

1. Course Code

2293

2. Course Title

Software Development Special Experiments

3. Teacher

WANNOS, Muhammad

4. Term

Fall 1

5. Course Overview and Objectives

This course is problem-driven. It introduces a whole project that contains a number of close-to-real-world functions to develop. It is intended to demonstrate the methods and technologies that could be applied to arrive at a proper solution. Students will be able to use the experiences/skills they have acquired especially those related to programming, web-technologies, and Cloud Computing environment.

Working individually on the different functions is fine, but teamwork is encouraged and more appreciated.

6. Course Goals (Attainment Targets)

- (1) Examine a document provided by a virtual customer to develop an application.
- (2) Formulate a number of requirements in a document
- (3) Propose a design for the solution system
- (4) Decide the best technologies for implementation
- (5) Use the requirement document and the different technologies to implement the parts of the solutions system
- (6) Experiment with the modules of the solution system

7. Correspondence relationship between Educational goals and Course goals

Educational goals of the school			Course Goals
High level ICT skills	Basic academic skills		(1) (2) (3)
	Specialized knowledge and literacy		(4) (5) (6)
Human skill (Tankyu skill)	Ability to continually improve own strengths		
	Ability to discover and resolve the problem in society	Problem setting	
		Hypothesis planning	
		Hypothesis testing	
		Practice	
	Fundamental Competencies for Working Persons	Ability to step forward	
		Ability to think through	
		Ability to work in a team	
Professional ethics			

8. Course Requirements (Courses / Knowledge prerequisite for this course)

Programming (Java), database systems, and web application development skills are required. The following courses are required to be completed.

[1] Advanced Software Development (Cloud Computing)(2245)

9. Textbooks (Required Books for this course)

For this course, a set of lecture slides, handouts, and other resources will be distributed in a timely manner through Moodle.

10. Reference Books (optional books for further study)

None

11. Evaluation

Goals	Evaluation method & point allocation					
	examination	Quiz	Reports	Presentation	Deliverables	Other
(1)		○				
(2)		○				
(3)		○				
(4)					○	
(5)					○	
(6)					○	
Allocation		40			60	

12. Notes

This course mainly contains practical parts. Be prepared for using Integrated Development Environment and for coding (in Java).

Quizzes and projects have deadlines and they won't be postponed unless a serious issue occurs.

13. Course plan

(Notice) This plan is tentative and might be changed at the time of delivery

Lesson 1: (Course orientation, WeBill Project)

(Discussion and Lecture 45 minutes, Demonstration, 45 minutes)

[1] Course syllabus

[2] Grading

[3] The course project (WeBill)

+ Description document

Lesson 2: (Entity Relation Diagram)

(Discussion & Groupwork 90 minutes)

[1] Identify sub-systems/entities

[2] Generating the Entity Relation Diagram (ERD)

Lessons 3-4: (Initial design and requirements)

(Discussion & Groupwork 180 minutes)

-
- [1] The main functions of the solution system
 - [2] An initial design for the solution system
 - + Main modules
 - + Interconnections
 - [3] The functional requirements
 - + The Requirements Document (RD)
-

Lesson 5-6: (Development Environment)

(Practice 180 minutes)

-
- [1] Java Development Kit (JDK)
 - [2] Android Studio
 - [3] Google Cloud SDK
 - [4] Google App Engine Java SDK
 - [5] NetBeans IDE
 - [6] Tomcat Apache Server
 - [7] MySQL server
-

Lesson 7-8: (Initial design - Log in/out)

(Groupwork 90 minutes, Practice 90 minutes)

-
- [1] Initial design document
 - [2] User verification sub
 - + Login page (HTML, JavaScript)
 - + Database (users' and user's tables)
 - + Validation Servlet
 - + Response page
 - + Logout Servlet
 - [3] Deployment
-

Lesson 9-10: (Initial design - File uploading)

(Practice 180 minutes)

-
- [1] File upload page (HTML, JavaScript)
 - + Upload Servlet
 - * Storing the file
 - * Updating the user's table in the database
 - [2] Deployment
-

Lesson 11-12: (initial design - Location information)

(Practice 180 minutes)

-
- [1] File verification page (HTML, JavaScript)
 - [2] Location reader Servlet
 - + Obtain the location information from the file uploaded
 - [3] Deployment
-

Lesson 13-14: (Initial design - QR-Code informatio	(Practice 180 minutes)
--	------------------------

- [1] QR-Code reader Servlet
 - + Detect and decode the QR-Code in the file uploaded
- [2] Deployment

Lesson 15-16 : (Initial design - OCR)	(Practice 180 minutes)
---------------------------------------	------------------------

- [1] Testing OCR individually
- [2] OCR Servlet
 - + Detect the characters in the file uploaded
 - + User input if necessary (HTML/JavaScript)
- [3] Deployment

Lesson 17-18 : (Combining modules, review)	(Practice 120 minutes, Discussion 60 minutes)
--	---

- [1] Combine all the modules in one application
- [2] Deploy the complete application
- [3] Testing the application
- [4] Course review

Lesson 19-22 : (Enhancements to the initial desigr	(Groupwork 360 minutes)
--	-------------------------

Starting from this session, the students will be divided into groups to work on selected number of additional features in the application.

Each group will select a set of features to add to the application.

1- Add two new columns to the Users' table, one column for the longitude of the electricity meter and the other one for the latitude. Save sample values in the new columns.

2- Modify location detection module to obtain the GPS information of the uploaded image and compare it with the one in the Users' table.

3- Add a new page to list the files uploaded by one user.

4- Add a thumbnail to the file record in the page that lists the file.

5- Add a page and Servlet to modify the user's information.

6- Provide the admin with a page to verify the reading obtained from the file uploaded or from the user input.

7- Add a page to allow the admin to set the different charges and generfate bills.

8- Add a function that notifies the admin of new file uploads.

Lesson 23-26 : (Mobile application -Login)

(Practice 360 minutes)

-
- [1] Log in screen
 - [2] Passing information to intity
 - [3] Creating new activity
 - [4] Connecting to the web application
 - [5] Taking a photo and uploading it to the application.
 - [6] Adding new activities for the different functions available in the web interface.

Lesson 27-29 : (Testing the application)

(Practice 270 minutes)

-
- [1] Planning test procedure
 - + Number of users
 - + Test scenario
 - [2] Carrying the test procedure
 - [3] Checking weak points in the application
 - [4] Correcting errors

Lesson 30 : (Wrap up)

(Discussion, 90 minutes)

-
- [1] Discuss and review the topics covered in this course.
 - [2] Suggestions of improvements.
-