الجامعة التقنية الشمالية
الكلية التقنية الهندسية/ الموصل
الدراسات العليا

متطلبات أداء الامتحان التنافسي لدراسة الماجستير التقني في قسم هندسة تقنيات الاجهزة الطبية للعام الدراسي 2026 - 2027

1- Medical Instrumentations	أجهزة طبية
a	Laboratory Instrumentation (Microscopes, Centrifuge, Electronic Balance, Oven, and Laboratory Incubators.
b	Diagnostics Instrumentation (Ordinary X-Ray, Computerized Tomography (CT) scan , Magnetic Resonance Imaging (MRI), and Positron Emission Tomography (PET).
c	Therapeutic Instrumentation (Kidney Machine, Electrosurgical units (ESU), and Dental Unit).
d	Biomedical Signal Recording Systems (Electrocardiography (ECG), Electromyography (EMG), Electroencephalography (EEG), and Electrooculography (EOG)).

2- Digital signal processing	معالجة اشارة رقمية
a	Fourier Transform.
b	Z-Transform.
c	Convolution.
d	Signals and Systems.

3- Medical communication systems	أنظمة اتصالات طبية
a	Periodic and non-periodic signals analysis.
b	Analogue modulation and demodulation (AM/FM) techniques.
c	Sampling, PAM, PWM, PPM, PCM.
d	Digital modulation and demodulation (ASK, FSK, PSK).
e	Principle of multiplexing for OFDM systems.

4- Medical Electronics	الكترونيات طبية
a	Bipolar transistor (characteristics and biasing).
b	Field effect transistor (characteristic and biasing).
c	Small signal amplifier.
d	Power amplifier.
e	Operational amplifier and applications.
f	Active filter (LPF, HPF, BPF, BSF).
g	ADC and DAC introduction and Sampling circuit, Dual-slope ADC, The successive approximation ADC, Simultaneous DAC, and an R/ 2R ladder –type DAC.

5- Microprocessor 8086	المعالج 8086
a	Architecture of the 8086 microprocessor.
b	Memory segmentation.
c	Addressing modes.
d	Stack with its details and instructions.
e	Interrupt and co-processors.
f	Types of memories and memory interface.

6- Computer Applications	تطبيقات حاسبة
a	**Artificial Neural Networks:** **1- Single layer neural networks.** **2- Multi-layers neural networks.** **3- Supervised training.** **4- Unsupervised training.** **Useful reference:** - **L. V. Fausett and P. Hall, Fundamentals of neural networks: architectures, algorithms, and applications. Prentice-Hall Englewood Cliffs, 1994.**
b	**Matlab:** 1- Instructions of inputs and outputs. 2- Essential Matlab instructions such as for, while, if, ... etc. 3- Plotting and analysing signals (signal processing). Useful reference: The help of Matlab.