

Exercise and Digital Healthcare

Undergraduate syllabus — Department of Sport Science, University of Seoul, Fall 2026.

This is an English translation of the official syllabus for a course I teach in the Department of Sport Science at the University of Seoul. It is offered for the first time in Fall 2026.

Course at a glance

Institution	University of Seoul — Department of Sport Science
Term	Fall 2026
Course number	63034 (section 01)
Type	Major elective · lab and practicum
Credits	1 credit · 2 contact hours per week
Level	Fourth-year undergraduate
Meetings	Tuesdays, periods 2–3 · Room 1-107
Format	70% in person · 30% online
Materials	Instructor-prepared
Instructor	Kyung Hyun Lee · lkh256 [at] gmail [dot] com

Course description

Digital healthcare is changing quickly, and sport and exercise science sits closer to that change than the two fields usually acknowledge. This course asks students to understand the shift and then to work out where exercise and health practice can meet it — with the aim of preparing people who can contribute to public health from that intersection.

Alongside the lecture material, students analyse cases across a set of designated areas — wearable devices, exercise mobile apps, digital therapeutics, smart healthcare, IT-based home-training technology — learning the concepts and theory each area requires, then discussing how the technology is actually put to use.

Learning objectives

1. Survey the landscape of the digital healthcare and wellness industry, and identify where a sport and exercise specialist can contribute.
2. Explain why and how exercise matters to health, from both a physiological-evidence and a data perspective.
3. Carry out quantitative inquiry first-hand: run a small literature and market scan, analyse measurement data you collected yourself, and build a prediction formula from it.
4. Connect theory to industry practice through the working experience of invited practitioners.

On the use of AI

AI tools — Claude, ChatGPT, Gemini — are actively encouraged for literature search, data analysis, and report writing, with two conditions. Students share **how** they used the tool, the use case and not only the output. And they own the accuracy of whatever they submit, verifying generated claims against sources. Building fluency and judgment with these tools is part of what the course teaches, not something it polices.

Assessment

Norm-referenced grading. There is no written midterm or final examination; quizzes, when given, are online.

Component	Weight
Attendance	10%
Participation	20%
Assignments	15%
Midterm project	25%
Final project	30%

Methods used across the term: lecture, presentation, discussion, hands-on practice, project work, and e-learning.

Weekly schedule

Part I — Framing the field (weeks 1–3)

- **Week 1 · Orientation: why digital healthcare, why now.** Course overview and assessment. In an era where a phone and a watch already monitor our health, what does “digital healthcare” actually refer to?
- **Week 2 · From wellness to medicine: one spectrum.** Walking the prevention → management → diagnosis → treatment spectrum, and locating the line where a wellness product — a fitness app, a wearable — becomes a regulated medical device (SaMD).
- **Week 3 · Mapping the ecosystem.** Wearables, health apps, telemedicine, AI diagnostics: who the players are, and why MFDS and FDA regulation exists, read through real cases.

Part II — Exercise as evidence and as measurement (weeks 4–6)

- **Week 4 · Why exercise: the value the data shows.** How cardiorespiratory fitness relates to mortality and metabolic disease, taken from published findings. “Exercise is good for you” revisited as a quantitative claim.
- **Week 5 · How exercise gets measured.** What activity volume, heart rate, VO₂max, and step count each mean — and what aspect of health each one actually stands in for.
- **Week 6 · Sensors and biosignals: what a watch can and cannot measure.** How wearables estimate heart rate, sleep, and activity, and where those estimates fail — for instance, what optical photoplethysmography misses. Developing a feel for data that is never quite complete.

Part III — Working with your own data (weeks 7–10)

- **Week 7 · [Midterm presentation] Sharing the landscape scan.** Teams research and present a digital healthcare product, service, or study they find interesting. Seeing the breadth of the field in each other’s work sets the direction for the final project.
- **Week 8 · Collection lab: gathering data from your own body.** Each student collects their own activity and heart-rate data using a watch, an app, or a simple instrument — learning first-hand what it means to *produce* data rather than receive it.
- **Week 9 · Working with data.** Organising the collected data in a spreadsheet or a simple tool, then reading it through means, distributions, and correlations. No coding background required.
- **Week 10 · Building a prediction formula.** Using my own cardiorespiratory-fitness prediction study as the worked example, students retrace how a handful of variables become a predictive formula — regression made intuitive by working it through by hand.

Part IV — Practitioners and the final project (weeks 11–16)

- **Week 11 · [Guest lecture I] Research.** A researcher working in clinical and digital health on how a study actually gets done, and where its results go.
- **Week 12 · [Guest lecture II] Industry.** A healthcare-startup and data practitioner on how an idea becomes a product and a business, and how exercise and health data are used along the way.
- **Week 13 · Final project workshop I.** Teams settle the topic of their final report and begin their analysis, with the instructor working through direction team by team.
- **Week 14 · Final project workshop II.** Continuation of the same hands-on, team-by-team support.
- **Week 15 · [Final presentation] Sharing the analysis.** Each team presents what it collected and what it found, offering its own answer to the course’s guiding question: how can exercise data contribute to digital healthcare?
- **Week 16 · Final report and closing discussion.** Reports are completed with presentation feedback folded in, and the class looks back over the term — and forward, to how each student might connect with this field from here.

Weeks 8–10 and 13–14 are hands-on sessions; students bring a personal laptop.

Academic integrity

Presenting another person’s writing as your own, without proper citation and referencing, is plagiarism. Depending on severity, a plagiarised report or presentation is penalised or graded zero.

Students who need accommodations for a disability can arrange them with me through the university’s Human Rights Center (Office for Students with Disabilities).