Software Requirements Specification

for

UPOD – Physics Research

**Version 0.1**

**Prepared by Anders Lam**

**Wilfrid Laurier University, CP317**

**May 30, 2016**

**Table of Contents**

**Table of Contents**

**Revision History**

**1. Introduction**

1.1 Purpose

1.2 Document Conventions

1.3 Intended Audience and Reading Suggestions

1.4 Product Scope

1.5 References

**2. Overall Description**

2.1 Product Perspective

2.2 Product Functions

2.3 User Classes and Characteristics

2.4 Operating Environment

2.5 Design and Implementation Constraints

2.6 User Documentation

2.7 Assumptions and Dependencies

**3. External Interface Requirements**

3.1 User Interfaces

3.2 Hardware Interfaces

3.3 Software Interfaces

3.4 Communications Interfaces

**4. System Features**

4.1 System Feature 1

4.2 System Feature 2 (and so on)

**5. Other Nonfunctional Requirements**

5.1 Performance Requirements

5.2 Safety Requirements

5.3 Security Requirements

5.4 Software Quality Attributes

5.5 Business Rules

**6. Other Requirements**

**Appendix A: Glossary**

**Appendix B: Analysis Models**

**Appendix C: To Be Determined List**

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
|  |  |  |  |
|  |  |  |  |

# Introduction

## Purpose

*<Identify the product whose software requirements are specified in this document, including the revision or release number. Describe the scope of the product that is covered by this SRS, particularly if this SRS describes only part of the system or a single subsystem.>*

The purpose of the physics information in this project is to be used as a basis for the website to completely engage and introduce any unfamiliar physics concepts to the user. A wide variety of available information is to be gathered and available to any user who wishes to understand more about certain physic aspects as well as learn more about already familiar physics components.

## Product Scope

*<Provide a short description of the software being specified and its purpose, including relevant benefits, objectives, and goals. Relate the software to corporate goals or business strategies. If a separate vision and scope document is available, refer to it rather than duplicating its contents here.>*

The goal of integrating physics into UPOD is that the website is composed completely of physics research and information, and will be used to explain and cover topics relevant to physics concepts that users wish to know. The main purpose of the new UPOD website is to replace the old UPOD website and to help students learn on concepts covered in physics that they have yet to learn or are trying to relearn as they have forgotten.

# Overall Description

## Product Perspective

*<Describe the context and origin of the product being specified in this SRS. For example, state whether this product is a follow-on member of a product family, a replacement for certain existing systems, or a new, self-contained product. If the SRS defines a component of a larger system, relate the requirements of the larger system to the functionality of this software and identify interfaces between the two. A simple diagram that shows the major components of the overall system, subsystem interconnections, and external interfaces can be helpful.>*

Integrating physics research and information into the new UPOD website, which will replace the old one, will be completely new in its design and all the features that the website provides. The new UPOD system will be much more interactive and will contain many of the elements of the old UPOD website, but will be much more user friendly as well as containing much more relevant information to the topics covered.

## Product Functions

*<Summarize the major functions the product must perform or must let the user perform. Details will be provided in Section 3, so only a high level summary (such as a bullet list) is needed here. Organize the functions to make them understandable to any reader of the SRS. A picture of the major groups of related requirements and how they relate, such as a top level data flow diagram or object class diagram, is often effective.>*

The physics research and information provided in the UPOD website must be able to provide useful information sufficient enough for the MathJax, Animations and Front-end team to use to complete their own aspects of the website. The information provided by the Physics team must be insightful and provide useful information that can be used appropriately for animations, equations, and problems relevant to the topic.

## User Classes and Characteristics

*<Identify the various user classes that you anticipate will use this product. User classes may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience. Describe the pertinent characteristics of each user class. Certain requirements may pertain only to certain user classes. Distinguish the most important user classes for this product from those who are less important to satisfy.>*

Front-end Team will be using this physics research and information that will result in them projecting the information onto the website in the most efficient and user-friendly way possible. The MathJax Team will be using the information to create interesting diagrams and project the equations and formulas from the Physics Team. The Animations Team will work together with the physics information and research given to create unique ways to demonstrate relative physics information.

## Operating Environment

*<Describe the environment in which the software will operate, including the hardware platform, operating system and versions, and any other software components or applications with which it must peacefully coexist.>*

The physics information and research will operate alongside a wide variety of different teams to create a UPOD website that is compatible with all website browsers. The physics information will work closely with MathJax, and Animations as well as the Front-End team.

## Design and Implementation Constraints

*<Describe any items or issues that will limit the options available to the developers. These might include: corporate or regulatory policies; hardware limitations (timing requirements, memory requirements); interfaces to other applications; specific technologies, tools, and databases to be used; parallel operations; language requirements; communications protocols; security considerations; design conventions or programming standards (for example, if the customer’s organization will be responsible for maintaining the delivered software).>*

Some limitations and constraints that the Physics Team might face is that there is too much physics research and information pertaining to certain topics covered. This might provide constraints as incorporating too much information into the UPOD website might be detrimental to the effectiveness of the website or the usability of the website.

## User Documentation

*<List the user documentation components (such as user manuals, on-line help, and tutorials) that will be delivered along with the software. Identify any known user documentation delivery formats or standards.>*

The Requirements Documents will help aid in understanding the process that went through to completing and finishing the UPOD website and how exactly the physics information was used in order to complete certain aspects of the website.

## Assumptions and Dependencies

*<List any assumed factors (as opposed to known facts) that could affect the requirements stated in the SRS. These could include third-party or commercial components that you plan to use, issues around the development or operating environment, or constraints. The project could be affected if these assumptions are incorrect, are not shared, or change. Also identify any dependencies the project has on external factors, such as software components that you intend to reuse from another project, unless they are already documented elsewhere (for example, in the vision and scope document or the project plan).>*

The information and research collected that is relevant to the physics topics covered in the UPOD website are accurate and precise. The success of the UPOD website, as well as all the formula sheets, diagrams, interactive diagrams, animations and sample problems all depend on the physics information collected to be correct and clearly understandable. It would also make sense to assume that the information provided by the Physics Team to be used in a manner that is also correct in portraying that the concept and diagrams are related to the topic that is being covered.

# External Interface Requirements

## User Interfaces

*<Describe the logical characteristics of each interface between the software product and the users. This may include sample screen images, any GUI standards or product family style guides that are to be followed, screen layout constraints, standard buttons and functions (e.g., help) that will appear on every screen, keyboard shortcuts, error message display standards, and so on. Define the software components for which a user interface is needed. Details of the user interface design should be documented in a separate user interface specification.>*

The physics information and research that is provided by the Physics Team will be used in conjunction with the MathJax Team and Animations Team to provide unique and creative ways to help the user learn about the physic concepts. The MathJax Team will use the physics information collected to showcase sample problems and show equations that the user can see and do practice with. The Animations Team will use the physics information provided to provide the UPOD website with unique and interactive diagrams and animations for the user so that they can be involved and understand the material better.

## Hardware Interfaces

*<Describe the logical and physical characteristics of each interface between the software product and the hardware components of the system. This may include the supported device types, the nature of the data and control interactions between the software and the hardware, and communication protocols to be used.>*

The UPOD website will be based on the user being able to have access to the internet and accessing the website to learn more about the information. No specific hardware interaction between the website and the user is necessary for the user to be able to access or use the website’s large pool of resources.

## Software Interfaces

*<Describe the connections between this product and other specific software components (name and version), including databases, operating systems, tools, libraries, and integrated commercial components. Identify the data items or messages coming into the system and going out and describe the purpose of each. Describe the services needed and the nature of communications. Refer to documents that describe detailed application programming interface protocols. Identify data that will be shared across software components. If the data sharing mechanism must be implemented in a specific way (for example, use of a global data area in a multitasking operating system), specify this as an implementation constraint.>*

The physics research and information that will be collected from the Physics Team will be used to as a basis for the whole UPOD website to function around. Everything from the information projected to the libraries of information available on the UPOD website will be supported by the physics information collected. The equations and formulas that will be produced by MathJax will be focused on mainly presenting the equations and formulas of the physics concepts and topics that will be covered by UPOD. The Animations and the overall look of the UPOD website will be derived from physics information and will reflect the whole aspect of the 6 dynamics of physics that UPOD is currently covering.

## Communications Interfaces

*<Describe the requirements associated with any communications functions required by this product, including e-mail, web browser, network server communications protocols, electronic forms, and so on. Define any pertinent message formatting. Identify any communication standards that will be used, such as FTP or HTTP. Specify any communication security or encryption issues, data transfer rates, and synchronization mechanisms.>*

The Physics Team will regularly be communicating with the MathJax Team, the Animations Team, and the Front-end Team. Using various Medias of communication such as Facebook and slack, the line of communication will be kept open as to define an opportunities or confusions that may arise when collaborating and working together. Also, open meetings between members of the team or team leaders will occur frequently as to keep an up-to-date basis on how well the project is moving along and where improvements could be made.

# System Features

*<This template illustrates organizing the functional requirements for the product by system features, the major services provided by the product. You may prefer to organize this section by use case, mode of operation, user class, object class, functional hierarchy, or combinations of these, whatever makes the most logical sense for your product.>*

## Physics Information and Research

*<Don’t really say “System Feature 1.” State the feature name in just a few words.>*

4.1.1 Description and Priority

*<Provide a short description of the feature and indicate whether it is of High, Medium, or Low priority. You could also include specific priority component ratings, such as benefit, penalty, cost, and risk (each rated on a relative scale from a low of 1 to a high of 9).>*

The physics information and researched collected from the Physics Team is of High priority because it is used throughout the whole UPOD website and will be what the website is portraying throughout. The penalty of having errors with the physics information collected is that the whole validity of the UPOD website might be questioned as a result of information shown being incorrect. The cost of researching the physics information required to cover the topics and subtopics required for the UPOD website are completely free, and many of the concepts can be found online. It is crucial that the information that is to be used is reviewed and made sure that it is correct, which may include double-checking the information. The benefit of creating a completely new UPOD website with our own animations and diagrams and the way the information is presented is that it is solely based on certain aspects of physics. This means that the content on the website will be more focused on portraying and helping users understand aspects of physics more clearly than other websites that showcase more than one subject.

4.1.2 Stimulus/Response Sequences

*<List the sequences of user actions and system responses that stimulate the behavior defined for this feature. These will correspond to the dialog elements associated with use cases.>*

4.1.3 Functional Requirements

*<Itemize the detailed functional requirements associated with this feature. These are the software capabilities that must be present in order for the user to carry out the services provided by the feature, or to execute the use case. Include how the product should respond to anticipated error conditions or invalid inputs. Requirements should be concise, complete, unambiguous, verifiable, and necessary. Use “TBD” as a placeholder to indicate when necessary information is not yet available.>*

*<Each requirement should be uniquely identified with a sequence number or a meaningful tag of some kind.>*

*4.1.3.1 – The physics information and researched that is collected must be correct and must be validated before they are passed on the MathJax, Animations, and Front-end Team to ensure accuracy in the other parts of the website.*

*4.1.3.2 – The physics information for the UPOD website must be of the 6 aspects of physics that the website will be providing to the users: Fundamentals, Classical Mechanics, Optics, Electricity and Magnetism, Quantum Mechanics and Statistical Mechanics*

*4.*1.3.3 – *The information that is collected regarding the 6 aspects of the physics that is to be recorded must include relevant information to the topics and will include problems as well as equations*

*4.1.3.4 – The units and explanations for each variable of the equation must also be present for the physics information*

*4.1.3.5 – The subtopics pertaining to certain topics of the 6 aspects of physics must also be included and covered by the physics information.*

## Animations and MathJax

1. 4.2.1 Description and Priority

*<Provide a short description of the feature and indicate whether it is of High, Medium, or Low priority. You could also include specific priority component ratings, such as benefit, penalty, cost, and risk (each rated on a relative scale from a low of 1 to a high of 9).>*

The physics information that is to be used by the Animations and MathJax Team must be relevant to the 6 aspects of physics covered and must be correct so that they can be visually represented correctly. The priority of this is High (10) since the physics equations and information must be correct in order for the user to be able to accurately understand the material as well the website to gain valid credibility for displaying the correct information.

4.2.2 Stimulus/Response Sequences

*<List the sequences of user actions and system responses that stimulate the behavior defined for this feature. These will correspond to the dialog elements associated with use cases.>*

4.2.3 Functional Requirements

*<Itemize the detailed functional requirements associated with this feature. These are the software capabilities that must be present in order for the user to carry out the services provided by the feature, or to execute the use case. Include how the product should respond to anticipated error conditions or invalid inputs. Requirements should be concise, complete, unambiguous, verifiable, and necessary. Use “TBD” as a placeholder to indicate when necessary information is not yet available.*

*4.2.3.1 – The physics information that includes equations and formulas as well as appropriate information pertaining to the physics topic being covered must be correct.*

*4.2.3.2 – The information will be used by the MathJax and Animations Team to display certain interactive diagrams and sample problems/links to videos that will help the user better understand the topic at hand.*

*4.2.3.3 – The equations that will be displayed by the MathJax Team must allow users to rearrange equations and formulas and use them in sample problems that are given.*

*4.2.3.4 – The units and explanations for each variable for each equation must be displayed and remain visible as to show the user exactly what each formula is related to and how it is useful in the topic they are looking at.*

*4.2.3.5 – The animations and videos that are linked to the physics topic covered must be relevant to the physics topic that it is covering.*

*4.2.3.6 – Links to sample problems must also be visible under “Suggestions” as to show possible additional help that the user can receive.*