310249: Seminar and Technical Communication

(Guidelines and Log Book)

**Third Year Computer Engineering**

Year 2024 - 2025

Seminar ID:

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Seminar Title : Solar Panel Energy Management

Seminar Guide: Dr. Chaya Ravi Jadhav Area of the Seminar :

Dr. D. Y. Patil Institute of Technology,Pimpri, Pune

DPU

**Department of Computer Engineering**

**Dr. D. Y. Patil Unitech Society’s**

**Dr. D. Y. Patil Institute of Technology, Pimpri, Pune-411018**

**Savitribai Phule Pune University, Pune.**

**General Instructions**

## Students should enter the correct information in the work book.

1. Get all entries verified by respective seminar guide. No changes are to be made without seminar guide’s permission.
2. Students should report to their respective guides as per the schedule and the visit log is to be maintained in the work book.
3. Follow all deadlines and submit all documents strictly as per prescribed formats.
4. The work book should be produced at the time of all discussions and presentations.
5. The work book must be submitted to Seminar coordinator/ guide/ department

/ College after successful examination.

1. All documents and reports are to be prepared in Latex only (All the formats specifications provided adheres to MS Word but consequently applicable to final seminar report published using Latex)
2. Submit hard as well as soft copy as per guidelines

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## This booklet is supportive document to rules and a regulation provided by affiliated university curriculum providing recommendations, guidelines and is record of all related activities associated with seminar. This booklet is provided with the genuine intent to bring uniformity and to systematize the seminar work and to keep the audit of the work undergone by each student.

Work Book Development Project

|  |  |
| --- | --- |
| Project Institution | Department of Computer Engineering  Matoshri College of Engineering and Research Centre, Nashik |
| Support & Guidance | Dr. Gajanan K. Kharate,  Principal, Matoshri College of Engineering and Research Centre, Nashik |
| Concept and Design | Dr. Varsha. H. Patil  BoS Coordinator Computer Engineering , SPPU, Pune  Vice Principal, Matoshri College of Engineering and Research Centre, Nashik |
| Coordinator | Mrs. Swati A. Bhavsar Assistant Professor,  Matoshri College of Engineering and Research Centre, Nashik |
| Technical Committee Members | 1. Dr. Madhavi Pradhan 2. Dr. Parikshit Mahalle 3. Mr. Niranjan L. Bhale 4. Dr. Neeta Deshpande 5. Mr. Ranjit Gawande 6. Ms. Sharmila Wagh |
| Date | 21st April 2017 |
| Version No. | 2.0 |
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### (For circulation at BoS Computer Engineering, Savitribai Phule Pune University only)

|  |
| --- |
| **Savitribai Phule Pune University, Pune Computer Engineering** |
| **Program Educational Objectives** |
| 1. **PEO1:** To Have strong fundamental concepts in mathematics, science and engineering to address technological challenges. 2. **PEO2:** To Possess knowledge and skills in the field of Computer Engineering for analyzing, designing and implementing novel software products in a dynamic environment for a successful career and pursue higher studies. 3. **PEO3:** Demonstrate the multidisciplinary approach and leadership skills that augment their professional competency. 4. **PEO4:** Exhibit commitment to ethical practices, societal contributions and lifelong learning. |
| **Program Outcomes** |
| **Students are expected to know and be able –**   1. To apply knowledge of mathematics, science, engineering fundamentals, problem solving skills, algorithmic analysis and mathematical modeling to the solution of complex engineering problems. 2. To analyze the problem by finding its domain and applying domain specific skills 3. To understand the design issues of the product/software and develop effective solutions with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. 4. To find solutions of complex problems by conducting investigations applying suitable techniques. 5. To adapt the usage of modern tools and recent software. 6. To contribute towards the society by understanding the impact of Engineering on global aspect. 7. To understand environment issues and design a sustainable system. 8. To understand and follow professional ethics. 9. To function effectively as an individual and as member or leader in diverse teams and interdisciplinary settings. 10. To demonstrate effective communication at various levels. 11. To apply the knowledge of Computer Engineering for development of projects, and its finance and management. 12. To keep in touch with current technologies and inculcate the practice of lifelong learning. |
| **Program Specific Outcomes (PSO)** |
| **A graduate of the Computer Engineering Program will demonstrate-**  **PSO1:** Professional Skills- The ability to understand and develop the software systems by applying the concepts and techniques in the areas related to data structures, algorithms, system software, networking, multimedia, web design and data science for efficient computer-based solutions.  **PSO2**: Problem-Solving Skills- The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the society related to computer engineering.  **PSO3:** Successful Career and Entrepreneurship- The ability to employ modern computer languages, environments and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies. |

**Prologue**

Seminar is the first formal curricular activity at the UG level, where students are supposed to exhibit their skills and knowledge by undertaking the study of the chosen topics. For standardization in the process of Seminar conduction, an effort to provide comprehensive and meticulous guidelines helping the learners to perform with respect to certain processes and evaluation criteria.

The logbook will surely help the learner from the very first step of topic selection to the final seminar delivery. Proper recording of the activities necessarily maintains the track of progress of the learner along with neat and clear planning helping to proceed on the right path and proper documents preparation. As per the individual learner’s domain interest the selected topic can be explored with determined perspective and definite methodology helping the learner to develop scientific and methodical approach in the study. In the course of the topic exploration various skills are built, directly and indirectly contributing to the development of learner.

The documentation provided in the form of the logbook will help to standardize the process with phenomenal transparency in evaluation guidelines, giving fair idea to learner and evaluator, minimizing the possibility to err. The documented logbook will hopefully answer even the slightest queries those may arise during the whole process of the activity conduction during the semester. So, it is our joint responsibility to stick to the basics to help the learner in character building not solely aiming at the grade in performance but aiming at all-round development in this regard.

Dr. Varsha H. Patil

Coordinator, Board of Studies (Computer Engineering)

SPPU, Pune 22nd February 2017.

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# About Seminar

The word *seminar* is derived from the Latin word *seminarium*, meaning "seed plot". It refers to a course of intense study relating to the student's major intended for the improvement of technical knowledge of student. The ability to articulate ideas is an important life skill which will be required outside the academic world in the world of work, for interviews, consulting experts, getting and understanding advice and giving work presentations etc. Seminars give practice in these general skills and help students to develop confidence. It is an important way of learning - by discussing and questioning issues, students can clarify their own ideas and also learn from each other. (Ref: https://en.wikipedia.org/wiki/Seminar)

Keeping this in mind each student of Third Year Computer Engineering has to deliver the seminar under the head “SEMINAR AND TECHNICAL COMMUNICATION” that is Term Work of 50 marks in second semester.

As per the individual learner’s domain interest the selected topic can be explored with determined perspective and definite methodology helping the learner to develop scientific and methodical approach in the study. In the course of the topic exploration various skills are built, directly and indirectly contributing to the development of learner.

To aid both student and faculty this booklet provides the guidelines for preparation of topic, report, presentation, evaluation.

### Objectives and Outcomes Objectives -

* + To explore the basic principles of communication (verbal and non- verbal) and active, empathetic listening, speaking and writing techniques.
  + To expose the student to new technologies, researches, products, algorithms, services

### Outcomes -

On completion of the course, student will–

* + be able to be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
  + be able to improve skills to read, understand, and interpret material on technology.
  + improve communication and writing skills

### Guidelines for selection of Seminar Topic

* + Each student will select a topic in the area of Computer Engineering and Technology preferably keeping track with recent technological trends and development beyond scope of syllabus avoiding repetition in consecutive years.
  + Each student will make a seminar presentation using audio/visual aids for duration of 20-25 minutes and submit the seminar report prepared in Latex only.
  + Active participation at classmate seminars is essential.
  + Softcopy (CD) must include copy of synopsis, report, PPT, reference material and related.

### Recommended Guidelines for Evaluation

Panel of staff members along with a guide would be assessing the seminar work based on these parameters-

* + Topic
  + Contents and Presentation
  + regularity, Punctuality and Timely Completion
  + Question and Answers
  + Report, Paper Presentation/Publication
  + Attendance and Active Participation.

(Kindly note that these guidelines provided for selection, evaluation, presentation and documentation are recommended to follow. However it is suggested to refer the guidelines prescribed in respective course of syllabus by SPPU)

* 1. **Review and Visit Log**

| **Sr. No.** | **Date** | **Details of Discussion/ Remark** | **Signature of Guide/ Seminar**  **In charge** |
| --- | --- | --- | --- |
| 1. |  | Topic Finalization |  |
| 2. |  | Preparing draft of proposal of seminar |  |
| 3. |  | Submission of Proposal |  |
| 4. |  | Review-I |  |
| 5. |  | Review-II |  |
| 6. |  | Preparing for presentation-(Review-III) |  |
| 7. |  | Preparing for presentation-(Review-IV) |  |
| 8. |  | Seminar Report rough draft Preparation |  |
| 9. |  | Seminar Report finalization |  |
| 10. |  | Seminar Report submission |  |



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **4. Seminar Evaluation Sheet (Internal)**  Table 1.1 Evaluation Sheet | | | | | | | | | |
|  | **Sr.**  **No.** | **Conten**  **ts and**  **Presen tation** | **Punctuality and Timely Completion (following of deadline)** | **Semin ar Report** | **Attendanc e**  **and Active participati on** | **Question and Answers** | **Paper**  **Publication and Participation at Conference (Bonus)** | | **Total** |
|  | **25** | **05** | **10** | **05** | **05** | **05** | | **50** |
| 1. |  |  |  |  |  |  | |  |
|  |  | # To be filled by guide/ authorities | | | | | | |
|  | **Whether the seminar is delivered as per**  **schedule(yes/ no):**  **(If no, mention the reason)** | | | |  | |  | |
| **Name and Signature of Evaluation Committee:**      **Signature of Guide**  **Dr. Chaya Jadhav Dr. Vinod V. Kimbahune**  **(Refer Rubrics – page number 08)**    Seminar Log Book Third Year Computer Engineering, SPPU, Pune Page 5 | | | | | | | | | |

1. **Paper Publication/ Participation at Conference**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.**  **No.** | **Name of Organizer** | **Date** | **Certificates/ Prizes**  **won if any** |
| **1.** |  |  |  |
| **2.** |  |  |  |
| **3.** |  |  |  |
| **4.** |  |  |  |



# Rubrics

### Contents and Presentation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade (Grade Point)** | **Excellent (10-9)** | **Very Good (6-8)** | **Fair (3-5)** | **Poor (1-2)** |
| **Parameter** |  |  |  |  |
| Slide Preparation |  |  |  |  |
| Verbal Skills |  |  |  |  |
| Confidence |  |  |  |  |
| Eye Contact |  |  |  |  |
| Contents |  |  |  |  |

1. **Overall performance**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade (Grade Point)** | **Excellent (10-9)** | **Very Good (6-8)** | **Fair (3-5)** | **Poor (1-2)** |
| **Parameter** |  |  |  |  |
| Punctuality and Timely Completion |  |  |  |  |
| Question and Answers |  |  |  |  |
| Attendance and Active Participation |  |  |  |  |
| Seminar Report |  |  |  |  |
| Paper publication & presentation |  |  |  |  |

**Annexure i: Format for Synopsis**

* 1. **Cover Page:**

**Name of the Student: Vishal Ankush Gavali**

**Roll No: TCOB38**

**Branch: Computer Engineering**

**Email ID: vishalgavali2004@gmail.com**

**Mobile:7796885013**

**Title of the topic:Solar Panel Energy Management System**

**Area of topic**

**Abstract:**

The increasing demand for sustainable energy has accelerated the adoption of solar panels, yet efficient energy management remains a critical challenge to fully harness solar power. This project introduces an innovative Solar Panel Energy Management System designed to improve energy generation, maintenance, and utilization through advanced features.

A key component is the Solar Tracking System, which automatically adjusts the panels' orientation to follow the sun's path throughout the day. This maximizes energy capture by ensuring optimal alignment with the sun’s rays. Additionally, the system incorporates a Self-Cleaning Mechanism that periodically removes dust and debris from the panels, maintaining peak efficiency with minimal manual intervention, reducing maintenance costs, and preventing energy loss due to contaminants.

The Comprehensive Energy Monitoring feature provides real-time insights into both energy production and consumption. Advanced sensors and software track these metrics, enabling users to identify inefficiencies and optimize energy usage. By offering a complete view of energy patterns, this system empowers users to make informed decisions and enhance overall energy management.

In conclusion, the Solar Panel Energy Management System enhances efficiency, minimizes maintenance, and provides valuable insights, making it an ideal solution for maximizing the benefits of solar energy

**2) Brief About Contents:**

**Introduction**

* Overview of Solar Energy
* Importance of Energy Management in Solar Systems
* Objectives of the Project

**Solar Tracking System**

* Working Principle of Solar Tracking
* Impact on Energy Efficiency
* Benefits and Challenges

**Self-Cleaning Mechanism**

* Importance of Clean Solar Panels
* Description of the Self-Cleaning Technology
* Cost and Maintenance Benefits

**Comprehensive Energy Monitoring**

* Overview of Energy Monitoring Systems
* Sensors and Software Used
* Real-Time Energy Data and Insights

**System Integration**

* Communication between Components
* Hardware and Software Requirements
* Implementation Challenges

**Optimization Techniques**

Energy Usage Patterns

Potential Inefficiencies and Solutions

Recommendations for Improving Energy Utilization

### Applications areas, if any:

Residential Solar Power Systems

Commercial Solar Installations

Industrial Energy Management

Off-Grid and Rural Areas

Smart Cities and IoT Integration

Public Infrastructure

* 1. **References / Bibliography**

[1] A. Green, J. Emery, Y. Hishikawa, W. Warta, and E. J. 1957, Solar Cell Efficiency Tables (Version 62), Progress in Photovoltaics: Research and Applications, vol. 26, no. 6, pp. 3–12, 2018.

[2] International Energy Agency (IEA), World Energy Outlook 2021, IEA, 2021. [Online]. Available: https://www.iea.org/reports/ world-energy-outlook-2021

[3] S. M. Hossain, “Review on Self-Cleaning Mechanisms of Photovoltaic Panels: Techniques, Challenges, and Future Directions,” Renewable and Sustainable Energy Reviews, vol. 103, pp. 124-135, 2019.

[4] J. P. N. Valero, M. F. G. Sanchez, and V. M. Rodriguez, “A Review of Solar Tracking Systems: Techniques and Applications,” Renewable Energy, vol. 50, pp. 291-308, 2013.



### 

Seminar Report

On

Solar Panel Energy Management

By

**Vishal Ankush Gavali**

**T1902404283**

Under the guidance of

**Dr. Chaya Jadhav**

DPU

# DEPARTMENT OF COMPUTER ENGINEERING

**Dr. D. Y. Patil Institute of Technology, Pimpri, Pune.**

**Sant Tukaram Nagar,**

**Pimpri Colony, Pune-411018.**

**Savitribai Phule Pune University [2024-2025]**



|  |  |
| --- | --- |
| **Annexure iv.: Certificate**  DPU | Department of Computer Engineering,  Dr. D. Y. Patil Institute of Technology, Pimpri, Pune-411018 |

**CERTIFICATE**

This is to certify that **Vishal Ankush Gavali** from **Third Year (TE)**

**Computer Engineering** has successfully completed his seminar work titled

Solar Panel Energy Management at Dr. D. Y. Patil Institute of Technology, Pimpri, Pune in the partial fulfillment of the Bachelors Degree in Engineering.

Dr.Chaya Jadhav

Guide Head of the Department Principal

**Annexure v: Report Documentation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Seminar Report Documentation** | | | | | |
| Report Code: CS-TE-Seminar 2024-25 | | | | **Report Number: TCOB38** | |
| Report Title**:Solar Panel Energy Management** | | | | | |
| **Address (Details):**  **Dr. D. Y. Patil Institute of Technology, Pimpri, Pune.**  **Sant Tukaram Nagar, Pimpri Colony, Pune-411018.** | | | | | |
| **Author [with Address, phone, E-mail]: Address- Dr. D. Y. Patil Intitute of Technology Pimpri**  **E-mail : vishalgavali2004@gmail.com**  **Roll:TCOB38**  **Cell No:** | | | | | |
| **Year:** 2024-25  **Branch:** Computer Engineering | | | | | |
| ***Key Words*:** | | | | | |
| Type of Report: FINAL | *Report Checked By****:*** | Report Checked Date: | **Guides Complete Name:**  **Dr.Chaya Ravi Jadhav** | | Total Copies    2 |
| **Abstract:-**  The increasing demand for sustainable and renewable energy sources has led to the widespread adoption of solar panels. However, efficient energy management remains a critical challenge to maximize the benefits of solar power. This project explores an advanced solar panel energy management system. This project presents an innovative Solar Panel Energy Management System designed to enhance energy generation, maintenance, and utilization through several advanced features:-  **Solar Tracking System:**  The solar panels are equipped with a state-of-the-art tracking mechanism that automatically adjusts their position to follow the sun's trajectory throughout the day. By aligning with the sun's rays at all times, the system maximizes energy capture, leading to increased overall efficiency.  **Self-Cleaning Mechanism**:  Dust, dirt, and other contaminants on solar panels can significantly reduce energy output. To address this, our system incorporates a self-cleaning function that periodically removes debris from the panel surfaces. This ensures that the panels operate at peak efficiency with minimal manual intervention, reducing maintenance costs and downtime.  **Comprehensive Energy Monitoring**:  The system includes advanced sensors and software that continuously monitor both the energy produced by the solar panels and the energy consumed by connected devices. This real-time data is accessible to users, providing insights into energy usage patterns, potential inefficiencies, and opportunities for optimization. By understanding these metrics, users can make informed decisions to better manage their energy consumption and maximize the benefits of solar power.  **User-Friendly Interface:**  The management system is complemented by a user-friendly interface that provides detailed visualizations of energy production, consumption, and savings. This interface allows users to monitor system performance, schedule maintenance, and adjust settings to further optimize energy management. | | | | | |

