

Syllabus [2025Year 2 Term]

Course Information

Course Title	Basic Mobile Lab 2	Credits	1
Course Code	521200-1	Required/Elective (For Undergraduate Courses)	Mandatory Major
Department or Major	Department of Mobile Systems Engineering	Language	English
Methods of Teaching		Lecture Room	화10,11,12,13(국제210)
Time Allotment	Lecture(0) Experiments(2) Trainging & Practice(0) Performance(0) Designing & Planning(0)	Cyber Lectures	
Course Type	offline		
Cyber Lectures Preview			

Lecturer

Lecturer	Name	JaeYeon Park	Rank	Assistant Professor	Final Academic Degree	공학박사
	Department & college	Department of Mobile Systems Engineering		Office		
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	Field of Interest					

Course Summary

Course Description	Basic Mobile Experiment 2 is a hands-on course designed to develop foundational skills in embedded systems and mobile applications using Arduino and various sensors and communication modules. The course begins with theoretical components, including circuit theory, microprocessor architecture, interrupt handling, and GPIO-based control. These fundamentals are then applied in practical sessions involving Arduino programming, sensor integration, ECG (Electrocardiogram) signal measurement, and mobile app development. Through project-based learning, students gain practical experience in developing integrated hardware-software systems, with a focus on real-world healthcare applications.
Description Related Courses	
Course Goals	[Self-Directed Learning] Students are expected to actively plan and explore each stage of the experiment, from prep

	<p>ation and equipment setup to identifying and solving problems during implementation. They will independently research and apply the necessary tools and techniques throughout the course.</p> <p>[Cooperation and Teamwork]</p> <p>Through team-based projects, students will gain experience in task distribution, mutual feedback, collaborative debugging, and integrating system components as a team. Effective communication and collective problem-solving are emphasized.</p> <p>[Creative Problem-Solving]</p> <p>Students will encounter and resolve challenges such as sensor data inconsistencies, communication errors, and real-time app integration. They will design innovative solutions that consider both user experience and system performance.</p>
Projected Results	<p>Upon successful completion of this course, students will be able to</p> <ul style="list-style-type: none"> <li>– Understand and explain core theoretical concepts in embedded systems</li> <li>– Build and operate sensor-based hardware using Arduino UNO</li> <li>– Apply digital communication protocols such as UART, I2C, SPI, and Bluetooth</li> <li>– Acquire and visualize real-time ECG biosignals, and integrate them into a mobile application</li> <li>– Design, develop, and present integrated hardware-software systems</li> <li>– Demonstrate improved skills in problem-solving, collaboration, and self-directed learning through labs and projects</li> </ul>
Percentage of the original language classes(%)	
Cyber Lectures Preview	

## Syllabus

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
1	Course Orientation & Lab Introduction	<ul style="list-style-type: none"> <li>– Overview of the course and safety guidelines</li> <li>– Team formation and equipment setup</li> <li>– Introduction to Arduino UNO and sensor kits</li> </ul>	강의,	
2	Basic Circuit Theory	<ul style="list-style-type: none"> <li>– Understand signals in frequency domain</li> <li>– Learn the roles of resistors, capacitors, and inductors</li> </ul>	강의,	
3	Microprocessor Architecture	<ul style="list-style-type: none"> <li>– Learn the structure of microprocessors</li> <li>– Understand ARM architecture and operating modes</li> <li>– Registers and processor modes</li> </ul>	강의,	

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
4	Interrupt Handling & Exception Management	<ul style="list-style-type: none"> <li>– Understand interrupts and how to write ISRs</li> <li>– Learn ARM exception handling mechanisms</li> </ul>	강의,	
5	Device Control in Embedded Systems	<ul style="list-style-type: none"> <li>– Understand GPIO and memory-mapped I/O</li> <li>– Device control using interrupts</li> </ul>	강의,	
6	Introduction to Arduino UNO & Programming Basics	<ul style="list-style-type: none"> <li>– Overview of Arduino UNO hardware and pin map</li> <li>– Digital/Analog I/O and serial communication</li> <li>– Basic sketch structure</li> </ul>	강의,	
7	Sensor & Communication Practice (UART, I2C, SPI)	<ul style="list-style-type: none"> <li>– Connect sensors to Arduino and read data</li> <li>– Learn UART, I2C, and SPI communication protocols</li> </ul>	강의,	
8	Midterm Exam			
9	Introduction to Biosignals & ECG	<ul style="list-style-type: none"> <li>– Understand characteristics of biosignals</li> <li>– Learn ECG structure and signal filtering</li> </ul>	강의, 팀기반학습(TBL),	
10	ECG Sensor + Arduino Interface	<ul style="list-style-type: none"> <li>– Interface ECG sensor with Arduino</li> <li>– Visualize ECG signal</li> </ul>	강의, 팀기반학습(TBL),	
11	Bluetooth Communication	<ul style="list-style-type: none"> <li>– Wireless transmission of ECG data via a Bluetooth module</li> </ul>	강의, 팀기반학습(TBL),	
12	ECG App Development I	<ul style="list-style-type: none"> <li>– Design Android app UI</li> <li>– Plan ECG data reception</li> </ul>	강의, 팀기반학습(TBL),	
13	ECG App Development II	<ul style="list-style-type: none"> <li>– Implement real-time ECG data visualization</li> </ul>	강의, 팀기반학습(TBL),	
14	Final Project Development	<ul style="list-style-type: none"> <li>– Integrate hardware and software systems</li> <li>– Debugging and pr</li> </ul>	강의, 팀기반학습(TBL),	

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
		resentation preparati on		
15	Final Exam	Project demo and pr esentation		

## Methods of Grading

sequen ce	Description	Percentage	Details
1	Mid-tem Exam	30%	
2	Final-exam	35%	
3	Pop Quizzes	0%	
4	Assignments	20%	
5	Reports	0%	
6	Presentations & Discussions	0%	
7	Attendance	15%	
8		0%	
9	Others	0%	
All		100%	

## Core of Value

핵심가치	전공역량	역량정의	역량구분	값(%)
혁신 (Discovery)	창의적문제해결 (Creative problem-s olving)	주어진 상황과 문제 를 창의적으로 해결 할 수 있는 능력	부역량	20%
혁신 (Discovery)	도전 (Challenging)	전공 지식을 새로운 분야와 융합하고 아 우를 수 있는 능력		0%
혁신 (Discovery)	지식융합 (Knowledge conver gence)	새로운 분야를 개척 하거나 도전적으로 임할 수 있는 능력		0%
헌신 (Dedication)	세계시민 (Universal value)	세계 공동체 구성원 으로 전공자로서 국 제적 이슈에 대응할 수 있는 능력		0%
헌신 (Dedication)	상호협력 (Cooperation)	공동의 목적 달성을 위해 타인과 상호협 력을 할 수 있는 능력	부역량	30%
헌신 (Dedication)	공동체 (Sense of communit y)	공동체의 구성원으로 서 필요한 태도와 윤 리의식을 가질 수 있 는 능력		0%

핵심가치	전공역량	역량정의	역량구분	값(%)
능동 (self-Determination)	자기주도 (Self-Managing)	주어진 상황과 문제를 주도적이고 능동적으로 해결할 수 있는 능력	주역량	50%
능동 (self-Determination)	지식활용 (Knowledge application)	주어진 상황과 문제에 대해 논리적으로 파악하고 분석할 수 있는 능력		0%
능동 (self-Determination)	논리적사고 (Logical thinking)	전공관련 지식을 필요에 따라 다양하게 적용하고 활용할 수 있는 능력		0%
능동 (self-Determination)	의사소통 (Articulation)	대화를 통해 다양한 의견을 조율하고 합의를 이끌어 낼 수 있는 능력		0%

## Textbook(s) &amp; References

Description	Title	Author	Publisher
Required Textbook	Embedded System Design: A Unified Hardware/Software Introduction	Frank Vahid and Tony Givargis	Wiley

## Memo