



University of Engineering and Technology
School of Computer Science
Syllabus of Course
Academic Period 2018-II

1. **Code and Name:** CS2B01. Platform Based Development
2. **Credits:** 2
3. **Hours of theory and Lab:** 1 HT; 2 HL;
4. **Professor(s)**

Lecturer

- Jesus Edwin Bellido Angulo
 - PhD in Computer Science, Pontificia Universidad Católica de Chile, Chile, 2014.
 - MSc in Computer Science, Pontificia Universidad Católica de Chile, Chile, 2014.

Meetings after coordination with the professor

5. Bibliography

- [ADC13] J. Anzuzzi, L. Darcey, and S. Conder. *Introduction to Android Application Development: Android Essentials*. Developer's Library. Pearson Education, 2013. ISBN: 9780133477337.
- [Fie00] Roy Thomas Fielding. "Fielding dissertation: Chapter 5: Representational state transfer (rest)". In: http://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm (2000).
- [FR11] Eric Freeman and Elisabeth Robson. *Head first HTML5 programming: building web apps with JavaScript*. "O'Reilly Media, Inc.", 2011.
- [Gro09] R. Grove. *Web Based Application Development*. Jones & Bartlett Learning, 2009. ISBN: 9780763759407.
- [Mar17] Robert C Martin. *Clean architecture: a craftsman's guide to software structure and design*. Prentice Hall Press, 2017.

6. Information about the course

- (a) **Brief description about the course** The world has changed due to the use of fabric and related technologies, rapid, timely and personalized access to the information, through web technology, ubiquitous and pervasive; they have changed the way we do things, how do we think? and how does the industry develop? Web technologies, ubiquitous and pervasive are based on the development of web services, web applications and mobile applications, which are necessary to understand the architecture, design, and implementation of web services, web applications and mobile applications.
- (b) **Prerequisites:** CS1102. Objects oriented programming I. (2nd Sem)
- (c) **Type of Course:** Mandatory
- (d) **Modality:** Face to face

7. Specific goals of the Course

- That the student is able to design and implement services, web applications using tools and languages such as HTML, CSS, JavaScript (including AJAX), back-end scripting and a database, at an intermediate level.
- That the student is able to develop mobile applications, administration of web servers in a Unix system and an introduction to web security, at an intermediate level.

8. Contribution to Outcomes

- c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (**Usage**)
- d) An ability to function on multidisciplinary teams. (**Usage**)
- g) The broad education necessary to understand the impact of computing solutions in a global, economic, environmental, and societal context. (**Usage**)
- i) An ability to use the techniques, skills, and modern computing tools necessary for computing practice. (**Usage**)
- c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (**Usage**)
- d) An ability to function on multidisciplinary teams. (**Usage**)
- g) The broad education necessary to understand the impact of computing solutions in a global, economic, environmental, and societal context. (**Usage**)
- i) An ability to use the techniques, skills, and modern computing tools necessary for computing practice. (**Usage**)

9. Competences (IEEE)

- C1.** An intellectual understanding and the ability to apply mathematical foundations and computer science theory.⇒ **Outcome c,d,i**
- C6.** Ability to design and implement larger structural units that utilize algorithms and data structures and the interfaces through which these units communicate.⇒ **Outcome c,d,i**
- CS8.** Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, multimedia systems and mobile systems..⇒ **Outcome g**
- C1.** An intellectual understanding and the ability to apply mathematical foundations and computer science theory.⇒ **Outcome c,d,i**
- C6.** Ability to design and implement larger structural units that utilize algorithms and data structures and the interfaces through which these units communicate.⇒ **Outcome c,d,i**
- CS8.** Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, multimedia systems and mobile systems..⇒ **Outcome g**

10. List of topics

1. Introduction
2. Web Platforms
3. Desarrollo de servicios y aplicaciones web
4. Mobile Platforms
5. Mobile Applications for Android Handheld Systems

11. Methodology and Evaluation

Theory Sessions:

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

Lab Sessions:

In order to verify their competences, several activities including active learning and roleplay will be developed during lab sessions.

Oral Presentations:

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

Reading:

Throughout the course different readings are provided, which are evaluated. The average of the notes in the readings is

considered as the mark of a qualified practice. The use of the UTEC Online virtual campus allows each student to access the course information, and interact outside the classroom with the teacher and with the other students.

Evaluation System:

The final grade NF depends of 4 intermediary grades :

$$NF = 0.4 * P + 0.2 * L + 0.2 * T + 0.2 * R$$

Where:

P : Project

L : Laboratory

T : Homework

R : Readings

To pass the course you must obtain 11 or more in the final grade NF .

12. Content

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|---|--|
| Unit 1: Introduction (5) | |
| Competences Expected: CS8 | |
| Learning Outcomes | Topics |
| <ul style="list-style-type: none"> • Describe how platform-based development differs from general purpose programming [Familiarity] • List characteristics of platform languages [Familiarity] • Write and execute a simple platform-based program [Familiarity] • List the advantages and disadvantages of programming with platform constraints [Familiarity] | <ul style="list-style-type: none"> • Overview of platforms (e.g., Web, Mobile, Game, Industrial) • Programming via platform-specific APIs • Overview of Platform Languages (e.g., Objective C, HTML5) • Programming under platform constraints |
| Readings : [Fie00], [Gro09], [ADC13] | |

| | |
|--|---|
| Unit 2: Web Platforms (5) | |
| Competences Expected: C1,C6 | |
| Learning Outcomes | Topics |
| <ul style="list-style-type: none"> • Design and Implement a simple web application [Familiarity] • Describe the constraints that the web puts on developers [Familiarity] • Compare and contrast web programming with general purpose programming [Familiarity] • Describe the differences between Software-as-a-Service and traditional software products [Familiarity] • Discuss how web standards impact software development [Familiarity] • Review an existing web application against a current web standard [Familiarity] | <ul style="list-style-type: none"> • Web programming languages (e.g., HTML5, JavaScript, PHP, CSS) • • Web Platform constraints: Client-Server, Stateless-Stateful, Cache, Uniform Interface, Layered System, Code on Demand, ReST. • Web platform constraints • Software as a Service (SaaS) • Web standards |
| Readings : [Fie00] | |

| Unit 3: Desarrollo de servicios y aplicaciones web (25) | |
|---|--|
| Competences Expected: C1,C6 | |
| Learning Outcomes | Topics |
| <ul style="list-style-type: none"> • Server-side python scripting language: variables, data types, operations, strings, functions, control statements, arrays, files and directory access, maintain state. [Usage] • Web programming approach using embedded python. [Usage] • Accessing and Manipulating MySQL. [Usage] • The Ajax web application development approach. [Usage] • DOM and CSS used in JavaScript. [Usage] • Asynchronous Content Update Technologies. [Usage] • XMLHttpRequest objects use to communicate between clients and servers. [Usage] • XML and JSON. [Usage] • XSLT and XPath as mechanisms for transforming XML documents. [Usage] • Web services and APIs (especially Google Maps). [Usage] • Macros Ajax for the development of contemporary web applications. [Usage] • Design patterns used in web applications. [Usage] | <ul style="list-style-type: none"> • Describe, identify and debug issues related to web application development • Design and development of interactive web applications using HTML5 and Python • Use MySQL for data management and manipulate MySQL with Python • Design and development of asynchronous web applications using Ajax techniques • Using dynamic client side Javascript scripting language and server side python scripting language with Ajax • Apply XML / JSON technologies for data management with Ajax • Use framework, services and Ajax web APIs and apply design patterns to web application development |
| Readings : [FR11] | |

| Unit 4: Mobile Platforms (5) | |
|---|---|
| Competences Expected: C1,C6 | |
| Learning Outcomes | Topics |
| <ul style="list-style-type: none"> • Design and implement a mobile application for a given mobile platform [Familiarity] • Discuss the constraints that mobile platforms put on developers [Familiarity] • Discuss the performance vs power tradeoff [Familiarity] • Compare and Contrast mobile programming with general purpose programming [Familiarity] | <ul style="list-style-type: none"> • Mobile programming languages • Design Principles: Segregation of Interfaces, Single Responsibility, Separation of concerns, Dependency Inversion. • Challenges with mobility and wireless communication • Location-aware applications • Performance / power tradeoffs • Mobile platform constraints • Emerging technologies |
| Readings : [Mar17], [ADC13] | |

Unit 5: Mobile Applications for Android Handheld Systems (25)**Competences Expected: C1,C6****Learning Outcomes**

- Students identify necessary software and install it on their personal computers.
- Students perform various tasks to familiarize themselves with the Android platform and Environment for development. [Usage]
- Students build applications that trace the lifecycle callback methods emitted by the Android platform and demonstrate the behavior of Android when device configuration changes (for example, when the device moves from vertical to horizontal and vice versa). [Usage]
- Students build applications that require starting multiple activities through both standard and custom methods. [Usage]
- Students build applications that require standard and custom permissions. [Usage]
- Students build an application that uses a single code base, but creates different user interfaces depending on the screen size of a device. [Usage]
- Students construct a to-do list manager using the user interface elements discussed in class. The application allows users to create new items and to display them in a ListView. [Usage]
- Students build an application that uses location information to collect latitude, length of places they visit. [Usage]

Topics

- The Android Platform
- The Android Development Environment
- Application Fundamentals
- The Activity Class
- The Intent Class
- Permissions
- The Fragment Class
- User Interface Classes
- User Notifications
- The BroadcastReceiver Class
- Threads, AsyncTask & Handlers
- Alarms
- Networking (http class)
- Multi-touch & Gestures
- Sensors
- Location & Maps

Readings : [ADC13]