

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 3~5
- (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) Data Structures for Disjoint Sets:
Chapter 21
- (8) Graph Algorithms:
Chapter 22~26
- (9) 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 |

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| | 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 Machine Learning、Deep Learning and Practice |