2023Year 2nd Semester Syllabus

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Course Title	LINEAR ALGEBRA(2)	Course Code-Section	MAT3120-02
Credit/Time/ Experiment,Lab,Practical Technique Time	3/Mon7,8,Wed8	Department	Mathematics
Time	Mon7,8,Wed8	Location	SciHB103
Exam Date & Time	Midterm exam	Final exam	
Class Language	English	Evaluation Type	Absolute evaluation

Instructor's Profile	Name	Lee Joonkyung	Contact Information	Telephone	
	Department	MATHEMATICS		Mail	JOONKYUNGLEE@YONSEI.AC.KR
	Office	과학관 207		Interview information	

TA's Name & Contact Information	Name		Contact Information	Telephone	

Course Description Brief Introduction of the Course	MAT3120 is the second course for linear algebra for sophomore/junior level undergraduate students, which is one of the fundamental mathematical languages and applies to various fields of mathematics. MAT3120은 2학년, 3학년 학부 선형대수학을 위한 두 번째 학기 과정입니다. 이 과목은 학생들이 선형대수학의 추상화를 이해하는 것을 돕습니다. 선형대수학은 수학의 기본적인 언어이고 수학의 모든 분야에 많은 응용이 있습니다.			
Course Goals	1.	Korean	선형대수학에 대한 구조적 이해를 심화하고, 체, 벡터공간, 선형 연산자, 판별식 등 다양한 주제에 대해 탐구한다.	30%
		English	To develop a systematic knowledge of the elements of linear algebra described in detail in the weekly syllabus, and the ability to apply the concepts covered in classes: Fields and Vector Spaces, Linear Operators, Determinants and Eigenvalues, The Jordan Canonical Form, Orthogonality, Spectral Theory, Singular Value Decomposition, Matrix Factorization, and Infinite Dimensional Vector Spaces.	
	2.	Korean	선형대수학의 언어를 사용한 개념의 정의와 증명 방법을 이해한다.	30%
		English	To understand the elements of linear algebra with an emphasis on concepts, methods of proof, and the communication of mathematical ideas.	
	3.	Korean	수학 내외의 다양한 분야에서 선형대수학이 어떻게 활용되는지 이해한다.	20%
		English	To see how all these play a key role in many practical applications in today's technological society; various applications of linear algebra show how linear algebra is essential not only in solving problems involving algebra, geometry, differential equations, optimization, approximation, combinatorics, but also in the fields such as biology, economics, computer graphics, electrical engineering, cryptography, political science as well as sciences.	
	4.	Korean	최신 현대 수학 연구를 향한 지식의 지평을 넓힌다.	20%
			To broaden students' horizons by learning connections of one subject	

		English	to other areas of linear algebra and mathematics and by mentioning results at the forefront of research.	
	5.	Korean		0%
		English		

Core Competencies	The total measurable competencies must be 100%. Each course objective should set the competency as 25%. The core and major competencies should equal at least 50%.		
	Computation and Modeling Skills 40%	Analytical Skills 30%	Independent Understandings and Creative Problem-Solving Skills 30%
Sub-Competencies/Learning Unit1			
Sub-Competencies/Learning Unit2			
Sub-Competencies/Learning Unit3			
Core Competencies(Liberal Arts)Major competency(	**Must reflect the interrelationship between core competencies (elective courses) and major competencies (major studies).**		
Sustainable Development Goals			

Average Recommended Amount of Learning per	Average Reading Volume		Average amount of writing(Based on A4)	

Course Methods (%) Total Amount 100	Lecture	Practice Training	Presentation	Dabate	Team Project
	100%	0%	0%	0%	0%
Course Methods 2 Select Relevant Items	PBL Subject	Capstone Design	CBL, Social Innovation Course	Flipped Classroom	Work Experience,Internsh

Grading Policy(%) Total Amount 100 Free Input for Other Information	Midterm exam	Final exam	Quiz	Individual Assignment	Team Assignment	Attendance	Others
	30%	40%	20%	0%	0%	10%	0%

Assignment/ Report, Project Guide	Title of Assignment/Project Name, and Method of Filling Out	Submission Deadline	Type of Submission and Method
Prerequisite		Online Course Address	

Course Material	Course Material Name	Author	Publisher	Publish Year	ISBN
주교재	Finite dimensional linear algebra	Mark S. Gockenbach	CRC Press	2010	

Main Learner Precautions	
Attatchment	

Weekly Plan

week	Period	Weekly Topic & Contents	Remarks
1	2023-09-01 2023-09-07	Introductions, course overview, syllabus review 6.1 Norms and inner products 6.2 The adjoint of a linear operator	(9.1.) Fall semester classes begin (9.5. - 9.7.) Course add and drop period
2	2023-09-08 2023-09-14	6.3 Orthogonal vectors and bases 6.4 The projection theorem	
3	2023-09-15 2023-09-21	6.5 The Gram-Schmidt process 6.6 Orthogonal complements 6.7 Complex inner product spaces	
4	2023-09-22 2023-09-28	6.8 More on polynomial approximation 6.9 The energy inner product and Galerkin's method 6.10 Gaussian quadrature 6.11 The Helmholtz decomposition	09.28 추석
5	2023-09-29 2023-10-05	7.1 The spectral theorem for symmetric matrices 7.2 The spectral theorem for normal matrices 7.3 Optimization and Hessian matrix	(9.28. - 9.30.) 추석연휴 (10.3.) National Foundation Day 09.29 추석, 09.30 추석, 10.03 개천절
6	2023-10-06 2023-10-12	7.4 Lagrange multipliers 7.5 Spectral methods for differential equations	(10.8.) First third of the semester ends (10.9.) Hangul Proclamation Day 10.09 한글날
7	2023-10-13 2023-10-19	8.1 Introduction to the SVD 8.2 The SVD for general matrices	
8	2023-10-20 2023-10-26	Midterm	(10.20. - 10.26.) Midterm Examinations
9	2023-10-27 2023-11-02	8.3 Solving least-squares problems using the SVD 8.4 The SVD and linear inverse problems 8.5 The Smith normal form of a matrix	(10.27. - 10.31.) Course withdrawal period (11.1. - 11.3.) Application Period for S/U evaluation
10	2023-11-03 2023-11-09	9.1 The LU factorization 9.2 Partial pivoting	
11	2023-11-10 2023-11-16	9.3 The Cholesky factorization 9.4 Matrix norms	(11.14.) Second third of the semester ends
12	2023-11-17 2023-11-23	9.5 The sensitivity of linear systems to errors 9.6 Numerical stability 9.7 The sensitivity of the least- squares problem	
13	2023-11-24 2023-11-30	9.8 The QR factorization 9.9 Eigenvalues and simultaneous iteration 9.10 The QR algorithm	
14	2023-12-01 2023-12-07	10.1 Analysis in R^n 10.2 Infinite-dimensional vector spaces	
15	2023-12-08 2023-12-14	10.3 Functional analysis 10.4 Weak convergence	(12.8. - 12.14.) Self-study

16	2023-12-15 2023-12-21	Final	(12.15. - 12.21.) Final Examinations

• Students with disabilities(SWDs) can request accommodations related to lectures, assignments, or tests by contacting t
he course professor at the beginning of semester.
(However, accommodations may vary depending on the essentiality of lecture and discretion of professors.)

[Lecture]
- Visual Impairment: alternative, braille, enlarged reading materials, note-taker
- Physical Impairment: alternative reading materials, access to classroom, note-taker, assigned seat
- Hearing Impairment: note-taker/stenographer, recording lecture
- Intellectual Disability/Autism: note-taker

[Assignments and Test]
- Visual/Physical/Hearing Impairment: (reasonable) extra days for submission, alternative type of assignment, extende
d test time, alternative type of test, arranging separate test room, and proctors, test ghostwriter
- Intellectual Disability/Autism: (reasonable) extra days for submission, alternative type of assignment