National Center University
Department of Computer Science and Information Engineering
Course Lectured in English
2st Semester of Academic Year 2013/2014

Course	Theory of Computation I
Instructor	Sun, Min-Te(Peter)
Credit	3
Whole Year or Semester	Semester
Teaching goal	This course introduces the fundamental computation language and machine models.
Teaching content	(none)

Course	Optimization
Instructor	Chang, Chia-Hui
Credit	3
Whole Year or Semester	Semester
Teaching goal	The objective of this course is to introduce the fundamental theory behind machine learning. The students could learn how to design an objective function of unknown variables (parameters to be learnt) subject to some predefined constraints (enforced by given data). Based on the given problem, we will introduce the technique to find the optimal solution.
Teaching content	Course Contents 1. Introduction (1 weeks) Why this course? Some applications from ML: SVM, MM, HMM, CRF Understanding your optimization problem Course contents and schedule Course administrative 2. Mathematical Preliminaries (1 weeks)

	matrix, calculus, convex set 3. Part I: Unconstrained Optimization (3 weeks) One-dimension search method Gradient method Newton's Conjugate direction method Least-square analysis Neural networks 4. Part II: Linear Constrained Optimization(4 weeks) Linear programming The simplex method Duality Quadratic programming 5. Part III: NonLinear Constrained Optimization (4 weeks) Langrange multipliers KKT condition Convexity Duality 6. Part IV: Maximum Likelihood Estimation (4 weeks) Mixture model + EM algorithm Hidden markov model + Dynamic programming Conditional random field

Course	Computer Architecture
Instructor	Cheng, Hsu-Yung
Credit	3
Whole Year or Semester	Semester
Teaching goal	Let the students understand the design and development of computer architecture
Teaching content	Fundamentals of Computer Design Instruction Set Principles and Pipelining Advanced Pipelining and Instruction Level Parallelism (ILP) Scoreboard, Tomasulo Branch Prediction

	Memory Hierarchy, Cache Virtual Memory I/O, Storage Multi-Processers

Course	3D Computer Graphics
Instructor	Yeh, Shih-Ching
Credit	3
Whole Year or Semester	Semester
Teaching goal	(none)
Teaching content	1. Rasterization 2. Transformation 3. Projection 4. Ray Casting 5. Clipping 6. Culling, Z-buffer 7. Lighting 8. Shading 9. Texture Mapping 10. Special effect: Bumping 11. Noise Filtering 12. Interfaces