Library System Requirements Specification

Version 1.0

April 19, 2021

Use this Requirements Specification template to document the requirements for your product or service, including priority and approval. Tailor the specification to suit your project, organizing the applicable sections in a way that works best, and use the checklist to record the decisions about what is applicable and what isn't.

The format of the requirements depends on what works best for your project.

This document contains instructions and examples which are for the benefit of the person writing the document and should be removed before the document is finalized.

To regenerate the TOC, select all (CTL-A) and press F9.

**Table of Contents**

[**[YOURPROJECT] REQUIREMENTS SPECIFICATION 1**](#_heading=h.19c6y18)

[**VERSION 1.0 1**](#_heading=h.3tbugp1)

[**APRIL 19, 2021 1**](#_heading=h.28h4qwu)

[**1.**](#_heading=h.nmf14n) **EXECUTIVE SUMMARY 3**

[1.1](#_heading=h.37m2jsg) Project Overview 3

[1.2](#_heading=h.1mrcu09) Purpose and Scope of this Specification 3

[**2.**](#_heading=h.46r0co2) **PRODUCT/SERVICE DESCRIPTION 3**

[2.1](#_heading=h.2lwamvv) Product Context 3

[2.2](#_heading=h.111kx3o) User Characteristics 3

[2.3](#_heading=h.3l18frh) Assumptions 3

[2.4](#_heading=h.206ipza) Constraints 3

[2.5](#_heading=h.4k668n3) Dependencies 4

[**3.**](#_heading=h.2zbgiuw) **REQUIREMENTS 4**

[3.1](#_heading=h.1egqt2p) Functional Requirements 5

[3.2](#_heading=h.3ygebqi) Non-Functional Requirements 5

[*3.2.1*](#_heading=h.2dlolyb) *Product Requirements 5*

[**3.2.1.1**](#_heading=h.44sinio) **User Interface Requirements** 6

[**3.2.1.2**](#_heading=h.2jxsxqh) **Usability** 6

[**3.2.1.3**](#_heading=h.z337ya) **Efficiency** 6

[3.2.1.3.1](#_heading=h.3j2qqm3) Performance Requirements 6

[3.2.1.3.2](#_heading=h.1y810tw) Space Requirements 6

[**3.2.1.4**](#_heading=h.4i7ojhp) **Dependability** 6

[**3.2.1.5**](#_heading=h.2xcytpi) **Security** 7

[*3.2.2*](#_heading=h.sqyw64) *Organizational Requirements 7*

[**3.2.2.1**](#_heading=h.3whwml4) **Environmental Requirements** 7

[**3.2.2.2**](#_heading=h.2bn6wsx) **Operational Requirements** 7

[**3.2.2.3**](#_heading=h.qsh70q) **Development Requirements** 7

[*3.2.3*](#_heading=h.3cqmetx) *External Requirements 7*

[**3.2.3.1**](#_heading=h.1pxezwc) **Regulatory Requirements** 7

[**3.2.3.2**](#_heading=h.49x2ik5) **Ethical Requirements** 7

[**3.2.3.3**](#_heading=h.2p2csry) **Legislative Requirements** 7

[3.2.3.3.1](#_heading=h.147n2zr) Accounting Requirements 7

[3.2.3.3.2](#_heading=h.3o7alnk) Security Requirements 7

[3.3](#_heading=h.1rvwp1q) Domain Requirements 7

[**4.**](#_heading=h.4bvk7pj) **USER SCENARIOS/USE CASES 7**

# Executive Summary

## Project Overview

## Purpose and Scope of this Specification

# Product/Service Description

## Product Context

## User Characteristics

## Assumptions

## Constraints

## Dependencies

# Requirements

* Describe all system requirements in enough detail for designers to design a system satisfying the requirements and testers to verify that the system satisfies requirements.
* Organize these requirements in a way that works best for your project. See Appendix DAppendix D, Organizing the Requirements for different ways to organize these requirements.
* Describe every input into the system, every output from the system, and every function performed by the system in response to an input or in support of an output. (Specify what functions are to be performed on what data to produce what results at what location for whom.)
* Each requirement should be numbered (or uniquely identifiable) and prioritized.

See the sample requirements in Functional Requirements, and System Interface/Integration, as well as these example priority definitions:

**Priority Definitions**

The following definitions are intended as a guideline to prioritize requirements.

* Priority 1 – The requirement is a “must have” as outlined by policy/law
* Priority 2 – The requirement is needed for improved processing, and the fulfillment of the requirement will create immediate benefits
* Priority 3 – The requirement is a “nice to have” which may include new functionality

It may be helpful to phrase the requirement in terms of its priority, e.g., "The value of the employee status sent to DIS **must be** either A or I" or "It **would be nice** if the application warned the user that the expiration date was 3 business days away". Another approach would be to group requirements by priority category.

* A good requirement is:
* Correct
* Unambiguous (all statements have exactly one interpretation)
* Complete (where TBDs are absolutely necessary, document why the information is unknown, who is responsible for resolution, and the deadline)
* Consistent
* Ranked for importance and/or stability
* Verifiable (avoid soft descriptions like “works well”, “is user friendly”; use concrete terms and specify measurable quantities)
* Modifiable (evolve the Requirements Specification only via a formal change process, preserving a complete audit trail of changes)
* Does not specify any particular design
* Traceable (cross-reference with source documents and spawned documents).

## Functional Requirements

In the example below, the requirement numbering has a scheme - BR\_LR\_0## (BR for Business Requirement, LR for Labor Relations). For small projects simply BR-## would suffice. Keep in mind that if no prefix is used, the traceability matrix may be difficult to create (e.g., no differentiation between '02' as a business requirement vs. a test case)

The following table is an example format for requirements. Choose whatever format works best for your project.

For Example:

| **Req#** | **Requirement** | **Comments** | **Priority** | **Date Rvwd** | **SME Reviewed / Approved** |
| --- | --- | --- | --- | --- | --- |
| BR\_LR\_05 | The system should associate a supervisor indicator with each job class. | Business Process = “Maintenance | 3 | 7/13/04 | Bob Dylan, Mick Jagger |
| BR\_LR\_08 | The system should handle any number of fees (existing and new) associated with unions. | Business Process = “Changing Dues in the System”  An example of a new fee is an initiation fee. | 2 | 7/13/04 | Bob Dylan, Mick Jagger |
| BR\_LR\_10 | The system should capture and maintain job class status (i.e., active or inactive) | Business Process = “Maintenance”  Some job classes are old and are no longer used. However, they still need to be maintained for legal, contract and historical purposes. | 2 | 7/13/04 | Bob Dylan, Mick Jagger |
| BR\_LR\_16 | The system should assign the Supervisor Code based on the value in the Job Class table and additional criteria as specified by the clients. | April 2005 – New requirement. It is one of three new requirements from BR\_LR\_03. | 2 |  |  |
| BR\_LR\_18 | The system should provide the Labor Relations office with the ability to override the system-derived Bargaining Unit code and the Union Code for to-be-determined employee types, including hourly appointments. | April 2005 – New requirement. It is one of three new requirements from BR\_LR\_04.  5/11/2005 – Priority changed from 2 to 3. | ~~2~~  3 |  |  |

## Non-Functional Requirements

**In here try to use the Structure given at slide 13 in Requirements Engineering Lecture Slides, with main categories of:**

### Product Requirements

#### **User Interface Requirements**

The user interface of this system is divided into five (5) main sections:

* Registration interface
* Home page interface (books)
* Student Interface
* Librarian interface
* Administrator interface

Registration Interface:

This section outlines the requirements for the registration interface of the Epoka University Library System.  The registration interface will consist of two main processes, "Log In" and "Sign Up".

The Sign-Up process can be completed only by students since the administrator must be registered when the system is deployed, and the librarians will be added manually by the administrator. The account creation process for the students will be completed using the email address provided by Epoka University.

The students must enter their first and last name, username, phone number, and password. Before clicking sign up the system prompts the students to verify their passwords.

The Log-In interface will consist of a user entering the email address provided by Epoka University, and then the password. The Log-In interface can be applied to all user types.

A "forgot password" functionality will assist users who may forget their password or lose access to their accounts. Clicking on it will help users reset their passwords and regain access to their accounts.

Home Page interface:

This interface will be accessed by every registered user. The purpose of this home page is to display all of the books registered in the Epoka university library. The data will be filtered and organized to be easily navigable and user-friendly.

Initially, the user can search directly for the book they’re looking for, or the user can even specify their major by choosing a study degree and the list of courses taken from the syllabus will show on the page. The user may select a course and every book from that course will appear. The “view as” button can allow the user to show the books as a list, as small icon books, or as large icon books. The “order by” button will order the books by the number of downloads, publication time, size, title, author name, etc. A book is shown by its cover and title. By clicking on it the user can get more information about the book size, number of pages, name of the author, publication year, and edition. Additionally, student users have more complex and special functionalities on the homepage, which will be furtherly mentioned in the “Student Interface” section.

Student Interface:

Except for basic functionalities like searching and viewing books, student users have other special functionalities, such that by hovering over the book, the system can assist students to add the book to their favorites or order it by clicking on two separate buttons. Adding a book to favorites will make it appear on the “Book collection”. Furthermore, ordering or reserving the book will facilitate the students with information like library availability (borrowed, available) of the book, time, and date when the student can reserve the book. The reservation of the book by a student will cause them to get the approval if the book is on stock, otherwise the button can appear disabled, or the book will not show up as available. After approval, the book will appear as reserved automatically. Then the student must go to the library and get the book. If a student user does not show up, the librarian will wait for them for 12 hours, and after that the librarian can either deny the request or notify the students by their phone number, however, it is not mandatory to do so.

The “Book collection” functionality provides the students to see the books that are added to their favorites, and the ordered books. The students can also make their “Book collection” private or public as they wish. One week before the students get daily notifications about their due date to submit the books.

Students can give feedback on the system or even report bugs and inconveniences. These messages can be read by the librarians and the administrator. Student users can view their profiles and edit personal data.

A green dot in a student’s profile indicates an active user in terms of accessibility, while a grey dot implies that this user has no longer access to the library.

Librarian Interface:

To gain access to their interface, librarians first have to approve the registration of their profile by the administrator.

The librarian will have access to the default homepage without any specific features like the student users.

The “Borrowers” functionality consists of listing the borrowers of the books based on left days in ascending or descending order. If there are students that don’t submit their books in time, their records will immediately turn red. Then, the librarian can choose to click on their profile and call them by the phone number shown in their profile, or even ignore the late submission for a few days if the book has a low demand.

When a student submits a book in the library, the librarian must make a book “returned”, so the in-library availability of the book will become “available” for students to view. On the other hand, when many students reserve a book, the system will automatically approve the request of the student who applied first.

Administrator Interface:

The Administrator Interface is a key component of the system, as it facilitates the manual registration of librarians and the management of book records. Upon deployment, developers will manually register the administrator. The administrator is responsible for adding librarians to the system, which can be accomplished by selecting the "Add Librarians" button located in the left pane of the interface. The librarian registration process mirrors that of student registration.

The administrator will also add books and edit them. On the bottom of the “Add Librarians”, There will be a “View Books” which when clicked will show all the books as a table. The table will have columns like title, author name, quantity or stock, date of publication, date of import in the system, status (borrowed, returned, available), number of pages, etc. The administrator can edit the information of the book, delete the book from the database as a record, or even add a new book.

The administrator can read the messages that students may send, like reports about bugs, suggestions, or complaints in terms of the library service. The bug reports will be communicated to the software developers by the administrator, while other notifications will be handled properly by the administrator and even by the librarians if needed.

#### **Usability**

#### **Efficiency**

##### Performance Requirements

##### Space Requirements

#### **Dependability**

* The data of the books in the Homepage depends on the BookList database.
* Registering in the library using the Epoka Mail depends on the Epoka Account.
* When the student users search and click courses, the courses are depending on the syllabus provided by the department of the university.
* The approval of a reservation request made by a student depends on the time the request was submitted.
* The account will be considered active and passive based on the information from EIS platform of Epoka University.

**Availability**

* The application will be available only if the device has access to the internet.
* The application will be available to users in any time, however in the weekends, holidays, or out of the university season reserving the books will not be available. Other features like viewing the books or adding them to favorites will still work.
* The application will be available at any geographic location by any device and phone number, however, only accounts with Epoka university email addresses will be able to get registered.

**Reliability**

**Monitoring**

**Maintenance**

**Integrity**

#### **Security**

### Organizational Requirements

#### **Environmental Requirements**

#### **Operational Requirements**

#### **Development Requirements**

### External Requirements

#### **Regulatory Requirements**

#### **Ethical Requirements**

#### **Legislative Requirements**

##### Accounting Requirements

##### Security Requirements

## Domain Requirements

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# User Scenarios/Use Cases

APPENDIX

The appendixes are not always considered part of the actual Requirements Specification and are not always necessary. They may include

* Sample input/output formats, descriptions of cost analysis studies, or results of user surveys;
* Supporting or background information that can help the readers of the Requirements Specification;
* A description of the problems to be solved by the system;
* Special packaging instructions for the code and the media to meet security, export, initial loading, or other requirements.

When appendixes are included, the Requirements Specification should explicitly state whether or not the appendixes are to be considered part of the requirements.

1. **Definitions, Acronyms, and Abbreviations**

Define all terms, acronyms, and abbreviations used in this document.

1. **References**

List all the documents and other materials referenced in this document.

1. **Requirements Traceability Matrix**

The following trace matrix examples show one possible use of naming standards for deliverables (FunctionalArea-DocType-NN). The number has no other meaning than to keep the documents unique. For example, the Bargaining Unit Assignment Process Flow would be BUA-PF-01.

For example (1):

| **Business Requirement** | **Area** | **Deliverables** | **Status** |
| --- | --- | --- | --- |
| BR\_LR\_01  The system should validate the relationship between Bargaining Unit/Location and Job Class.---Comments: Business Process = "Assigning a Bargaining Unit to an Appointment" (Priority 1) | BUA | BUA-CD-01  Assign BU Conceptual Design | Accepted |
| BUA-PF-01  Derive Bargaining Unit-Process Flow Diagram | Accepted |
| BUA-PF-01  Derive Bargaining Unit-Process Flow Diagram | Accepted |
| BR\_LR\_09  The system should provide the capability for the Labor Relations Office to maintain the job class/union relationship.---Comments: Business Process = "Maintenance" (Priority 1) | BUA | BUA-CD-01  Assign BU Conceptual Design | Accepted |
| BUA-PF-02  BU Assignment Rules Maint Process Flow Diagram | ReadyForReview |

For example (2):

| **BizReqID** | **Pri** | **Major Area** | **DevTstItems DelivID** | **Deliv Name** | **Status** |
| --- | --- | --- | --- | --- | --- |
| BR\_LR\_01 | 1 | BUA | BUA-CD-01 | Assign BU Conceptual Design | Accepted |
| BR\_LR\_01 | 1 | BUA | BUA-DS-02 | Bargaining Unit Assignment DB Modification Description | Accepted |
| BR\_LR\_01 | 1 | BUA | BUA-PF-01 | Derive Bargaining Unit-Process Flow Diagram | Accepted |
| BR\_LR\_01 | 1 | BUA | BUA-UCD-01 | BU Assign LR UseCase Diagram | ReadyForReview |
| BR\_LR\_01 | 1 | BUA | BUA-UCT-001 | BU Assignment by PC UseCase - Add Appointment and Derive UBU | Reviewed |
| BR\_LR\_01 | 1 | BUA | BUA-UCT-002 | BU Assignment by PC UseCase - Add Appointment (UBU Not Found) | Reviewed |
| BR\_LR\_01 | 1 | BUA | BUA-UCT-006 | BU Assignment by PC UseCase - Modify Appointment (Removed UBU) | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-CD-01 | Assign BU Conceptual Design | Accepted |
| BR\_LR\_09 | 1 | BUA | BUA-DS-02 | Bargaining Unit Assignment DB Modification Description | Accepted |
| BR\_LR\_09 | 1 | BUA | BUA-PF-02 | BU Assignment Rules Maint Process Flow Diagram | Accepted |
| BR\_LR\_09 | 1 | BUA | BUA-UCD-03 | BU Assign Rules Maint UseCase Diagram | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-045 | BU Assignment Rules Maint: Successfully Add New Assignment Rule | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-051 | BU Assignment Rules MaintUseCase: Modify Rule | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-053 | BU Assignment Rules MaintUseCase - Review Assignment Rules | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-057 | BU Assignment Rules MaintUseCase: Inactivate Last Rule for a BU | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UI-02 | BU AssignRules Maint UI Mockups | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-021 | BU Assignment Rules Maint TestCase: Add New Rule (Associated Job Class Does Not Exist) - Success | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-027 | BU Assignment Rules Maint TestCase: Modify Rule - Success | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-035 | BU Assignment Rules Maint TestCase: Add New Rule (Associated Job Class Does Not Exist) - Error Condition | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-049 | BU Assignment Rules Maint TestCase: Modify Rule - Error Condition | ReadyForReview |

For example (3):

| **BizReqID** | **CD01** | **CD02** | **CD03** | **CD04** | **UI01** | **UI02** | **UCT01** | **UCT02** | **UCT03** | **TC01** | **TC02** | **TC03** | **TC04** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BR\_LR\_01 |  |  | X |  | X |  | X |  |  | X |  | X |  |
| BR\_LR\_09 | X |  |  | X |  | X |  |  | X |  | X |  | X |
| BR\_LR\_10 | X |  |  | X |  |  |  |  | X |  | X |  |  |
| BR\_LR\_11 |  | X |  |  |  |  |  |  |  |  |  |  |  |

1. **Organizing the Requirements**

This section is for information only as an aid in preparing the requirements document.

Detailed requirements tend to be extensive. Give careful consideration to your organization scheme. Some examples of organization schemes are described below:

**By System Mode**

Some systems behave quite differently depending on the mode of operation. For example, a control system may have different sets of functions depending on its mode: training, normal, or emergency.

**By User Class**

Some systems provide different sets of functions to different classes of users. For example, an elevator control system presents different capabilities to passengers, maintenance workers, and fire fighters.

**By Objects**

Objects are real-world entities that have a counterpart within the system. For example, in a patient monitoring system, objects include patients, sensors, nurses, rooms, physicians, medicines, etc. Associated with each object is a set of attributes (of that object) and functions (performed by that object). These functions are also called services, methods, or processes. Note that sets of objects may share attributes and services. These are grouped together as classes.

**By Feature**

A feature is an externally desired service by the system that may require a sequence of inputs to affect the desired result. For example, in a telephone system, features include local call, call forwarding, and conference call. Each feature is generally described in a sequence of stimulus-response pairs, and may include validity checks on inputs, exact sequencing of operations, responses to abnormal situations, including error handling and recovery, effects of parameters, relationships of inputs to outputs, including input/output sequences and formulas for input to output.

**By Stimulus**

Some systems can be best organized by describing their functions in terms of stimuli. For example, the functions of an automatic aircraft landing system may be organized into sections for loss of power, wind shear, sudden change in roll, vertical velocity excessive, etc.

**By Response**

Some systems can be best organized by describing all the functions in support of the generation of a response. For example, the functions of a personnel system may be organized into sections corresponding to all functions associated with generating paychecks, all functions associated with generating a current list of employees, etc.

**By Functional Hierarchy**

When none of the above organizational schemes prove helpful, the overall functionality can be organized into a hierarchy of functions organized by common inputs, common outputs, or common internal data access. Data flow diagrams and data dictionaries can be used to show the relationships between and among the functions and data.

**Additional Comments**

Whenever a new Requirements Specification is contemplated, more than one of the organizational techniques given above may be appropriate. In such cases, organize the specific requirements for multiple hierarchies tailored to the specific needs of the system under specification.

There are many notations, methods, and automated support tools available to aid in the documentation of requirements. For the most part, their usefulness is a function of organization. For example, when organizing by mode, finite state machines or state charts may prove helpful; when organizing by object, object-oriented analysis may prove helpful; when organizing by feature, stimulus-response sequences may prove helpful; and when organizing by functional hierarchy, data flow diagrams and data dictionaries may prove helpful.