21 Friday	Component Selection	All components selection with their specification after discussion with group members	Selection of components for simulation	
Week 7 13/5/21 Thursday	Programming and Testing	Online platform for writing program.	Creating file on online software	
Week 8 21/5/21 Friday	Simulation	Proteus design suite, loading the program in MPlab of simulation software, testing output	Creating a design in given software and loading .hex file in ATMEGA	
Week 9 28/5/21 Friday	Final presentation	Presentation of simulation program, ppt and first draft of report	Power point making and report making	
Week 10 30/5/21 Sunday	Project Report	Final project report	Making a final report	

Monthly Planning Sheet

Day and Date	Task	Discussion/Description	Action Point	Signature of Int/ Guide
Week 11 1/6/21 Tuesday	Final Submission	Updating Documents	Logbook, ppt, report, simulation, poster, synopsis	