**PROJECT OVERVIEW SPECIFICATION DOCUMENT**

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CSc 190 Senior Project

Department of Computer Science - College of Engineering and Computer Science

California State University, Sacramento

Version 3.23.2007

**1. INTRODUCTION**

This is the Project Overview Specification document for the RFID Triangulation and Inventory project sponsored by the NAND Solutions Group of Intel.

This project is being undertaken by Axon Guidance development team. The team is comprised of undergraduate students majoring in Computer Science at California State University, Sacramento. The team members are enrolled in a two-semester senior project course required of all undergraduate majors. Successful delivery of the desired software product will fulfill the senior project requirement for the student team members.

The identification of the project sponsor and the team are as follows:

PROJECT SPONSORS:

Svanhild Simonson

Validation Engineer

[svanhild.m.simonson@intel.com](mailto:svanhild.m.simonson@intel.com)

Ronald Peroni

Validation Manager

[ronald.j.peroni@intel.com](mailto:ronald.j.peroni@intel.com)

AXON GUIDANCE DEVELOPMENT TEAM:

Team Lead:

Steven Salmons

408.881.3310

[stevefett@gmail.com](mailto:stevefett@gmail.com)

Team Members:

Salil Nizar

Forrest Slater

Morgan Darke

* 1. **PURPOSE**

The Project Overview Specification is intended to develop a mutual understanding between the development team and the project sponsor regarding the general expectations, assumptions, deliverables, and success criteria for the project. This document serves as a foundation to explain the general purpose of the proposed software system, as well as an explanation of the phases of work involved in the product’s development.

* 1. **SCOPE**

This document does not contain an exclusive set of all requirements collected from the sponsor. Also, it does not contain any specific technical details about the design and implementation of the product. More specific requirement, design, implementation, and testing documents will be provided throughout the course of this project.

* 1. **DEFINITIONS AND ACRONYMS**
     1. **DEFINITIONS**

**Baseline**: A baseline is a work product that has been formally reviewed and accepted by the involved parties. A baseline is changed only through formal configuration management procedures.

**Software Requirements Specification**: Documentation of the essential requirements (functions/features/uses, performance, design constraints, and attributes) of the software and its external interfaces.

**Project Management Plan:** Documentation of how the team members will be managed, how progress will be measured, and how tasks will be distributed. The document will also include more detailed schedule information.

**Project Sponsor:** The customer. Due to the academic nature of this project, the sponsor has no financial responsibilities for the development of the product.

**1.3.2. ACRONYMS**

RFID: Radio Frequency Identification. Small antenna tags with memory storage containing identification information

PHP: PHP Hypertext Preprocessor. Web-based language to be used in the user interface.

SQL: Structured Query Language. A relational database system to be used in the project.

SSD: Solid State Drive, in this case NAND based hard disks.  
 OLE: Object Linking and Embedding, a Microsoft-specific method of distributing objects.

* 1. **OVERVIEW OF DOCUMENT CONTENTS**

Section 2: Project Sponsor and Sponsor Need – This section focuses on the Sponsor’s business and operating environment.

Section 2.1: Sponsor Identification – The sponsor is the NAND Solutions Group at Intel Corporation.

Section 2.2: Sponsor’s Business – The sponsor develops and tests Intel Solid State Drives (SSD) to ensure that they are fully functional.

Section 2.3: Description of Need – This section focuses on the Sponsor’s issue.

Section 2.3.1: Vision -- There is no system for locating tools other than looking around the lab and asking colleagues where the tools are.

Section 2.3.2: Goals -- The goal of this project is to design a solution that allows for the tracking of SSDs and tools with as much automation as possible.

Section 2.3.3: Success Criteria -- Software displays relative location of items within the lab.

Section 3: Method for Satisfying the Sponsor’s Need -- When implemented, the system will streamline the task of locating assets within the workspace to help boost overall efficiency and productivity of the working environment, as well as minimize managerial overhead involved in tracking inventory within the workspace.

Section 4: Technical Proposal – This section will give a brief overview of the proposed solution.

Section 4.1: Technical Description of Product -- The product is comprised of four major components: passive RFID tags, RFID antennas, RFID Transceivers, and the software bundle.

Section 4.2: Deliverables – This section lists all of the deliverables for each phase.

Section 5: Management Proposal – This section sets the foundation for the management of the team and project.

Section 5.1: Work Schedule – A rough timeline of each phase of work is given.

Section 5.2: Resource Requirements -- There are two resources required in the creation of this product: RFID hardware and man-hours for the development of the software.

Section 5.3: Costs -- Though most senior projects do not incur a financial cost, this project utilizes some development hardware, which are currently covered by the team.

Section 5.4: Organization and Staff – A brief description of the specialties of each team member is listed.

Section 6.1: Assumptions and Constraints -- This subsection contains a detailed list of all assumptions being made by the project team as well as constraints placed upon the team by the project sponsor.

Section 6.2: Limiting Conditions -- This subsection should describe whatever limits the project team is placing on the project and the finished product.

Section 6.2.1: Factors Associated With the Academic Nature of the Project

Section 6.2.1.1: Goals – The curricular goals of the project are described here.

Section 6.2.1.2: General Disclaimer -- While the intent of the team is to deliver a high quality product that meets the sponsor’s expectations, neither the students, faculty adviser, nor CSUS can be held responsible for any errors in the delivered software product, failure to meet any of the specified requirements, or failure to deliver the software. The team must implement the requirements to pass the course.

Section 6.2.1.3: Support Limitations -- By accepting this proposal, the sponsor recognizes that upon completion of the project and delivery of the proposed system, neither the senior project team nor any other representative of CSUS is obligated to provide software maintenance or additional support.

Section 6.2.1.4: Ownership of the Product – All source code will remain the sole property of the development team.

Section 6.2.2: Other Disclaimers -- Additional conditions that the project team requires and/or that require the sponsor's approval listed here.

Section 7: Approvals – Signature page

Appendix A: Project Team Experience – Qualifications of each team member in the form of resumes.

Appendix B: Partnership Between the Team and the Sponsor – A Bill of Rights for both the sponsor and the team, clearly stating expectations and responsibilities of each.

Appendix C: Phases of Work – Tables illustrating phases of work, deliverables, and approximate schedules of both semesters of the project course.

**2. PROJECT SPONSOR AND SPONSOR NEED**

## 2.1. SPONSOR IDENTIFICATION

The sponsor is the NAND Solutions Group at Intel Corporation. The primary contacts within this group are Ronald Peroni, who is the Validation Manager, and Svan Simonson, the Validation Engineering Team Lead.

**2.2. SPONSOR’S BUSINESS**

The sponsor develops and tests Intel Solid State Drives (SSD) to ensure that they are fully functional. The SSDs consist of NAND Flash Memory, a microcontroller, and Intel firmware to control the operation of the hard drive. The firmware is the most valuable component of the SSD as it contains proprietary algorithms for wear-leveling and warranty purposes. The sponsor tests the SSDs in multiple labs using a variety of tools.

## 2.3. DESCRIPTION OF NEEDS

### 2.3.1. VISION

Currently, hard drives and tools are frequently misplaced or even lost. While there is a system in place to track the usage of the engineering sample SSDs, it is generally ignored by the Test Engineers. The current system consists of tracking SSDs via barcode. When a SSD is first brought into the lab, it is tagged with a barcode and entered into a database where it is assigned to a particular engineer. If a drive moves from one area of the lab to another, it is rescanned and reassigned to another engineer. This system is largely unused by the Test Engineers and, as a result, it is difficult to locate specific drives or track drive usage accurately.

Additionally, since the SSDs contain proprietary Intel firmware which is very valuable, it is important to ensure that none of the drives are stolen. The firmware gives Intel a significant advantage over its competitors, which would be lost if a competitor had an Intel engineering sample to reverse engineer.

Finally, the tools used in the lab to test and analyze the SSDs are also valuable and in short supply. These tools are shared among the Test Engineers. There is no system for locating tools other than looking around the lab and asking colleagues where the tools are.

### 2.3.2. GOALS

The goal of this project is to design a solution that allows for the tracking of SSDs and tools with as much automation as possible. Over the course of this project, the members of Axon Guidance hope to develop our time and project management techniques in an effort to produce a timely, as well as dependable, software solution. We also want to use this project as a tool to both sharpen our technical skills as well as enhance our understanding of organizational and professional practices.

### 2.3.3. SUCCESS CRITERIA

* Software that displays relative location of items (within a defined margin of error).
* Software that provides positional tracking of hard drives and items.
* Time-stamped inventory for the current contents of the lab.

# 3. METHOD FOR SATISFYING THE SPONSOR’S NEED

The sponsor requires an automated system for tracking tools and engineering samples within a specified workspace. The end-user community is comprised of engineers who work for the sponsor. The workspace is made up of single or multiple labs within the sponsor’s facilities. Ideally, the end-user community will utilize the system when needed in order to locate specified assets and view time-stamped positional histories within their workspace.

Automation is the essential feature of this vision. The sponsor wants minimal managerial overhead between its employees and the system, as the system should track all tagged tools and engineering samples independent of any required user interaction. Tagging the assets and adding its identification into the system database is the only managerial process the user should have to perform on the system. From that point on, tracking all assets within the system should be as simple and effortless as locating it on a two-dimensional map of the workspace.

The graphical interface is the key attribute behind the vision. Tracking multiple components within a cluttered lab can be tedious. The graphical interface of the system will simplify tracking of these assets to a very small potential area of existence. The two-dimensional map within the interface will display the estimated position of the requested assets. Because this two-dimensional map will leave the largest impression on the client as to the quality of the application, it is imperative that it be clean and intuitive. More specifically, the user should be able to glance at the graphical interface and know exactly where an asset is located within seconds.

When implemented, the system will streamline the task of locating assets within the workspace to help boost overall efficiency and productivity of the working environment, as well as minimize managerial overhead involved in tracking inventory within the workspace.

# TECHNICAL PROPOSAL

**4.1 TECHNICAL DESCRIPTION OF PRODUCT**

The product is comprised of three major components: passive RFID tags, RFID antennas, and the software bundle. The software bundle will contain a 3-layered design. The first layer will involve writing an RFID transceiver driver to communicate and interpret responses from the hardware, to be written in C. The second layer involves the SQL database, which will be used to store RFID scan information and histories within a defined time frame. The third level will be the user interface, to be written in Java, PHP, and HTML, and will utilize the information stored within the SQL database and render it in a user friendly way.

The passive RFID tags are in the form of stickers, and will be placed on all assets that the customer wishes to track. The decision for passive tagging as opposed to active tags revolves around two main factors: size and power requirements. Active tags are much larger, thicker, and require a power source with a finite lifespan, which increases maintenance overhead. Passive tags are very small, flexible, and require no external power, and therefore require no maintenance besides replacement for possible damage. The information by which the assets are to be distinguished by can be written to the memory section of the tags, which are then read by any RFID antennas that tag is located near.

The array of RFID antennas are set up at various locations within the workspace and are responsible for detecting the RFID tags. The location detection algorithm works with varying signal strengths to record the distance between each RFID tag and antenna. This information, combined with a proprietary triangulation algorithm, will determine the position of each RFID tag within (ideally) a foot or two.

The database will hold all necessary information regarding the tagged assets. This information will include the serial number of each tag, the asset that serial number is coupled with, a timestamp, and the coordinates of that asset on a two-dimensional grid.

The web-based front end is responsible for allowing the user to add new assets into the database, and also provides the graphical grid layout of the workspace. The grid layout will display basic visual boundaries of the designated workspace as well the pinpointed assets that the user is looking for. The user may query a specific asset to be visually highlighted, as well as query any specific asset for more information. The front end of the system must be visually appealing, but also simple and intuitive. Three operational modes, potentially with different security and access rights provisions, will be available. The first is a "writing" mode, which allows new tag information to be written to an RFID tag -- this mode will be limited to a Lab Administrator level account. The second is an "inventory scan" mode, which will quickly query every antenna in the room on a set interval and keep track of what tags are in the room at the time of the scan. Finally, a "triangulate" mode will involve a more thorough scan and will output a location to a two-dimensional map (java applet) for each tag queried.

**4.2. DELIVERABLES**

Upon completion of the project, the following will be delivered to the sponsor:

* Software Requirements Specification document. This document will be a more detailed description of the customer's requirements and the team's technical approaches to those requirements. This document will require customer's approval.
* Any development hardware provided, reimbursed, or purchased by the sponsor used in the creation of this software. Current development hardware has been purchased by the team and will remain their property.
* Software package including a compiled C driver, scripts to configure a SQL database with the appropriate tables/fields, and web interface including PHP/HTML front end and embedded java applets. This will be provided on a CD.
* User Guide documentation to also be included as a PDF or Word document on the CD. This will include instructions to set up and configure both hardware and software aspects of the product.

## MANAGEMENT PROPOSAL

**5.1. WORK SCHEDULE**

The following describes the phases of work required in the development of this product:

1. Establishment of Vision and Scope of the Project: In this phase, the focus is on developing a relationship between the team and project sponsor. Basic expectations and understandings are developed to form a foundation for the project. The deliverable is this Project Overview Specification document, to be approved by the sponsor. **Estimated Timeline: 3/6/09 to 4/10/09**
2. Development of a Project Management Plan: This phase centers around designing a formal plan regarding the team's approach to the project. Managerial processes, expectations of team behavior and output, and work distribution and timeframes will be outlined. A Project Management Plan will be created, and does not require sponsor approval. **Estimated Timeline:** **3/27/09 to 4/15/09**
3. Elicitation, Analysis, Validation, and Publishing of Software Requirements: As the technical foundation of the project, this phase involves detailed analysis of each aspect of the customer's requirements and the technical approaches to be utilized to meet those requirements. This is the first document which will contain technical aspects of the project, and requires the sponsor's approval. **Estimated Timeline: 4/13/09 to 5/15/09**
4. Design, Implementation, and Prototyping of Software: This phase involves a more detailed technical analysis of how the requirements will be implemented in their appropriate languages. Also included in this phase is the prototyping of proof-of-concept software. This phase concludes with the implementation of the design in code. A Software Design Specification document, as well as the prototype and final code, will be produced in this phase. **Estimated Timeline: 9/1/09 to 10/30/09**
5. Software Testing and Validation: Test cases will be formed and executed for each feature to validate the software and ensure it properly meets the defined requirements. This phase will occur as the software is implemented. A Software Test Specification document will be created to outline this process, and requires the sponsor's approval. **Estimated Timeline: 9/30/09 to 11/30/09**
6. Preparation and Delivery of Final Product: User documentation will be authored for the software and a CD containing the code and manual will be produced. A sample hardware environment will be set up for the customer to demonstrate the product. The user documentation requires sponsor approval. **Estimated Timeline: 12/1/09 to 12/15/09**

**5.2. RESOURCE REQUIREMENTS**

There are two resources required in the creation of this product: RFID hardware and man-hours for the development of the software. The RFID hardware requires the purchase of transceivers, antennas, antenna cabling, and RFID passive tags. Development hardware has been purchased for use by the team, but final implementation hardware will be purchased by the customer.

In terms of man-hours for development, the following provides a rough estimate of the per-phase requirements:

|  |  |  |
| --- | --- | --- |
| **Project Phase** | **% of Work** | **Est. Hours** |
| Establishment of Vision and Scope of the Project | 4% | 35 |
| Development of a Project Management Plan | 4% | 35 |
| Elicitation, Analysis, Validation, and Publishing of Software Requirements | 15% | 120 |
| Design, Implementation, and Prototyping of Software | 30% | 250 |
| Software Testing and Validation | 7% | 60 |
| Preparation and Delivery of Final Product | 2% | 15 |
| Learning and Developing Skills Needed To Complete Project | 13% | 110 |
| Managerial Procedures, Project and Team | 25% | 200 |
| **Totals:** | **100%** | **825** |

**5.3. COST**

Though most senior projects do not incur a financial cost, this project utilizes some development hardware. The cost of the prototyping hardware are being covered by the Senior Project Team, while the cost of the installation hardware is beyond the scope of this project. For a 'true implementation' of this system, the following hardware costs would be incurred:

|  |  |  |
| --- | --- | --- |
| **Item** | **Quantity Needed** | **Price** |
| RFID Transceiver | 1 for every 8 antennas | Est. $700 ea. |
| RFID Antennas | Est. 4 for every 50 sq. ft | Est. $100 ea. |
| RFID Tags | 1 per item to track | Est. $0.15 ea. |
| Antenna Cabling | 1 cable per antenna | Est. $15 ea. |

**5.4. ORGANIZATION AND STAFF**

The project team consists of the following members:  
  
Steven Salmons -- Project Lead: Team responsibilities include acting as main contact for the sponsor, as well as ensuring that schedules and performance expectations are kept. Implementation emphasis is on low-level coding in C, C++, as well as algorithm design and implementation. Also proficient in LAMP (Linux, Apache, mySQL and other relational databases, and PHP), he will specialize in the user interface design as well.

Salil Nizar: Main team responsibilities include team managerial tasks such as agendas, meeting minutes, and coordinating schedules. Implementation emphasis will be working with Steven on the low level design, with a focus on C to SQL OLE coding.

Morgan Darke: Resident Java Guru, his focus will be on designing the graphical applet used in the triangulation feature of the front end.

Forrest Slater: Implementation focus will be on design of the relational database as well as SQL-to-Java communication. He will also assist Morgan in design of the graphical applet to be imbedded within the PHP user interface.

While the aforementioned role descriptions highlight areas of specialization and emphasis, these descriptions are not encompassing of roles to be taken during this project. As an educational process, all members of this team will be involved with all aspects of requirement specification, design, and implementation. For example, responsibilities concerning all documents generated in all phases of this project will be distributed equally among the members. Team responsibilities will be shared as well, with equal distribution of leadership, managerial, and other roles amongst all members.

**6. CONDITIONS AND COMMENTS**

**6.1. ASSUMPTIONS AND CONSTRAINTS**

This subsection should contain a detailed list of all assumptions being made by the project team as well as constraints placed upon the team by the project sponsor.

The following list outlines the project constraints placed upon the team:

1. All work on the project must be completed no later than the last day of instruction of CSC 191 (12/18/2009).

2. The installation hardware purchase is beyond the scope of the Senior Project, and therefore is not the responsibility of the team.

3. The software will be designed to work in the lab environment intended for this particular project. While future expandability is a feature worth investigating, the team will only do so if time permits.

4. Average turnaround time when obtaining faculty approvals for documentation is expected to be two weeks.

5. The product will be designed around the current Intel networking and database environment, with no anticipation that the environment will change during the course of the project.

6. Deliverables will include only software and documentation -- development hardware used will remain with the project team unless the sponsor reimburses the financial cost of the hardware.

**6.2. LIMITING CONDITIONS**

The deliverables at the time of project completion will consist of the User Documentation, compiled C and Java programs and libraries, and the PHP/SQL source code. The C and Java applet source code will remain the sole property of the project team, to be used in portfolios or other collections of work for the team members. The rights to all software designed by the project team will remain with the project team unless otherwise negotiated.

**6.2.1. FACTORS ASSOCIATED WITH THE ACADEMIC NATURE OF THE PROJECT**

**6.2.1.1. GOALS**

Due to the academic nature of this project, the following objectives are the team goals:

1. To develop and deliver a software system that will increase the productivity of a real-world client.

2. To provide the senior project team with a learning experience in which software engineering principles are applied to the development of a real-world software system.

3. To develop a product that encompasses as many topics as possible related to the core courses taught in the computer science curriculum at CSUS.

4. To expand upon the team members' skill sets by developing a high risk, challenging product utilizing cutting edge technologies that go beyond the course content of other studies.

5. To implement all hardware and software in such a way that meets all regulatory requirements.  
 **6.2.1.2. GENERAL DISCLAIMER**

All students majoring in Computer Science at CSUS are required to complete a two semester senior project intended to give the students an opportunity to experience the entire software life cycle of a real world application. While the intent of the team is to deliver a high quality product that meets the sponsor’s expectations, neither the students, faculty advisor, or CSUS are responsible for any errors in the delivered software, failure to meet any specifications, or failure to deliver the software. The team must implement the requirements to pass the course.

Due to the academic nature of this project and its requirement for graduation, students cannot be paid for any work associated with the project.   
  
**6.2.1.3. SUPPORT LIMITATIONS**

By accepting this proposal, the sponsor recognizes that upon completion of the project, neither the development team nor any other representatives of CSUS are obligated to provide any software maintenance or support. Furthermore, work on this project can not extend past the last day of instruction of CSC 191.

**6.2.1.4. OWNERSHIP OF THE PRODUCT**

Axon Guidance reserves the right to full ownership of the completed software product; however, the client will be provided will full documentation including some source code and all executable code. Both Axon Guidance and the Computer Science Department at CSUS reserve the right to use the documentation and product as samples of student work.

**6.2.2. OTHER DISCLAIMERS**

Axon Guidance takes no responsibility for any implementation, installation, or other issues that concern the hardware used in this project. The focus of the senior project is on the software system that utilizes the hardware and therefore the team cannot be held responsible for any issues involved in the procurement, installation, or implementation of any hardware involved.

**7. APPROVALS**

This section contains the sign-off sheet that is used to indicate approval of, and agreement to, the conditions and commitments contained in the software proposal. The signed proposal serves as an agreement between the Project Sponsor and Project Team as to the responsibilities entailed for both parties during the project.

**Axon Guidance**

**Sign-Off Sheet**

**Corporate Sponsor**

Svanhild Simonson, Validation Engineer, Intel Corporation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ronald Peroni, Validation Manager, Intel Corporation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Faculty Advisor**

Dr. Ying Jin, Faculty Advisor, CSUS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Axon Guidance**

Steve Salmons, Project Manager, Axon Guidance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Salil Nizar, Team Member, Axon Guidance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Morgan Darke, Team Member, Axon Guidance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Forrest Slater, Team Member Axon Guidance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**APPENDIX A: PROJECT TEAM EXPERIENCE**

The following pages include the resumes of each of the four team members of Axon Guidance.

**APPENDIX B: PARTNERSHIP BETWEEN THE TEAM AND THE SPONSOR**

The following lists express the responsibilities and expectations of both the design team and the customer.

Requirements Bill of Rights for Software Customers

As a software customer, you have the right to:

1. Expect the team to speak your language.

2. Expect the team to learn about your business and your objectives for the system.

3. Expect the team to structure the requirements information you present into a software requirements specification.

4. Have the team explain requirements work products.

5. Expect the team to treat you with respect and to maintain a collaborative and professional attitude.

6. Have the team present ideas and alternatives both for your requirements and for implementation.

7. Describe characteristics that will make the product easy and enjoyable to use.

8. Be presented with opportunities to adjust your requirements to permit reuse of existing software components.

9. Be given good-faith estimates of the costs, impacts, and trade-offs when you request a requirement change.

10. Receive a system that meets your functional and quality needs, to the extent that those needs have been communicated to the team and agreed upon.

Requirements Bill of Responsibilities for Software Customers

As a software customer, you have the responsibility to:

1. Educate the team about your business and define jargon.

2. Spend the time to provide requirements, clarify them, and iteratively flesh them out.

3. Be specific and precise about the system’s requirements.

4. Make timely decisions about requirements when requested to do so.

5. Respect developers’ assessments of cost and feasibility.

6. Set priorities for individual requirements, system features, or use cases.

7. Review requirements documents and prototypes.

8. Promptly communicate changes to the product’s requirements.

9. Follow team’s defined requirements change process.

10. Respect the requirements engineering processes the team uses.

**APPENDIX C: PROJECT PHASES AND DELIVERABLES**

The following table identifies each of the phases of work that are to be completed in developing the software for the team’s project sponsor. Associated with each phase is a baseline deliverable indicated in the second column. The last column indicates those deliverables that must be reviewed and approved by the sponsor. The team’s faculty adviser is responsible for reviewing and approving the final draft of each baseline document. In the case where the sponsor must also approve the document, the faculty adviser’s approval is necessary before submitting the document to the sponsor.

|  |  |  |
| --- | --- | --- |
| PROJECT PHASE | PHASE DELIVERABLE | APPROVALS NEEDED |
| Establish the Vision and Scope of the Project | Project Overview Specification | Sponsor |
| Develop and Define Project Management Plan | Project Management Plan |  |
| Elicit, Analyze, Specify, Validate, and Publish Requirement Specification | Software Requirement Specification | Sponsor |
| Design the Software | Software Design Specification |  |
| Implement the Software Design | The Software |  |
| Define System Test Plan and Necessary Test Cases | System Test Plan and Test Cases |  |
| Perform System Testing and Publish Results | Software Test Report |  |
| Prepare Final Materials for Delivery To Sponsor | Software Delivery Materials (Including User Manual and CD) | Sponsor |
| Time Spent Learning Skills and Knowledge Necessary to Complete the Project | Learning, occurs in All Phases. | NA |
| Time Spent For Project/Team Management | Project Management, occurs in All Phases. | NA |

The following table represents a tentative time of when each phase of the project will begin and end.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CSc 190  PHASES | WEEK | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| POS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PMP |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Prototypes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SRS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| CSc 191  PHASES | WEEK | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Prototypes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SDS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CODE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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