# UNIVERSITY OF BORÅS

## Development of mobile applications
### Utveckling av mobila applikationer
7.5 credits
7.5 högskolepoäng

**Ladok Code:** C1UMIB
**Version:** 1.0
**Established by:** Committee for Education in Librarianship, Information, and IT 2023-11-07
**Valid from:** Spring 2024

**Education Cycle:** First cycle
**Main Field of Study (Progressive Specialisation):** Informatics (G1F), Computer Science (G1F)
**Disciplinary Domain:** Natural sciences
**Prerequisites:** General entry requirements for university studies.
Completed courses comprising at least 22.5 credits in programming and database technology, including knowledge and skills in the C# programming language
**Subject Area:** Informatics/Computer and Systems Sciences
**Grading Scale:** Seven-degree grading scale (A-F)

## Content

The course aims to provide an understanding of distributed systems over the internet and specifically an applied skill in developing mobile applications. The course introduces the basics of programming distributed applications for the internet with a focus on web services based on Representational State Transfer (REST). These fundamentals are concretised through a broad orientation regarding technologies and components used for the development of mobile applications for Android and iOS. For this development, the programming language C# is applied with the .NET framework with the aim of achieving an efficient integration with persistent storage databases. User interface design is introduced both generally and more specifically to each selected framework. For the separation of program code into parts in terms of logic and graphics, the Model-View-ViewModel (MVVM) design pattern is used. The graphical interface is designed and developed using the XAML (eXtensible Application Markup Language) markup language.

## Learning Outcomes

After completing the course, the student will be able to:

*Knowledge and understanding*
1.1. describe fundamental theories, limitations and possibilities for software development during mobility,
1.2 describe protocols and techniques for application interfaces based on the internet as a medium,
1.3 describe the designs and principles within the .NET framework for REST-based web services,
1.4 describe the structures and principles within the framework .NET MAUI,
1.5. describe theories and principles for the development of user interfaces for mobile devices, and
1.6 describe standard techniques for responsive design.

*Competence and skills*
2.1. design and implement mobile applications that are part of a larger distributed system,
2.2. design and implement mobile applications with technologies intended to be executed on Android systems,
2.3. design and implement mobile applications using technologies intended to be executed on iOS systems,
2.4. apply graphical interface design constructions using the XAML markup language and the .NET MAUI framework;
2.5. apply constructions for graphical interface design with the programming language C# and the .NET MAUI framework, and
2.6. apply constructions for database communication in C# and .NET through object-relational mapping,

*Judgement and approach*
3.1. independently choose appropriate standards and techniques for application in the field of mobile application development,

and
3.2. independently collect, compile, critically evaluate and present information in writing and orally about standards and technologies in the field of mobile application development.

## Forms of Teaching

The course consists of:
- lectures
- supervision in the form of workshops
- supervision of laboratory sessions
- seminars

The language of instruction is English.

## Forms of Examination

The course will be examined through the following examination elements:

*Individual written examination*
Learning outcomes: 1.1-1.6
Credits: 3
Gradingscale: Seven-degree grading scale (A-F)

*Laboration 1: mobile application with interface design in XAML (group assignment)*
Learning outcomes: 2.2–2.5, 3.1
Credits: 1.5
Gradingscale: Fail (U) or Pass (G)

*Laboration 2: mobile application with distributed and persistent storing by Entity Framework (group assignment)*
Learning outcomes: 2.1–2.6, 3.1
Credits: 1.5
Gradingscale: Fail (U) or Pass (G)

*Written assignment: individual in-depth study with implementation*
Learning outcomes: 2.1–2.6, 3.1-3.2
Credits: 1
Gradingscale: Fail (U) or Pass (G)

*Seminar: individual presentation of in-depth study*
Learning outcomes: 3.1-3.2
Credits: 0.5
Gradingscale: Fail (U) or Pass (G)

For the grade E on the whole course, the grade E at a minimum is required on *Individual written exam* and Pass on the others examination components. A higher grade on the whole course is then determined by the grade on *Individual written exam*.

If the student has received a decision/recommendation regarding special pedagogical support from the University of Borås due to disability or special needs, the examiner has the right to make accommodations when it comes to examination. The examiner must, based on the objectives of the course syllabus, determine whether the examination can be adapted in accordance with the decision/recommendation.

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

## Literature and Other Teaching Materials

The course literature is in English.

Liberty, Jesse and Juarez, Rodrigo. (2023). .NET MAUI for C# Developers. Packt Publishing. (296 p.)

Troelsen, Andrew and Japikse, Philip. (2022 or later edition). Pro C# 10 With .NET 6. Apress.

Scientific articles and lecture material may be added according to the teacher's instructions.

**Student Influence and Evaluation**

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås in which students' views are to be gathered. The course evaluation report is published and returned to participating and prospective students in accordance with the above-mentioned guidelines, and will be taken into consideration in the future development of courses and education programmes. Course coordinators are responsible for ensuring that the evaluations are conducted as described above.

**Miscellaneous**

This syllabus is a translation from the Swedish original.