

Transdisciplinary Major in Learning Health Systems

Educational Objectives

A Learning Health System (LHS) is a healthcare paradigm in which knowledge generation is embedded within routine practice, enabling the healthcare system to continuously evolve. Its goal is to ensure that patients receive the most appropriate care based on the best available evidence, while emphasizing disease prevention and health promotion, maximizing value, and continuously learning from healthcare processes to improve the overall health of the population.

This transdisciplinary major expands the concept of the Learning Health System by placing health equity at its core. The program seeks to cultivate professionals who can organize, design, operate, and evaluate learning-based health systems beyond healthcare organizations, extending to national and global health contexts and grounded in the social determinants of health. Through the integration of public health and data-driven innovations emerging from the Fourth Industrial Revolution, students will develop the capacity to identify the structures and patterns of health inequities and provide tailored healthcare solutions for vulnerable communities and populations. Ultimately, the program aims to foster globally competitive leaders capable of building self-improving healthcare systems for all.

Regulations

1. Definitions

1. “Transdisciplinary Major” refers to the Transdisciplinary Major in Learning Health Systems.
2. “Home Department” refers to the department to which a student applied and was admitted at the time of enrollment.
3. “Home Major” refers to the major within the student’s “Home Department”.

2. Four Areas of Transdisciplinary Education

- 1) To promote interdisciplinary education and research, the program is organized into the following four educational areas:
 - ①. Digital Health Data Sciences: Research and application of methodologies for the development of tools used to measure health outcomes and the biological, environmental, and social determinants of health, as well as data collection, assembly, and processing using such tools.

- ②. Biomedical Healthcare: Research on the biological mechanisms of health, development of diagnostic technologies, and collection of clinical data.
 - ③. Community Healthcare: Research on the application of knowledge generated through healthcare systems, digital health data sciences, and biomedical healthcare to communities; development, implementation, and evaluation of living-lab-based programs designed to solve community health problems.
 - ④. Healthcare Systems: Research on the social and environmental mechanisms of health, as well as studies on institutions, governance, and indicator development.
- 2) Academic advisors shall be classified into the following four interdisciplinary education areas:

표 4. 대 융합교육영역에 따른 지도교수 분류
(Table 4. Classification of Advisors by Major Convergence Ed

지도교수 성명	교수 성명 (영문)	디지털헬스데이터	바이오헬스케어	Co
Professor Name	Professor Name (EN)	Digital Health Data	Bio Healthcare	
기명	Ki, Myung			
김경해	Kim, Kyung-Hae			
김난희	Kim, Nan-Hee			
김병조	Kim, Byung-Jo			
김성욱	Kim, Suhng Wook			
김성은	Kim, Sung Eun			
김준선	Kim, June Sun			
김지환	Kim, Ji-Hwan			
김혜영	Kim, Hae-Young			
문경환	Moon, Kyung-Hwan			
박성철	Park, Sung Chul			
박재용	Park, Jae-Yong			
서문경애	Seomun, Gyeongae			
서형주	Seo, Hyung Ju			
설근희	Seol, Geun-Hee			
송준아	Song, Jun-Ah			
안준용	An, Joon Young			
원승현	Woen, Seung Hyun			

윤석준	Yoon, Seok-Jun			
이원호	Lee, Won Ho			
이주한	Lee, Ju-Han			
이준영	Lee, Jun-Young			
이준협	Lee, Jun-Hyeop			
장성옥	Jang, Sung-Ok			
정혜주	Chung, Hae Joo			
조금준	Jo, Kum-Joon			
천병철	Chun, Byung-Chul			
최만규	Choi, Man Kyu			
최윤형	Choi, Yoon-Hyeong			
최재욱	Choi, Jae-Wook			
최재윤	Choi, Jae Yun			
추진아	Chu, Jin-A			

3. Academic Advisors

1. The selection procedures and appointment process for academic advisors shall follow the regulations of the student's Home Department.
2. Students are encouraged to appoint one co-advisor from a participating department other than their Home Department.

4. Completion Requirements for the Transdisciplinary Major

(1) Students may complete the Transdisciplinary Major by selecting either the Additional Completion Track or the Major Change Track. The characteristics and credit requirements of each track are shown in the table below

Table 2. Completion Tracks for the Transdisciplinary Major

Category	Additional Completion Track	Major Change Track
Academic Status	Home department and home major retained	Home department retained; major changed to the Transdisciplinary Major
Credits Required	Credits required for the home major (24 credits for Master's, 30 credits for Doctoral, and 48 credits for Integrated Master's–Doctoral programs) plus additional credits required for the Transdisciplinary Major	Completion of the credits required for the Transdisciplinary Major (24 credits for Master's, 30 credits for Doctoral, and 48 credits for

	(12 credits for Master's, 15 credits for Doctoral, and 15 credits for Integrated Master's–Doctoral programs) Up to 6 credits may be double-counted toward both the home major and the Transdisciplinary Major	Integrated Master's–Doctoral programs) Credits earned prior to the major change may be recognized
Diploma	Conferred in accordance with Article 16 of the Graduate School Academic Regulations; degree title based on the home department	Conferred in accordance with Article 16 of the Graduate School Academic Regulations; degree title based on the Transdisciplinary Major
Academic Transcript	Both the home major and the Transdisciplinary Major are indicated	Only the Transdisciplinary Major is indicated

(2) In order to be recognized as having completed the transdisciplinary major, students in both the Additional Track and the Major Change Track must satisfy the credit acquisition requirements outlined in Table 3.

Table 3. Credit Requirements by Completion Track and Degree Program

Completion Track and Degree Program	Basic Common Courses	Common Major Courses	Specialized Major Courses	Total Credits
Additional Completion Track				
Master's Program	3	3	6	12
Doctoral Program	3	6	6	15
Integrated Master's–Doctoral Program	3	6	6	15
Major Change Track				
Master's Program	3	3	18	24
Doctoral Program	3	6	21	30
Integrated Master's–Doctoral Program	3	6	39	48

① Core Common Courses (기초공통과목)

Students affiliated with this transdisciplinary major must take <LHS501> Introduction to Community-Based Learning Health Systems and <LHS503> Basic Research Ethics. Additionally, students must select and complete at least one of the following courses: <LHS505> Academic Writing for Social Scientists OR <LHS507> Academic Writing for Scientists .

② Major Courses (전공과목)

Common Major Courses (공통전공과목)

- Master's Program Students: Must complete at least 1 course from the 4 major transdisciplinary educational areas, specifically selecting an area that does not include their academic advisor. *(Note: Students who entered before March 1, 2023, must select an area that does not include their original department's primary major field, in accordance with Appendix 1.)*
- Doctoral and Integrated Master's/Doctoral Program Students: Must complete at least 2 courses selected from two or more different areas among the 4 major transdisciplinary educational areas.
- Progressing from Master's to Doctoral Program: When a student enters the Doctoral program of this transdisciplinary major after obtaining their Master's degree from the same major, the Core Common courses completed during the Master's program will be excluded from the required credits. The student must fulfill the necessary transdisciplinary major graduation credits by taking Common Major and Detailed Major courses.
- Course Directory: Please refer to the attached 'Learning Health Systems Common Major Courses' list for subjects available in each area.
- Prior Credits: Common major courses completed prior to officially entering this transdisciplinary major will be recognized toward the transdisciplinary major credit requirements.

Detailed Major Courses (세부전공과목)

- Courses offered by the departments participating in this transdisciplinary major are defined as Detailed Major courses. For students in the Additional Track, up to 6 credits can be overlappingly recognized with their primary major.
- Please refer to the list of courses offered by participating departments for available Detailed Major subjects.

- Detailed Major credits can also be earned from courses in other departments, provided they are officially approved by the student's academic advisor.

5. Comprehensive Examination (종합시험)

1. Matters regarding the comprehensive examination shall comply with the internal bylaws of the student's original department.

6. Miscellaneous (기타)

1. Any matters not explicitly specified in these bylaws shall follow the Academic Regulations and Enforcement Rules of the Graduate School of Korea University.
2. Detailed matters not explicitly specified in these bylaws shall follow the internal bylaws of the student's original department and primary major.
3. Graduate students participating in the BK21 project must comply with the operational bylaws of the respective BK21 project group in addition to these bylaws.
4. The term "Academic Advisor" used in these bylaws includes co-advisors.

Addenda (부칙)

Addendum (September 1, 2020)

- (Effective Date): These bylaws shall take effect on September 1, 2020.
- (Transitional Measures): ① Students who entered a participating department prior to the official establishment date of the transdisciplinary major (September 1, 2020) will be recognized as having completed the major if they satisfy the following criteria:
 - A) Completion of <HEL514> Introduction to Transdisciplinary Research on Human Life-Social Environment Interaction OR the 3 Core Common courses specified in these bylaws.
 - B) Acquisition of all required credits specified for either the Additional Track or Major Change Track.
 - C) Completion of a thesis/dissertation in a research area that aligns with the objectives of this transdisciplinary major.

② Students who entered prior to March 1, 2021, must complete 36 credits for the Doctoral program and 54 credits for the Integrated program under the Major Change Track.

Addendum (March 1, 2021)

- (Effective Date): These revised bylaws shall take effect on March 1, 2021.
- (Transitional Measures):
 - ① (Regarding Major Completion): The provisions in Section 4 (Completion of Transdisciplinary Major), Clause ② regarding Common Major Courses (Item D) shall apply retroactively starting from students who entered the transdisciplinary major in the 2nd semester of the 2020 academic year.
 - ② (Regarding Comprehensive Examination): Regulations concerning Section 5 (Comprehensive Examination) shall apply retroactively starting from students who entered the transdisciplinary major in the 2nd semester of the 2020 academic year.
 - ③ (Regarding Completion Requirements): The provisions regarding completion requirements in Item ① of the previous Addendum (Transitional Measures) are categorized into separate "Completion Requirements" and "Degree Acquisition Requirements", and apply retroactively to students who entered a participating department prior to the establishment date of the transdisciplinary major:
 - A) Completion Requirements:
 - Completion of <HEL514> Introduction to Transdisciplinary Research on Human Life-Social Environment Interaction OR the 3 Core Common courses specified in these bylaws.
 - Acquisition of all required credits specified for either the Additional Track or Major Change Track.
 - B) Degree Acquisition Requirements:
 - Fulfillment of all completion requirements for the transdisciplinary major stated above.
 - Fulfillment of the comprehensive examination requirements according to the bylaws of the original department.
 - Completion of a thesis/dissertation in a research area that aligns with the objectives of this transdisciplinary major.

Addendum (March 1, 2022)

- (Effective Date): These revised bylaws shall take effect on March 1, 2022.

Addendum (September 1, 2023)

- (Effective Date): These revised bylaws shall take effect on September 1, 2023.

Addendum (March 1, 2025)

- (Effective Date): These revised bylaws shall take effect on March 1, 2025.

Courses Offered by Transdisciplinary Major in Learning Health Systems

Course Code(학수번호)	Course Title (English Verbatim / Korean)(과목명(영문))	Offering Department(개설학과)	Credits (Hours)(학점)
LHS501	Introduction to Community-Based Learning Health Systems (공동체 기반의 러닝헬스시스템 개론)	Transdisciplinary Major in Learning Health Systems (러닝헬스시스템융합전공)	1(1)
LHS503	Basic Research Ethics (연구윤리의 기초)	Transdisciplinary Major in Learning Health Systems (러닝헬스시스템융합전공)	1(1)
LHS505	Academic Writing for Social Scientists (사회과학 논문작성법)	Transdisciplinary Major in Learning Health Systems (러닝헬스시스템융합전공)	1(1)
LHS507	Academic Writing for Scientists (자연과학 논문작성법)	Transdisciplinary Major in Learning Health Systems (러닝헬스시스템융합전공)	1(1)

Must take <LHS501> Introduction to Community-Based Learning Health Systems and <LHS503> Basic Research Ethics.

Must select and complete at least one of the following courses: <LHS505> Academic Writing for Social Scientists OR <LHS507> Academic Writing for Scientists .

② Major Courses

Common Major Courses

1. Digital Health Data Sciences Area

(디지털헬스데이터 영역)

Course Code	Course Title (English Verbatim / Korean)	Offering Department	Credits (Hours)
-------------	--	---------------------	-----------------

HCS515	Introduction to Machine Learning (기계학습 개론)	Department of Healthcare Science	3(3)
HLT503	Introduction to Epidemiology (역학 개론)	Interdisciplinary Program in Public Health	3(3)
HLT628	Principles of Social Epidemiology (사회역학원론)	Interdisciplinary Program in Public Health	3(3)
HEL506	Biostatistics (보건통계학)	Department of Health Sciences	3(3)
BST655	Biostatistical Methodologies in Clinical Trials (임상시험 방법론)	Interdisciplinary Program in Medical Statistics	3(3)
HCS522	Cohort Analyses Using KoGES (KoGES 를 이용한 코호트 분석)	Department of Healthcare Science	1(1)
HCS519	Health Big Data Analysis (보건빅데이터분석)	Department of Healthcare Science	3(3)
HSL524	Monte Carlo Methods (몬테카를로 방법)	Department of Biomicrosystem Technology	3(3)
HSL822	Applied Digital Circuit (응용디지털회로)	Department of Biomicrosystem Technology	3(3)
HCS520	Healthcare Data Management Strategy (보건데이터관리전략)	Department of Healthcare Science	3(3)
HEL677	Advanced Healthcare Database (보건데이터베이스특론)	Department of Health Sciences	3(3)
HIL830	Advanced Genomics (고급유전체학)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL832	Advanced Biostatistics (고급생물통계학)	Department of Integrated Biomedical and Life	3(3)

		Sciences	
HEL856	Assessment of Research Papers in Digital Dental Industry (디지털 치과산업논문평가)	Department of Health Sciences	3(3)
HCS525	Mathematics for Machine learning (기계학습 보건의학)	Department of Healthcare Science	3(3)

2. Biomedical Healthcare Area

(바이오헬스케어 영역)

Course Code	Course Title (English Verbatim / Korean)	Offering Department	Credits (Hours)
HSL914	Special Topics in Biochemistry (생화학특론)	Department of Biomicrosystem Technology	3(3)
HSL913	Advanced Immunology (고급면역학)	Department of Biomicrosystem Technology	3(3)
HSL612	Special Topics in Hematology (혈액학특론)	Department of Biomicrosystem Technology	3(3)
HSL615	Molecular Diagnostics (분자진단학)	Department of Biomicrosystem Technology	3(3)
MED548	Introduction to Molecular and Cellular of Tumors (종양의 분자세포생물학입문)	Department of Medicine	3(3)
HIL560	Methodology of Genetic Engineering (유전공학방법론)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL637	Physical Chemistry of Food (식품물리화학)	Department of Integrated Biomedical and Life Sciences	3(3)

HIL649	Nutrition Biochemistry (영양생화학)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL827	Biology of Human-Microbe Interactions (휴먼-미생물상호작용학)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL883	Ion Channels (이온통로)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL899	Special Topics In Synthetic Biology (합성생물학특론)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL835	Advanced Cancer Biology (고급종양학)	Department of Integrated Biomedical and Life Sciences	3(3)
HEL593	Neuroscience (신경과학)	Department of Health Sciences	3(3)
HEL841	Movement Science (운동과학)	Department of Health Sciences	3(3)
NSG742	Advanced Basic Nursing Science (상급기초간호과학)	Department of Nursing	3(3)
HSL544	Principles of Environmental Risk Assessment (환경위해성평가방법)	Department of Biomicrosystem Technology	3(3)
HSL843	Toxicity and Risk Management (독성위해관리)	Department of Biomicrosystem Technology	3(3)
NSG823	Seminar on Basic Nursing Science (기초과학연구세미나)	Department of Nursing	3(3)
HSL712	Capstone Design2 (캡스톤디자인2)	Department of Biomicrosystem Technology	3(3)

HIL836	Cancer Metabolism (암대사학)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL837	Studies on Cell Death (세포사멸학)	Department of Integrated Biomedical and Life Sciences	3(3)
HIL838	Special Topics in Cancer Biology Research (종양학연구특론)	Department of Integrated Biomedical and Life Sciences	3(3)

3. Community Healthcare Area

(커뮤니티헬스케어 영역)

Course Code	Course Title (English Verbatim / Korean)	Offering Department	Credits (Hours)
NSG752	Seminar on Pain Research (통증연구세미나)	Department of Nursing	3(3)
NSG651	Seminar on Basic Needs Intervention (기본요구중재세미나)	Department of Nursing	3(3)
NSG811	Seminar on Health Related Issues in Older Adults (노인건강문제세미나)	Department of Nursing	3(3)
NSG815	Community Health Care System and Management (지역사회건강관리론)	Department of Nursing	3(3)
HLT773	Community Health and Global Health (지역보건과 국제보건)	Interdisciplinary Program in Public Health	3(3)
HLT772	Planning and Evaluation in Global Health (국제 보건 사업의 기획과 평가)	Interdisciplinary Program in Public Health	3(3)
HEL714	Methods for Community-Based Participatory Health Research(CBPR) (지역사회 참여적 연구방법론)	Department of Health Sciences	3(3)

HEL1637	Seminar in Health Communication (헬스커뮤니케이션세미나)	Department of Health Sciences	3(3)
HCS511	Urban Environment and Community (도시환경과 커뮤니티)	Department of Healthcare Science	3(3)
HCS510	Health Psychology (정신건강공중보건학)	Department of Healthcare Science	3(3)
HCS512	Biobehavioral Health (바이오-행동 보건학 연구)	Department of Healthcare Science	3(3)
HCS505	Implementation Science in Public Health (보건학 실행연구)	Department of Healthcare Science	3(3)
HSL881	Environmental Epidemiology (환경역학)	Department of Biomicrosystem Technology	3(3)
HSL882	Environmental Health Data Analysis (환경보건데이터분석)	Department of Biomicrosystem Technology	3(3)
HSL883	Living Lab-Based Environmental Database (리빙랩기반 환경데이터베이스)	Department of Biomicrosystem Technology	3(3)
HEL561	Health and Safety Design 1: Specialized Spaces and Health: Healthcare and Care Facility Design (보건안전디자인1: 특수공간과 건강(병원·요양시설 설계를 위한 보건학적 접근))	Department of Health Sciences	3(3)
HEL590	Health and Safety Design 2: Everyday Spaces and Health: Public Health Design for Daily Environments	Department of Health Sciences	3(3)

	(보건안전디자인2: 일상 속 건강(주거·학교·근린공간의 보건학적 재구성))		
--	---	--	--

4. Healthcare System Area

(헬스케어시스템 영역)

Course Code	Course Title (English Verbatim / Korean)	Offering Department	Credits (Hours)
MED512	Medical Ethics (의윤리학)	Department of Medicine	3(3)
HCS506	Health Justice (건강정의론)	Department of Healthcare Science	3(3)
HCS514	Smart Healthcare (스마트 헬스케어)	Department of Healthcare Science	3(3)
HCS509	Digital and Healthcare (디지털과 보건의료)	Department of Healthcare Science	3(3)
HCS502	Introduction to Healthcare (헬스케어개론)	Department of Healthcare Science	3(3)
HLT720	Comparative Study of Health Care System (비교의료제도론)	Interdisciplinary Program in Public Health	3(3)
HEL852	Early Childhood Development Research (조기아동기연구)	Department of Health Sciences	3(3)
HEL947	Methods for Health Equity Studies (건강형평성연구방법론)	Department of Health Sciences	3(3)
HEL931	Healthcare Microeconomics (미시의료경제학)	Department of Health Sciences	3(3)

HEL943	Welfare State, Social Policy and Health (복지국가, 사회정책, 건강)	Department of Health Sciences	3(3)
HEL1642	Seminar in Law and Public Health (법과보건세미나)	Department of Health Sciences	3(3)
MED582	Bio-Medical and Research Ethics (의윤리/및 연구윤리)	Department of Medicine	3(3)
HCS527	Healthcare Service Experience Design (헬스케어 서비스 경험디자인)	Department of Healthcare Science	1(1)
HCS523	Health Services Research: Theoretical and Empirical Approaches (보건서비스연구의 이론과 실증)	Department of Healthcare Science	3(3)
HCS524	Health Services Research: Methodology (보건서비스연구를 위한 연구방법론)	Department of Healthcare Science	3(3)

[Detailed Major Courses] <Deleted>

[Appendix 1] <Added>

Appendix 1. Classification of Detailed Majors by the Four Transdisciplinary Educational Areas

Participating Department	Detailed Major	Digital Health Data Sciences	Biomedical Healthcare	Community Healthcare	Healthcare Systems
Department of Nursing	Nursing Science			○	
Department of Health Policy and Management	Health Policy and Management				○
	Healthcare Administration			○	

	Dental Laboratory Science and Engineering	○			
Department of Health and Environmental Science	Radiation Science	○			
	Clinical Laboratory Science		○		
	Environmental Health Science		○		
	Environmental Health Management			○	
Interdisciplinary Program in Health Policy and Management	International Health				○
	Health Policy and Hospital Management				○
	Epidemiology and Health Informatics	○			
	Community Health and Social Medicine			○	
Department of Integrated Biomedical and Life Sciences	Life Science		○		

	Biomedical Science		○		
College of Medicine	Medicine		○		
Interdisciplinary Program in Medical Statistics	Medical Statistics	○			
	Digital Health Statistics	○			
Department of Healthcare Science	Healthcare Financial Policy				○
	Healthcare Industry				○