

109 學年度國立台灣科技大學電子工程系
計算機組博士班資格考試主要內容及參考書目

(第一次修訂：84 年 9 月)
(第二次修訂：85 年 9 月)
(第三次修訂：87 年 9 月)
(第四次修訂：88 年 3 月)
(第五次修訂：89 年 9 月)
(第六次修訂：92 年 6 月)
(第七次修訂：93 年 9 月)
(第八次修訂：94 年 9 月)
(第九次修訂：96 年 9 月)
(第十次修訂：98 年 9 月)
(第十一次修訂：99 年 3 月)
(第十二次修訂：100 年 3 月)
(第十三次修訂：101 年 3 月)
(第十四次修訂：106 年 9 月)

一、作業系統領域

1. 主要內容：(1) Operating System Structures, (2) Process Concept & Process Synchronization, (3) CPU Scheduling, (4) Memory Management, (5) Disk and File Systems, (6) Distributed Operating Systems.
2. 參考書目：(1) A. Silberschatz and P. B. Galvin, “Operating System Concepts” 9th ed., John Wiley & Sons, 2012.

二、計算機結構領域

1. 主要內容：(1) Hardware / Software Interface, (2) Processor Design, (3) Memory Hierarchy, (4) Instruction-Level Parallelism, (5) Multiprocess and Thread-Level Parallelism, (6) Performance Enhancement.
2. 參考書目：(1) J. L. Hennessy and D.A. Patterson, “Computer Architecture: A Quantitative Approach,” 5th Ed, Morgan Kaufmann, 2011.
(2) D. A. Patterson and J. L. Hennessy, “Computer Organization and Design,” 5th Ed, Morgan Kaufmann, 2014.

三、計算機演算法領域

1. 主要內容：(1) Mathematical Foundations, (2) Sorting and Searching, (3) Dynamic Programming, (4) Graphs, (5) NP-Completeness.
2. 參考書目：(1) Cormen, Thomas H./ Leiserson, Charles E./ Rivest, Ronald L./ Stein, Clifford, “Introduction to Algorithms,” 3rd, MIT Press, 2009.
(2) Horowitz, Ellis/ Sahni, Sartaj/ Rajasekaran, Sanguthevar, Computer Algorithms, 2nd ed., Silicon Press, 2007

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(第九次修訂：100 年 9 月)
(第十次修訂：105 年 9 月)

一、通訊系統領域

1. 主要內容：(1) Baseband Transmission, (2) Analog & Digital Modulation Technique, (3) Basic Channel Coding, (4) Basic Detection & Estimation Theory.
2. 參考書目：(1) Sklar, “Digital Communications - Fundamentals and Applications,” 2nd Ed. Prentice-Hall, 2001.
(2) Simon Haykin, “Communication System,” John Wiley, 2001.

二、通訊網路領域

1. 主要內容：(1) Data Communications, (2) Network Architecture and Protocols, (3) Interconnection Networks, (4) Network Modeling and Performance Evaluation, (5) Routing and Congestion Controls.
2. 參考書目：(1) Tanenbaum, “Computer Networks,” 4th Ed. Prentice-Hall, 2003.
(2) Stallings, “Data and Computer Communications,” 8th Ed. 2007.
(3) Stallings, “Local & Metropolitan Area Networks,” 6th Ed., Prentice-Hall, 2000.

三、電磁領域

1. 主要內容：(1) Static Electric Fields, (2) Static Magnetic Fields, (3) Maxwell's Equations (4) Plane Wave Propagations, (5) Transmission Line and Its Applications, (6) Waveguides, (7) Antenna Theory
2. 參考書目：(1) David M. Pozar, “Microwave Engineering,” 3rd Ed. John Wiley & Sons, 2005. (2) David K Cheng, “Fundamentals of Engineering Electromagnetics”, Addison-Wesley, 1993

四、電子電路領域

1. 主要內容：(1) Diode Applications, (2) Discrete Transistor Circuits, (3) Op Amp Applications, (4) Frequency Response, (5) Digital Circuits.
2. 參考書目：(1) Donald A. Neamen, Microelectronics: Circuit Analysis and Design, 4e, 2010
(2) Sedra/Smith, "Microelectronic Circuits, 6e, 2011.

五、信號處理領域

- 1.主要內容：(1) Z-transform, DFT and FFT, (2) Digital Filter Design, (3) Discrete Signals and Systems, (4) Fourier Analysis.
- 2.參考書目：(1) A. V. Oppenheim, R. W. Schaffer and J. R. Buck, "Discrete-time Signal Processing," 2nd Ed., Prentice-Hall, 1999.
(2) S. J. Orfanidis, "Introduction to Signal Processing," Prentice-Hall International, Inc., 1996.

六、電力電子領域

- 1.主要內容：(1) Power Semiconductor Switches, (2) Magnetic Circuits, (3) Basic Converter and Inverter Topologies, (4) Isolated PWM DC/DC converters, (5) Resonant Converters, (6) EMI Filter Design, (7) Power Factor Correction.
- 2.參考書目：(1) Mohan, Undeland and Robbins, "Power Electronics: Converters, Applications and Design," 3rd Ed., John Wiley & Sons, Inc., 2003.
(2) Pressman, Abraham I./ Billings, Keith/ Morey, Taylor, "Switching Power Supply Design" , 3rd ed., McGraw-Hill, 2009.

七、控制系統領域

- 1.主要內容：(1) Steady-state Analysis, (2) Root-locus Design, (3) Frequency-response Design, (4) State-space Design
- 2.參考書目：(1) G. F. Franklin, etc, "Feedback Control of Dynamics System," 5th Ed., Prentice Hall, 2006.
(2) B. C. Kuo, "Automatic Control System," 8th Ed., John Wiley & Sons, Inc., 2003
(3) Feedback Control Systems (5e), Charles L. Phillips/John M. Parr, 2011

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(第六次修訂：90 年 4 月)

(第七次修訂：95 年 3 月)

(第八次修訂：97 年 9 月)

(第九次修訂：98 年 3 月)

(第十次修訂：100 年 9 月)

一、固態電子學領域

1. 主要內容：(1) Crystal Structure，(2) Lattice Vibration，(3) Free-Electron Model, (4) Band Theory, (5) Fundamentals of Quantum Statistics, (6) Carrier Transport, (7) Dielectric and Optical Properties, (8) Metal-Semiconductor Structure and Semiconductor Junctions.
2. 參考書目：(1) C. Kittel, "Introduction to Solid State Physics," 8th ed., John Wiley & Sons, 2004.
(2) C.T. Sah, "Fundamentals of Solid State Electronics," World Scientific, 1991.

二、半導體元件領域

1. 主要內容：(1) Diodes, (2) BJT's, (3) MOS Structure, (4) FET's.
2. 參考書目："Introduction to semiconductor physics and devices" by Neaman.

三、光子學領域

1. 主要內容：(1) Wave Optics, (2) Beam Optics, (3) Electromagnetic Optics, (4) Polarization and Crystal Optics, (5) Guided Wave Optics (6) Fiber Optics.
2. 參考書目：(1) Fundamentals of Photonics (2007), 2nd Edition B.E.A Saleh, M.C. Teich
(2) Photonics (2007), 6th Edition by A. Yariv and P. Yeh

四、光電半導體領域

1. 主要內容：(1) Optical Properties of Semiconductor, (2) Optoelectronic Detectors, (3) Light Emitting Diodes, (4) Laser Diodes.
2. 參考書目：(1) J. Singh, "Semiconductor Optoelectronics: Physics and Technology," McGraw-Hill, 1995.
(2) Pallab Bhattacharya, "Semiconductor Optoelectronic Devices," 2nd ed., Prentice Hall, 1997.
(3) Larry A. Coldren and Scott W. Corzine, Diode Lasers and Photonic Integrated Circuits, Wiley, 1995

(4) S. O. Kasap, "Optoelectronics and Photonics Principles and Practices," 2nd ed, 2013

五、富立葉光學領域

1. 主要內容：(1) Fourier Transform, (2) Scalar Diffraction Theory, (3) Fresnel and Fraunhofer Diffraction, (4) Coherent and Incoherent Optical Systems, (5) Frequency Analysis of Optical Imaging Systems, (6) Wavefront Modulation, (7) Analog Optical Information Processing, (8) Holography.
2. 參考書目：(1) "Introduction to Fourier Optics," by Joshph W. Goodman, 3nd Ed., McGraw-Hill, 2005.