Math for Data Science (오민환, 20시간)

Category	Date	Type	Content
Linear Algebra Basics	1/5 (화)	**Lecture 1**	Systems of Linear Equations, Matrices
		Lecture 2	Solving Systems of Linear Equations
		Lecture 3	Vector Spaces
		Practice 1	Linear Algebra Practice I
	1/6 (수)	**Lecture 4**	Linear Independence
		Lecture 5	Basic Python programming
		Lecture 6	Linear Mappings, Affine Spaces
		Practice 2	Linear Algebra Practice II
Analytic Geometry	1/7 (목)	**Lecture 7**	Norms and Inner Products
		Lecture 8	Angles and Orthogonality
		Lecture 9	Orthonormal Basis, Components, Projections
		Practice 3	Analytic Geometry
Matrix Decompositions	1/8 (금)	**Lecture 10**	Determinant and Trace
		Lecture 11	Eigenvalues and Eigenvectors
		Lecture 12	Decompositions
		Practice 4	Matrix decomposition
Vector Calculus	1/11 (월)	**Lecture 13**	Gradients of Vector-Valued Functions, Gradients of Matrices
		Lecture 14	Backpropagation and Automatic Differentiation
		Lecture 15	Linearization and Multivariate Taylor Series
		Practice 5	Vector Calculus
		Exam	**날짜 추후 공지**

Probability and Statistics for Data Science (이승근, 20시간)

Category	Date	Type	Content
Probability	2/2 (화)	Lecture 1	Probability Intro, Independence
		Lecture 2	Conditional Probability, Bayes Theorem, R Intro
	2/3 (수)	Lecture 3	Random variables intro, discrete random variables
		Lecture 4	Continuous ranodm variables, Independence, Conditional Dist.
	2/4 (목)	Lecture 5	Multivariate Random variable, Transformation
		Lecture 6	Basic Python programming
	2/5 (금)	Lecture 7	Covariance, MGF
		Lecture 8	Convergence
Statistical Inference	2/8 (월)	Lecture 9	Statisticsal Inference, Bias-Variance Tradeoff
		Lecture 10	Confidene interval
	2/15 (월)	Lecture 11	CDF
		Lecture 12	Resampling approach, Bootstrap
	2/16(화)	Lecture 13	Parametric Inference, MLE
		Lecture 14	Parametric Inference, MLE
	2/17 (수)	Lecture 15	Hypothesis Test and P-value
		Lecture 16	Bayesian Statistics
	2/18 (목)	Lecture 17	Linear and logistic regression
		Lecture 18	Linear and logistic regression
	2/19 (금)	Exam	

Programming for Data Science (김형신, 28시간)

Category	Date	Type	Content
Python (7 lectures + 4 practices)	1/12 (화)	**Lecture 1**	Computer architecture - Abstraction, Hello Python! (expression, assignment, name, memory model)
		Lecture 2	Functions, String
	1/13 (수)	**Practice 1**	Complex assignment and function namespace
		Lecture 3	Control Structures, Modules, and Classes
	1/14 (목)	**Lecture 4**	Lists, Loops, and Joins
		Practice 2	Basic Python programming
	1/15 (금)	**Lecture 5**	Sets, Tuples, and Dictionaries
		Lecture 6	Reading and writing files (I/O)
	1/18 (월)	**Practice 3**	Reading and processing a text file
		Lecture 7	Object oriented programming
	1/19 (화)	**Practice 4**	Object oriented programming
Search and Sort (4 lectures + 1 practice)	1/19 (화)	**Lecture 8**	Linear/Binary Search, Big O
	1/20 (수)	**Lecture 9**	Sort (1) - Selection and Insertion Sort
		Lecture 10	Sort (2) - MergeSort and Recursion
	1/21 (목)	**Lecture 11**	Sort (3) - Quick Sort
		Practice 5	Sorting problems
Data structures (2 lectures + 2 practices)	1/22 (금)	**Lecture 12**	Linked Lists, Stacks, and Queues
		Practice 6	Linked list problem
	1/25 (월)	**Lecture 13**	Hashing
		Practice 7	Two Sum
Trees and Graphs (3 lectures + 3 practice)	1/26 (화)	**Lecture 14**	Trees and traversal (1) - Recursive structure, BFS, DFS
		Lecture 15	Trees and traversal (2) - BST, Find, Insert, Deletion
	1/27 (수)	**Practice 8**	BFS and DFS implementation by using (1) recursion
		Practice 9	BFS and DFS implementation by using (2) queue and stack
	1/29 (금)	**Lecture 16**	Graphs and traversal - Graph basics, DFS, Topological sort
		Practice 10	Graph problems
	2/1 (월)	**Exam**	

Computer System for Data Science (이재진, 26시간)

Category	Date	Type	Contents	Note
컴퓨터구조의 이해	1/12 (화)	Lecture 1	Number Representation	
		Lecture 2	Logic Circuits	Homework Assignment for Logic Circuits
	1/13 (수)	Lecture, Practice 1	Adder and Subtractor	
		Lecture, Practice 2	ALU, Register File and Control Unit	Homework Assignment for ALUs
	1/14 (목)	Lecture 3	CPU and Memory	
		Lecture 4	Basic Python programming	Homework Assignment for Caches
프로그램의 동작 원리	1/15 (금)	Lecture, Practice 3	Machine and Assembly Instructions	
		Lecture, Practice 4	Assembly Programming	Homework Assignment for Assembly Programming I
	1/18 (월)	Lecture, Practice 5	Subroutines and the Call Stack	
		Lecture 5	Files, Input and Output, and Network	Homework Assignment for Assembly Programming II
운영체제의 이해	1/19 (화)	Lecture, Practice 6	How to Use Linux I	
		Lecture, Practice 7	How to Use Linux II	Homework Assignment for Linux usage
	1/20 (수)	Lecture, Practice 8	Multitasking	
		Lecture, Practice 9	Virtual Memory	Homework Assignment for Processes and Virtual Memory
C 프로그래밍	1/21 (목)	Lecture, Practice 10	C Compiler, C Declarations and Assignments	
		Lecture 6	C Formatted IO, Flow of Control, and Functions	Homework Assignment for C Programming I
	1/22 (금)	Lecture, Practice 11	Debuggers I	
		Lecture, Practice 12	Debuggers II	Homework Assignment for Debuggers
	1/25 (월)	Lecture, Practice 13	Profilers I	
		Lecture, Practice 14	Profilers II	Homework Assignment for Profilers
	1/26 (화)	Lecture 7	C Arrays, Pointers, and Strings I	
		Lecture 8	C Arrays, Pointers, and Strings II	Homework Assignment for C Programming II
	1/27 (수)	Lecture 9	C File IO	
		Lecture 10	C Structures and Unions	Homework Assignment for C Programming III
	1/28 (목)	Exam		

First Step to Big Data and Knowledge Management (차상균, 26시간)

Category	Date	Type	Content
C++ Template 이용한 Memory Pool Management	1/28 (목)	Lecture 1	Review of C/C++ and Object Oriented Programming Concepts (1) - Class
		Lecture 2	Review of C/C++ and Object Oriented Programming Concepts (2) - Template
	1/29 (금)	Lecture 3	C++ Template Programming (1) - Function template, class template
		Lecture 4	C++ Template Programming (2) - Example: Smart Pointer and Memory Mgmt
	2/1 (월)	Lecture 5	Memory Pool Concept (1) - Memory pool vs. malloc/new
		Lecture 6	Basic Python programming
	2/2 (화)	Practice 1	Memory Pool Implementation Practice (1)
		Practice 2	Memory Pool Implementation Practice (2)
SQL Programming	2/3 (수)	Lecture 7	Introduction to Database Management System
		Lecture 8	SQL (1) - Data Definition Languages
	2/4 (목)	Lecture 9	SQL (2) - Data Manipulation Languages
		Lecture 10	SQL (3) - Data Control Languages, Performance Tuning
	2/5 (금)	Lecture 11	SQL Programming in Python
		Lecture 12	SQL Programming in C++
	2/8 (월)	Practice 3	SQL Programming Practice (1)
		Practice 4	SQL Programming Practice (2)
Large-Scale Graph Database Programming	2/15 (월)	Lecture 13	Graph DB Systems
		Lecture 14	Introduction to Neo4j
	2/16 (화)	Lecture 15	Graph Statics Analysis
		Lecture 16	Graph Query: Cypher (in Neo4j)
	2/17 (수)	Lecture 17	Graph Algorithms, Recommendation Algorithms
		Lecture 18	Graph Machine Learning Algorithms
	2/18 (목)	Practice 5	Practice with real dataset: movie recommendation (1)
		Practice 6	Practice with real dataset: movie recommendation (2)
	2/19 (금)	Exam	Exam