Software Requirements Specification

for

Dominican University GSLIS Course Electives Forecasting System

Version 1.0

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Spring 2014 LIS 754-99

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Revision History

Name	Date	Reason For Changes	Version
Valeria L. Hunter	April 14, 2014	original	0

1. Introduction

1.1 Purpose

This specification describes the functional requirements, for the Dominican University GSLIS Course Electives Forecasting System (CEFS). The specification document will provide a description of the intended product, including functions, use cases, constraints and limitations, assumptions and dependencies, and prioritized product features.

1.2 Document Conventions

Links to data sources required for this system are included as hyperlinks. Before using the data from a hyperlink the GSLIS Business Office must confirm information is current and valid to use.

Each requirement shall have a priority, no priorities are inherited or implied by nested priorities.

1.3 Intended Audience and Reading Suggestions

The specification document is intended for the system developers, GSLIS faculty project liaison, project managers, GSLIS student representative liaison, testers, and documentation writers.

The remainder of this SRS contains the product description, system features, system interfaces, and security requirements. Each major section is listed in the Table of Contents. This document isn't intended to be read from beginning to end; rather each member of the intended audience may

read the Introduction and may consult the Table of Contents for the additional sections pertinent to them.

1.4 Project Scope

The CEFS will forecast student plans for elective coursework, match them to faculty offerings, and show proposed course availabilities based on student demand. New elective courses can be added to offerings based on perceived interest during high demand times maximizing the opportunity for student uptake.

The project proposal (Appendix D) describes the business case for the project that has this system as the product, and the goals and objectives of the project that results in this system as an enabling tool.

1.5 References

Dominican University GSLIS curriculum and degree requirements for all Masters degrees are referred to for this system. All bulletins applicable for students' degree requirements are required references. As of the issue date of this document curriculum and degree requirements are available online at Master of Library and Information Science|Dominican GSLIS, Curriculum and Degree Requirements (last accessed 6 April 2014). The latest bulletin is available at http://public.gslis.dom.edu/sites/default/files/documents/DOM%20GSLIS%20Bulletin%202012-14.pdf. All other applicable bulletins are available from the GSLIS business office.

Dominican University GSLIS required and elective courses are referred to for this system. As of the issue date of this document required and elective courses are available online at Courses|Dominican GSLIS, http://gslis.dom.edu/academics/courses (last accessed 6 April 2014). If this data is unavailable online, this required data is available from the GSLIS business office.

Dominican University GSLIS required and elective course descriptions referred to for this system. As of the issue date of this document required and elective course descriptions are available online in the Dominican University GSLIS Course Descriptions document (last accessed 6 April 2014). http://gslis.dom.edu/sites/default/files/documents/courses_2014_02Feb_05.pdf.

This information may change periodically, the GSLIS Business office is required to submit additions and deletions to the system; and to maintain the information required in all official, applicable bulletins to the system.

2. Overall Description

2.1 Product Perspective

The CEFS described in this SRS is a standalone system used to forecast elective GSLIS courses for the registration schedule based on Student demand. The result is a semester-by-semester demand forecast of GSLIS courses from the immediate future semester and continuing for a total of nine semesters (a total of three years). The forecast is non-binding, based on Student input into the system, with selections based on course offerings and descriptions from the most up-to-date course catalog and requirements from all Bulletins applicable to each participating Student.

While the CEFS is standalone, it operates within the Dominican University myDU system for user identification and authentication. Other than the myDU security policy protections, CEFS operates without interaction to other systems.

Future second priority enhancements include mapping Faculty scheduling constraints that will enhance course supply information. Third priority enhancements will allow the system to identify elective courses most likely to meet minimum attendance requirements and provide these courses as offerings directly to the registration process for the immediate future semester.

<Insert a system interface diagram showing current system interface with enhancements. Clearly identify this project system separate from existing systems and separate from future enhancements.>

2.2 Product Functions

Basic functionality of the CEFS is described in this section.

User Access and Authentication: Users will log-in and are authenticated as valid users of the system. Any valid User without access will hve to be provided with log-in permission. Users will be able to log-in to the system from any PC (Apple or PC) with access to the GSLIS portal on myDU. This is a primary feature and is required for initial release.

Student Demand Forecasting: Students will be identified by the system and elective courses successfully completed or currently in progress will be shown. Upon verification of this information, the Student will see new courses available since the last registration process. Upon verification of this information the Student will be shown an input screen for nine future semesters with space to forecast up to three courses per semester. On this screen, the Student will be shown the maximum number of credit hours they are permitted to forecast. The system will calculate this number based on the number of elective credit hours in their degree program (24 hours for the MSLIS candidate, 18 credit hours for the MPS candidate). This is a primary feature and is required for initial release.

Reporting Module: A reporting module is a required feature. Include a full database report of all data. Develop other reports that can be accessed on demand that provide the information necessary to provide a forecast of electives that are likely to be filled based on student demands. An initial set of reports is defined in Section 3. Future reports will be defined as the system is used. This is a primary feature and is required for initial release.

Faculty Supply Input: This is a secondary feature and is an enhancement.

Forecast Handover to Registration System: This is a secondary feature and is an enhancement.

<Update the CEFS Process Flow if it no longer represents the requirements of the system>

Figure 2.2.1: CEFS Process Flow
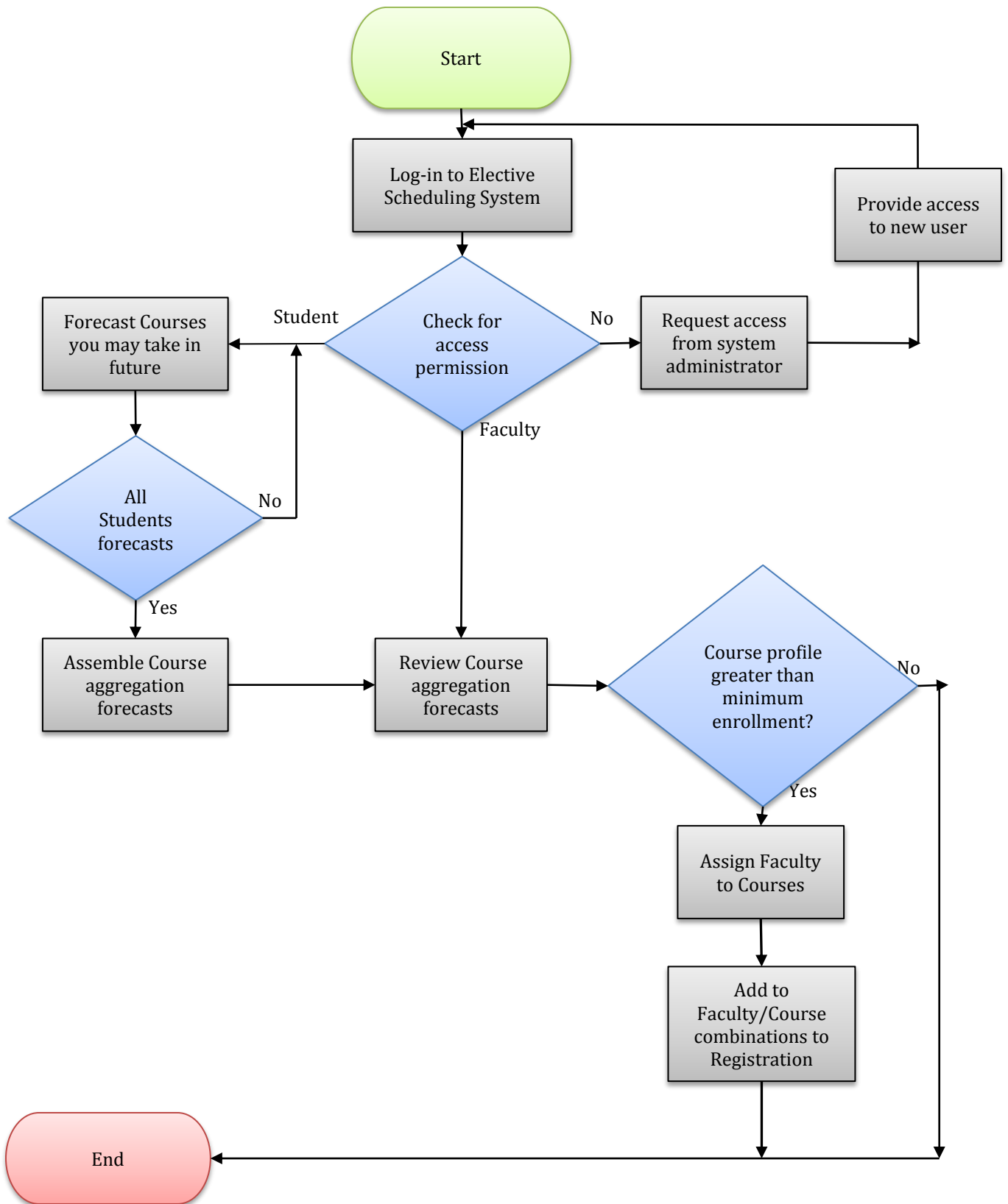
2.3 User Classes and Characteristics

Student User: This user role is for all students that expect to take elective courses during their matriculation in the GSLIS program.

Faculty User: This user role is for all faculty that expect to offer instruction for elective courses in the GSLIS program.

Staff User: This user role is for all staff that will use reports from the system to aid GSLIS elective scheduling and provide input to the registration process.

Staff Administrator: One person from the staff, and a back-up administrator shall be identified and assigned roles in the system. This role will provide log-in permissions for any authorized user that is unable to log-in to the system. This role will also be the first person to provide help if online help isn't sufficient, and before a help-desk ticket is created.

2.4 Operating Environment

The system will be deployed via myDU, through the Dominican University Student, Faculty, and Staff portal. Authentication may be verified through the myDU log-in process. The system must be able to be used in any hardware environment that is supported by myDU.

2.5 Design and Implementation Constraints

The CEFS will be maintained by the Dominican University Information Technology (IT) department. System documentation is required such that break-fixes, vendor software updates and upgrades, and any other general maintenance can be accomplished by DomU IT. <Describe security considerations>

2.6 User Documentation

Contextual User instructions will be provided within the tool on each screen as online help. A short user guide with general instructions will be provided in Adobe Reader (.pdf) format and provided on the log-in screen for each type of User. A Student Guide, Faculty Guide, and a Staff Guide shall be created and provided. Instructions for a User to create a helpdesk ticket shall be included in each Guide.

2.7 Assumptions and Dependencies

2.7.1 Organization and People Assumptions

This system is directed toward students enrolled in and faculty teaching in GSLIS at Dominican University. Courses at Dominican University at large and NOT in the School of Library and Information Science are not in scope. All GSLIS students enrolling in LIS electives during future years are in scope.

2.7.2 Data and Procedures Assumptions

Direct methods for collecting student expectations are in scope. Data collected is used for planning purposes, and is non-binding on actual registration. All students will continue to be

required to register for all classes using the standard methods. Participating in course electives forecasting is no guarantee of actual course offering and no guarantee of course enrollment. No preferential registration is implied by participating in forecasting activities. Registration procedures will not change as a result of the CEFS.

2.7.3 Policies

Student privacy is of utmost importance. No recommendations or procedures that jeopardize student privacy will be established as a result of this project. Students are expected to provide forecasts for themselves only, on a schedule for the volume of courses that they might reasonably expect to complete.

3. 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.>

3.1 User Identification and Authentication

Users will log-in and are authenticated as valid users of the system.

3.1.1 Description and Priority

Any valid User without access will have to be provided log-in permission. Users will be able to log-in to the system from any PC (Apple or PC) with access to the GSLIS portal on myDU. This is a primary feature and is required for initial release.

3.1.2 Stimulus/Response Sequences

<Insert User Authentication Use Case>

3.1.3 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.>

REQ-1:
REQ-2:

3.2 Staff Administrator System Configuration

Staff Administrator will provide data required to set-up the system for open forecasting.

3.2.1 Description and Priority

Staff Administrator will identify the two week open forecasting period to the system, determine the pre-determined number of students to participate in open forecasting to begin generating reports, and provide user credentials to any authorized Users unable to log-in to the system. This is a primary function and is required for initial release.

3.2.2 Stimulus/Response Sequences

<Enter Staff Administrator open forecasting use case>
<Enter Staff Administrator User credentials use case>

3.2.3 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.>

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

REQ-1:
REQ-2:

3.3 Student Program and Elective Course Status and Confirmation

Authenticated Students confirm courses successfully completed or currently in progress. Students confirm their program and the maximum number of credit hours remaining in their program.

3.3.1 Description and Priority

Students will be identified by the system and elective courses successfully completed or currently in progress will be shown. Student will confirm this information. Student will be shown their program and the maximum number of credit hours remaining in their program. Student will confirm this information. This is a primary feature and is required for initial release.

3.3.2 Stimulus/Response Sequences

<Enter Student program identification and confirmation use case>
<Enter Student elective course status and confirmation use case>

3.3.3 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.>

3.4 Individual Student Forecast Entry

Students will forecast courses for up to the next nine semesters up to the maximum number of elective credit hours remaining in the Student's program. This is a primary feature and is required for initial release.

3.4.1 Description and Priority

Student will see new courses available since the last registration process. Upon confirmation of this information the Student will be shown an input screen for nine future semesters with space to forecast up to three courses per semester, up to the maximum number of elective credit hours remaining in the Student's program. This is a primary feature and is required for initial release

3.4.2 Stimulus/Response Sequences

3.4.3 Functional Requirements

3.5 Aggregate Forecast Reporting Module

Staff reports can be shown upon request. Reports will be compiled showing pertinent information from the system.

3.5.1 Description and Priority

Reports will be available for staff to review information from the system. This is a primary feature and is required for initial release.

3.5.2 Stimulus/Response Sequences

<Enter Reporting use case>

3.5.3 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.>

REQ-1:
REQ-2:

3.6 Faculty Supply Input

Faculty will provide data for elective courses in their field necessary to complete each semester registration GSLIS offerings.

3.6.1 Description and Priority

Faculty will provide data for elective courses in their field necessary to complete each semester registration GSLIS offerings. Faculty will receive student demand information from the system. For each course that meets filled requirements a Faculty member can nominate to provide instruction for the course. This is a secondary feature. It is an enhancement and isn't required for initial release, but will be considered for the first system upgrade.

3.6.2 Stimulus/Response Sequences

The use case(s) for this enhancement are to be determined.

3.6.3 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.>

REQ-1:
REQ-2:

3.7 Handover Forecast to Registration System

Proposed courses from filled Student demand with Faculty instructors identified will be handed to the Registration System.

3.7.1 Description and Priority

Proposed courses from filled Student demand with Faculty instructors identified will be handed to the Registration System. This is a secondary feature. It is an enhancement and isn't required for initial release, but will be considered for the first system upgrade.

3.7.2 Stimulus/Response Sequences

Use case(s) for this enhancement are to be determined.

3.7.3 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.>

REQ-1:
REQ-2:

4. External Interface Requirements

4.1 User Interfaces

The user interface should have the same look and feel of the myDU portal. Menus, standard buttons, keyboard shortcuts, and error messages should match those in the myDU portal to give consistency to the Users. All data input that has prescribed and defined input should be given in drop-down menus to reduce the possibility for input error. Details of user interface design for main screens are provided in Appendix E – User Interface Designs.

4.2 Hardware Interfaces
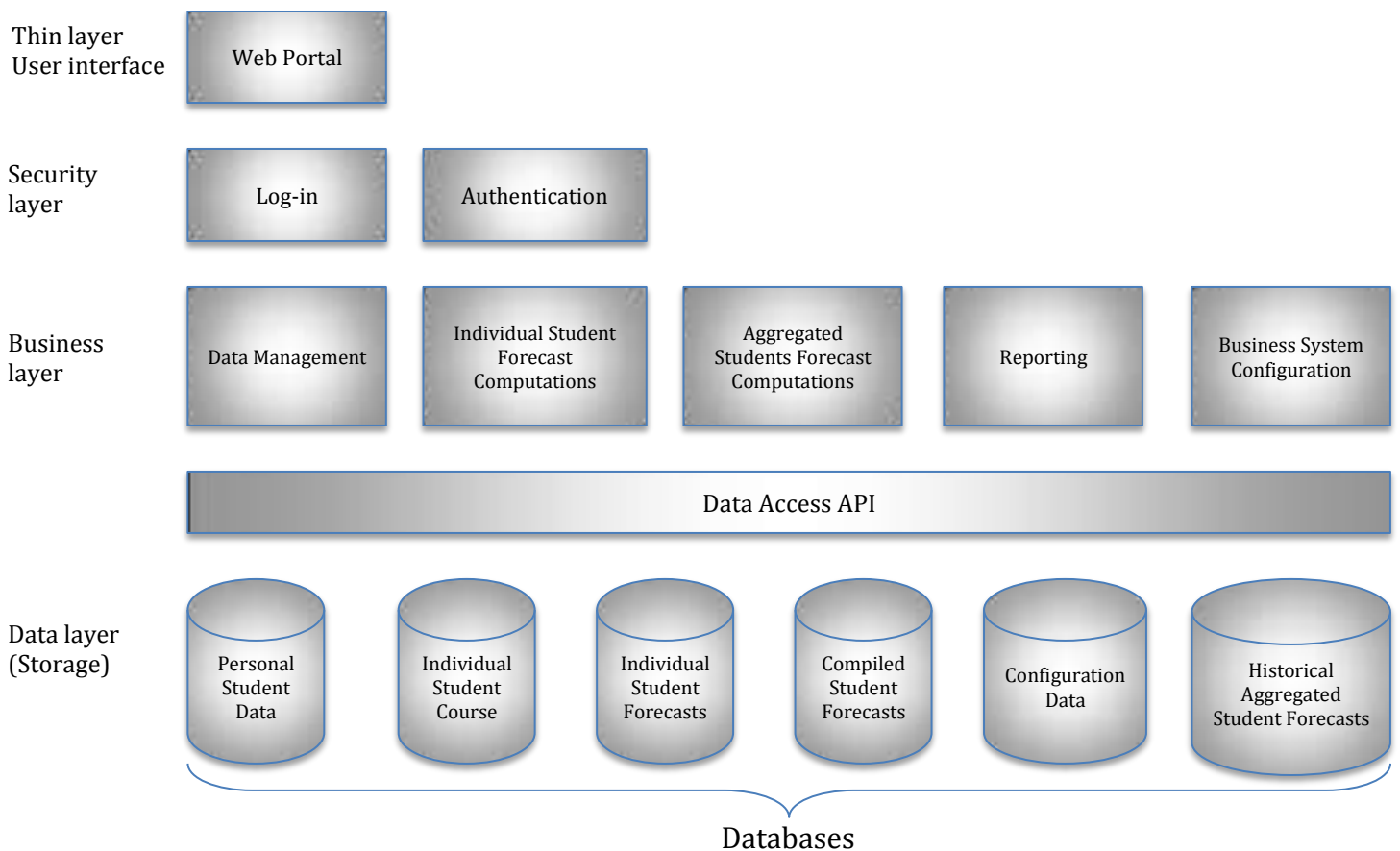
Any hardware devices that can use the myDU interface shall also be able to be used for this system. Mobile device interfaces (smartphone and tablet) must be available for the Student User interface. Faculty and Staff users, and the Staff Administrator are expected to use desktop and/or laptop computers. No mobile interface is required for Faculty and Staff users or the Staff Administrator.

4.3 Software Interfaces

The CEFS software must be integrated with the myDU interface. Provisions shall be made in the initial release to allow for the eventual handover of forecasting data to the DomU registration system. The software architecture for the CEFS system is shown in Figure 4.3.2.

Figure 4.3.1: Software Architecture Diagram

Thin layer User interface — Web Portal

Security layer — Log-in — Authentication

Business layer — Data Management — Individual Student Forecast Computations — Aggregated Students Forecast Computations — Reporting — Business System Configuration

Data Access API

Data layer (Storage) — Personal Student Data — Individual Student Course — Individual Student Forecasts — Compiled Student Forecasts — Configuration Data — Historical Aggregated Student Forecasts

Databases

4.4 Communications Interfaces

No special communications interfaces are required in the CEFS other than email notifications on the status of Student forecast completion.

The Staff Administrator shall identify a two week open forecasting period each semester where the system shall be open for the Student forecasting function. The system will email all Student users one week prior to the beginning of open forecasting, on the first day of open forecasting, and one day before the end of the open forecasting time.

Email notifications shall be sent to the Staff administrator when a pre-defined percentage of currently enrolled students have completed forecasts during open forecasting. The Staff Administrator shall define the pre-determined percentage and the system shall allow this percentage to be changed from forecast period to forecast period.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The system is required to have 99.99% reliability during the open forecasting time frame. Any disruption to the system during this time must be treated as an incident, and is expected to be repaired within 2 hours. An error message should be returned to any user during outages giving an approximate outage time. No planned outages are permitted during open forecasting. Two weeks of open forecasting each semester will be identified by the Staff Administrator and communicated to the Support Team. At all other times only disruptions to the Reporting Module Function must be treated as an incident. Other functions can be treated according to the DomU IT basic maintenance schedule.

5.2 Safety Requirements

No safety requirements beyond those used for myDU are required for the functions of this system. Data safety is paramount to Student privacy. No procedures that jeopardize student privacy shall be established as a result of this system.

5.3 Security Requirements

The security requirements are intended to describe user identification, authentication, access control, and system permissions.

The myDU user identification and authentication protocols shall be used to provide user authentication. System permissions shall be in place sufficient to allow Student Users to provide forecasts for themselves only. Student ethics and integrity policies shall govern that forecasts are given for a schedule of a volume of courses that the Student might reasonably expect to complete per semester.

The following tables are created for each of the main operational functions of the CEFS. Access control is shown for each User Role. Permissions are determined for the activity of creating, reading, updating, and deleting data for each operational function. For each role that has permission for the activity, an "X" is listed in the matrix. Blank cells are shown where permission is denied.

Table 5.3.1 shows Individual Forecasting, a main function performed by the Student User Role. In Table 5.3.1, the Student User has permission to create, read, update, and delete their individual forecasts. In addition, the Faculty User can read individual forecasts. A Faculty Advisor or other faculty member in a mentor role for students will need this access for student support. The Staff Administrator for the system also has read and delete permissions, as these permissions may be necessary to administrate the system.

Table 5.3.1: Individual Student Forecasts			
User Role	Create Forecast	Read Forecast	Update Forecast	Delete Forecast
System				
Student	X	X	X	X
Faculty		X		
Staff				
Staff Administrator		X		X

Table 5.3.2 shows the aggregated forecasts of student electives selections that have been compiled as an operation of the System. Therefore, the System as a User performs the operations that create and update this compiled forecast. Students have no role in the compilation, and therefore no permissions to this data. Faculty and Staff may read the compile forecasts. The Staff Administrator may also delete the compiled forecasts in case of problems or errors.

Table 5.3.2: Aggregate Student Forecasts				
User Role	Create Forecast	Read Forecast	Update Forecast	Delete Forecast
System	X		X	
Student				
Faculty		X		
Staff		X		
Staff Administrator		X		X

Table 5.3.3 shows the reports generated from aggregated forecasts of student electives selections. The reports are formatted by the Staff Administrator, which is the create permission. The system provides the data that updates the reports as the data changes during the time individual forecasts are added. Faculty, Staff, and the Staff Administrator may read all reports. The Staff Administrator may also update or delete any reports in case of problems or errors.

Table 5.3.3: Aggregate Forecast Reports				
User Role	Create Reports	Read Reports	Update Reports	Delete Reports
System			X	
Student				
Faculty		X		
Staff		X		
Staff Administrator	X	X	X	X

The final access control is around system configuration variables that are defined to run the system during each forecasting window. These variables are items such as the open forecasting period (two weeks during which individual forecasting is available to students). Table 5.3.4 shows the system configuration access control permissions. The System Administrator has the permission for each activity in this function. For information purposes, the Faculty and Staff Users have read permission to this activity. The system needs to read this information to process and perform its operations.

Table 5.3.4: Configure System Variable Input				
User Role	Create Input	Read Input	Update Input	Delete Input
System		X		
Student				
Faculty		X		
Staff		X		
Staff Administrator	X	X	X	X

5.4 Software Quality Attributes

Provide a test environment for use case testing to verify the operability of the system before moving it into production. Support must be available during the entire first open forecasting period, plus one week prior to and one week following the initial open forecasting period. Support is

expected to be available during defined hours (16 hours per 24 hour period) for troubleshooting any defects or incidents.

6. Other Requirements

Student privacy is of utmost importance. No recommendations or procedures that jeopardize student privacy will be established as a result of this project. Students are expected to provide forecasts for themselves only, on a schedule for the volume of courses that they might reasonably expect to complete per semester.

Appendix A: Glossary

Users: Users of CEFS will be Students, Faculty, and Staff.

Students: A person approved to register for courses in the Dominican University GSLIS. A Student must have a valid Student ID and Password for the University.

Faculty: A person approved to teach courses in the Dominican University GSLIS. A Faculty must have a valid Faculty ID and Password for the University.

Staff: A person who interacts with the system and is not a Student or Faculty. A Staff must have a valid Staff ID and Password for the University.

Staff Administrator: A person identified from Staff, and a back-up identified from Staff. This role will perform basic administrative functions for the system, and be the first line interface to IT Support.

Must:
Shall:

Should:

May:

Acronyms and Abbreviations
CEFS: Course Electives Forecasting System
GSLIS: Graduate School of Library and Information Science

Appendix B: Analysis Models

<Optionally, include any pertinent analysis models, such as data flow diagrams, class diagrams, state-transition diagrams, or entity-relationship diagrams.>

Appendix C: Issues List

< This is a dynamic list of the open requirements issues that remain to be resolved, including TBDs, pending decisions, information that is needed, conflicts awaiting resolution, and the like.>

Appendix D: Problem Statement and Original Proposal

Dominican University GSLIS Electives Course Forecasting and Scheduling

Problem Statement

Elective course offerings that don't match student plans and expectations result in course under-enrollment, lengthy matriculations, incomplete or unfinished MSLIS degrees, reduced satisfaction for the educational experience and may have a negative impact on semester tuition revenue. A non-binding forecast of student requests for electives from the existing course catalog, matched to faculty coursework offerings on a rolling two – three year basis will minimize enrollment gaps and optimize faculty teaching schedules.

Project Proposal

Create a system that forecasts student elective course plans and matches them to faculty offerings and availability. New elective courses can be added to offerings based on perceived interest during high demand times maximizing the opportunity for student uptake.

Background

Students enrolled in Dominican University's Graduate School of Library and Information Science (GSLIS) complete thirty-six credit hours of coursework to qualify for graduation with the Masters of Science in Library and Information Science (MSLIS). Twelve credit hours are required "core" classes, typically taken during a student's first year of enrollment. Many students also complete a three credit hour Practicum. This leaves a maximum of eight courses (twenty-four credit hours) available as electives to be completed with the core coursework in a maximum duration of six years.[1]

Electives may be used to benefit a student's breadth or depth in their library and information science (LIS) career[2]. For the student focusing their electives and/or pursuing a certificate concurrent with their MLIS it is critically important that the courses available for registration match their study vision and graduation requirements. For the student expanding their breadth of knowledge across the LIS discipline it is equally important to have a wide variety of coursework available during the time they matriculate in the GSLIS program.

Adding to the difficulty of meeting student coursework expectations, many matriculating GSLIS students are highly motivated, non-traditional students with significant competing demands on their time and availability to attend courses during much of the traditional classroom day, and at the traditional main campus location. Having a robust forecasting and scheduling methodology that considers the myriad of competing student and faculty priorities is useful because:

- Student expectations can be queried over a long-term period (two – three years) and used in future schedule planning exercises.

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[1] See [Master of Library and Information Science|Dominican GSLIS](#), Curriculum and Degree Requirements, accessed 24 February 2014.

[2] See [Courses|Dominican GSLIS](#), accessed 24 February 2014.

- Students can complete programs that have specific course requirements and limited durations with a higher level of assurance.
- Students will no longer perceive the need to register for more courses than they plan to enroll and complete during a semester.
- Faculty expertise and scheduling can be optimized.
- Faculty can plan and develop new course offers considering student vision and mission combined with faculty research and publication interests.
- Student, faculty, and staff frustrations are minimized, therefore allowing energy and time to be refocused onto more value-added activities.

Boundaries and Constraints:

Organization Scope. This system is directed toward students enrolled in and faculty teaching in GSLIS at Dominican University. Courses at Dominican University at large and NOT in the School of Library and Information Science are not in scope.

Data. Direct methods for collecting student expectations are in scope. Indirect methods may become in scope if these methods can be articulated and defined during the requirements analysis stage of the project. Data collected is used for planning purposes, and is non-binding on actual registration. All students will continue to be required to register for all classes using the standard methods. Participating in course needs forecasting is no guarantee of actual course offering and no guarantee of course enrollment. No preferential registration is implied by participating in forecasting activities.

People. GSLIS students enrolling in LIS electives during future years are in scope. GSLIS faculty and staff with a direct or indirect interface with GSLIS students are in scope. In particular, GSLIS advisors may be the initial point of contact to ascertain student expectations.

Procedures. Registration procedures are not expected to change as a result of the system developed by this process.

Policies. Student privacy is of utmost importance. No recommendations or procedures that jeopardize student privacy will be established as a result of this project. Students are expected to provide forecasts for themselves only, on a schedule for the volume of courses that they might reasonably expect to complete.

Appendix E: User Interface Designs

<Include representative user interface designs>