

博士學位候選人資格考核實施辦法附加說明【113版】

960416/980108/990105/1000601/1110607/1130702/1131223 學委會

一、筆試：

- 筆試各類成績以佔分比例加權平均計算後，成績達 70 分(含)以上者，毋需審查，通過資格考核。
- 單門成績 70 分(含)以上，重考時該門得免考，惟其成績不列入加權平均計算。
- 關書考試一律不得攜帶參考資料。
- 筆試科目、佔分比例、考試時間、考試方式及注意事項：
 - 每門考試時間均為 100 分鐘，總分 100 分。
 - 考試方式：除電力系統外，其他均為關書考試。

| 組別 | 考試科目 | 佔分比例及注意事項 |
|--------|---|-------------------------------|
| 控制組 | 1.控制系統 2.線性系統 | 每門需 70(含)分以上 |
| 電力組 | 1.工程類 1 門--電路學(共 1 科) 2.專業類 1 門--下列 2 門選考 1 門 (1)電力電子學(共 1 科) (2)電力系統(含電力系統控制與穩定度、電腦電驛，共 2 科，每科佔分 50%) | 工程類 30% 專業類 70% |
| 計算機科學組 | 1.數學類 1 門--下列 3 科選考 1 科 線性代數、離散數學、機率與統計 2.工程類 1 門--演算法 (共 1 科) 3.專業類 1 門--下列 2 科選考 1 科 電腦網路、機器學習 | 數學類 30% 工程類 40% 專業類 30% |
| 資訊安全組 | 1.機器學習 2.密碼學 3.電腦通信網路 | 3 門平均計算 |

二、抵免筆試：需事前申請，由學術委員會提請各組討論後做成推薦，交付學術委員會決議是否同意抵免。抵免通過後，成績以該門(科)總分之 70% 計。

控制組：無論文發表抵免，抵免門數不限。

電力組：最多可抵免 2 科。其中修課抵免最多 1 科，論文發表抵免最多 1 科。

計算機科學組：無修課抵免，數學類不可抵免，最多可抵免 1 科。

資訊安全組：最多可抵免 2 門。

1.以修課抵免筆試：各組修課抵免之課程及成績標準如下。需為 5 年內修習之課程。

控制組：

| 考試科目 | 課號 | 課程識別碼 | 可抵免之課程 | 成績標準 |
|------|--------|-----------|--------|--------|
| 控制系統 | EE3024 | 901 43100 | 控制系統 | A 或 A+ |
| | ME3007 | 502 45100 | 自動控制 | A 或 A+ |
| 線性系統 | EE5128 | 921 U8200 | 線性系統 | A 或 A+ |
| | ME5220 | 522 U5040 | 線性控制系統 | A 或 A+ |

電力組：

| 考試科目 | 課號 | 課程識別碼 | 可抵免之課程 | 成績標準 |
|-------|--------|-----------|-------------------|------|
| 電路學 | EE2004 | 901 20100 | 電路學 ^{*註} | B-以上 |
| 電力電子學 | EE5002 | 921 U0080 | 電力電子學 | A-以上 |

| | | | | |
|------------|--------|-----------|------------|--------|
| 電力系統控制與穩定度 | EE5102 | 921 U6110 | 電力系統控制與穩定度 | A 或 A+ |
| 電腦電驛 | EE5068 | 921 U3030 | 電腦電驛 | A 或 A+ |

*註：電路學若以非表列課號之本系成績抵免，需經電力組學術委員同意，並送學術委員會審查。

計算機科學組：無修課抵免。

資訊安全組：

| 考試科目 | 課號 | 課程識別碼 | 可抵免之課程 | 成績標準 |
|--------|--------|-----------|-----------|------|
| 機器學習 | EE5184 | 921 U2620 | 機器學習(4學分) | B-以上 |
| 密碼學 | EE5060 | 921 U2780 | 密碼學 | B-以上 |
| 電腦通信網路 | EE5025 | 921 U1080 | 電腦通信網路 | B-以上 |
| | EE5188 | 921 U2660 | 網路攻防實習 | B-以上 |

2 以論文發表抵免筆試：

- (1)論文需為該學生與指導教授共同發表，並註明本系為第一論文發表單位，該學生必須為指導教授除外之第一作者。
- (2)抵免之論文可用於論文審查。
- (3)各組可抵免之會議論文及期刊如下，其他相同等級會議或期刊，由各組決議。

控制組：無。

電力組：

期刊：

| | |
|----|---|
| 1 | IEEE Transactions on industrial electronics |
| 2 | IEEE Transactions on power electronics |
| 3 | IEEE Journal of Emerging and Selected Topics in Power Electronics (JSTPE) |
| 4 | IEEE Transactions on Industry Applications |
| 5 | IEEE Open Journal of Power Electronics |
| 6 | IEEE Transactions on SMART GRID |
| 7 | IEEE Transactions on SUSTAINABLE ENERGY |
| 8 | IEEE Transactions on POWER SYSTEM |
| 9 | IEEE Transactions on CIRCUITS and system-I |
| 10 | IET Transactions on power electronics |
| 11 | IEEE ACCESS |
| 12 | IEEE Transactions on Transportation Electrification |
| 13 | IEEE Open Journal of Industrial Electronics |
| 14 | IEEE Open Journal of Industry Applications |
| 15 | IEEE Transactions on Energy Conversion |
| 16 | IEEE Transactions on Power Delivery |
| 17 | IEEE Open Access Journal of Power and Energy |

計算機科學組：可申請抵免該項專業類或工程類科目(數學類不可抵免)，論文需與抵免科目相關。

期刊：品質等同優良期刊或以上。請參考本院傑出期刊或優良期刊清冊。

http://www.eecs.ntu.edu.tw/zh_tw/DepartmentsPrograms/info5

會議論文：品質等同下表或以上。

| No | Conference | Fields | Subfields | Accept Rate |
|----|---|------------------------------|----------------------|-------------|
| 1 | FME | Computer-Aided Design | Formal Method | 23% |
| 2 | ISSTA | Computer-Aided Design | Software Testing | 26% |
| 3 | TACAS | Computer-Aided Design | System Tools | 25% |
| 4 | International Test Conference | Computer-Aided Design | Testing | 30% |
| 5 | VLSI Test Symposium | Computer-Aided Design | Testing | 30% |
| 6 | CAV | Computer-Aided Design | Verification | 29% |
| 7 | IEEE/ACM DAC | Computer-Aided Design | EDA | 21% |
| 8 | IEEE/ACM DATE | Computer-Aided Design | EDA | 21% |
| 9 | IEEE/ACM ICCAD | Computer-Aided Design | EDA | 23% |
| 10 | ACM CIKM | Data mining | Data mining | 20% |
| 11 | IEEE ICDM | Data mining | Data mining | 20% |
| 12 | SIAM SDM | Data mining | Data mining | 20% |
| 13 | ACM SIGMOD | Database | Database | 15% |
| 14 | EDBT | Database | Database | 14% |
| 15 | IEEE ICDE | Database | Database | 18% |
| 16 | VLDB | Database | Database | 14% |
| 17 | ACM SIGKDD | Knowledge discovery | Knowledge discovery | 15% |
| 18 | ACM/IEEE ICSE | Software Engineering | Software Engineering | 9% |
| 19 | IEEE International Symposium on Software Reliability Engineering (ISSRE) | Software Engineering | Software Engineering | 25% |
| 20 | ACM MM | System, Network, Security | Applications | 15% |
| 21 | ACM WWW | System, Network, Security | Applications | 14% |
| 22 | IEEE/IFIP DSN | System, Network, Security | Dependable Systems | 19% |
| 23 | IEEE ICDCS | System, Network, Security | Distributed Systems | 14% |
| 24 | IEEE IPDPS | System, Network, Security | Distributed Systems | 23% |
| 25 | IEEE PERCOM | System, Network, Security | Distributed Systems | 8% |
| 26 | IEEE INFOCOM | System, Network, Security | General Networks | 18% |
| 27 | ACM MOBICOM | System, Network, Security | Mobile Networks | 11% |
| 28 | ACM MOBIHOC | System, Network, Security | Mobile Networks | 10% |
| 29 | ACM MOBISYS | System, Network, Security | Mobile Networks | 15% |
| 30 | ACM SenSys | System, Network, Security | Mobile Networks | 14% |
| 31 | IEEE SECON | System, Network, Security | Mobile Networks | 25% |
| 32 | IEEE/ACM IPSN | System, Network, Security | Mobile Networks | 15% |
| 33 | ACM Sigcomm | System, Network, Security | Networking | 12% |
| 34 | International World Wide Web Conference (WWW) | System, Network, Security | Networking | 11% |
| 35 | ASIACRYPT | System, Network, Security | Security | 16% |
| 36 | CRYPTO | System, Network, Security | Security | 16% |
| 37 | EUROCRYPT | System, Network, Security | Security | 18% |
| 38 | USENIX Security Symposium | System, Network, Security | Security | 14% |
| 39 | IEEE Conference on Nanotechnology (IEEE-NANO) | System, Network, Security | System | 30% |
| 40 | IEEE International Symposium on Circuits and Systems(ISCAS) | System, Network, Security | System | 30% |
| 41 | ACM SIGMETRICS | System, Network, Security | System Performance | 13% |
| 42 | ACM CCS | System, Network, Security | System Security | 14% |
| 43 | IEEE Security & Privacy | System, Network, Security | System Security | 12% |
| 44 | ACM PODC | System, Network, Security | Theory | 23% |
| 45 | ACM SODA | Theoretical Computer Science | Theory | 27% |
| 46 | ACM STOC | Theoretical Computer Science | Theory | 30% |
| 47 | ICALP | Theoretical Computer Science | Theory | 26% |
| 48 | IEEE FOCS | Theoretical Computer Science | Theory | 22% |
| 49 | ACNS | Security | Cryptography | 18% |
| 50 | ASIACCS | Security | Cryptography | 25% |
| 51 | CHES | Security | Cryptography | 27% |

| | | | | |
|----|--------|----------|--------------|-----|
| 52 | CT-RSA | Security | Cryptography | 30% |
| 53 | PKC | Security | Cryptography | 31% |
| 54 | SAC | Security | Cryptography | 30% |

References

- [1] The ACM Digital Library (<http://portal.acm.org/dl.cfm?coll=portal&dl=ACM&CFID=4647136&CFTOKEN=72221600>)
[2] Networking Conferences Statistics (<http://www.cs.ucsb.edu/~almeroth/conf/stats/>)
[3] Some CS Conference Statistics (http://www.cs.berkeley.edu/~pbg/conf_stats/)
[4] ACNS: 是密碼學暨資訊安全方面高水準的國際會議之一，平均接受率為 17.7%
[5] ASIACCS: 資訊安全方面高水準國際會議，亞洲版的 CCS，接受率約 25%
[6] CHES: 密碼學界最重要的高水準國際會議之一，2015 年的接受率為 27%，PR 約 9.2%
[7] CT-RSA: 資訊安全最大國際會議 RSA 中的 Cryptographer's track，接受率約 30%，PR 約 25%
[8] PKC: 密碼學界最重要的高水準國際會議之一，2015 年的接受率為 31%，PR 約 28.7%
[9] SAC: 密碼學方面高水準國際會議，接受率約 30%
註：PR = #accepted papers / #registered participants，亦即與會者當中約略是來發表文章的比率，而 1 - PR 則大約是沒有發表論文、純粹是來吸取新知的比率

資訊安全組：論文需與抵免科目相關。

期刊：品質等同下表或優良期刊或以上。優良期刊請參考本院傑出期刊或優良期刊清冊。http://www.eecs.ntu.edu.tw/zh_tw/DepartmentsPrograms/info5

| No | Name | IF |
|-----|---|------|
| 1. | IEEE (ACM) Transactions and Magazines. | |
| 2. | TISSEC-ACM Transactions on Information and System Security | 1.78 |
| 3. | DCC-Designs, Codes and Cryptography | 1.52 |
| 4. | IEEE Security & Privacy | 2.62 |
| 5. | IEEE Transactions on Information Forensics and Security | 6.01 |
| 6. | IEEE Transactions on Dependable and Secure Computing | 8.94 |
| 7. | Elsevier Computers & Security | 3.57 |
| 8. | International Journal of Advanced Computer Science and Information Technology | 1.3 |
| 9. | International Journal of Information Security | 1.49 |
| 10. | ACM Transactions on the Web | 2.0 |
| 11. | ACM Transactions on Embedded Computing Systems | 1.53 |
| 12. | JOC-Journal of Cryptology | 1.2 |

會議論文：品質等同下表或以上。

| | |
|-----|--|
| 1. | S&P - IEEE Symposium on Security and Privacy |
| 2. | CCS - Computer and Communications Security |
| 3. | USENIX Security Symposium - USENIX Security Symposium |
| 4. | CSFW - Computer Security Foundations Workshop |
| 5. | NDSS - Network and Distributed System Security Symposium |
| 6. | DSN - Dependable Systems and Networks |
| 7. | ESORICS - European Symposium on Research in Computer Security |
| 8. | RAID - International Symposium on Recent Advances in Intrusion Detection |
| 9. | CSF - IEEE Computer Security Foundations Symposium. |
| 10. | SAC - ACM Symposium on Applied Computing |
| 11. | CNS - IEEE Conference on Communications and Network Security |
| 12. | ICISC - International Conference on Information Security and Cryptology |
| 13. | Globecom, |
| 14. | ICC |
| 15. | PIMRC |

三、筆試參考書目

線性代數、離散數學、機率與統計、電路學、演算法
→請參考本系大學部課程綱要。

| | |
|------------|---|
| 控制系統 | (1) Feedback Control of Dynamic Systems, by G. F. Franklin, J. D. Powell, and A. Emami-Naeini (2) Modern Control Systems, by R. C. Dorf |
| 線性系統 | (1) Linear System Theory and Design, by C.-T. Chen (2) A Linear Systems Primer, by P. Antsaklis and A. Michel, (3) Linear System Theory, by W.J. Rugh (4) Linear Systems by T. Kailath |
| 電力電子學 | 請參考上課講義 |
| 電力系統控制與穩定度 | P.M. Anderson, Power System Control and Stability |
| 電腦電驛 | "Computer Relaying for Power Systems" by Arun G.Phadke, James S. Thorp |
| 電腦網路 | James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 5th Edition. |
| 機器學習 | • Introduction to Machine Learning, Ethem Alpaydin, 2009, MIT Press • Pattern Recognition and Machine Learning, Christopher M. Bishop, 2006, Springer |
| 密碼學 | Introduction to Modern Cryptography: Principles and Protocols Jonathan Katz, Yehuda Lindell, 2nd edition, CRC Press, 2015. |
| 電腦通信網路 | Computer Networks, Andrew S. Tanenbaum, Prentice Hall |

控制組資格考 Outline and Reference Exam

I. Control Systems

- Mathematical modeling of dynamic systems in the frequency domain (Laplace transforms, transfer functions)
- Block diagram manipulations
- Stability; Routh Hurwitz Criterion
- Transient response; transient performance specifications (overshoot, rise time, settling time)
- Steady state errors; final value theorem; system type; steady state performance
- Root locus analysis and design; closed loop root locations and transient performance
- Frequency response methods (bode, nyquist); frequency domain analysis (gain margin, phase margin, band width)
- Frequency domain loop shaping
- Compensator design using PID controllers, lead, lag and integral action
- Reference
 - i. *Feedback Control of Dynamic Systems* by G. F. Franklin, J. D. Powell, and A. Emami-Naeini

ii. *Modern Control Systems* by R. C. Dorf

II. Linear Systems

- State-space representation of continuous-time and discrete-time control systems
- Relevant methods and results from linear algebra, such as eigenvalues and eigenvectors, singular values, the Cayley-Hamilton theorem, Jordan form
- Matrix exponentials, state-transition matrices, impulse-response functions
- Stability of linear systems, Lyapunov functions and Lyapunov equations
- Controllability, stabilizability, observability, detectability; controllability, and observability diagrams
- Control and observer canonical forms, companion form
- Stabilization and pole-placement by feedback
- Reconstruction of state vector and state observer feedback
- Relationships between state-space representations and frequency-domain representations
- Reference
 - i. *Linear System Theory and Design* by C.-T. Chen
 - ii. *A Linear Systems Primer* by P. Antsaklis and A. Michel
 - iii. *Linear System Theory* by W.J. Rugh
 - iv. *Linear Systems* by T. Kailath