

Spring 2017

# Digitized Engineering Notebook

Sarath Garimella  
*Governors State University*

Deepak Kumar Koka  
*Governors State University*

Murali Manohar Maganti  
*Governors State University*

Irfan Syed  
*Governors State University*

Follow this and additional works at: <http://opus.govst.edu/capstones>

 Part of the [Computer Sciences Commons](#)

---

## Recommended Citation

Garimella, Sarath; Koka, Deepak Kumar; Maganti, Murali Manohar; and Syed, Irfan, "Digitized Engineering Notebook" (2017). *All Capstone Projects*. 295.  
<http://opus.govst.edu/capstones/295>

For more information about the academic degree, extended learning, and certificate programs of Governors State University, go to [http://www.govst.edu/Academics/Degree\\_Programs\\_and\\_Certifications/](http://www.govst.edu/Academics/Degree_Programs_and_Certifications/)

Visit the [Governors State Computer Science Department](#)

This Project Summary is brought to you for free and open access by the Student Capstone Projects at OPUS Open Portal to University Scholarship. It has been accepted for inclusion in All Capstone Projects by an authorized administrator of OPUS Open Portal to University Scholarship. For more information, please contact [opus@govst.edu](mailto:opus@govst.edu).

## **ABSTRACT**

Digital Engineering Notebook is a web application that deals with recording the projects and procedure of the paper notebook in the digital form. This application does have great advantages over the traditional notebooks. In this application user has options to place images, text, videos another related format into the project. This also allows user to interact with other members on the real-time basis and helps in identifying various shortcomings and eliminating them through discussions.

### **Why is this project important?**

An engineering notebook is intended to capture vital details of the engineering process, and is an ongoing record of a project. Experiments are recorded, including ideas, invention insights, observations and other details relating to the progression of information. Tasks such as meetings or appointments, are also recorded in the book.

When an engineer is working on a project, there can be legal questions that must be answered or a patent dispute can arise. Keeping detailed notes proves the ongoing work on the project and the engineer's involvement. For these reasons, engineers are taught to record information in a certain way to show the trail of the project.

### **What problem does it solves?**

Many collegiate engineering programs require their students to keep an engineer's notebook during design capstone and lab-based engineering courses to

Develop better time management skills.

Improve documentation, sketching, research, and communication skills.

Produce a thorough and complete summary presentation and report for future use and purposes.

### **Does it provide a new application/service, replace an existing application/service, or enhance an existing application/service?**

This project will cover more focused functionalities, such as:

- **USER FRIENDLY OPTIONS:** The features used in this project are easily understandable to any user.
- **NOTICE AND BLOGS:** This is an additional feature, Notices and Blogs are included into this portal. Students and Admin can use notices to share important and upcoming events.

The Digital Engineering Notebook will be available for its final presentation and release before May 8<sup>th</sup>, 2017.

## Table of Content

<b>1</b>	<b>Project Description</b>	<b>1</b>
1.1	Competitive Information	1
1.2	Relationship to Other Applications/Projects	2
1.3	Assumptions and Dependencies	2
1.4	Future Enhancements	2
1.5	Definitions and Acronyms	2
<b>2</b>	<b>Technical Description</b>	<b>2</b>
2.1	Project/Application Architecture	4
2.2	Project/Application Information flows	4
2.3	Interactions with other Projects (if Any)	4
2.4	Interactions with other Applications	4
2.5	Capabilities	4
2.6	Risk Assessment and Management	4
<b>3</b>	<b>Project Requirements</b>	<b>4</b>
3.1	Identification of Requirements	4
3.2	Operations, Administration, Maintenance and Provisioning (OAM&P)	5
3.3	Security and Fraud Prevention	5
3.4	Release and Transition Plan	5
<b>4</b>	<b>Project Design Description</b>	<b>6</b>
<b>5</b>	<b>Project Internal/external Interface Impacts and Specification</b>	<b>6</b>
<b>6</b>	<b>Project Design Units Impacts</b>	<b>7</b>
6.1	Functional Area/Design Unit A	7

<b>6.1.1</b>	<b>Functional Overview</b> .....	<b>7</b>
<b>6.1.2</b>	<b>Impacts</b> .....	<b>7</b>
<b>6.1.3</b>	<b>Requirements</b> .....	<b>7</b>
<b>6.2</b>	<b>Functional Area/Design Unit B</b> .....	<b>8</b>
<b>6.2.1</b>	<b>Functional Overview</b> .....	<b>8</b>
<b>7</b>	<b>Open Issues</b> .....	<b>11</b>
<b>8</b>	<b>Acknowledgements</b> .....	<b>11</b>
<b>9</b>	<b>References</b> .....	<b>11</b>
<b>10</b>	<b>Appendices</b> .....	<b>12</b>

## **1.Project Description**

Digital Engineering Notebook is a web application that deals with recording the projects and procedure of the paper notebook in the digital form. This application does have great advantages over the traditional notebooks. In this application user has options to place images, text, videos another related format into the project. This also allows user to interact with other members on the real-time basis and helps in identifying various shortcomings and eliminating them through discussions.

This application will have the home page where a panel for navigation will be available for the user. Through this they have the various options to go through. There will also be an admin console for the administrator who will have the privilege to delete any member or edit the application as per the requirement. The main focus of this application will be to the creation and updating of projects. There will be healthy space and work involved in this part of design. There will be options available to create or edit any existing project. If the user wants to add a new project he/she has preferences and various layouts to choose from. There will be options available to add any link, videos, notes and images which will be helpful in clear explanation of the project. If the project requires team then the user will have the option to add team members to that project. This step will allow good discussion and analysis of project through more brains. This will be like the face to face discussions which are held in the lab and the only difference will be that it will take place over the application and will be on a real-time basis.

Another aspect of this application is the availability of chronological order of events and it will also maintain the logs which were created by the user in the form of notes, discussion or anything else. There will also be calendar of events which will help the users to plan the things accordingly. The database for this project will be stored locally and will be synced on the real-time basis.

This application will be completed using PHP and Java. There will also be other tools involved which will be used according to the needs of the application. For database MySQL will be used.

### **1.1 Competitive Information**

This project does not have any competition with other applications. It has been designed based on the university requirements keeping security in mind.

## 1.2 Relationship to Other Applications/Projects

When it comes to the relationship of our project to others, then we can say that the homepage will be different and the log in page and the dashboard may be like any other projects. Of course, the database design might be different compared to other applications.

## 1.3 Assumptions and Dependencies

System should be available with internet all the time to access the portal, it should be strong. System is not platform dependent. It will run on any system which has the minimal requirements to run any website. System should not be dependent on any other managerial system.

## 1.4 Future Enhancements

- We can also deploy a chat, calling option so that it can be good mode of online communication between the users.
- Online quiz options can also be deployed where students can take quizzes online.
- More security will be provided to the user data and the reports will be run more smoothly and accurately in future to enhance the portal.

## 1.5 Definitions and Acronyms

Portal: A website which allows the user to navigate through the different pages.

## 2 Project Technical Description

**Admin panel:** - In this application the access for admin is controlled through different url than the student login page. In this portal first the admin has to provide its email and password to access. The admin can then handle various tasks and perform operations on number of processes. These include: -

- Change the content of any project which is listed in the portal. The admin can go through the explanation of the project and can edit if he/she thinks the content is not suited for the project or is a spam. It operates each and every task view on portal like, Adding content, Notice, Online-blog etc. For this edit button is provided after every project which is listed.
- Delete/Add the project: - The admin can also delete the project if he/she thinks that it violates the terms of use of engineering book or is away from the topics for which this portal is created. Admin has the authorization to add new project which could be helpful for the students and for discussion. In the add project tab the admin can add image, ppt and pdf related to the project as well.

- Contact with students and other users: - The database of the students and users will be available to the admin which can be used to contact them with any new development as well. The queries of the users will be directed towards the email of admin which will provide apparent and less time-consuming solutions to the various queries of the student.

**Student panel:** - From this panel student can view and learn about the topic entered by the admin and download PPT, PDF file etc. This panel has functionality which has following elements: -

- The student first must sign in to the portal which can be done by choosing username and password. Email is required from the student. The student will then be able to login into the portal.
- Add project: - the basic motive of this portal is to provide real time interaction between various users who can communicate with one another share ideas and see progress on a project. In this process, this portal will provide users a chance to start and submit their projects which can then be evaluated by other users and if there is any change or progress which can be made in the development of project that will be thoroughly discussed.
- Search: - students and admin can search for a project. This feature has specific project title sensitive and will work only for the title of project. The search can be sorted by the date of the project when it is added into the portal.
- Another important feature for the usability and to make engineering book more productive and responsive, Notices and Blogs are included into this portal. Students and Admin can use notices to share important and upcoming events. This is useful in the form of calendar in which the users can go through the various upcoming projects and events that will take place soon. This can also be used for variety of other purposes as required by the users. The admin has the authorization to review the content of Notices and blogs which will then be deleted or edited if there is any violation of terms of use.
- Contact Admin: - Another purposeful tab included in the student portal is the contact admin, through this tab the user will have the option to send query to the admin. this can be easily done by adding email id, phone number and the content of query. This can be helpful for students or users who want to contact admin for personal or other provision of the portal which they believe is best suited for personal approach.



## **2.1 Application Architecture**

### **System Design:**

Design phase is the first phase in the development phase. The goal of the designer is to create a model or representation of the entity which will be built later. Once the requirement phase is completed then this phase will be designed.

## **2.2 Application Information flows**

Application flow of the user in the system

- First, admin log in into the system.
- Then after login he can see the portal and can perform various tasks like view the project, upload the project, manage events, view notices, blogs.
- Administrator can delete, erase files and set permission for users.
- There is a login for user where you need to sign up and login.
- You can perform various operations like upload files, create events, put notices.

## **2.3 Interaction with other projects**

There is no interaction with other projects.

## **2.5 Capabilities**

PHP and MySQL is used for backend design of this project. For the frontend HTML, CSS and JavaScript functions are used to perform various operations.

## **2.6 Risk Assessment and Management**

We are talking about the risks which are associated with the system of ours like the connection between the database and the browser and the retrieval of the information which is stored in the database. Running scripts which have been written in JavaScript and HTML and present it on the front page.

## **3 Project Requirements**

### **3.1 Identification of Requirements**

\* **Specific** – target a specific area for improvement.

\* **Measurable** – quantify or at least suggest an indicator of progress.

\* **Achievable** – specify what will be accomplished

\* **Realistic** – state what results can realistically be achieved, given available resources.

\* **Time-related** – specify when the result(s) can be achieved.

The applications should allow CRUD operations. The portal should allow admin and users to perform add, update and delete.

### **3.2 Operations, Administration, Maintenance, and Provisioning (OAM&P)**

User data backup: In this the backup of the system is made on the regular intervals of time.

fault recovery: For this, we need to have the default backup which should run in the event system crash.

Routine maintenance: This maintenance is done routinely to make sure that everything goes good.

### **3.3 Security and Fraud Prevention**

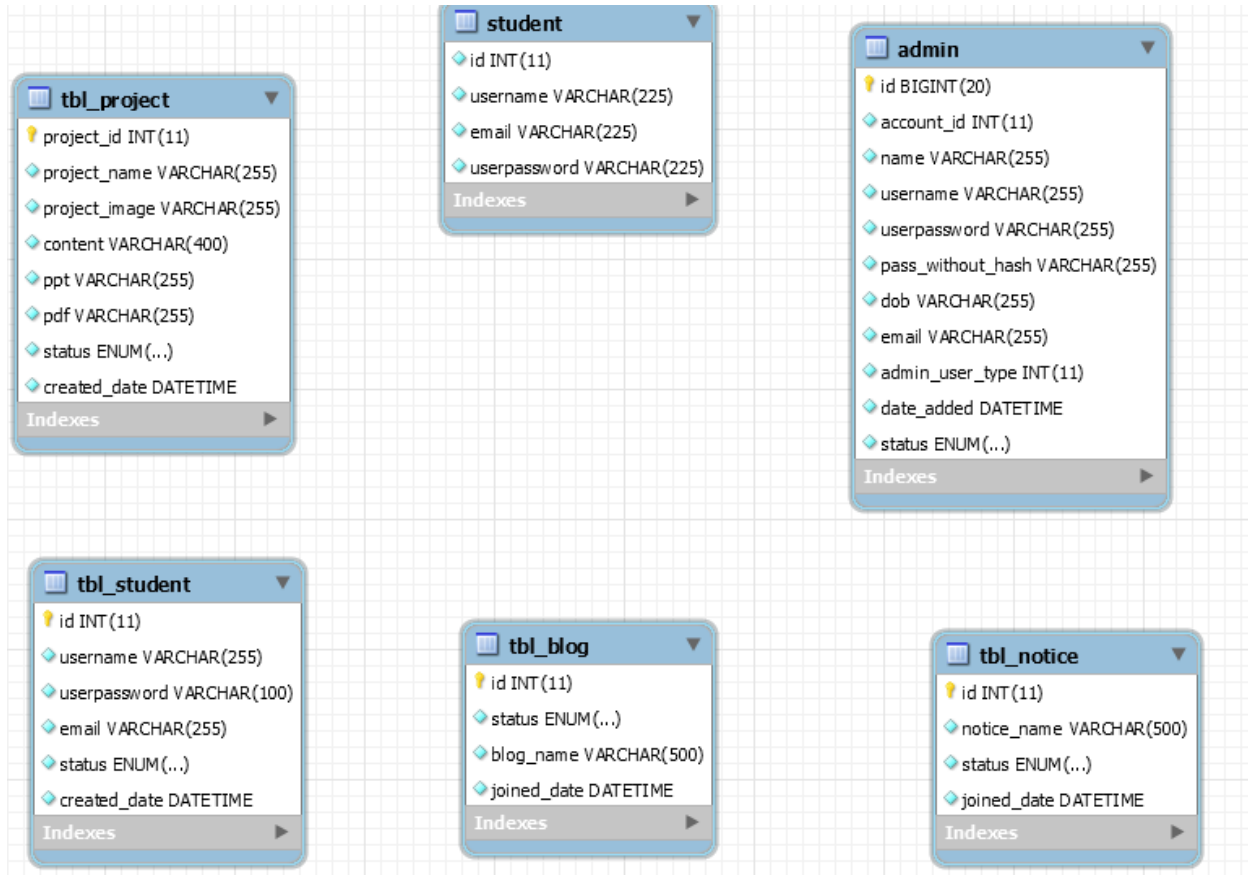
For better security purposes, we have implemented three-tier architecture. Unregistered users just see the dashboard and nothing else. They need to first register themselves and the admin authorizes them to enter into the system.

### **3.4 Release and Transition Plan**

The whole project is deployed on the particular host server that will manage and take care of the database and can be run on any web browser and directly from the internet.

## 4 Project Design Description

The diagram below shows the database structure and the relationships that are between different tables and entities.



All these entities are given the title names and the roles performed by them in order to have a successful completion of work.

## 5 Internal/external Interface Impacts and Specification

System Name- Digital Engineering Notebook

Description- This has been designed to maintain the lab records.

Source Contact- Database

Platform- Any platform

Frequency – Every time user wants to update or retrieve information it need to contact the database.

Timing- Totally depends on the user choice.

## **6 Design Units Impacts**

No Impacts.

### **6.1 Functional Area A/Design Unit A**

#### **6.1.1 Functional Overview**

Here the functions of the users such as the Admin and the student of the Digital Engineering notebook are mentioned and discussed.

#### **6.1.2 Impacts**

All these peoples have their own impacts and the responsibilities are divided and mentioned in the manual or the agreements which they do while deploying the project.

#### **6.1.3 Requirements**

##### **1: Admin Functions**

- 1: Login: Login for the system, admin need to enter his/her email ID and password to access the system.
- 2: View Dashboard: After successful login, admin will get the dashboard where he can view users and a navigation menu to access all the other functionalities.
- 3.Manage Users: This functionality helps you to activate or deactivate users and delete registered users.
- 4.Logout: System logout.

##### **2: User Functions**

1. Register User: User need to register in a system to register for any project.
2. Login User: After successful registration in a system, user need to login and he can access all the other functionalities like project, notice, blogs etc.
3. Logout: system logout.

## **6.2 Functional Area/Design Unit B**

### **6.2.1 Functional Overview**

#### **Software Testing**

Software testing is any activity aimed at evaluating an attribute or capability of a program or system and determining that it meets its required results. Although crucial to software quality and widely deployed by programmers and testers, software testing still remains an art, due to limited understanding of the principles of software. The difficulty in software testing stems from the complexity of software: we cannot completely test a program with moderate complexity. Testing is more than just debugging. The purpose of testing can be quality assurance, verification and validation, or reliability estimation. Testing can be used as a generic metric as well. Correctness testing and reliability testing are two major areas of testing. Software testing is a trade-off between budget, time and quality.

#### **Principles of Software Testing**

1. Testing shows the presence of bugs
2. Exhaustive testing is impossible
3. Early testing
4. Defect clustering
5. Absence of error

#### **Best practices of Testing**

1. Test case presentation and review
2. The test objective should be clear
3. Improvement in test process continually
4. Testing teams should be trained and certified

## **Misconceptions of Testing**

1. Testing is a cost center
2. Testers can test at the end of the project.
3. Testing is easy and anyone can do it.

## **Black box Testing:**

Black box testing is testing software based on output requirements and without any knowledge of the internal structure or coding in the program. In another word, a black box is any device whose workings are not understood by or accessible to its user.

Using black box technique, we are going to test the application and for that we have design the test case as below and we also recorded the result of that cases.

## **White Box Testing:**

White box testing is highly effective in detecting and resolving problems, because bugs (bug or fault is a manifestation of an error in a software, we can shortly define this method as testing software with the knowledge of the internal structure and coding inside the program.

It is a strategy for software debugging (it is the process of locating and fixing bugs in computer program code or the engineering of a hardware device, in which the tester has excellent knowledge of how the program components interact. This method can be used for Web services applications

Disadvantages:

Does not ensure that user's requirements are met.

Does not establish if the decisions / conditions / paths / statements are insufficient.

While developing the app debugging process perform a White Box Testing as debugging is looking for any error found in code and we can find its location by tracing code line by line.

## **Types of Testing:**

### **Static Testing**

- A form of verification that most of the times does not require execution of software.  
Ex. Inspecting documents

- While developing this portal code is verified once by reading lines of code to find any error or defect in it.
- All documents and diagrams are verified once without any execution.

### **Dynamic Testing**

- Requires the execution of the software.  
Ex. Output Validation
- After completion of code development or completion of every module, testing is done dynamically or by executing the code to find out the variance between actual and expected result.

### **Levels of Testing**

- Unit Testing - done by the developer at unit level.
- Integration Testing - conduct by the project team integrating the modules
- Acceptance Testing - Conducted by client either in developer's site or at his site.

### **Unit Testing**

- The smallest piece of software that is tested in isolation
- It is procedure used to validate that individual piece of source code is working properly.
- Unit Testing performed when each component is completed, like in Parental tracking app, setting alerts for location.
- Approaches
- Black Box
- White Box

### **Integration Testing**

- The Integration testing part of a testing methodology is the testing of the different modules/components that have been successfully unit tested when integrated together to perform specific tasks and activities (also known as scenario testing).
- This testing is usually done with a combination of automated functional tests and manual testing depending on how easy it is to create automated tests for specific integrated components.
- Four Basic Approaches to Testing While Integrating Modules
- Bottom Up
- Top Down
- Critical Part First
- Big Bang

## **Acceptance Testing**

The acceptance testing part of a testing methodology is the final phase of functional software testing and involves making sure that all the product/project requirements have been met and that the end-users and customers have tested the system to make sure it operates as expected and meets all their defined requirements

## **Alpha Testing**

- Tested at developer site by customer
- Developer "looks over shoulder" and records errors and usage problems
- Tests conducted in controlled environment.

## **Beta Testing**

- Beta testing conducted at one or more customer sites by end user of application.
- Live application environment – not controlled by developer.
- Customer records all problems encountered, reports to developer at regular intervals.

## **7. Open Issues**

- There is no open issue in the application
- Application requirements are implemented successfully.

## **8. Acknowledgement**

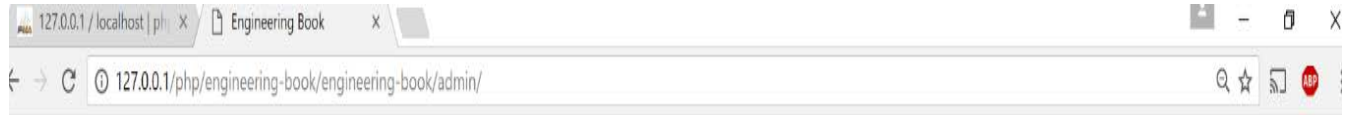
- Professor Do Young Park.

## **9. References**

No references



## 10. Appendices



# Engineering-Book.

## Administration Panel

Email:

Password:

## Add Agent

Username :

Password :

Email :

© Copyright Engineering-Book | Tip

Pathankot Admin x 127.0.0.1 / localhost / bc- x

127.0.0.1/php/engineering-book/engineering-book/admin/all\_project.php

Hello, Manohar  
Sign Out




**Projects**  
Notice  
Blog  
Settings

Your Profile  
Change Password

Records Per Page: 10 | Sort By: Date Added | Search:

Showing Records: 1 to 3 of 3

**Projects**

<input type="checkbox"/>	Project Image	Project Name	Content	PPT	PDF	Created Date	Edit
<input type="checkbox"/>		3d animation	3d animation			26-03-2017	<input type="button" value="Edit"/>
<input type="checkbox"/>		engine	testting content	1488116969	1488116969	26-02-2017	<input type="button" value="Edit"/>
<input type="checkbox"/>		engineerig book	new project			17-04-2017	<input type="button" value="Edit"/>

© Copyright Engineering-Book | Top

Ask me anything

4:51 PM  
4/17/2017

Engineering-Book x 127.0.0.1 / localhost / bo x

127.0.0.1/phpmyadmin/index.php?db=book&token=44b94cb3c59ca0c25d3f7dc21d78a2fa

phpMyAdmin

localhost » book » student

Browse Structure SQL Search Insert Export Import Operations Triggers

Showing rows 0 - 1 ( 2 total, Query took 0.0004 sec)







```
SELECT *
FROM `student`
LIMIT 0, 30
```




Profiling [Inline] [ Edit ] [ Explain SQL ] [ Create PHP Code ] [ Refresh ]

Show: Start row: 0 Number of rows: 30 Headers every 100 rows

Sort by key: None






+ Options

	id	username	email	userpassword
  	1	test@test.com	test@test.com	admin
  	3	sarath	sarath@student.com	user

Check All / Uncheck All With selected:  Change  Delete  Export

Show: Start row: 0 Number of rows: 30 Headers every 100 rows

Query results operations

 Print view  Print view (with full texts)  Export  Display chart  Create view

Windows Ask me anything 4:06 PM 4/17/2017

Engineering-Book x 127.0.0.1 / localhost / bo x

127.0.0.1/phpmyadmin/index.php?db=book&token=44b94cb3c59ca0c25d3f7dc21d78a2fa

phpMyAdmin

localhost » book » student

Browse Structure SQL Search Insert Export Import Operations Triggers

Showing rows 0 - 1 (2 total, Query took 0.0004 sec)

```
SELECT *
FROM `student`
LIMIT 0, 30
```

Profiling [Online] [Edit] [Explain SQL] [Create PHP Code] [Refresh]

Show: Start row: 0 Number of rows: 30 Headers every: 100 rows

Sort by key: None

+ Options

	id	username	email	userpassword
<input type="checkbox"/>	1	test@test.com	test@test.com	admin
<input type="checkbox"/>	3	sarath	sarath@student.com	user

Check All / Uncheck All With selected: Change Delete Export

Show: Start row: 0 Number of rows: 30 Headers every: 100 rows

Query results operations

Print view Print view (with full texts) Export Display chart Create view

Windows taskbar: Ask me anything, 4:06 PM, 4/17/2017