

ELNC-6012 – 25W – Team 1 – Project Scope – **Rev 2.0 – DRAFT.docx/.pdf**

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1. EXECUTIVE SUMMARY:

Provide a brief overview of this project (project purpose and justification for need):

We as a group have visioned a medium for common usage by all those who wish to play a musical instrument without having prior knowledge of the same, in this case, a Piano! In here, visual aid is present for the user to make note of and play any kind of music he/she wishes to. By addressing key deficiencies in current piano learning tools, KeyLuminate offers a technological edge to music education.

2. BUSINESS OBJECTIVES:

For each section below, provide sufficient detail to justify launching a project:

2.1. Current Position (Description of Existing Products/Technology)

Majority of the piano learning resources now available rely on recorded lessons or audio instructions. Because of these technologies' lack of adaptability, real-time feedback, and efficient progress tracking, users find it difficult to develop their abilities.

2.2. Problem Definitions (Identification of Design Deficiency of Existing Products/Technology)

Tools available these days are lacking real-time feedback to the user that shows their standing in perfecting the music being played. Also, there is no proper visual aid being given to the player to correct their mistakes/shortcomings. The available resources are quite costly to be tagged as affordable.

2.3. Proposed Solutions (Enhancement, Improvement, or Value Adding Feature/Functionality)

We propose an LED-based guidance system that helps the user visually to play the instrument. There are several modes of playing that range from easy to difficult suiting all skill levels present over here. Personalized learning is easy as there is both guided mode & free-playing mode.

2.4. Proposed Benefits (Tangible Value to Customer)

Users can keep a detailed track of their progress whilst looking into the improvements to play in a better fashion. It mainly simplifies the learning method, keeps the user engaged mainly due to the visual aids. People with hearing impairments can benefit hugely from this project.

3. PROJECT DESCRIPTION:

For each section below, provide sufficient detail to fully define this project. Do not be vague or unclear in your deliverables for your project.

3.1. Project Scope:

In Scope (explicitly list the discrete output(s) the team will research, design, document and deliver)

- Researching the current trends, learning about its pros and cons – based on these findings, we are developing a visually guiding model for piano with the help of LEDs.

- The UI basically has standout features like interactive menu selection for the user to choose from having options of song selection with speed controls.
- The detachable LED strip-case made has all the LEDs mounted on it to be placed on the piano.
- Once the song is selected, LEDs glow as per the tune and tempo of the user.
- LCD gives the indication of current key being pressed and the next key that comes up in the melody.

Out of Scope (explicitly list what you will be excluding from the focus of the project)

- Our team is not considering the possibility of creating a mechanical arm/hand that can be mounted upon the piano that automatically detects the note to be played by viewing the LED indication and playing it on its own without any manual interference.
- This project does not take into consideration the fact that it could be possible for a more user-friendly UI that helps integrate with instruments other than Piano and have it blend in with other instruments surrounding it.

3.2. Project Completion Criteria:

It can only be considered as complete when the following list is all checked out and it matches the required parameters as follows...

- A visually helping system of LEDs on the piano.
- A UI that helps the user for song selection and its speed parameters.
- A working prototype that integrates the hardware & software – in line with the proposed designs that are decisions taken into the documentation.

3.3. Assumptions:

We believe that the required hardware components/devices needed for this work should be readily available on the market and that they will arrive at our doorstep any minute we wish to. Our team has members that have sufficient knowledge and necessary software tools to make this a success.

3.4. Constraints:

It is very difficult to find components within the limited budget students have. Also, it is a hectic task to have all of them under a single roof on a regular basis working hard to match the deadlines set in the course plan of this project. Coding is also a heavy toll task over here.
ESP32 will be sufficient for processing and controlling all components.
LEDs will be bright enough to be easily visible.

4. PROJECT MILESTONES/COURSE DELIVERABLES:

Estimated Schedules – List sequential project milestones and discrete deliverables: *(insert rows as needed)*

Project Milestone	Target Date <i>DD MMM YYYY</i> Or <i>Week of Term</i>
Project proposal	Week 1
Project scope	Week 2
WBS	Week 3
Design reviews	Week 4
Test Reports	Week 5
Project Report	Week 6
Project Presentation	Week 7
Design Demonstration	Week 8
Design Journal Inspection	Week 9
Project Post Mortem	Week 10

5. PROJECT PLAN:

5.1. Primary Plans: What formal plans will be established for the project to address scope creep, schedule, quality, risk, safety etc. (as applicable)? Describe briefly in the space below:

The team will employ standardized project management methodology while exercising sound engineering design principles to...

- **Scope Management:** Changes will require approval from all team members and the project advisor. We have decided on regular meetings with an agenda of scope review that will avoid scope creep.
- **Schedule Management:** Weekly progress will be tracked using milestones. This section will be under Nisha Desai
- **Quality Assurance:** Thorough testing of each subsystem will ensure reliability. It will be under Viral Gajera
- **Risk Management:** Backup components and modular coding will mitigate risk. Mohd saif Malam will handle this section.
- **Safety:** Manan will identify all connections and will follow safe wiring practices.
- Adhering to deadlines can be easily followed with the help of a schedule-based work strategy.
- Our team believes that regularly testing each step of addition into the main project will keep the project quality intact.
- Potential issues of damage can be identified and made sure that safety of this project remains a top priority.

5.2. Scheduled Meetings: *(insert rows as needed)*

Meeting Topic	Purpose	Frequency
Design Collaboration	Assess the progress of all team members and coordinate efforts to keep the project on schedule.	Weekly, Fridays, 12:00pm
Testing Review	Modifying the design based on achieved results of testing of the project.	Every two weeks, Thursdays, 3:00 PM
Reporting the Progress Status	We will be mainly expressing our views regarding the making of this project with our teammates.	Every fortnight, Mondays, 4:00 PM

5.3. Scheduled Reporting: *(insert rows as needed)*

Report	Purpose	Frequency
Test Reports	Document testing results for LEDs, piano keys, and wireless display to validate individual component functionality. Includes success criteria,	Weekly after week 2

	failures, and recommendations for improvement.	
Integration Reports	Record the progress of integrating LEDs, piano keys, and wireless display with the ESP32. Identify challenges in combining subsystems and outline solutions.	Weekly starting week 4
Design Review Reports	Provide updates on software logic for mapping song notes to LED sequences, button feedback mechanisms, and overall system workflow. Includes feedback from advisors and updates based on recommendations.	Week 7 and 9
Progress Reports	Summarize overall project progress against milestones. Highlight completed tasks, pending tasks, and adjustments needed to meet deadlines.	Weekly
Final Test Report	Summarize the results of the fully integrated system. Provide evidence of functionality (videos, photos, or graphs) and validate completion of project objectives.	Week 7
Final Report	Comprehensive document summarizing the project, including the scope, design, implementation, testing, and lessons learned. Serves as the official record of project completion.	Week 12
Final Presentation	High-level overview of the project, including objectives, methodology, challenges, and results. Includes live or recorded demonstration of the system.	Week 13 or 14

6. TEAM DELIVERABLES:

Nisha Desai	UI development, Debugging and Testing as well, along with coordination of the entire team for their work deliverables and have the project managed under the required criteria/ guidelines and matching the given deadlines.
Mohd. Saif Malam	Our team member is responsible for coding the entire project outcome that is to be met and program suitable algorithms to match the scope requirements of this project. Citation of resources acquired over the internet is also what he is entitled to provide with.
Viral Gajera	The mechanical part of our project is mainly handled by him being in the lead. Implementing the proposed designs is another one of his expertise while making sure necessary data is recorded for tracking daily progress.
Manan Patel	Putting together the hardware and adding it in the software part is what this team member is responsible for. Integrating UI into the successful work-model is his task to be done. Preparing the final presentation and documenting the report comes under his contribution to the project.

7. AUTHORIZATIONS:

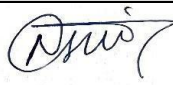


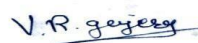
Project scope, plan, schedule, and/or budget (as applicable) are approved by the:
<ul style="list-style-type: none"> Project Technical Advisor: XIAOMING GUO
Project deliverables will be approved/accepted by the:
<ul style="list-style-type: none"> Project Advisor: XIAOMING GUO

8. APPROVALS:

Role	Name	Signature	Date (DD MMM YYYY)
Project Advisor	Prof Xiaoming Guo		

Team/Project Name KeyLuminate

I have reviewed the information contained in this Project Scope and agree:

Role	Name	Signature	Date (DD MMM YYYY)
Project Leader	Nisha Desai		26/01/2025
Team Member	Manan Patel		26/01/2025
Team Member	Mohd Saif Malam		26/01/2025
Team Member	Viral Gajera		26/01/2025

The purpose of this document is to provide a vehicle for documenting the initial planning phase for the project. It is used to reach a satisfactory level of mutual agreement among the Team and Team Members, Project Manager, Project Advisor(s), Course Instructor(s), and/or Industry Partners (if applicable) with respect to the objectives, goals, and/or scope of the project before significant resources are committed and/or expenses incurred (if applicable).

The signatures above indicate an understanding of the purpose and content of this document by those signing it. By signing this document, they agree to this as the formal Project Scope for the purposes of this ELNC-6012 Practical Project Course.

9. REVISION CONTROL:

Revision History

REV	DATE	REVISION DESCRIPTION
1.0	26/01/2025	Draft Release of Project Scope

Once your project scope has been approved by the above listed approvers, you would add the following row:

2.0	DD MMM YYYY	Finalized and Approved Release of Project Scope
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In the event that your project is rescoped and/or descoped, you would add the following row:

3.0	DD MMM YYYY	FOR EXAMPLE: Project scope revised to minimize potential scope creep after discovery of XYZ
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IMPORTANT: Any/all supporting documentation that is linked to the Project Scope inherently becomes part of the Project Scope and, therefore, subject to the same level of revision control.

IMPORTANT: REMEMBER your revision control section must NOT show revisions that are not current. Once the project scope has been (verbally) approved, you may create the next appropriate revision (insert row below to maintain table integrity). Ensure that you obtain all the proper approver signatures. Scan and submit approved document to the FOL dropbox.

OF INTEREST: In industry, typically one blank row is left in the revision history to permit manual revisions to be performed. I encourage you to continue this practice.

IMPORTANT: REMEMBER to update the scope revision level and scope status in the footer.

IMPORTANT: REMEMBER to retag the file name when you resubmit to the FOL dropbox for Project Scope!

Example: ELNC-6012 – 19W Team X – Project Scope Revision – **Rev 3.0 – DRAFT.docx/.pdf**

*****Delete this table, revision examples, and associate instructions after reading*****

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