一、筆試科目

(一) 計算機架構 (Computer Architecture)

References:

Contents:
1. Fundamentals of Quantitative Design and Analysis
   1.1 - 1.10
2. Memory Hierarchy Design
   2.1 - 2.2
3. Instruction-Level Parallelism and Its Exploitation
   3.1-3.12
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:

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:

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)

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。）

<table>
<thead>
<tr>
<th>類別</th>
<th>資格考科目</th>
<th>修課取代筆試課程</th>
</tr>
</thead>
<tbody>
<tr>
<td>甲</td>
<td>計算機架構 Computer Architecture</td>
<td>計算機架構 Computer Architecture</td>
</tr>
<tr>
<td></td>
<td>作業系統 Operating Systems</td>
<td>作業系統或作業系統設計與實作 Operating Systems or Operating System Design and Implementation</td>
</tr>
<tr>
<td></td>
<td>演算法 Computer Algorithms</td>
<td>演算法 Computer Algorithms</td>
</tr>
<tr>
<td></td>
<td>計算理論 Computation Theory</td>
<td>正規語言與計算理論 Formal Languages and Theory of Computation</td>
</tr>
<tr>
<td></td>
<td>人工智慧 Artificial Intelligence</td>
<td>人工智慧 Artificial Intelligence</td>
</tr>
<tr>
<td>乙</td>
<td>編譯器設計 Compiler Design</td>
<td>編譯器設計 Compiler Design</td>
</tr>
<tr>
<td></td>
<td>嵌入式系統設計 Embedded System Design</td>
<td>嵌入式系統設計 Embedded System Design</td>
</tr>
<tr>
<td></td>
<td>電腦視覺</td>
<td>電腦視覺</td>
</tr>
<tr>
<td>English</td>
<td>Chinese</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>Computer Vision</td>
<td>計算機圖學</td>
<td></td>
</tr>
<tr>
<td>Computer Graphics</td>
<td>影像處理</td>
<td></td>
</tr>
<tr>
<td>Image Processing</td>
<td>圖形識別</td>
<td></td>
</tr>
<tr>
<td>Pattern Recognition</td>
<td>圖形理論</td>
<td></td>
</tr>
<tr>
<td>Graph Theory</td>
<td>網路程式設計</td>
<td></td>
</tr>
<tr>
<td>Network Programming</td>
<td>排隊理論</td>
<td></td>
</tr>
<tr>
<td>Queuing Theory</td>
<td>計算機網路</td>
<td></td>
</tr>
<tr>
<td>Computer Networks</td>
<td>網路安全</td>
<td></td>
</tr>
<tr>
<td>Network Security</td>
<td>資料探勘</td>
<td></td>
</tr>
<tr>
<td>Data Mining</td>
<td>機器學習</td>
<td></td>
</tr>
<tr>
<td>Machine Learning</td>
<td>機器學習、深度學習與實務</td>
<td></td>
</tr>
</tbody>
</table>