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Table of Registration Standards for Liberal Arts Education Subjects
Informatics and Data Science Program

◎ Required subject (period of registration specified)

○ Compulsory elective subject (any of these subjects shall be registered)

Subject Type					Required No. of Credits	Class Subjects, etc.	No. of Credits	Type of Course Registration	Year in Which the Subject is Taken(*The lower figure means semester) (Note 1)															
									1st year				2nd year				3rd year				4th year			
									1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Liberal Arts Education Subjects	Peace Science Courses				2	Peace Science Courses	2	Compulsory elective		○														
	Basic Courses in University Education	Introduction to University Education			2	Introduction to University Education	2	Required	◎															
		Introductory Seminar for First-Year Students			2	Introductory Seminar for First-Year Students	2	Required	◎															
	Common Subjects	Area Courses			8	4 credits from Courses in Arts and Humanities/Social Sc	2	Compulsory elective	○	○	○	○	○	○	○	○								
		Foreign Languages	English (Note 2・3)	Basic English Usage	2	Basic English UsageI	1	Required	◎															
						Basic English UsageII	1				◎													
				Communication I	2	Communication I A	1	Required	◎															
						Communication I B	1		◎															
				Communication Ⅱ	2	Communication Ⅱ A	1	Required			◎													
						Communication Ⅱ B	1				◎													
				Communication Ⅲ	2	CommunicationⅢA	1	Compulsory elective					○		○									
						Communication ⅢB	1						○		○									
						Communication ⅢC	1						○		○									
						Select two subjects from the three subjects above																		
			Initial Foreign Languages (Select one language from German, French and Chinese)		2	Two subjects from Basic language I	1	Compulsory elective	○															
		Health and Sports Courses			2		1or 2	Compulsory elective	○		○													
	Basic Subjects				12	Elements of Calculus (Note 4)	2	Compulsory elective	○															
						Seminar in Basic Mathematics I (Note4)	1		○															
						Seminar in Basic Mathematics Ⅱ (Note4)	1				○													
						Statistical Data Analysis	2	Required	◎															
						CalculusI	2			◎														
						Calculus Ⅱ	2				◎													
						Linear Algebra I	2			◎														
						Linear Algebra Ⅱ	2				◎													
	No. of Credits Required for Graduation				38																			

Note 1: If a student failed to earn the credit in the term or semester indicated with the mark "   " or "   " in the column of "Academic year", it is allowed to take the subject in a following term or semester. It is required to confirm the semester in which the subject is provided in the class schedule for liberal arts education subjects that is published for every academic year, because some subjects might be provided in a term or semester other than that which is shown in this document.

Note 2: The credit for "Field Research in the English-speaking World" and that for "Online English Seminar A" and "Online English Seminar B", that are earned through a program of self-study, are not accepted as the credit for graduation. However, a credit for foreign language study abroad might be accepted as that for "Basic English Usage I", "Basic English Usage II", or "Basic English Usage III" based on advance application. For the details, refer to the description regarding English subjects in liberal arts education in the Students Handbook.

Note 3: Achievement in a foreign language skill test might be accepted as a credit. For the details, refer to the description regarding English subjects in liberal arts education in the Students Handbook.

Note 4: Students who took four mathematics subjects (Math I, Math II, Math A, and Math B) in the entrance examination are required to take the subject "Elements of Calculus." Students who took five mathematics subjects (Math I, Math II, Math III, Math A, and Math B) in the entrance examination are required to take the subjects "Seminar in Basic Mathematics I" and "Seminar in Basic Mathematics II."

◎ G W
○ b a a W
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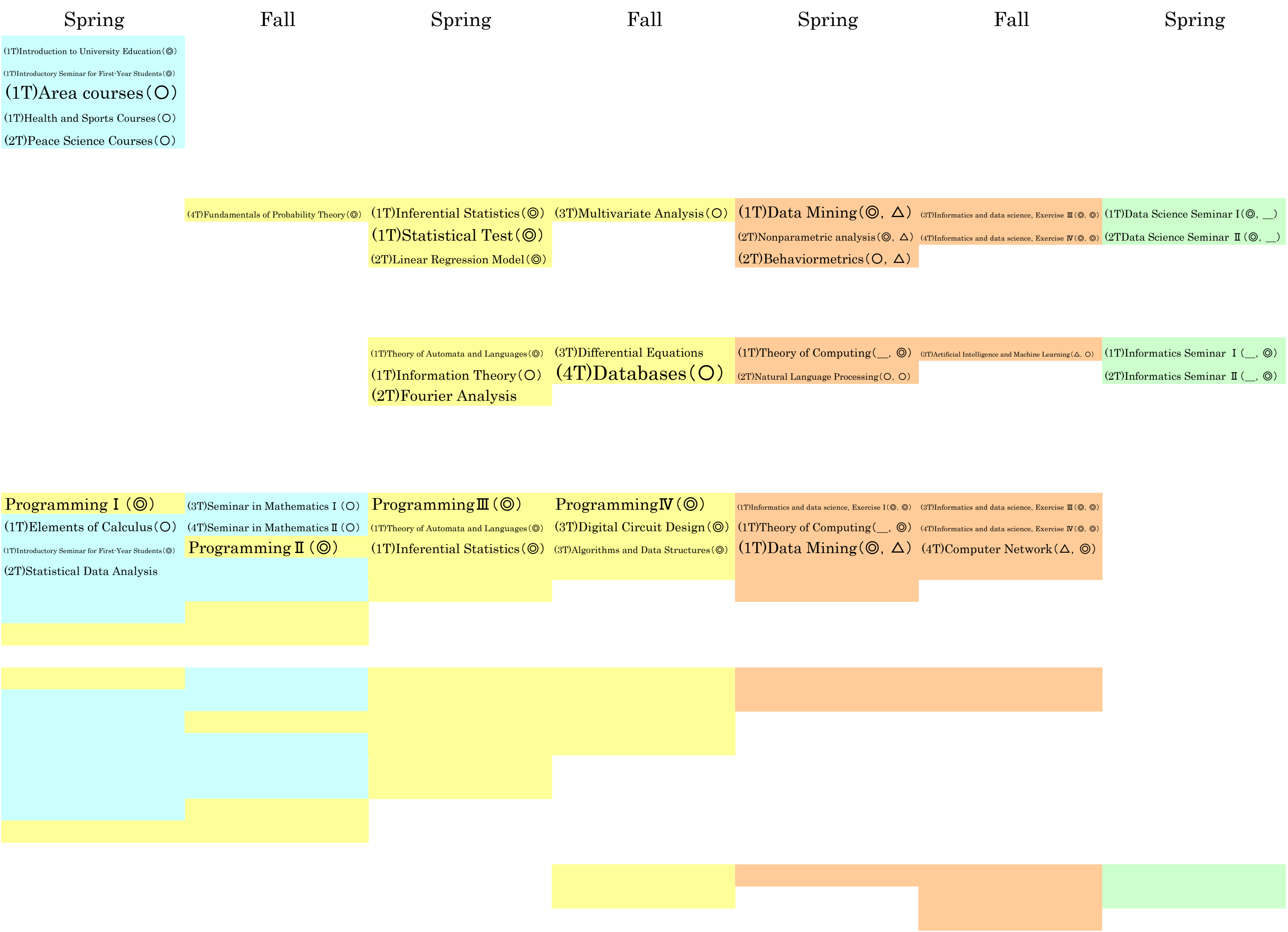
B V b V
B V b V Ⅱ
E Vb b
E Vb b Ⅱ
E Vb b Ⅲ
E Vb b Ⅳ
I 6 b V VV AV V
Va
E Vb b AV V

Liberal Arts Education	Introduction to University Education	2	1st grade	100	1																					100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	1st grade	25	1					25	1	25	1											25	1	100
Liberal Arts Education	Peace Science Courses	2	1st grade	100	1																					100
Liberal Arts Education	Area Courses	8	1st grade	100	1																					100
Liberal Arts Education	Basic English Usage Ⅰ	1	1st grade															100	1							100
Liberal Arts Education	Basic English Usage Ⅱ	1	1st grade															100	1							100
Liberal Arts Education	Communication ⅠA	1	1st grade															100	1							100
Liberal Arts Education	Communication ⅠB	1	1st grade															100	1							100
Liberal Arts Education	Communication ⅡA	1	1st grade															100	1							100
Liberal Arts Education	Communication ⅡB	1	1st grade															100	1							100
Liberal Arts Education	Communication ⅢA	1	2nd grade															100	1							100
Liberal Arts Education	Communication ⅢB	1	2nd grade															100	1							100
Liberal Arts Education	Communication ⅢC	1	2nd grade															100	1							100
Liberal Arts Education	Basic Foreign Languages Ⅰ	2	1st grade															100	1							100
Liberal Arts Education	Basic Foreign Languages Ⅱ	2	1st grade															100	1							100
Liberal Arts Education	Health and Sports Subject	2	1st grade	100	1																					100
Liberal Arts Education	Elements of Calculus	2	1st grade							50	1	50	1													100
Liberal Arts Education	Seminar in Basic Mathematics Ⅰ	1	1st grade							50	1	50	1													100
Liberal Arts Education	Seminar in Basic Mathematics Ⅱ	1	1st grade							50	1	50	1													100
Liberal Arts Education	Statistical Data Analysis	2	1st grade							50	1	50	1													100
Liberal Arts Education	Calculus Ⅰ	2	1st grade							50	1	50	1													100
Liberal Arts Education	CalculusⅠⅡ	2	1st grade							50	1	50	1													100
Liberal Arts Education	Linear Algebra Ⅰ	2	1st grade							50	1	50	1													100
Liberal Arts Education	Linear Algebra Ⅱ	2	1st grade							50	1	50	1													100
Specialized Education	Discrete Mathematics Ⅰ	2	1st grade							50	1	50	1													100
Specialized Education	Discrete Mathematics Ⅱ	2	1st grade							50	1	50	1													100
Specialized Education	Programming Ⅰ	2	1st grade							50	1	50	1													100
Specialized Education	Programming Ⅱ	2	1st grade							50	1	50	1													100
Specialized Education	Programming Ⅲ	2	2nd grade							50	1	50	1													100
Specialized Education	Programming Ⅳ	2	2nd grade							50	1	50	1													100
Specialized Education	Theory of Automata and Languages	2	2nd grade					34	1	33	1	33	1													100
Specialized Education	Digital Circuit Design	2	2nd grade							33	1	33	1			34	1									100
Specialized Education	Programming Languages	2	2nd grade							33	1	33	1			34	1									100
Specialized Education	Algorithms and Data Structures	2	2nd grade							33	1	33	1									34	1			100
Specialized Education	Fundamentals of Probability Theory	2	1st grade			34	1			33	1	33	1													100
Specialized Education	Inferential Statistics	2	2nd grade			34	1			33	1	33	1													100
Specialized Education	Linear Regression Model	2	2nd grade			34	1			33	1	33	1													100
Specialized Education	Statistical Test	2	2nd grade			34	1			33	1	33	1													100
Specialized Education	Generalized Linear Model	2	2nd grade											100	1											100
Specialized Education	Stochastic Modeling	2	2nd grade											100	1											100
Specialized Education	Numerical Computation	2	2nd grade																			100	1			100
Specialized Education	Mathematical Programming	2	2nd grade																			100	1			100
Specialized Education	System Optimization	2	2nd grade																			100	1			100
Specialized Education	Differential Equations	2	2nd grade					100	1																	100
Specialized Education	Fourier Analysis	2	2nd grade					100	1																	100
Specialized Education	Multivariate Analysis	2	2nd grade			100	1																			100
Specialized Education	Basic and practice in Categorical data analysis	2	2nd grade																	100	1					100
Specialized Education	Computer Architecture	2	2nd grade													100	1									100
Specialized Education	Operating Systems	2	2nd grade													100	1									100
Specialized Education	Databases	2	2nd grade					100	1																	100
Specialized Education	Software Engineering	2	2nd grade																			100	1			100
Specialized Education	Information Theory	2	2nd grade					100	1																	100
Specialized Education	Practical English Ⅰ	1	3rd grade															100	1							100
Specialized Education	Practical English Ⅱ	1	3rd grade															100	1							100

Specialized Education	Informatics and data science, Exercise Ⅰ	1	3rd grade							33	1	33	1			34	1									100
Specialized Education	Informatics and data science, Exercise Ⅱ	1	3rd grade							33	1	33	1			34	1									100
Specialized Education	Informatics and data science, Exercise Ⅲ	1	3rd grade			34	1			33	1	33	1													100
Specialized Education	Informatics and data science, Exercise Ⅳ	1	3rd grade			34	1			33	1	33	1													100
Specialized Education	Theory of Computing	2	3rd grade					50	1	50	1															100
Specialized Education	Image Processing	2	3rd grade													100	1									100
Specialized Education	Visual Computing	2	3rd grade													100	1									100
Specialized Education	Artificial Intelligence and Machine Learning	2	3rd grade					100	1																	100
Specialized Education	Computer Network	2	3rd grade							50	1					50	1									100
Specialized Education	Human Computer Interaction	2	3rd grade													100	1									100
Specialized Education	Parallel and Distributed Processing	2	3rd grade													100	1									100
Specialized Education	Software Management	2	3rd grade																			100	1			100
Specialized Education	Natural Language Processing	2	3rd grade					100	1																	100
Specialized Education	Information Society and Security	2	3rd grade																			100	1			100
Specialized Education	Data Mining	2	3rd grade			50	1			50	1															100
Specialized Education	Survey design	2	3rd grade											100	1											100
Specialized Education	Nonparametric analysis	2	3rd grade			50	1			50	1															100
Specialized Education	Big Data	2	3rd grade							50	1									50	1					100
Specialized Education	Behaviormetrics	2	3rd grade			100	1																			100
Specialized Education	Econometrics	2	3rd grade																	100	1					100
Specialized Education	Time Series Analysis	2	3rd grade											100	1											100
Specialized Education	Biostatistics	2	3rd grade																	100	1					100
Specialized Education	Biomedical Statistics	2	3rd grade																	100	1					100
Specialized Education	Stochastic Processes	2	3rd grade																	100	1					100
Specialized Education	Financial Engineering	2	3rd grade																	100	1					100
Specialized Education	Data Analysis for Medical and Welfare Policies	2	3rd grade											100	1											100
Specialized Education	Society and Data Analysis	2	3rd grade																	100	1					100
Specialized Education	Total Quality Management and Data Analysis	2	3rd grade																	100	1					100
Specialized Education	Education Policy and Data Analysis	2	3rd grade											100	1											100
Specialized Education	Data Science Seminar Ⅰ	1	4th grade			33	1							33	1					34	1					100
Specialized Education	Data Science Seminar Ⅱ	1	4th grade			33	1							33	1					34	1					100
Specialized Education	Informatics Seminar Ⅰ	1	4th grade					33	1							33	1					34	1			100
Specialized Education	Informatics Seminar Ⅱ	1	4th grade					33	1							33	1					34	1			100
Specialized Education	Graduation thesis	3	4th grade											50	1									50	1	100

Sheet 4

Curriculum Map of Informatics and Data Science Program



Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
(1T)Introduction to University Education（◎） (1T)Introductory Seminar for First-Year Students（◎） (1T)Area courses（○） (1T)Health and Sports Courses（○） (2T)Peace Science Courses（○）							
	(4T)Fundamentals of Probability Theory（◎）	(1T)Inferential Statistics（◎） (1T)Statistical Test（◎） (2T)Linear Regression Model（◎）	(3T)Multivariate Analysis（○）	(1T)Data Mining（◎, △） (2T)Nonparametric analysis（◎, △） (2T)Behaviormetrics（○, △）	(3T)Informatics and data science, Exercise Ⅲ（◎, ◎） (4T)Informatics and data science, Exercise Ⅳ（◎, ◎）	(1T)Data Science Seminar I（◎, __） (2TData Science Seminar Ⅱ（◎, __）	
		(1T)Theory of Automata and Languages（◎） (1T)Information Theory（○） (2T)Fourier Analysis	(3T)Differential Equations (4T)Databases（○）	(1T)Theory of Computing（__, ◎） (2T)Natural Language Processing（○, ○）	(3T)Artificial Intelligence and Machine Learning（△, ○）	(1T)Informatics Seminar Ⅰ（__, ◎） (2T)Informatics Seminar Ⅱ（__, ◎）	
Programming Ⅰ（◎） (1T)Elements of Calculus（○） (1T)Introductory Seminar for First-Year Students（◎） (2T)Statistical Data Analysis	(3T)Seminar in Mathematics Ⅰ（○） (4T)Seminar in Mathematics Ⅱ（○） Programming Ⅱ（◎）	ProgrammingⅢ（◎） (1T)Theory of Automata and Languages（◎） (1T)Inferential Statistics（◎）	ProgrammingⅣ（◎） (3T)Digital Circuit Design（◎） (3T)Algorithms and Data Structures（◎）	(1T)Informatics and data science, Exercise I（◎, ◎） (1T)Theory of Computing（__, ◎） (1T)Data Mining（◎, △）	(3T)Informatics and data science, Exercise Ⅲ（◎, ◎） (4T)Informatics and data science, Exercise Ⅳ（◎, ◎） (4T)Computer Network（△, ◎）		

Academic Achievement Evaluation Itemas		1st grade		2nd grade		3rd grade		4th grade	
		Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	evidence by using a wide range of knowledge and skills related to data science.								
	(4) I3. Knowledge related to hardware and software, and the programming skills required for efficiently processing data.				(3T)Digital Circuit Design(◎) (3T)Operating Systems(○) (4T)Programming Languages(◎) (4T)Computer Architecture(○)	(1T)Informatics and data science, Exercise Ⅰ(◎, ◎) (2T)Informatics and data science, Exercise Ⅱ(◎, ◎) (2T)Image Processing(__, ○)	(3T)Visual Computing(△, ○) (3T)Human Computer Interaction(△, ○) (3T)Parallel and Distributed Processing(△, ○) (4T)Computer Network(△, ◎)	(1T)Informatics Seminar Ⅰ(__, ◎) (2T)Informatics Seminar Ⅱ(__, ◎)	
Comprehensive Abilities	(1) C2. Skills for communication, reading, and writing in English, capabilities required for giving a good, clear oral presentation, and documentation and communication skills that contribute to active discussion.	Basic English Usage Ⅰ(◎) Communication Ⅰ A(◎) Communication Ⅰ B(◎) Basic Foreign Languages Ⅰ(○) Basic Foreign Languages Ⅱ(○)	Basic English Usage Ⅱ(◎) Communication Ⅱ A(◎) Communication Ⅱ B(◎)	Communication Ⅲ A(○) Communication Ⅲ B(○) Communication Ⅲ C(○)		(1T)Practical English Ⅰ(◎)	(3T)Practical English Ⅱ(◎)		Graduation Thesis(◎,
	(2) D3. Ability to examine social needs and issues which are interlinked in a complex manner, using a top-down view to solve the problems through quantitative and logical thinking based on data, diverse perspectives, and advanced skills in information processing and analysis.			(2T)Basic and practice in Categorical data analysis(○)		(2T)Econometrics(○, △) (2T)Biostatistics(○, __)	(3T)Biomedical Statistics(○, __) (3T)Society and Data Analysis(△, △) (3T)Total Quality Management and Data Analysis(△, △) (4T)Big Data(◎, ◎) (4T)Stochastic Processes(○, ○) (4T)Financial Engineering(○, ○)	(1T)Data Science Seminar Ⅰ(◎, __) (2T)Data Science Seminar Ⅱ(◎, __)	
	(3) I2. Ability to provide the most appropriate system solution to a cross-sectional problem in the diversified and complicated information society based on the many forms of cutting edge information technology.			Mathematical Programming(○) (2T)Software Engineering(○)	(3T)Algorithms and Data Structures(◎) (3T)System Optimization(○) (4T)Numerical Computation(○)	(2T)Software Management(△, ○) (2T)Information Society and Security(○, ○)		(1T)Informatics Seminar Ⅰ(__, ◎) (2T)Informatics Seminar Ⅱ(__, ◎)	
	(4) E. Creative and logical thinking ability for analyzing practical issues and challenges in order to provide rational solutions that match social needs, as well as the capability to realize these solutions.	(1T)Introductory Seminar for First-Year Students(◎)							Graduation Thesis(◎, ◎)

Ex)	Liberal Arts Education	Specialized Core Subjec	Specialized Subjects Type of course registration in parenthesis is as (Data Science and Informatics)	Graduation Thesis