

ACADEMIC CATALOG

for Students Admitted in 2026



TAEJAE
UNIVERSITY

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I. Overview

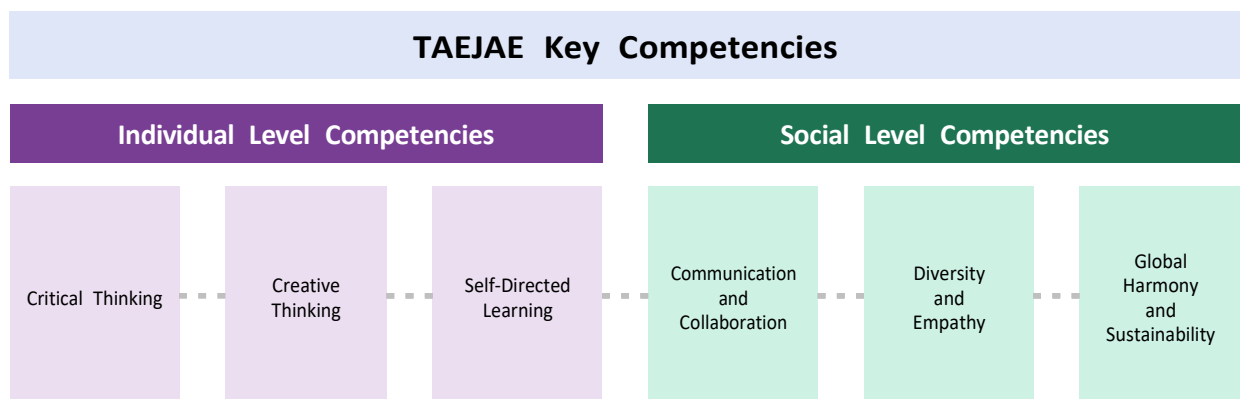
1. Preface

1.1. Vision & Mission

Vision	Taejae University is dedicated to cultivating self-directed, future-oriented, and internationally diverse talents to promote global harmony and sustainability.
Mission	Taejae University cultivates leaders to promote the harmony of mankind and digitally civilized society with its global education platform.

1.2. Curriculum Based on Taejae Key Competencies

The curriculum of Taejae is connected systematically and holistically to the development of Taejae's key competencies.



- ✓ **Critical Thinking**
Think critically and reason logically
- ✓ **Creative Thinking**
Think creatively to solve complex problems and make sound decisions
- ✓ **Self-Directed Learning**
Create self-directed learning goals and independent learning strategies
- ✓ **Communication and Collaboration**
Communicate clearly and collaborate effectively
- ✓ **Diversity and Empathy**
Use intercultural competence and empathy to promote social justice and shared prosperity
- ✓ **Global Harmony and Sustainability**
Apply scientific concepts to global sustainability challenge

2. Curriculum Requirements

2.1. Common Curriculum Requirements

Students must complete a total of **120 credits** for graduation, as outlined in the table below.

Important Note: Graduation eligibility is based on **the total credits earned**, not the number of courses completed. Since credit values may vary by course (e.g., 1, 2, or 4 credits), students must focus on fulfilling **the Minimum Required Credits for each category**.

Category	Requirement Type	Courses & Requirements	Credits	Remarks
Innovation Foundation	Required	Must complete 6 required courses in Innovation Foundation	24	
	Elective	Select elective courses in Innovation Foundation	8	
	Foreign Language (No Coursework, Certificate required)	3 Foreign Languages (Korean, Japan, Chinese, Russian)	3	Excluding Native Language
Subtotal (a)			35	
Major	Major Elective	Complete at least 28 credits in the your Major	28	
Subtotal (b)			28	
Field Practice	Required	Global Study and Engagement (GSE)	10	5 Countries
		Civic Project (CV)	10	5 Countries
Subtotal (c)			20	
Others*(General Electives)		- Students may select courses from any categories. - Double Major: 28 credits are counted in this category. - Minor: 16 elective credits are counted in this category.	37	
Subtotal (d)			37	
Capstone	Required (No Coursework)	Capstone Project		Proof of Completion Required
Total Credits (a) + (b) + (c) + (d)			120	

*Note: Includes transfer credits earned at partner universities and recognized MOOC credits.

*Note: One credit for a Computer Language is recognized upon the student's submission of a certificate.

2.2. MOOC Course Credit Recognition

To support students' global learning experiences and provide greater flexibility in academic planning, Taejae University recognizes MOOC courses offered through Coursera for academic credit. This policy enables students to take high-quality online courses from leading institutions worldwide, broaden their academic perspectives, and tailor their studies to align with personal interests and career goals.

In addition, students may earn up to 6 credits per semester and up to 12 credits in total during their entire program through approved Coursera courses. To receive academic credit and related benefits, students must apply for course recognition and submit their final results within the designated period. For detailed guidelines and application procedures, please refer to p.32.

2.3. Additional Degree Requirement: Capstone Project

In addition to the 120 credits specified in Section 2.1, all students must complete a Capstone Project as a mandatory requirement for the degree.

The Capstone Project is the culminating academic experience of undergraduate study, designed to integrate the knowledge and skills acquired throughout the major(s) and apply them to a meaningful, long-term project. Unlike a regular course, the project is carried out in a non-course format, allowing for more personalized and flexible faculty guidance.

Through the Capstone Project, students are expected to develop advanced research skills, creative problem-solving abilities, and practical application competencies. Project outcomes may include, but are not limited to, a research paper, policy analysis, prototype, or multimedia work. Completion of the Capstone Project is required in the final year of study. Successful completion will be officially recorded on the student's transcript and is a prerequisite for graduation. For detailed guidelines and application procedures, please refer to p.35.

II. Innovation Foundations

1. Educational Goals

Upon completion of our program, students should be able to develop those key competencies:

✓ **Critical Thinking**

Students are encouraged to think analytically and systematically, evaluating information and ideas from multiple perspectives to make informed decisions and solve complex problems.

✓ **Creative Thinking**

Students are given knowledge and skills that help them to produce new and useful solutions to difficult problems. They learn to use heuristics that strengthen their abilities to devise new ideas and select those that are most appropriate for a specific situation.

✓ **Communication and Collaboration**

We foster an environment that inspires students to explore new ideas, experiment with novel approaches, and embrace unconventional solutions, ultimately equipping them with the tools to drive groundbreaking change.

✓ **Cross-Cultural Skills**

As the world becomes increasingly interconnected, the ability to navigate and thrive in multicultural settings is crucial. Our programs emphasize the importance of understanding, respecting, and appreciating different cultures, perspectives, and values.

✓ **Self-Directed Learning**

In today's dynamic landscape, the ability to adapt, learn, and grow is essential. We support students in becoming lifelong learners, providing them with the tools to identify knowledge gaps and seek out resources that will enhance their personal and professional growth.

✓ **Sustainability**

Recognizing the critical role that sustainability plays in ensuring a prosperous future, we instill in our students a deep appreciation of the long-term impact of their decisions and the importance of developing innovative solutions that promote environmental, social, and economic well-being.

2. Course List

Course ID	Course Title	Classification	Credits	Credit Hours	
				Lecture	Field Work
IF101	Critical and Rational Thinking	Required	4	4	
IF113	Creative Problem Solving	Required	4	4	
IF103	Diversity, Empathy, and Global Citizenship	Required	4	4	
IF111	Empowered Learning	Required	4	4	
IF112	Rhetoric and Persuasion	Required	4	4	
IF106	Sustainability and Equity	Required	4	4	
IF114	Creativity Across Cultures	Elective	4	4	
IF108	Judgment and Decision Making	Elective	4	4	
IF109	Leadership and Collaboration	Elective	4	4	
IF110	Navigating Social Systems	Elective	4	4	
SL601	Second Language (Korean)	Elective	1	1	
SL602	Second Language (Japanese)	Elective	1	1	
SL603	Second Language (Chinese)	Elective	1	1	
SL604	Second Language (Russian)	Elective	1	1	
CL601	Computer language	Elective	1	1	

3. Course Description

IF101 I Critical and Rational Thinking

In this course, students learn best practices for thinking critically. Students develop intellectual virtues of thoughtfulness, reflection, and perceptiveness, and learn proven skills for detecting falsehoods and unsound arguments. Students also learn to weigh the credibility of various sources of information and to analyze and reflectively interpret their own judgments and intuitions. These traits, skills, and practices will help students be responsible citizens, perceptive thinkers, and virtuous leaders.

IF113 I Creative Problem Solving

This course addresses how to use creative thinking methods to solve problems. The course starts with a discussion of creativity and the process of thinking creatively to solve problems. Next, students learn various methods to spur novel and innovative ideas and select the most promising among these. Students will, week by week, apply the lessons learned to a semester-long project to demonstrate their understanding of the learning objectives.

IF103 I Diversity, Empathy, and Global Citizenship

This course helps students to develop the foundational knowledge and skills necessary to become leaders in a global society. Students develop cultural competence and empathy, which includes the ability to effectively interact, work, and solve problems with people of various cultural backgrounds. Students will identify the characteristics of global society and the challenges and opportunities created by an increasingly interdependent world with rapid digital transformation. They will recognize and respect diversity, identify and evaluate diverse perspectives on complex subjects, and analyze complex global issues while evaluating potential solutions.

IF111 I Empowered Learning

This course discusses the value and interrelation of curiosity, interests, and self-directed learning. We consider each of the components of this triad independently and then in combination as a part of the project of developing the highest and best version of the individual self. We begin by examining the role of curiosity and subsequently consider how to foster it. Then, we turn to identifying and developing interests through curiosity. Students will deeply analyze a variety of proven learning strategies that can be used to explore new interests. We will also explore the efficacy of AI as a self-directed learning tool. This course teaches the importance of lifelong growth and development of the individual.

IF112 I Rhetoric and Persuasion

This course offers an in-depth exploration into the mechanics of effective communication, both written and oral, with a strong emphasis on persuasive techniques. Students will engage in rigorous training to enhance their collaboration skills, learn to construct compelling arguments, and become adept at listening and responding to diverse perspectives. Students will critically analyze and respond to messages across various contexts, craft well-researched, logical, and persuasive arguments in both written and spoken formats, and develop active listening and oral communication skills to better understand and engage with opposing viewpoints.

IF106 I Sustainability and Equity

This course helps students learn how to apply scientific concepts to global sustainability challenges. Students are introduced to the idea of sustainability and apply their understanding by examining and evaluating the United Nations' Sustainable Development Goals. Over the course of the semester, students delve into each of the areas outlined by the UN's SDGs. In doing so, they utilize ideas from many scientific, social science, and liberal arts fields including biology, chemistry, ecology, environmental science, technology, engineering, social sciences, and the humanities. They apply theories from each of these domains to analyze the UN's sustainability efforts and cultivate their own novel approaches.

IF114 I Creativity Across Cultures

This course explores how ideas are communicated creatively across cultures through multimodal texts, including literature, art, film, and interactive media. Students critically analyze these works to understand meaning, identity, and the relationship between creators and audiences. They also develop their own creative and critical communication skills by producing written and non-written works that express their perspectives on cultural, social, and environmental issues while reflecting on their own identities.

IF108 I Judgment and Decision Making

This course analyzes major approaches to judgment and decision-making. The course starts with a discussion of basic distinctions among the major approaches, and then considers how judgments and decisions might be flawed due to common cognitive biases. Next, the course explores how human beings make choices using real-world case examples. Finally, the course concludes with an evaluation of moral judgment and decision-making, and an analysis of the importance of understanding judgment and decision-making for our lives. Throughout the course, students apply theoretical concepts to real world situations during active learning exercises.

IF109 I Leadership and Collaboration

In today's increasingly interconnected and globalized world, effective leadership and collaboration skills are not just desirable, but essential. This course helps students to analyze the multifaceted nature of leadership and the dynamics of collaborative environments. Students learn to analyze, compare and contrast various theories of leadership, and they characterize what it means to be a leader in diverse and multicultural settings. The course invites students to consider the role of emotional intelligence and growth mindset in both leadership and collaboration. Beyond leadership skills, students also learn how to be effective team members. Students will learn strategies and techniques that amplify their effectiveness both as leaders and as invaluable team members. Students will be equipped with the knowledge and tools to work cross-culturally, foster inclusivity, and leverage diversity, ensuring not only productive collaborations but also innovative outcomes.

IF110 I Navigating Social Systems

This course helps students identify, analyze, and engage with the social systems and structures at play in the world. They learn important concepts from sociology and social psychology, and then apply those to the global community. They learn about the roles that people play within these systems and the ways that individuals from differing systems can relate through shared values. Students learn about their own roles within these systems, and how their identities may be affected by them. Students use empathy to recognize how these systems affect those with different social roles or in different social structures. Finally, they investigate challenges that arise within social structures and learn to develop and apply solutions for addressing and mitigating those challenges.

SL601 I SL602 I SL603 I SL604 I Second Language

For the 2023–2025 cohorts, **students must obtain certification in two second languages**, excluding both their native language and English, from the four languages listed below as a graduation requirement.

Taejae University offers language support programs to help students develop proficiency. However, students are responsible for registering for and passing an approved external language proficiency examination. Upon submission of a recognized certificate, students will be awarded 1 credit for the corresponding language. **To receive credit, students must register for the corresponding certification course and submit the certificate during the same semester.**

Course ID	Language	Certification Exam	Minimum Level
SL601	Korean	TOPIK	TOPIK I Level 2
SL602	Japanese	JLPT	N5
SL603	Chinese	HSK / HSKK	Level 2 / Beginner
SL604	Russian	TORFL	Elementary (A1)

CL601 I Computer Language

Students may take courses in various computer languages as part of their academic program. The table below lists examples of eligible programming languages offered and recognized certifications that can be pursued. These certifications are not required for graduation, but may provide valuable opportunities to strengthen technical skills, enhance employability. **To receive credit, students must register for the corresponding certification course and submit the certificate during the same semester.** Upon submission and verification of a recognized certification, students will be awarded 1 general elective credit.

Eligible Languages	Python, JavaScript, R, JAVA, HTML, CSS, C, C++, C#, PHP, Kotlin, Swift, etc.
Recognized Certifications	• [Python Institute] PCEP, PCAP, PCPP1, PCPP2, PCAT, PCAD • AWS Certified Developer Associate • AWS Certified Solutions Architect–Associate • azure, GCP • C and C++ Certifications • Oracle Certified Associate Java Programmer OCAJP • R Programming Certification • CCA Spark and Hadoop Developer • Oracle MySQL Database Administration (CMDDBA)

III. The Majors

1. Humanities & Social Sciences

1.1. Educational Goals

Upon completion of our program, students should be able to:

- ✓ Develop their own critical perspectives and understanding of human beings and society.
- ✓ Think creatively about key concepts and theories in their chosen areas of interest and use this knowledge to solve real-world problems in innovative ways.
- ✓ Improve their communication and collaborative skills through open discussion and respect and empathy for others.
- ✓ Gain a greater awareness of diversity, empathy, and sustainability and be able to positively impact domestic and global affairs based on these values.
- ✓ Discover their vocational interests and career options through practical experience gained from capstone courses.

1.2. Course List

Course ID	Course Title	Classification	Credits	Credit Hours		Notes
				Lecture	Field Work	
HS200	Perspectives on Humans and Society	Major Elective	4	4		
HS211	Global History I	Major Elective	4	4		
HS212	Global Narratives	Major Elective	4	4		
HS221	Domestic and International Politics	Major Elective	4	4		
HS311	Global History II	Major Elective	4	4		
HS312	Literary and Cultural Connections	Major Elective	4	4		
HS313	Creative Digital Humanities	Major Elective	4	4		
HS314	Global Philosophy	Major Elective	4	4		

Course ID	Course Title	Classification	Credits	Credit Hours		Status
				Lecture	Field Work	
HS321	Domestic Problems and Social Changes	Major Elective	4	4		
HS322	Global Challenges and Governance	Major Elective	4	4		
HS411	Humanities Special Seminar I	Major Elective	4	4		
HS412	Humanities Special Seminar II	Major Elective	4	4		
HS421	Social Science Special Seminar I	Major Elective	4	4		
HS422	Social Science Special Seminar II	Major Elective	4	4		
*XD201	Technopreneurship and Innovation	Major Elective	4	4		
*XD401	Navigating Tomorrow: Emerging Technologies and Future Society	Major Elective	4	4		

***Note:** XD201, XD401 may be recognized either as courses offered by the program that provides the course or as major courses within the Program of Humanities and Social Sciences. Note that each course can only be counted once for graduation credit purposes, and students must choose which program's credits they would like the course to count toward.

1.3. Course Description

HS200 | Perspectives on Humans and Society

This interdisciplinary course explores multifaceted intellectual perspectives on humans and society, integrating insights from philosophy, literature, the arts, and social sciences. The first part of the course delves into essential aspects of “being human,” exploring various themes such as human nature, consciousness, sensibilities, and normativity. The second part focuses on fundamental questions and concepts regarding society, such as freedom, justice, equity, and democracy. Throughout the course, students will engage in critical discussions, debating the strengths and weaknesses of various ideas and weaving connections between them. They will also analyze narratives that bring these ideas to life. Our goal is not only to understand ourselves and society but also to develop the ability to articulate and explain our understanding of them. By the course's conclusion, students will have built a solid interdisciplinary foundation and acquired intellectual tools to further explore and understand complex themes and topics in the humanities and social sciences.

HS211 | Global History I

Global History has emerged as one of the most dynamic approaches to the study of history, offering a powerful framework for understanding how societies have been shaped by complex cultural, political, intellectual, and commercial entanglements. This course examines how long before the rise of Western colonialism societies across the world became deeply interconnected through trade, migration, empire, and intellectual exchange. Moving beyond conventional Eurocentric narratives, Global History serves as a lens to explore how historical actors forged, contested, and reshaped their relationships across vast distances, often in ways that challenge modern assumptions about globalisation and progress. Through this approach, students will develop a strong foundation in premodern global history while also cultivating the essential research and analytical skills to critically assess historical narratives and the complexities of cross-cultural encounters. By the end of this course, students will not only engage with the richness and diversity of the human past but also reflect on how the study of the past can help us navigate today's global challenges.

HS212 | Global Narratives

The stories cultures tell are windows to their societies and lives. Global Narratives explores the diverse tapestry of human stories from around the globe. The course will engage with various forms of narratives, including historical and cultural texts, literature, film, art, digital media, and games. Students will analyze and compare these narratives to investigate global themes like heroism, morality, and nationalism. Through close readings, group discussions, collaborative projects, and creative assignments, students will cultivate a profound appreciation for the diversity of human experiences while developing essential skills in cross-cultural communication, intercultural empathy, critical thinking, and creativity.

HS221 | Domestic and International Politics

This seminar explores the key concepts and topics in domestic and international politics. The course is divided into three parts, each focusing on a specific aspect of politics. In the first part, students examine various political regimes and their determinants from a comparative perspective. The second part focuses on the roles and functions of political institutions and actors in the context of a democratic system. In the third and final part, students investigate the characteristics and essential mechanisms of international politics.

HS311 | Global History II

Working with the insights of global historians like Sebastian Conrad and Sanjay Subrahmanyam, this course moves beyond 1500 and asks how interconnectedness can be understood not only through trade routes, intellectual networks, and imperial structures connections forged during the classical, late antique, and medieval periods but also through the deepening of global entanglements shaped by new structures of power, knowledge, and social transformation that shaped “the modern world”. Across five interlinked units, the course explores how conquest, classification, commerce, and cosmology intersected across the globe to reshape political and intellectual life and examines how competing visions of modernity emerged across Europe, Asia, Africa, and the Americas. The course foregrounds entangled transformations, contested claims, and uneven exchanges that defined the making and unmaking of the modern world. By the end of this course, students will not only have investigated the conditions that gave rise to global modernity by critically analysing primary sources and engaging with global historiographical debates but will also have critically engaged in sustained interrogation of what modernity means, where it came from, whose interests it served and how its legacies continue to shape our present world. In doing so, students will also be better equipped to engage with contemporary challenges of global harmony, sustainability, and cultural diversity, understanding how historical entanglements continue to inform the inequalities, solidarities, and responsibilities of the present.

HS312 | Literary and Cultural Connections

Literature's role as a cultural institution, influencing individual identity and values, will be emphasized in this course. It expands on Global Narratives by exploring diverse literatures, analyzing forms of expression, comparing themes, and considering the influence of genres across cultural traditions. Students gain insights into universal human experiences and cultural interpretations by exploring works from diverse regions and traditions. The course also examines major theoretical statements in literary theory and criticism from various disciplines that illuminate the relationship between form and meaning in literature, exploring how ideas are portrayed and questioned. By the end, students develop a comprehensive view of contemporary approaches to literature, understanding world literature's cultural significance and its relationship to various expressions. Analytical and critical thinking skills are honed through cultural diversity and interdisciplinary analysis. Works selected by the instructor can encompass traditions from Africa, Asia, the Caribbean, Europe, North and South America, and other regions.

HS313 | Creative Digital Humanities

Creative expression using new technologies is an important tool for the future. In this course, students will learn the basic applications of digital humanities and how they can be used to conduct research and creatively express ideas. New techniques for applying programming and other skills developed at Taejae will be further explored. These skills will be combined with artistic elements ranging from creative writing to design and more. For example, students may put narrative theories into practice, refining their storytelling skills and experimenting with different narrative approaches, including digital formats. Students will design their own projects in collaboration with the instructor, drawing on multiple techniques learned during the course. Equipped with these abilities, students will be prepared to embark on their own content creation journeys, whether as aspiring writers, traditional and new media creators, game designers, journalists, or researchers who can creatively captivate and inspire.

HS314 | Global Philosophy

This seminar explores diverse philosophical traditions and perspectives from around the world, transcending the confines of Western European thought. The course invites students on a profound intellectual journey, delving into the profound insights, debates, and wisdom of philosophers from various cultural backgrounds. Through critical analysis and thought-provoking discussions, participants will appreciate the profound contributions of various philosophers and gain valuable insights into the universal themes that connect humanity's quest for knowledge, meaning, and moral guidance.

HS321 | Domestic Problems and Social Changes

This course explores the intersection of public policy and social change within a domestic context. In the first part of the course, students examine the role of government and various stakeholders in addressing complex social issues and problems. In the second part, students learn and practice how to develop, implement, and assess public policy solutions to domestic social challenges with case studies and interactive discussions. Upon the completion of this course, students will be equipped with a solid understanding of how public policy can drive social transformation and innovation, as well as the skills necessary to foster an inclusive and sustainable society.

HS322 | Global Challenges and Governance

In this seminar, students will explore the complex issues facing our interconnected world and examine the mechanisms of governance designed to address these challenges. Through a multidisciplinary approach, students will analyze pressing global problems such as climate change, poverty, inequality, terrorism, conflict, and human rights. They will gain insights into the roles of international organizations, governments, NGOs, and civil society in promoting global cooperation and sustainable development. By examining case studies and engaging in discussions, students will develop a critical understanding of the dynamics of global governance and acquire the skills necessary to contribute to addressing global challenges effectively.

HS411 | Humanities Special Seminar I

HS412 | Humanities Special Seminar II

This seminar offers a dynamic platform within the School of Humanities and Social Sciences, presenting specialized electives beyond standard coursework. This seminar series responds adeptly to the evolving demands of our students and the expertise of our faculty. Updated annually, the curriculum explores a diverse range of advanced topics tailored to foster critical thinking and interdisciplinary engagement. From cultural studies to literary analysis, philosophical inquiries to historical perspectives, this seminar cultivates a vibrant intellectual community where students delve deeply into nuanced subjects. Through interactive discussions, research projects, and collaborative endeavors, participants refine their analytical skills and broaden their understanding of the human experience.

HS421 | Social Science Special Seminar I**HS422 | Social Science Special Seminar II**

This seminar offers a dynamic platform within the School of Humanities and Social Sciences, presenting specialized electives beyond standard coursework in Social Sciences. Responding to the evolving needs of our students and the expertise of our faculty, the theme of the seminar is updated annually. Through interactive discussions, research initiatives, and collaborative projects, participants refine their analytical skills and deepen their understanding of societal dynamics and human behavior.

XD201 | Technopreneurship and Innovation

Offered in conjunction with the School of Business Innovation, School of Natural Sciences, School of Data Science and Artificial Intelligence at Taejae University, and the University of San Francisco (USF), this course explores how scientific knowledge drives technological innovation and entrepreneurship. Students learn to transform scientific ideas into viable ventures by developing entrepreneurial, analytical, and innovation skills while examining emerging technologies, business applications, and the broader innovation ecosystem. Through discussions, case studies, group projects, presentations, guest lectures, and a final venture pitch with Silicon Valley technology experts and venture partners, students gain practical experience in designing and evaluating technology-based ventures.

XD401 | Navigating Tomorrow: Emerging Technologies and Future Society

This course is a cross-disciplinary seminar on emerging technologies and their social implications. It begins by looking backward, asking how past technological revolutions reshaped human history and reordered society. It then turns to the frontiers of technology today and in the near future, examining how these developments may transform human society and its possible futures. Using case studies, debates, and future scenario exercises, students connect technological possibilities with ethical dilemmas, social benefits, and long-term risks. By the end of the course, students will be able to analyze emerging technologies as forces that both reflect and remake society, and to develop creative, critical, and collaborative approaches to navigating technological change in pursuit of more humane, inclusive, and sustainable futures.

2. Natural Sciences

2.1. Educational Goals

Upon completion of our program, students should be able to:

- ✓ Develop problem-solving skills, simulation techniques, effective communication, and a strong foundation in theoretical knowledge for real-world applications.
- ✓ Acquire interdisciplinary knowledge and critical thinking methods to tackle complex challenges in modern and future society.
- ✓ Foster global engagement and cultural awareness by understanding global issues and designing solutions with scientific approaches.
- ✓ Encourage self-directed learning and self-tailored projects to support students' unique interests and career goals.

2.2. Course List

Course ID	Course Title	Classification	Credits	Credit Hours		Status
				Lecture	Field Work	
NS200	Physics in the Modern Society	Major Elective	4	4		
NS202	Chemical Principles	Major Elective	4	4		
NS221	Life Science	Major Elective	4	4		
NS311	Energy Transformation and Rates	Major Elective	4	4		
NS312	Electronics and Optics for Future Solutions	Major Elective	4	4		
NS322	Genetics and Biotechnology	Major Elective	4	4		
NS331	Integrated Earth Systems and Dynamics	Major Elective	4	4		
NS332	Ecology and Environmental Sustainability	Major Elective	4	4		
NS411	Quantum and Nano Frontiers for Net Zero	Major Elective	4	4		
NS421	Molecular Processes in Living systems	Major Elective	4	4		
NS422	Neuroimmune System	Major Elective	4	4		

Course ID	Course Title	Classification	Credits	Credit Hours		Status
				Lecture	Field Work	
*XD201	Technopreneurship and Innovation	Major Elective	4	4		
*XD221	Quantitative Modeling in the Sciences	Major Elective	4	4		
*XD222	History and Ethics of Sciences	Major Elective	4	4		
*XD231	Experimental Design and Statistics	Major Elective	4	4		
*XD321	Data-Driven Discovery Across the Sciences	Major Elective	4	4		
*XD401	Navigating Tomorrow: Emerging Technologies and Future Society	Major Elective	4	4		
*XD421	Strategies for Environmental and Urban Challenge	Major Elective	4	4		
*XD422	Science Communication & Public Engagement	Major Elective	4	4		

***Note:** XD201, XD221, XD222, XD231, XD321, XD401, XD421, XD422 may be recognized either as courses offered by the program that provides the course or as major courses within the Program of Natural Sciences. Note that each course can only be counted once for graduation credit purposes, and students must choose which program's credits they would like the course to count toward.

2.3. Course Description

NS200 | Physics in the Modern Society

Physics for Modern Society is a comprehensive course designed to introduce students to the fundamental principles of physics and their applications in the context of our rapidly advancing modern society. Through a combination of theoretical exploration and hands-on simulations with programming, this course aims to provide students with a solid understanding of the underlying concepts of physics and how they are relevant to various aspects of our daily lives. Topics covered include classical physics, energy, thermodynamics, quantum mechanics, relativity, and modern technologies. By the end of the course, students will have developed critical thinking skills and the ability to apply physics knowledge to real-world scenarios, preparing them for future academic and professional pursuits in related fields.

NS202 | Chemical Principles

Chemical Principles is an engaging and interactive course designed for students seeking a deep understanding of the molecular and atomic interactions governing the behavior of matter in our world. This course includes fundamental chemistry topics of the structures of matters and their changes to explore the intricate connections between chemistry, physics, earth science, and biology. Through designing experiments, virtual simulations, and collaborative problem-solving, students will develop a strong foundation in mechanistic chemical explanations and their applications in advanced scientific disciplines.

NS221 | Life Science

Life Science is a comprehensive course that provides students with a solid foundation in biology and its applications in modern society. Through theoretical knowledge, practical applications, creating simulations, and collaborative projects students will explore topics such as cellular structure, genetics, evolution, and ecological interactions. They will develop critical thinking skills, scientific inquiry methods, and an understanding of how biological knowledge is applied in medicine, biotechnology, agriculture, and environmental conservation. This course aims to foster a deep appreciation for the complexity of life while highlighting its relevance to human existence, equipping students with the skills to analyse biological phenomena and apply their understanding to real-world scenarios.

NS311 | Energy Transformation and Rates

This course delves into the fundamental principles of energy, motion, and chemical reactions. Through a combination of theoretical knowledge, practical applications, virtual labs, and simulations, students will explore the interdisciplinary nature of this course, integrating concepts from physics, chemistry, and biology. Topics covered include the laws of thermodynamics, energy transformations, chemical equilibrium, reaction rates, catalysis, and the factors influencing chemical reactions. By studying the behaviour of matter and the rates at which reactions occur, students will gain a comprehensive understanding of the fundamental principles that govern chemical systems. This course prepares students for further studies in physics, chemistry, biology, earth science and other related fields while also providing them with a solid foundation to comprehend and analyse the dynamic processes of nature.

NS312 | Electronics and Optics for Future Solutions

This course delves into the principles and applications of electronics and optics while emphasising their role in providing solutions for current and future challenges. Students will explore from fundamental theory to the cutting-edge scientific knowledge in these fields and learn how to apply it to tackle real-world problems, addressing issues such as communication, energy, healthcare, and beyond. Through system design, team projects, and critical thinking exercises, students will develop the skills and mindset necessary to contribute to innovative solutions using electronics, optics, and future-oriented approaches.

NS322 | Genetics and Biotechnology

This course introduces core genetic principles—from classical Mendelian inheritance to molecular genetics and contemporary biotechnology—with an emphasis on problem-solving and real-world applications. Students engage through lectures, collaborative learning, virtual labs, and case-based projects/presentations.

NS331 | Integrated Earth Systems and Dynamics

This course explores the intricate connections and interactions within Earth's systems and their influence on the environment. Through a multidisciplinary approach, students will gain a comprehensive understanding of Earth's physical processes, including geology, meteorology, hydrology, and biogeochemistry, as well as the complex interplay between these systems. By studying the Earth as a dynamic and integrated system, students will analyse environmental issues, such as climate change, land degradation, and natural resource management, and explore sustainable solutions for a resilient future. This course combines theoretical knowledge with virtual labs, and simulations to emphasise a system-based approach to understanding Earth's dynamics and addressing environmental challenges.

NS332 | Ecology and Environmental Sustainability

This course offers a comprehensive exploration of the intricate web of interactions among organisms and their environments. Through an interdisciplinary approach, students will investigate the principles and processes that shape ecological systems at various levels, including individuals, populations, communities, and ecosystems. By studying topics such as population dynamics, community structure, species interactions, and nutrient cycling, students will gain a deep understanding of how organisms adapt to their environments, how ecosystems function, and the impact of human activities on ecological systems. Through data analysis and critical thinking exercises, students will develop the skills to assess and address environmental challenges, fostering a deeper appreciation for the delicate balance of life on Earth. This course provides a solid foundation for further studies in ecology, environmental sciences, and related fields, and equips students with the knowledge and tools to contribute to the sustainable management and conservation of our planet's natural resources.

NS411 | Quantum and Nano Frontiers for Net Zero

This advanced elective introduces key concepts in quantum physics and nanoscience and connects them to technology pathways for net zero (clean energy generation, storage, conversion, and carbon management). Students examine how quantum/nano principles enable next-generation materials, devices, and measurement tools, and how these innovations translate into system-level decarbonization impact through case studies and design-oriented discussions.

NS421 | Molecular Processes in Living Systems

Molecular Processes in Living Systems investigate the intricate mechanisms governing molecular interactions within biological systems. Through a comprehensive exploration of biochemistry and molecular biology, students will gain a deep understanding of the fundamental processes that drive life, from the structure and function of biomolecules to the intricate pathways involved in cellular metabolism, gene expression, and signal transduction. By examining the dynamic interplay between DNA, RNA, proteins, and other essential biomolecules, students will develop a strong foundation in understanding the molecular underpinnings of life, equipping them with the knowledge to unravel the complexities of living systems and pursue further studies in the fields of biochemistry, molecular biology, and related disciplines.

NS422 | Neuroimmune System

The neuroimmune system emphasizes the bidirectional communication between the nervous system and the immune system often through hormones and cytokine signaling. Psychoneuroimmunology (PNI) is an interdisciplinary field studying the interactions between the immune system, the nervous system, and psychological effects. Topics of research to be presented in this course include mental health, chronic inflammation, and sleep disorders. Information in this course is designed for students to dive into the immune system, nervous system, and their interactions with an emphasis on the effects in the brain that can manifest when these systems are dysregulated. This course does not substitute professional medical or psychiatric advice and is not to be taken as personal medical suggestions.

XD201 | Technopreneurship and Innovation

Offered in conjunction with the School of Business Innovation, School of Natural Sciences, School of Data Science and Artificial Intelligence at Taejæ University, and the University of San Francisco (USF), this course explores how scientific knowledge drives technological innovation and entrepreneurship. Students learn to transform scientific ideas into viable ventures by developing entrepreneurial, analytical, and innovation skills while examining emerging technologies, business applications, and the broader innovation ecosystem. Through discussions, case studies, group projects, presentations, guest lectures, and a final venture pitch with Silicon Valley technology experts and venture partners, students gain practical experience in designing and evaluating technology-based ventures.

XD221 | Quantitative Modeling in the Sciences

An interdisciplinary mathematics course that develops quantitative reasoning through core “principles of reasoning” (e.g., decomposition, compositionality, transformation, dimensional reduction, finite approximation). Topics span precalculus, discrete math, linear algebra, and introductory calculus, with applications to modeling in AI, and the social and natural sciences.

XD222 | History and Ethics of Sciences

This course traces landmark scientific developments from antiquity to the present and examines their ethical, legal, and social implications. Students learn to understand science as a dynamic enterprise shaped by cultural values, political agendas, economic forces, and planetary constraints. Learning activities emphasize flipped-class materials, archival simulations, and structured debates to build STS literacy and ethical reasoning for responsible scientific citizenship.

XD231 | Experimental Design and Statistics

This course provides a hands-on introduction to experimental design and statistical analysis involving data science and AI. Students will learn to formulate research questions, design experiments, and apply statistical techniques to analyze data in both human-subject and AI-focused experiments. Core topics include data sampling, variable measurement, hypothesis testing, and inferential statistics, with coverage of methods such as t-tests, ANOVA, and regression analysis. The course also explores ethical considerations for human-participant experiments and practical guidance on designing and evaluating AI services and interfaces. Throughout the course, students will work collaboratively on a semester-long project, crafting a comprehensive research proposal that includes a well-defined research goal, literature review, hypothesis, experimental design, and statistical analysis plan. By the end of the course, students internalize skills to produce research proposals that meet rigorous academic standards, positioning them to conduct impactful research in AI and data science.

XD321 | Data-Driven Discovery Across the Sciences

This advanced project-based course enables students to investigate scientific questions using real-world data and computational methods across domains such as biology, chemistry, physics, and Earth science. Students work individually or in small teams to complete a semester-long project, producing outputs such as a research report, prototype, or interactive dashboard, with feedback from lectures, seminars, and critique sessions.

XD401 | Navigating Tomorrow: Emerging Technologies and Future Society

This course is a cross-disciplinary seminar on emerging technologies and their social implications. It begins by looking backward, asking how past technological revolutions reshaped human history and reordered society. It then turns to the frontiers of technology today and in the near future, examining how these developments may transform human society and its possible futures. Using case studies, debates, and future-scenario exercises, students connect technological possibilities with ethical dilemmas, social benefits, and long-term risks. By the end of the course, students will be able to analyze emerging technologies as forces that both reflect and remake society, and to develop creative, critical, and collaborative approaches to navigating technological change in pursuit of more humane, inclusive, and sustainable futures.

XD421 | Strategies for Environmental and Urban Challenge

This advanced project-based course addresses real-world sustainability problems in environmental and urban systems through a science- and technology-driven lens. Students develop research-based solutions for challenges such as climate resilience, smart-city innovation, and sustainable infrastructure, integrating systems thinking with ethical and policy awareness. Final outputs may include a prototype, design proposal, research paper, or public-facing tool.

XD422 | Science Communication and Public Engagement

This course develops practical skills for communicating scientific ideas clearly, responsibly, and persuasively to non-specialist audiences. Students explore how the public engages with science through media, culture, policy, and lived experience, and learn strategies for dialogue-based engagement rather than one-way “science dissemination.” The course emphasizes real-world contexts such as climate, health, energy, and emerging technologies, with attention to trust, uncertainty, and misinformation.

3. Data Science and Artificial Intelligence

3.1. Educational Goals

Upon completion of our program, students should be able to:

- ✓ Develop advanced technical expertise essential for designing and realizing technology-empowered future societies while maintaining a refined, user-centric approach.
- ✓ Attain comprehensive theoretical knowledge and thorough understanding of the principles of data science and artificial intelligence.
- ✓ Enhance core competencies and practical skills in computing technology through hands-on projects linked to on-site learning and civic projects across five global campuses. Outcomes of these experiences culminate in an all-encompassing capstone project upon graduation.
- ✓ Cultivate critical, creative, and convergent thinking abilities to identify and tackle intricate and complex challenges in both society and industry and devise practical solutions by applying creative design thinking approach.

3.2. Course List

Course ID	Course Title	Classification	Credits	Credit Hours		Status
				Lecture	Field Work	
DA200	Design of AI and Data-driven Services	Major Elective	4	4		
DA201	Computational Thinking and Data Literacy	Major Elective	4	4		
DA204	Exploring Data Ecosystems	Major Elective	4	4		
DA311	Computational Decision Science	Major Elective	4	4		
DA321	Data Analytics and Visualization	Major Elective	4	4		
DA322	Predictive Analytics and Modeling in Practice	Major Elective	4	4		
DA332	Vision AI for Detection and Generation of Visual Information	Major Elective	4	4		
DA333	Practical Applications of Machine Learning	Major Elective	4	4		
DA411	Computational Mathematics for Diverse Applications	Major Elective	4	4		
DA431	Next Generation AI: Linguistic, Multi-modal, Agentic, and Beyond	Major Elective	4	4		

Course ID	Course Title	Classification	Credits	Credit Hours		Status
				Lecture	Field Work	
DA432	AI in the Real World: Use Cases in Society and Business	Major Elective	4	4		
DA433	Affective Computing and Human-Robot Interaction	Major Elective	4	4		
DA434	Embodied Intelligence: AI in Physical Systems	Major Elective	4	4		
*XD201	Technopreneurship and Innovation	Major Elective	4	4		
*XD221	Quantitative Thinking in the Sciences	Major Elective	4	4		
*XD231	Experimental Design and Statistics	Major Elective	4	4		
*XD232	Applicable Psychology for Human-Centered AI and Design	Major Elective	4	4		
*XD321	Data-Driven Discovery Across the Sciences	Major Elective	4	4		
*XD401	Navigating Tomorrow: Emerging Technologies and Future Society	Major Elective	4	4		
*XD421	Strategies for Environmental and Urban Challenge	Major Elective	4	4		

*Note: XD201, XD221, XD231, XD232, XD321, XD41, XD421 may be recognized either as courses offered by the school that provides the course or as major courses within the Program of Data Science and Artificial Intelligence. Note that each course can only be counted once for graduation credit purposes, and students must choose which program's credits they would like the course to count toward.

3.3. Course Description

DA200 | Design of AI and Data-driven Services

A fully flipped, project-based course in which students learn to design human-centered service systems grounded in data science and AI. Through curated pre-class self-study and collaborative in-class workshops (no lectures), students build foundational skills across data science, AI, and human-centered design—examining the history and implications of data/AI, applying design thinking, and conducting user research to create personas and journey maps. They then translate concepts into tangible experiences through service blueprinting, information architecture, interaction and visual design, and iteratively develop, prototype, and evaluate intelligent services spanning front-end UX and back-end data modeling, analytics, visualization, and machine learning. Emphasizing teamwork, critique, and reflective learning throughout, the course culminates in final project presentations that demonstrate collaborative innovation and real-world application.

DA201 | Computational Thinking and Data Literacy

An active-learning course covering the core of a standard Data Structures and Algorithms curriculum through four connected units. Students first build computational thinking fundamentals (decomposition, pattern recognition, abstraction, algorithms), then explore data journalism to critique data sources, craft narratives, and visualize social issues. The course then covers essential data structures and algorithms—arrays, linked lists, stacks, queues, trees, and graphs—before culminating in student-led projects that apply these skills to social and scientific problems. Through collaborative hands-on work, discussions, and peer-led presentations, students develop the critical thinking, teamwork, and iterative problem-solving needed to confidently tackle data-driven challenges.

DA204 | Exploring Data Ecosystems

This course is a foundational course that immerses students in the dynamic world of data management and analysis, equipping them with essential skills for aspiring data professionals. Through a combination of engaging lectures and practical projects, students will learn the essentials of data modeling, database design, and SQL, while exploring the evolving landscape of the data industry. The curriculum encompasses crucial topics including database management systems, data governance, and cutting-edge database technologies, offering a comprehensive understanding of data's role in shaping our digital ecosystem. Upon completion, students will have developed their own database models, crafted complex SQL queries, and tackled real-world data challenges, preparing them for advanced studies and careers in data science, analytics, and related domains. This course seamlessly integrates theoretical concepts with hands-on applications, serving as the ideal launchpad for those eager to harness the power of data in our interconnected digital world.

DA311 | Computational Decision Science

A junior-level course on the mathematical and computational foundations of decision-making under uncertainty, blending theoretical models with real-world applications and human judgment. Unlike standard programming courses that produce deterministic outputs, students use Python to build algorithms that make smart choices with incomplete or changing data, focusing on three core skills: simulation, optimization, and state-space search. They model decision problems with trees and graphs, write Monte Carlo simulations to predict risk, use solvers to allocate resources, and are introduced to algorithmic agents that learn from their environment—while also learning to debug these models to ensure they are fair, unbiased, and genuinely helpful to users.

DA321 | Data Analytics & Visualization

A practice-oriented course that equips students to solve social, scientific, and business problems through advanced analytics and compelling visualization. Students apply techniques including regression, cluster analysis, association rule mining, text mining, sentiment analysis, time-series/sequence analysis, and machine learning, while mastering the principles of effective visual communication to build graphs, charts, maps, and interactive dashboards for diverse audiences. Emphasizing interpretation and critical evaluation, students learn to draw meaningful conclusions, communicate findings persuasively, and translate insights into strategic recommendations through hands-on projects and case studies—with ethics, data privacy, and societal impact woven throughout to foster responsible, holistic data-driven problem-solving.

DA322 | Predictive Analytics and Modeling in Practice

A rigorous course in predictive statistics and forecasting for structured business data, focused on the analytics of numbers and time rather than perception tasks like vision or NLP. Students extract actionable signals from historical tabular data to forecast trends and quantify risk, moving beyond linear regression into Generalized Linear Models (for counts, intervals, and binary outcomes), Time Series Analysis (ARIMA and modern additive models like Prophet), and tree-based ensembles (Gradient Boosting, XGBoost). Critically, the course stresses the business economics of modeling—evaluating models by ROI, lift analysis, and profit curves—so students learn to build robust forecasting pipelines that translate statistical insight into strategic value.

DA332 | Vision AI for Detection and Generation of Visual Information

A course on how humans and machines perceive, interpret, and generate visual information, beginning with human visual perception and cognition before transitioning to state-of-the-art computer vision and AI. Key topics include image processing, object detection and recognition, scene understanding, and generative models (GANs, diffusion), with hands-on experience in deep learning architectures (CNNs, Vision Transformers) and practical tools (Python, PyTorch, OpenCV), plus advanced topics such as video analysis, 3D vision, and multimodal AI. Through projects and case studies in healthcare, robotics, autonomous vehicles, and creative industries, students learn to design, implement, and critically evaluate Vision AI systems while reflecting on human perception and the broader societal implications of visual AI.

DA333 | Practical Applications of Machine Learning

This course focuses on the practical application of machine learning and deep learning to real-world problems. Students will actively apply concepts such as supervised and unsupervised learning, data preprocessing, feature engineering, and a variety of machine learning algorithms through hands-on projects. The curriculum emphasizes implementing classification and clustering techniques, building neural networks, assessing model performance with appropriate metrics, and working with deep learning frameworks. Learners may also apply natural language processing (NLP), generative models, and ethical considerations to practical scenarios. By the end of the course, students will have developed the skills and experience necessary to design, implement, and evaluate machine learning and deep learning solutions for complex, real-world challenges.

DA411 | Computational Mathematics for Diverse Applications

A course on the algorithmic foundations that let computers perceive, model, and interact with the physical world, taught from a computer science and robotics perspective with an emphasis on implementation over abstract proofs. Students represent space, motion, and physics in code—using linear algebra to position a robot arm, calculus to smooth motion trajectories, and numerical methods to stabilize noisy sensor data. Rather than solving equations by hand, they engineer robust computational pipelines in Python (NumPy/SciPy) to model complex geometries, simulate physics, and estimate system states in real time—skills essential for game development, robotics, and physical simulation.

DA431 | Next Generation AI: Linguistic, Multi-modal, Agentic, and Beyond

A course on the frontier of AI that moves past text-only models to cover linguistic, multi-modal, and agentic systems, with hands-on experience in language understanding, vision-language processing, and cross-media generation (text-to-image, video, audio). It centers on three pillars: multi-modal intelligence (perceiving and synthesizing across text, visuals, and sound), agentic AI (autonomously interpreting situations, setting goals, and making decisions), and emerging frontiers "beyond" current paradigms such as physical-world grounding, neuro-symbolic reasoning, and the path toward AGI. With ethical considerations like deepfakes and multi-sensory manipulation integrated throughout, students learn to design sophisticated AI systems that combine multi-modal perception and autonomous agency to solve real-world problems.

DA432 | AI in the Real World: Use Cases in Society and Business

A course exploring how AI is transforming society, business, science, and engineering through practical use cases, giving students a solid foundation in AI concepts before examining applications across healthcare, government, education, media, finance, industry, and research. Via case studies, hands-on projects, and guest lectures, students investigate AI in domains such as personalized medicine, smart cities, financial services, supply chain management, climate science, materials discovery, and advanced manufacturing—including language technologies, generative AI, and autonomous agents—while addressing the strategic, managerial, and ethical considerations of responsible deployment. By the end, students can critically analyze, design, and evaluate AI solutions and understand the broad societal, business, and scientific implications of AI adoption.

DA433 | Affective Computing and Human-Robot Interaction

This course provides a comprehensive introduction to Affective Computing and Human-Robot Interaction (HRI), with a primary emphasis on the design and development of emotionally intelligent AI systems. Students will explore how AI systems can perceive, interpret, model, and respond to human emotions through multimodal signals such as facial expressions, voice, text, and behavioral cues. The course covers foundational topics in affective computing including emotion representation, Facial Action Coding System (FACS), affect recognition, emotion classification, multimodal affect sensing, and emotionally adaptive interaction design. Students will also examine how affective intelligence can be integrated into socially interactive systems such as virtual humans, conversational agents, voice interfaces, and embodied AI systems. In the HRI portion of the course, students will investigate key conceptual issues surrounding human interaction with socially expressive and embodied AI, including anthropomorphism, social presence, trust, emotional attachment, and ethical considerations in human-centered AI systems. Through hands-on technical projects, students will design and implement affective computing prototypes using AI and machine learning techniques. The course emphasizes both technical implementation and critical reflection on the psychological, social, and ethical implications of emotionally aware AI technologies. By the end of the course, students will be able to analyze, design, and develop affective AI systems that support emotionally adaptive and socially interactive experiences across a variety of application domains.

DA434 | Embodied Intelligence: AI in Physical Systems

This course introduces students to the scientific and computational foundations of intelligence situated in the physical world. The course examines how bodies, sensors, actuators, and learning algorithms interact to produce adaptive, robust behavior in robots and artificial agents. Students learn to model physical systems, design perception-action loops, implement control and planning methods, and apply reinforcement and imitation learning techniques to acquire motor skills. Emphasis is placed on the role of morphology, environmental dynamics, and physical constraints in shaping intelligent behavior. Students engage in four hands-on workshops involving simulation tools, deep reinforcement learning, differentiable physics, and advanced embodiment techniques. A semester-long project involves designing, implementing, and evaluating an embodied agent, either simulated or physical, demonstrating nontrivial sensorimotor intelligence. The course also addresses safety, ethics, and emerging applications of embodied AI in real-world domains.

XD201 | Technopreneurship and Innovation

Offered in conjunction with the School of Business Innovation, School of Natural Sciences, School of Data Science and Artificial Intelligence at Taeje University, and the University of San Francisco (USF), this course explores how scientific knowledge drives technological innovation and entrepreneurship. Students learn to transform scientific ideas into viable ventures by developing entrepreneurial, analytical, and innovation skills while examining emerging technologies, business applications, and the broader innovation ecosystem. Through discussions, case studies, group projects, presentations, guest lectures, and a final venture pitch with Silicon Valley technology experts and venture partners, students gain practical experience in designing and evaluating technology-based ventures.

XD221 | Quantitative Modeling in the Sciences

An interdisciplinary mathematics course that develops quantitative reasoning through core “principles of reasoning” (e.g., decomposition, compositionality, transformation, dimensional reduction, finite approximation). Topics span precalculus, discrete math, linear algebra, and introductory calculus, with applications to modeling in AI, and the social and natural sciences.

XD231 | Experimental Design and Statistics

This course provides a hands-on introduction to experimental design and statistical analysis involving data science and AI. Students will learn to formulate research questions, design experiments, and apply statistical techniques to analyze data in both human-subject and AI-focused experiments. Core topics include data sampling, variable measurement, hypothesis testing, and inferential statistics, with coverage of methods such as t-tests, ANOVA, and regression analysis. The course also explores ethical considerations for human-participant experiments and practical guidance on designing and evaluating AI services and interfaces. Throughout the course, students will work collaboratively on a semester-long project, crafting a comprehensive research proposal that includes a well-defined research goal, literature review, hypothesis, experimental design, and statistical analysis plan. By the end of the course, students internalize skills to produce research proposals that meet rigorous academic standards, positioning them to conduct impactful research in AI and data science.

XD232 | Applicable Psychology for Human-Centered AI and Design

This course introduces core psychological concepts (e.g., perception, attention, memory, emotion, motivation, and decision-making) selected specifically for their practical value in AI development and/or human-centered design. Students will learn how to translate foundational psychological principles into strategies for creating user-centered AI systems, intuitive interfaces, persuasive communications, and engaging service experiences. The focus is on understanding human mind and behavior in context and applying this knowledge to improve design decisions, anticipate user needs, and build ethically responsible technologies. Through case studies, discussions, and design exercises, students will gain hands-on experience in applying psychology to real-world challenges in AI and design innovation.

XD321 | Data-Driven Discovery Across the Sciences

This advanced project-based course enables students to investigate scientific questions using real-world data and computational methods across domains such as biology, chemistry, physics, and Earth science. Students work individually or in small teams to complete a semester-long project, producing outputs such as a research report, prototype, or interactive dashboard, with feedback from lectures, seminars, and critique sessions.

XD401 | Navigating Tomorrow: Emerging Technologies and Future Society

This course is a cross-disciplinary seminar on emerging technologies and their social implications. It begins by looking backward, asking how past technological revolutions reshaped human history and reordered society. It then turns to the frontiers of technology today and in the near future, examining how these developments may transform human society and its possible futures. Using case studies, debates, and future scenario exercises, students connect technological possibilities with ethical dilemmas, social benefits, and long-term risks. By the end of the course, students will be able to analyze emerging technologies as forces that both reflect and remake society, and to develop creative, critical, and collaborative approaches to navigating technological change in pursuit of more humane, inclusive, and sustainable futures.

XD421 | Strategies for Environmental and Urban Challenge

This advanced project-based course addresses real-world sustainability problems in environmental and urban systems through a science- and technology-driven lens. Students develop research-based solutions for challenges such as climate resilience, smart-city innovation, and sustainable infrastructure, integrating systems thinking with ethical and policy awareness. Final outputs may include a prototype, design proposal, research paper, or public-facing tool.

4. Business Innovation

4.1. Educational Goals

Upon completion of our program, students should be able to develop the following key capabilities:

✓ **Entrepreneurial Thinking**

The School of Business Innovation aims to cultivate an entrepreneurial mindset among its students. It strives to instill a sense of creativity, risk-taking, and opportunity recognition, enabling students to think outside the box and develop innovative solutions to business challenges.

✓ **Innovation and Adaptability**

The school is dedicated to fostering a culture of innovation and equipping students with the skills and knowledge necessary to adapt to rapidly changing business environments. It encourages students to embrace emerging technologies, stay updated with industry trends, and develop the ability to identify and seize new opportunities.

✓ **Strong Leadership Skills**

The School of Business Innovation recognizes the importance of strong leadership in driving business success. It focuses on developing leadership capabilities among its students through courses, workshops, and experiential learning opportunities. The goal is to produce graduates who can effectively lead teams, inspire others, and navigate complex organizational dynamics.

✓ **Collaboration and Networking**

Collaboration is a vital aspect of the modern business landscape. The school emphasizes the importance of teamwork and provides opportunities for students to engage in group projects, case studies, and collaborative initiatives. It also facilitates networking events and connections with industry professionals, fostering valuable relationships that can contribute to future career growth and business partnerships.

✓ **Respect of Ethical and Sustainable Business Practices**

The School of Business Innovation places a strong emphasis on ethical and sustainable business practices. It recognizes the importance of responsible entrepreneurship and aims to educate students on the social, environmental, and ethical implications of business decisions. The goal is to produce business leaders who prioritize sustainability, corporate social responsibility, and ethical conduct in their professional endeavors.

4.2. Course List

Course ID	Course Title	Classification	Credits	Credit Hours		Status
				Lecture	Field Work	
BI200	Economics for Business and Policy Decisions	Major Elective	4	4		
BI201	Strategic Thinking and Strategic Management	Major Foundation	4	4		
BI202	Financial Intelligence and Business Innovation	Major Foundation	4	4		
BI203	Marketing Insights	Major Foundation	4	4		
BI301	Organizational Behavior and Leadership	Major Elective	4	4		
BI302	Advanced Topics in Strategic Management	Major Elective	4	4		
BI303	Entrepreneurship and Startup Essentials	Major Elective	4	4		
BI304	Brand Management: How to Build Lasting Reputation	Major Elective	4	4		
*XD201	Technopreneurship and Innovation	Major Elective	4	4		
*XD301	AI-Powered Business Strategy	Major Elective	4	4		
*XD401	Navigating Tomorrow: Emerging Technologies and Future Society	Major Elective	4	4		
*XD411	AI in the Real World: Impact on Business and Society	Major Elective	4	4		

***Note:** XD201, XD301, XD401, XD411 may be recognized either as courses offered by the program that provides the course or as major courses within the Program of Business Innovation. Note that each course can only be counted once for graduation credit purposes, and students must choose which program's credits they would like the course to count toward.

4.3. Course Description

BI200 | Economics for Business and Policy Decisions

Economics underlies all business and policy decisions including pricing, product development, investments, and monetary policy. This course provides an introduction to economic principles and their applications in business and policy decision-making. Students will develop a solid understanding of microeconomic and macroeconomic concepts and their relevance to various business and policy environments. The course will emphasize the application of economic analysis to real-world business and policy scenarios.

BI201 | Strategic Thinking and Strategic Management

This course offers students opportunities to understand fundamental concepts of strategy and to develop their own ways of strategic thinking. It equips students with frameworks to set vision and goals, analyze complex environments, identify internal resources and capabilities, and make a choice among alternative paths. Also, alternatives of growth strategies will be discussed. By applying concepts and theories to varying contexts, students will learn how an entity can achieve what it aspires to do.

BI202 | Financial Intelligence and Business Innovation

This course is designed to build financial literacy and analytical skills to embark on the journey of business innovation. Students will learn to interpret and apply financial statements, understand working capital management, distinguish between profit and cash flow, and utilize financial ratios for performance analysis. By learning how to use financial and accounting data and information, students are expected to develop perspectives on varying stages of business innovation from idea generation to tangible action plans.

BI203 | Marketing Insights

This course introduces students to the core principles and strategic frameworks of modern marketing. Emphasizing both analytical thinking and creative problem-solving, the course explores how companies generate customer insights, identify market opportunities, and craft compelling value propositions. Students will learn to evaluate market dynamics, segment and target audiences effectively, and position brands for sustainable competitive advantage. Through case studies, discussions, and hands-on projects, the course bridges theory and realworld application, preparing students to think strategically about marketing in a fast-changing, customer-centric business environment.

BI301 | Organizational Behavior and Leadership

This course examines human dynamics in workplaces, focusing on individual, group, and organizational levels to enhance management effectiveness. It covers topics at the individual level including personality, motivation, perception, attitudes and stress management. Also, group dynamics include team processes, communication, power, conflicts, and negotiation. The course will review leadership theories from traits, behavioral, contingency, transformational, to transactional approaches. It emphasizes applying theories to real world situations to enhance performance.

BI302 | Advanced Topics in Strategic Management

This course introduces advanced topics in strategic management. Taking Strategic Thinking and Strategic Management (BI201) prior to this course is required. Along with mainstream thinking on strategic management, notably Porter's competitive strategy, the course provides alternative perspectives on strategic management. Other advanced topics in strategic management including scenario planning will be introduced to trigger further thoughts by students. Also, other emerging issues in the area of strategy will be discussed.

BI303 | Entrepreneurship and Startup Essentials

This course is an advanced course designed for students interested in launching and leading startups. The course integrates entrepreneurship with practical financial skills, focusing on the unique challenges and opportunities faced by new ventures. Students will develop leadership skills tailored to startup environments, learn financial planning and valuation methodologies, and understand deal structuring and governance. Through a blend of theory, case studies, and hands-on projects, students will learn how to lead startup teams, make strategic decisions, and assess the value of emerging businesses.

BI304 | Brand Management: How to Build Lasting Reputation

This course introduces students to the fundamentals of how brands are built, managed, and grown over time. Students will explore what makes a brand successful, how companies create strong brand identities, and how brands influence customer choices and business value. Topics include brand positioning, brand equity, storytelling, visual identity, and strategies for managing brands across different products, markets, and media platforms. Through real world case studies and discussions, students will learn how to think strategically about brands—from launching a new brand to managing an existing one in a competitive environment.

XD201 | Technopreneurship and Innovation

This interdisciplinary course, offered in conjunction with Business Innovation, Natural Sciences, and Data Science at Taejae, explores the intersection of technology and entrepreneurship. Students will learn how to transform innovative ideas into business opportunities, develop minimum viable products (MVPs), and pitch their concepts to technology experts and venture partners.

XD301 | AI-Powered Business Strategy

This course offers emerging ideas on how to integrate artificial intelligence (AI) into strategic thinking to build sustainable competitive advantage. With working knowledge of practical AI applications, ethical considerations, and roadmap development without requiring deep technical expertise. Students will gain knowledge to align AI with specific strategic alternatives to achieve vision and goals of the organization.

XD401 | Navigating Tomorrow: Emerging Technologies and Future Society

This course is a cross-disciplinary seminar on emerging technologies and their social implications. It begins by looking backward, asking how past technological revolutions reshaped human history and reordered society. It then turns to the frontiers of technology today and in the near future, examining how these developments may transform human society and its possible futures. Using case studies, debates, and future scenario exercises, students connect technological possibilities with ethical dilemmas, social benefits, and long-term risks. By the end of the course, students will be able to analyze emerging technologies as forces that both reflect and remake society, and to develop creative, critical, and collaborative approaches to navigating technological change in pursuit of more humane, inclusive, and sustainable futures.

XD411 | AI in the Real World: Impact on Business and Society

This course provides a comprehensive examination of artificial intelligence (AI) and its transformative impact across business, science, and society. Students will gain foundational knowledge of AI technologies and explore real-world applications in healthcare, finance, education, industry, and more. By using case studies, hands-on projects, and guest lectures, the course addresses strategic, managerial, and ethical considerations for responsible AI deployment.

IV. Field-Practice Course

1. Education Goals

The course aims to foster students' global awareness and intercultural competence. It strengthens their ability to conduct research on real-world social issues and supports the development of problem-solving skills through the design and application of practical solutions grounded in cultural and historical understanding. The Civic Project focuses on developing students' ability to address future societal challenges through self-directed research on social issues in varied national and local contexts. Both Global Society and Global Engagement Tour enhance students' engagement with global challenges by fostering a deeper understanding of the historical, social, and cultural dimensions that shape them.

2. Course List

Course ID	Course Title	Classification	Credits	Credit Hours	
				Lecture	Field Work
CV901	Civic Project: Korea	Field Practice / Required	2	1	2
CV903	Civic Project: U.S.A.	Field Practice / Required	2	1	2
CV904	Civic Project: China	Field Practice / Required	2	1	2
CV902	Civic Project: Japan	Field Practice / Required	2	1	2
CV905	Civic Project: Russia	Field Practice / Required	2	1	2
GS806	Global Study and Engagement: Korea	Field Practice / Required	2	1	2
GS807	Global Study and Engagement: U.S.A.	Field Practice / Required	2	1	2
GS808	Global Study and Engagement: China	Field Practice / Required	2	1	2
GS809	Global Study and Engagement: Japan	Field Practice / Required	2	1	2
GS810	Global Study and Engagement: Russia	Field Practice / Required	2	1	2
*ST803	Silicon Valley Immersion	Field Practice / Required	1		2

***Note:** For the 2023–2025 cohorts, this course is recognized as 1 credit. For the 2026 cohort and thereafter, it is included in Global Study and Engagement: U.S.A. and no credit will not be recognized.

3. Course Description

These courses provide field-based learning experiences in Korea and other countries through Global Rotation. By integrating academic excursions, civic projects, and community engagement with classroom learning, students examine real-world issues from interdisciplinary perspectives and connect theory with practice. These courses cultivate practical problem-solving skills, intercultural competence, and a global perspective, preparing students to understand and address complex challenges in diverse local and global contexts.

CV901 | CV902 | CV903 | CV904 | CV905 | Civic Project

This course provides students with the opportunity to investigate real-world social issues through student-led projects, focusing on problem definition rather than solution delivery. Students conduct civic projects in Korea, the United States, China, Japan, and Europe, selecting project topics, defining social problems, and examining them within local and regional contexts. The course emphasizes process-oriented inquiry, interdisciplinary thinking, and communication with community stakeholders. Students are encouraged to identify issues that cause inconvenience, conflict, or demand improvement in their communities, and to explore them from multiple perspectives. In doing so, they gain practical experience in research, teamwork, and ethical engagement, while also cultivating empathy toward social challenges. By combining academic analysis with community-based inquiry, the Civic Project prepares students to address complex issues in local contexts with a global perspective.

GS806 | GS807 | GS808 | GS809 | GS810 | Global Study and Engagement

The GSE program comprises five country-specific courses - GSE: Korea, GSE: Japan, GSE: China, GSE: U.S.A., and GSE: Russia - each integrating analytical lectures, guided discussions, and academic excursions. Students explore sites ranging from historical landmarks and contemporary institutions to future-oriented spaces, examining their roles in shaping national identities and global dynamics. Expert-led, on-site sessions encourage students to move beyond surface-level observation toward deeper engagement with structural processes and historical patterns, illuminating how past transformations inform present realities and open future possibilities across diverse cultural and political systems.

ST803 | Silicon Valley Immersion

This course provides students with an intensive immersion into the entrepreneurial and innovation ecosystem of Silicon Valley. Through company visits, lectures, and design thinking workshops, students explore how global technology firms, venture capitalists, accelerators, and consulting companies address organizational challenges and foster innovation. The program emphasizes iterative thinking, entrepreneurship, and innovation. It helps students develop understanding and analytical skills in technological advancement, processes of innovation, the growth of enterprises and industries, and international business trends. The program consists of thematic lectures delivered by faculty and industry experts, company visits to startups, accelerators, venture capital firms, and global technology companies, and a sequence of design challenge sprints focused on discovery, ideation, prototyping, and storytelling. Through these activities, students connect academic knowledge with practice. In this process, they gain deeper insights into the impact of technology on society, the creation of new venture enterprises, the dynamics of industrial ecosystems, and the transformations shaping future societies.

V. MOOC Course Credit Recognition

1. Program Overview

Taejae University recognizes MOOC courses offered through Coursera for academic credit to foster global competencies and support self-directed academic planning. This policy enables students to access curricula from world-renowned institutions, tailor their degree pathways to align with personal career goals, and enhance flexibility in their studies.

2. Operational Guidelines

2.1. Application and Enrollment

✓ Eligibility

Students must select courses that issue a verifiable completion certificate. Courses that do not offer an official certificate are not eligible for credit.

✓ Approval Process

Students wishing to receive credit must submit a formal application to the Dean of their respective undergraduate division during the course registration period. Enrollment is permitted only upon receiving prior written approval from the Dean.

✓ Self-Paced Learning

Once approved, students may complete the course at their own pace. Coursework may be conducted at any time, including during vacation periods, provided that the completion requirements are met before the submission deadline.

2.2. Tuition Support

The University provides financial support for Coursera course fees at a rate of US \$49 per credit, up to a maximum of 12 recognized credits. Should Coursera's pricing structure change, the supported amount per credit will be subject to appropriate adjustment.

3. Credit Recognition and Evaluation

3.1. Application and Enrollment

To finalize credit recognition, students must submit the official Credit Recognition Application Form and the Course Completion Certificate to the Office of Academic Affairs.

The submission period will be announced each semester, and all required documents must be submitted strictly within the designated period.

3.2. Evaluation Policy

✓ **Grading Scale**

Credits are awarded on a Pass/Fail (P/F) basis.

✓ **Criteria**

Upon verification of the valid completion certificate, the course will be recorded as a 'Pass' (P) on the academic transcript. Numeric grades are not assigned.

3.3. Credit Limits and Counting Methodology

✓ **Maximum Credits**

Students may earn up to 6 credits per semester and a cumulative total of 12 credits throughout their entire degree program.

✓ **Calculation Standard**

The semester credit limit (6 credits) is calculated based on the date of certificate submission and recognition, not the date of initial application or study.

✓ **Note:** Even if a student studies during the summer/winter break, if the certificate is submitted at the end of the Fall semester, the credits will count towards the Fall semester's 6 credit limit.

✓ In principle, students in their final semester are not permitted to apply for or submit results for Coursera credit recognition. However, an exception is granted for students admitted in 2023, who may submit their Coursera course results.

✓ The schedule will be uploaded to the student portal each year, so students are responsible for checking the application and submission deadlines themselves.

4. Credit Classification and Allocation

4.1. Credit Classification

Credits earned through Coursera courses are not recognized as major course credits; however, they are counted toward the total number of credits required for graduation.

4.2. Credit Allocation Based on Course Hours

In accordance with the standards set forth by the Korean Higher Education Act, academic credits are allocated based on the minimum course completion hours as follows:

Minimum Course Hours	Recognized Credits
15 hours or more	1 credit
30 hours or more	2 credits
45 hours or more	3 credits
60 hours or more	4 credits

VI. Capstone Project

1. Course Description

The Capstone Project is the culminating academic experience of undergraduate study, designed to help students bring together what they have learned throughout their major(s) and apply it to a meaningful project.

Originally designed as part of 3rd- and 4th-year courses, the program has now been reshaped into a non-course format to allow for more personalized and flexible faculty guidance. The program's purpose is to cultivate advanced research, creative problem-solving, and practical application skills that extend beyond the classroom. By producing an outcome such as a research paper, a policy analysis, a prototype, or a multimedia work, students learn to frame complex questions, manage long-term projects, and communicate results to different audiences.

Although it is not a regular course, the Capstone Program is a mandatory graduation requirement. All students must complete it in their final year in order to graduate, and successful completion will be recorded on the official transcript.

2. Guidance and Requirements

Students will receive supervision from their assigned faculty advisor, and final evaluation will be conducted by the Capstone Review Committee. Students may complete the Capstone individually or in teams of up to four, and must produce one of the following types of final work:

- ✓ Research Paper: Academic paper in English (minimum 5,000 words)
- ✓ Practical Outputs: App, web service, prototype, etc.
- ✓ Multimedia Creations: Video, podcast series, game, etc.
- ✓ Project Report/Portfolio: Lab report, policy analysis, community project, etc.
- ✓ Other types of scholarly or creative work approved by the Capstone Review Committee

3. Preparation and Operation Process

3.1. 4th Year, Fall Semester

- ✓ September: Announcement of Capstone Program procedures to 4th-year students and faculty.
- ✓ November: Submission of project proposal
(approx. 2 pages: topic, plan, and preferred advisor).
- ✓ December: Assignment of advisors by the Capstone Review Committee.

3.2. 4th Year, Winter (Jan-Feb): Project work begins.

3.3. 4th Year, Spring Semester

- ✓ March-April: Progress check and advising.
- ✓ Early May: Submission of final product and summary report.
- ✓ May: Evaluation by two reviewers (including advisor). The Capstone Review Committee makes the final decision. Students who do not pass may revise and resubmit by early June.
- ✓ June: Results reflected in student records and transcripts.

4. Evaluation Criteria

Evaluation Criteria		Description	Core Competency	Points
1	Creative Problem-Solving	- Is the project topic or solution approach original and imaginative? - Does the work demonstrate creative thinking in design, framing, or execution?	Creative Thinking	20pts
2	Analytical Depth & Rigor	- Is the argument or product grounded in critical analysis? - Does it engage deeply with evidence, context, or technical challenges?	Critical Thinking	20pts
3	Communication & Collaboration	- Is the final product effectively structured and clearly conveyed? - Were feedback, peer input, or collaborative elements meaningfully integrated?	Communication & Collaboration	15pts
4	Self-Directed Learning	- Did the student manage their own learning, schedule, and development process? - Does the outcome reflect perseverance and self-initiative?	Self-Directed Learning	15pts
5	Empathy & Inclusiveness	- Does the project reflect understanding of diverse perspectives? - Are ethical, cultural, or social contexts considered respectfully?	Diversity & Empathy	15pts
6	Global & Sustainable Perspective	- Does the project consider global relevance or long-term sustainability? - Is the outcome mindful of wider impact beyond immediate context?	Global Harmony & Sustainability	15pts
Total				100pts

*Passing Standard: Minimum 70 points. Final evaluation includes both quantitative scoring and qualitative written feedback.