國立交通大學資訊科學與工程研究所

博士班資格考考試科目與評分規定
附件：筆試科目與範圍、可替代課程

一、 筆試科目

(一) 計算機架構（Computer Architecture）

References:

John L. Hennessy & David A Patterson, “Computer Architecture : A Quantitative Approach,” 6th Ed., Morgan Kaufmann Publishers, Inc., 2019

Contents:

(1) Fundamentals of Quantitative Design and Analysis
1.1 - 1.10

(2) Memory Hierarchy Design
2.1,2.3

(3) Instruction-Level Parallelism and Its Exploitation
3.1-3.11

(4) Data-Level Parallelism in Vector, SIMD, and GPU Architectures
4.1-4.3 & 4.5

(5) Tread-Level Parallelism
5.1 -5.5

Appendix A Instruction Set Principles
A.1-A.8

Appendix B Review of Memory Hierarchy
B.1-B.5

Appendix C Pipelining: Basic and Intermediate Concepts
C.1-C.5

(二) 作業系統（Operating Systems）

References:

A. Silberschatz, P. B. Galvin and G. Gagne, “Operating System Principles,”7th Edition, John Wiley & Sons Inc., 2006.

Contents:

Chapter 1-16

(三)　演算法（Computer Algorithms）

References:

Cormen et al., Introduction to Algorithms, 3rd Edition.範圍(有星號 * 的章節除外):

Contents:

(1) Analysis of Algorithms:
Chapter 1~5

(2) Sorting:
Chapter 6~9

(3) Data Structure:
Chapter 11~13

(4) Dynamic Programming:
Chapter 15

(5) Greedy Algorithms:
Chapter 16

(6) Amortized Analysis:
Chapter 17

(7) Fibonacci Heaps:
Chapter 19

(8) Data Structures for Disjoint Sets:
Chapter 21 (不包含 21.4)

(9) Graph Algorithms:
Chapter 22~26

(10) NP-completeness:
Chapter 34 & 35.1 & 35.2

(四)　計算理論（Computation Theory）

References:

(1) Michael Sipser, “Introduction to the Theory of Computation,” 2nd Ed., Thomson Course Technology, 2006, ISBN: 0619217642.

(2) John C.Martin, "Introduction to Languages and the theory of computation, 3rd Ed.," McGraw-Hill, 2003.

(3) J. E. Hopcroft, R. Motwani and J. D. Ullman,“ 2nd Ed., Introduction to Automata Theory, Languages, and Computation,” Addison-Wesley, 2001.

Contents:

(1) Finite automata

(2) Regular expression and Languages

(3) Pushdown automata

(4) Context-free grammars and Languages
(5) Turing machines
(6) Computability theory (recursive, r.e. and undecidability)
(7) Introduction to Computational Complexity (NP theory)

(五) 人工智慧（Artificial Intelligence）

References:
Artificial Intelligence: A Modern Approach by Stuart Russell and Peter Norvig 3rd Ed.

二、修課可抵免科目(修課可抵免科目以本院所開設的課程為限。)

類別	資格考科目	修課取代筆試課程
甲	計算機架構 Computer Architecture	計算機架構 Computer Architecture
	作業系統 Operating Systems	作業系統或作業系統設計與實作或作業系統總整與實作 Operating Systems or Operating System Design and Implementation or Operating Systems Capstone
	演算法 Computer Algorithms	演算法 Computer Algorithms
	計算理論 Computation Theory	正規語言與計算理論 Formal Languages and Theory of Computation
	人工智慧 Artificial Intelligence	人工智慧 Artificial Intelligence
乙	編譯器設計 Compiler Design	編譯器設計 Compiler Design
	嵌入式系統設計 Embedded System Design	嵌入式系統設計 Embedded System Design
	電腦視覺	電腦視覺

	Computer Vision	Computer Vision
	計算機圖學 Computer Graphics	計算機圖學 Computer Graphics
	影像處理 Image Processing	影像處理 Image Processing
	圖形識別 Pattern Recognition	圖形識別 Pattern Recognition
	圖形理論 Graph Theory	圖形理論 Graph Theory
	網路程式設計 Network Programming	網路程式設計 Network Programming
	排隊理論 Queuing Theory	排隊理論 Queuing Theory
	計算機網路 Computer Networks	計算機網路 Computer Networks
	網路安全 Network Security	網路安全 Network Security
	資料探勘 Data Mining	資料探勘 Data Mining
	機器學習 Machine Learning	機器學習、深度學習與實務、深度學習及深度學習實驗共兩門課 Machine Learning、Deep Learning and Practice、Deep Learning and

		Deep Learning Labs (2 lessons)