

A Report on the Course Project of

**Engineering Exploration (15ECRP101)**

**titled**

**Mr.SOWER**

By

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Under the guidance of

**Your Guide Full name Qualification**

**Position.**

Centre for Engineering Education Research

Academic Year 2021-2022, Even Semester



Centre for Engineering Education Research

#### CERTIFICATE

This is to certify that the course project entitled “Mr. SOWER” is carried out by the students **Pranav S Bhat (01FE21BCS230), Ankith Chavan (01FE21BCS243), Faheem Dehalvi (01FE21BEE083), Mahendraraddi Iraddi (01FE21BEC220)** as part of Engineering Exploration Course (15ECRP101), during 2nd Semester of B.E program for the academic year 2021-22. The project report fulfils the requirements prescribed by KLE Technological University.

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Guide  Guide Name    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Examiner 1: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Division in charge  Instructor Name  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Examiner 2: |

### DECLARATION

We hereby declare that the project work entitled “YOUR PROJECT TITLE HERE” submitted as a part of Engineering Exploration Course during 2nd semester of academic year 2021-2022, is a record of an original work done by us under the guidance of Your Guide Name. The project work and part of this report is not plagiarized to the best of our knowledge.

Date: DD/MM/YYYY

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(Signatures in all occasion in the report should be put on hard copy only. Do not try to insert the image of your signature in this page.)

**ACKNOWLEDGEMENT**

Acknowledgements enable you to thank all those who have helped in carrying out the Project. Careful thought needs to be given concerning those whose help should be acknowledged and in what order. The general advice is to express your appreciation in a concise manner and to avoid strong emotive language.

Note that personal pronouns such as 'I, my, me …' are nearly always used in the acknowledgements while in the rest of the project such personal pronouns are generally avoided.

The following list includes those people who are often acknowledged.

Note however that every project is different and you need to tailor your acknowledgements to suit your particular situation.

* Project Guide
* Course Instructor
* Other academic staff in your department
* Technical or support staff in your department
* Academic staff from other departments
* Other institutions, organizations or companies
* Past students
* Family
* Friends

Go through some sample acknowledgements in few reports. You can find plenty of them on internet and write one suiting to your project. Include names of at least 8 to 10 people in the acknowledgement. Fit your acknowledgement within 200 words on this page.

**Abstract:**

An abstract is an abbreviated version of your project final report. The project abstract appears at the beginning of the report as well as on your display board during exhibition.

The purpose of the abstract is to describe and justify the final design (or for the intermediate reports the current status of the design). Typically abstract for a design report will consist of:

1. Discussion on General Topic related to your need statement and its significance:
2. Discussion on current problem identified.
3. Unfold the steps of your project in two to three self-explanatory sentences. Keep it brief and to-the-point. (You can describe about the Engineering Design process followed)
4. In two or three sentences describe the process for testing for reliability and performance of your project.
5. Define the future scope for your project. (Assume you are given ample time and money, what are the additional functions/features you would like to add or incorporate so that your project becomes more valuable.)

Things to consider:

1. Make it easy for the reader to get your point.
2. Keep most sentences and paragraphs short.
3. Each paragraph will discuss about only one general theme and each sentence describes only one idea.
4. Run through **Grammarly** or any other software to check for grammatical errors (\*)

Things to Avoid

1. Avoid jargon or any technical terms that most readers won't understand.
2. Avoid abbreviations or acronyms that are not commonly understood unless you describe what they mean.
3. Abstracts do not have a bibliography or citations.
4. Abstracts do not contain tables or graphs.

Please write an abstract for your project with not more than 250 words. An example abstract is available in next page for your reference.

Abstract example:

The issue of security is very paramount in any organization, especially such organization as a bank. Therefore we intend to aid in security of the bank by bringing in an electronic code lock system that involves an individual to enter a password before getting an access to some items, a particular room or building. This code lock system is not just the normal single-user code lock system that required a user to insert an already programmed code to gain access to a room or safe; it is a code lock system that has an administrative password and enables multiple user access. By this, we mean that there is room for more than a one user with different unique codes to access the same safe or room. Also, with the kind of security code lock system we intend to implement, if for any reason a user forgets his password, with the help of the administrator user, the user’s password can be reset to a default password after which the user can change to a password of his choice. Lastly the administrator has records of log of activities of a user accessing a safe or a room at a particular time or whenever a user changes his password and this will further help the administrator to easily take security measures. The use of microcontroller, keypad, LED display and some other electronic devices coupled together will help in accomplishment of that. Here an individual have to enter a password which must have been programmed in assembly language and this is read from the microcontroller for clarification and verification. From this project, we hope to build an alternative security system for banks.

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**1. Problem Definition**

**1.1. Need Statement**

Here you need to write the need statement as it is, do not change the need statement given by clients.

**1.2. Gathering Pertinent Information**

Before you can go further in the design process, you need to collect all the information available that relates to the problem. Novice designers (Beginners) will quickly skip over this step and proceed to the generation of alternative solutions. You will find, however, that effort spent searching for information about your problem will pay big dividends later in the design process. Gathering pertinent information can reveal facts about the problem that result in a redefinition of the problem. You may discover mistakes and false starts made by other designers. Information gathering for most design problems begins with asking the following questions. If the problem addresses a need that is new, then there are no existing solutions to the problems, so obviously some of the questions would not be asked.

* What historical benchmarks in technology are associated with your project?
* What are the existing solutions to the problem? (Search through Internet, Journals, Patents, Books, Local Shops and Online shopping Sites etc. Collect information about 4 existing products)
  + What is working principle behind the existing products?
  + What are the different components or sub components of the existing products?
  + Based on the knowledge about existing products, what all technology, components or modules are needed for the design of your product.
  + Do you have the expertise about the technology, components or modules needed for your course project?
  + Can you identify the people of different expertise which you need for designing across the institute?
  + Have you met and discussed with any other teams who have selected the same need statement? (Meet at least 4 teams)
  + What are their solution ideas to design the product?
  + When compared with your problem statement, what is wrong with the way the problem that will be solved by other teams?
  + When compared with your problem statement, what is right about the way the problem that will be solved by other teams?
* How much will people pay for a solution to the problem?
* What other factors are important to the problem solution (such as safety, aesthetics and environmental issues)?

The report should be 4-5 pages, in 12pt Calibri. You can consider this document itself as the template for report writing. Download it and replace text with your information with the same formatting available in this document. It should also have a bibliography (not counting toward the page limit) for citing references as per the format given on the next page. Even though reports are to address the questions listed above, the report should still be written as a well composed, cohesive document, not merely a sloppy conglomeration of responses to the given questions. Keep your audience in mind; common technical jargon may be used, but word or phrases limited to a specialized field should be clearly defined. You can also include pictures and tables related to your project work. Please note that even these tables and pictures are also to be cited. Below is an example.

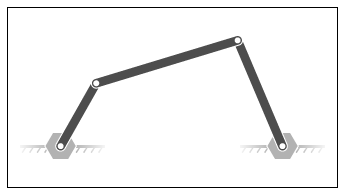


Figure 1. Four Bar Mechanism

Image Courtesy 1: http://in.mathworks.com/help/physmod/sm/ug/model-four-bar.html?requestedDomain=www.mathworks.com

Learning about work that has previously been done on any project you are currently working on is an important part of the engineering design process. When reporting this work, for example in the Engineering Exploration research report, it is imperative to give credit to all sources you have used (data, published materials, interviews, Internet sources, etc.).

**Any document you create or presentation you give should be written in your own words. The use of ideas, opinions, work, and words of others require explicit source referencing at the appropriate location within your documents.**

All citations used within your reports should have a complete description at the end of the document in the Bibliography section. Bibliography is a list of source materials that are used or consulted in the preparation of a work or that are referred to in the text [9]. These references are listed. The author and data of publication are used to cite the source within the body of your report. (e.g. “Since Kleiner [1] has shown that...” or “This is in agreement with results obtained later [1]. Some examples of the format are shown below by type of reference.

1.3. Questions asked to client / users for arriving at Objectives, Functions and Constraints

Based on the answers ✓(tick) O-objective, C-constraint and F-functions accordingly

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**1.4. Objectives**

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| **Sl. No** | **Objectives** |
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**Problem definition 1.1**

**1.5. Constraints**

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| **Sl. No** | **Constraints** |
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# Problem definition 1.2

**1.6. Functions**

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| **Sl. No** | **Functions** |
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**Problem definition 1.3**

**2. Conceptual Design**

**2.1. Establishing Functions**

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| **Sl. No** | **Functions from user perspective** | **Functions from the designer perspective** |
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**2.2. Functions Tree** you may take the image or table from the Github.

**2.3. Morphological Chart** you may take the image or table from the Github.

**2.4. Generated Concepts**

|  |  |
| --- | --- |
| **Concept 1** | Concept 3 |
| **Concept 2** | **Concept 4** |

**3. Conceptual Evaluation and Product Architecture**

**3.1. Pugh Chart** you may take the image or table from the Github.

**3.2. Justification for the Scores** you may take the image or table from the Github.

## 3.3 Selected Design

## 3.4 Product Architecture

**3.4.1 Function Clustering**

**3.4.2 Interaction between subsystems**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Sub System 2 | Sub System 3 | Sub System 4 |
| Sub System 1 | Material Interaction | ✓ | X | X |
| Data Interaction | X | ✓ | X |
| Spatial Interaction | X | X | ✓ |
| Details: Explain the ticked interaction here. | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Sub System 1 | Sub System 3 | Sub System 4 |
| Sub System 2 | Material Interaction | ✓ | X | X |
| Data Interaction | X | ✓ | X |
| Spatial Interaction | X | X | ✓ |
| Details: Explain the ticked interaction here. | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Sub System 1 | Sub System 2 | Sub System 4 |
| Sub System 3 | Material Interaction | ✓ | X | X |
| Data Interaction | X | ✓ | X |
| Spatial Interaction | X | X | ✓ |
| Details: Explain the ticked interaction here. | | | | |

## 4. Implementation

## 4.1. Sprint 1 Implementation

## 4.1.1. 3D model of the sprint 1 subsystem

Please take a snap of the 3D model of the Sub System 1 and place it here. Note that the dimensions should not be shown in the isometric view of the assembly. You can include more than one snap for better communication of the sub system.

Along with the 3D model of the sub system, even orthographic drawings of each parts used in the assembly are needed. The drawings will consist of front view, top view and side views with dimensions and isometric view of the component with no dimensions on it.

## 4.1.2. Bill of Materials (BOM) of the sprint 1

Take a picture or photo of Sprint 1 BOM and paste it here.

## 4.1.3. Circuit diagram of the sprint 1

Create neat electrical/electronic circuit diagram of Sub System 1 if needed in the software Fritzing along with all details needed for the complete construction of the prototype. Take the snap of it and paste it in this page. You can have many pictures for better clarity. If there is no need of Electrical or Electronic components usage in the Sub System 1 then please delete this Sub Heading.

## 4.1.4. Flow chart of the sprint 1

## 4.1.5. Physical implementation image of the sprint 1

Take the snap of the fabricated sub system 1 and paste it here. For the better clarity you can put more than 1 photo

## 4.2. Sprint 2 Implementation

## 4.2.1. 3D model of the sprint 2

Please take a snap of the 3D model of the Sub System 2 and place it here. Note that the dimensions should not be shown in the isometric view of the assembly. You can include more than one snap for better communication of the sub system.

Along with the 3D model of the sub system, even orthographic drawings of each parts used in the assembly are needed. The drawings will consist of front view, top view and side views with dimensions and isometric view of the component with no dimensions on it.

## 4.2.2. Bill of Materials (BOM) of the sprint 2

Take a picture or photo of Sprint 2 BOM and paste it here.

## 4.2.3. Circuit diagram of the sprint 2

Create neat electrical/electronic circuit diagram of Sub System 2 if needed in the software Fritzing along with all details needed for the complete construction of the prototype. Take the snap of it and paste it in this page. You can have many pictures for better clarity. If there is no need of Electrical or Electronic components usage in the Sub System 2 then please delete this Sub Heading.

## 4.2.4. Flow chart of the sprint 2

## 4.2.5. Physical implementation image of the sprint 2

Take the snap of the fabricated sub system 2 and paste it here. For the better clarity you can put more than 1 photo

## 4.3. Sprint 3 Implementation

## 4.3.1. 3D model of the sprint 3 subsystem

Please take a snap of the 3D model of the Sub System 3 and place it here. Note that the dimensions should not be shown in the isometric view of the assembly. You can include more than one snap for better communication of the sub system.

Along with the 3D model of the sub system, even orthographic drawings of each parts used in the assembly are needed. The drawings will consist of front view, top view and side views with dimensions and isometric view of the component with no dimensions on it.

## 4.3.2. Bill of Materials (BOM) of the sprint 3

Take a picture or photo of Sprint 3 BOM and paste it here.

## 4.3.3. Circuit diagram of the sprint 3

Create neat electrical/electronic circuit diagram of Sub System 3 if needed in the software Fritzing along with all details needed for the complete construction of the prototype. Take the snap of it and paste it in this page. You can have many pictures for better clarity. If there is no need of Electrical or Electronic components usage in the Sub System 3 then please delete this Sub Heading.

## 4.3.4. Flow chart of the sprint 3

## 4.3.5. Physical implementation image of the sprint 3

Take the snap of the fabricated sub system 1 and paste it here. For the better clarity you can put more than 1 photo

## 5. Statement of Expenditure

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No | Item with description | Quantity | Price in Rs. |
| 1 |  |  |  |
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| Total | | |  |

Note: Include items which you have procured outside the thinkering lab.

**6. Limitations of Present work and Future Scope**

Within 8 to 10 sentences give explanation on limitations of your present work.

(You can list the drawbacks of the system created.)

Within 8 to 10 sentences give explanation on Future Scope of your present work.

(Assume you are given ample time and money, what are the additional functions/features you would like to add or incorporate so that your project becomes more valuable.)

**References:**

**Example 1 - Web Page:**

[1] Knaresboro, T. (August 31, 2010). How to Make the Perfect French Fry. Retrieved from <http://www.popularmechanics.com/science/how-to-make-the-perfect-french-fry>.

[2] Author of web page (if available). (Date of publication). Title of web page.Retrieved from URL (web address).

[3] 2016 dictonary.com, http://www.dictionary.com/browse/bibliography

Please note that the below mentioned citations are wrong and should not be included in bibliography, since they are search engines. The references should include the web address of the page from which you have retrieved the information.

[4] www.google.com (This is wrong way of citation)

[5] www.wikipedia.com (This is wrong way of citation)

**Example 2 - Conference Proceedings**

[6] Hahn, H. A. &deVries, J. A. (1991). Identification of human errors of commission using Sneak Analysis.*Proceedings of the Human Factors Society 35th Annual Meeting*.San Francisco, 2-6 September, 1080-1084.

[7] Author Name, Year of the publication, Title of the Project, Title of the conference, Place of conference, Date of conference, Page numbers as according to conference proceedings.

**Example 3 - Book:**

[8] Embrey, D. E., Kontogiannis, T., Green, M. (1994). *Preventing Human Error in Process Safety. Centre for Chemical Process Safety CCP.* New York, NY: American Institute of Chemical Engineers.

[9]Author Name, Year of Publication, Title of the book, Edition, Publisher.