مواد الامتحان التنافسي للتقديم لدراسة الماجستير

في هندسة الحاسبات للعام الدراسي ٢٠٢١-٢٠٢٢

	ت	المادة
مواد المرحلة الثانية	1	Microprocessor and Microcomputer I
	2	Digital Systems Design
	3	Electronics II (Digital Electronics)
	4	Engineering Mathematics
مواد المرحلة الثالثة	1	Microprocessor and Microcomputer II
	2	Operating Systems
	3	Computer Architecture I
	4	Computer Networks
	5	Digital Control Systems
	6	Digital Signal Processing
مواد المرحلة الرابعة	1	Computer Architecture II
	2	Internet Technology
	3	Computer Security
	4	Embedded Systems
	5	Robotics and Artificial Intelligence
	6	Computer Vision and Pattern Recognition

المواضيع المنتقاة في الامتحان التنافسي مع المصادر لكل مادة

المرحلة الثانية

Microprocessor and Microcomputer I

- Microprocessor and its architectures
- Data movement instructions
- ٨٠٨٠٦ Hardwar specifications

Reference:

The Intel Microprocessors, Architecture, Programming, and Interfacing, Eighth Edition, BARRY B. BREY.

Digital Systems Design

- Sequence generator
- State machine (SM) (synchronous and asynchronous)
- VHDL programming language
- Algorithm state machine (ASM)
- Programming devices (RAM, ROM, PLA and FPGA)

Reference:

C.H. Roth, "Fundamental of logic design", 2010-2014, 6th edition, or any edition.

Electronics II (Digital Electronics)

- Multivibrator Circuits.
- Digital Logic Circuits.

References:

1- Electronic Devices and Circuit Theory, Robert Boylestad, Louis Nashelsky
2- Microelectronic Circuit", Sedra, Smith

Engineering Mathematics

- Solving differential equation
- Solving difference equation

Reference:

Engineering Mathematics: A Foundation for Electronic, Electrical, Communications and Systems Engineers, Fifth Edition, By Anthony Croft, Robert Davison, Martin Hargreaves and James Flint (2017).

المرحلة الثالثة

Microprocessor and Microcomputer II

- Memory interface 8 16 32 and 64 bits
- Basic input output 8255 Interrupts
- interrupt controller 8259

Reference:

Barry B. Brey, The Intel Microprocessors, 8th edition.

Operating Systems

- Process Management
- Concurrency
- Virtual Memory

Reference:

Operating Systems: Internals and Design Principles, William Stalling.

Computer Architecture I

- Basic Computer Organization and Design
- Microprogrammed Control
- Central Processing Unit
- Computer Arithmetic

Reference:

“Computer System Architecture”, Third edition, M. Morris Mano.

Computer Networks

- Application Layer
- Transport Layer
- Network Layer
- Datalink Layer

Reference:

Computer Networking a Top-Down Approach, 7 th edition, Kurose and Rose.

Digital Control Systems

- Transient and steady-state response analyses of first and second order systems
- Root locus method
- Frequency response method
- State Space: Design using state feedback (Pole placement)
- Discrete Time Systems: Stability analysis in digital control
- Digital control design: Design using state feedback (Pole placement)

References:

1- Modern control Engineering, Katsuhiko Ogata.
2- Digital Control System Analysis and Design, Charles L. Philips

Digital Signal Processing

- Digital Signals and Systems (Linear Time-Invariant, Causal Systems).
- Signal Sampling and Quantization.

Reference:

Tan, Lizhe, and Jean Jiang. Digital signal processing: fundamentals and applications. Academic Press, 2018

المرحلة الرابعة

Computer Architecture II

- Performance Equation
- Cache Memory
- Static Pipeline
- Dynamic Pipeline

Reference:

John L. Hennessy and David A. Patterson, Computer Architecture -- A Quantitative Approach, 5th Edition, Morgan Kaufmann Publications, Elsevier, Inc., 2012.

Internet Technology

- Content delivery Network
- Web Hosting, Hosting Setups
- Wide Area Networks (SONET/SDH), T1-E1 carriers
- Internet Access Technologies
  - DSL
  - Cable TV
  - Broadband Power Line
  - FTTH
- DNS

References:

1- TCP/IP Protocol Suite (McGraw-Hill Forouzan Networking), Behrouz A. Forouzan
2- Content Delivery Networks (Lecture Notes in Electrical Engineering, Rajkumar Buyya (Editor), Mukaddim Pathan (Editor), Athena Vakali (Editor)

Computer Security

- Encryption
- User Authentication
- Access Control
- Malicious Software

Reference:

Computer Security Principles and Practice, 3 rd edition, William Stallings.

Embedded Systems

- Introduction to PIC microcontrollers (chapter 1 in the reference)
- PIC Architecture and assembly language programming (chapter 2 in the reference)

Reference:

“PIC Microcontroller and Embedded Systems Using ASM & C for PIC18” book by Mohammed Ali Mazidi , Rolin D.Mckinlay and Danny Causey

Robotics and Artificial Intelligence

- Vector and Matrices.
- Inner Product
- Spatial descriptions and transformations
- Models of Artificial Neural Networks

References:

1. Introduction to Robotics Mechanics and Control Third Edition John J. Craig, 2005

2. Introduction to Artificial Neural Systems JACEK M. ZURADA 1992

Computer Vision and Pattern Recognition

- Digital Image Fundamentals, Intensity Transformations, Spatial Filtering, and Filtering in the Frequency Domain [Ref 1]

- Feature detection and matching [Ref 2]

References:

1- Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Pearson, 2018.ISBN: 0-13-335672-8
2- Szeliski, Richard. "Computer vision: algorithms and applications", Springer Science & Business Media, 2010.ISBN: 978-1-84882-935-0