مواد الامتحان التنافسي ومفرداتها للمتقدمين لدراسة الماجستير في اختصاص الهندسة الكيميائية الاحيائية للعام الدراسي 2021-2022

No.	Course	Subjects	Textbook & References
1	**Mass Transfer**	1. Diffusion 2. Absorption and stripping 3. Liquid-liquid extraction 4. Leaching 5. Distillation	(1) Separation process principles for chemical and biochemical engineering, THIRD EDITION. J. D. Seader. (2) محاضرات المرحلة الثالثة في Mass Transfer
2	**Control**	1. Basic Element of Process Control System, 2. Response of first order systems 3. Response Second Order System 4. Control valve Device 5. Feedback process, 6. Closed Loop system 7. Measuring elements 8. The Controllers, 9. The Stability, Routh's method	(1) Process Dynamics and Control), Third Edition, 2011, by Dale E. Seborg, Thomas F. Edgar, Duncan A. Mellichamp, and Francis J. Doyle III (2) Process modeling simulation and control for chemical engineers, William L. Luyben. (3) Process Systems Analysis and Control, Donald R. Coughanowr, Steven E. LeBlanc.Third Edition

3	**Heat Transfer**	1. Heat transfer by conduction, 2. heat transfer by convection, 3. heat transfer by radiation, 4. Heat Exchangers	(1) "Heat and Mass Transfer Fundamental" by Incropera
4	**Fluid Flow**	1. Newtonian fluid 2. Non-Newtonian fluid 3. Laminar flow 4. Turbulent flow 5. Bernoulli equation 6. Pressure drop in the flow of the fluid in the pipes and the friction 7. Pumps	(1) Fluid Flow for Chemical Engineers, Second edition, Professor F. A. Holland, Overseas Educational Development Office, University of Salford, Dr R. Bragg, Department of Chemical Engineering, University of Manchester Institute of Science and Technology. (2) Coulson and Richardson's CHEMICAL ENGINEERING, VOLUME 2, FIFTH EDITION, (3) Particle Technology and Separation Processes, J. F. RICHARDSON University of Wales Swansea and J. H. HARKER, University of Newcastle upon Tyne with J. R. BACKHURST University of Newcastle upon Tyne.

5	**Bioreactors Design**	1. Fundamentals of reactor design & media requirements. 2. Bioreactor requirements & non isothermal reactors. 3. Design of fermenters. 4. Bioreactors design.	(1) Wolf R. Vieth, Bioprocess Engineering – Kinetics, Mass Transport, Reactors and Gene Expression. A Wiley – Interscience Publication. (2) Chemical Kinetic Methods: Principles of relaxation techniques by Kalidas C. New Age International. (3) Chemical Reactor Analysis and Design by Forment G F and Bischoff K B., John Wiley.
6	**Modelling**	1. Ordinary Differential Equations 2. Partial differential Equations 3. Laplace transforms 4. Momentum, mass and heat transfer modeling in different coordinates (Plan, cylindrical and spherical).	(1) "Mathematical Methods in Chemical Engineering", By V.G. Jenson & G.V. Jeffreys.
7	**Principles of Biochemical**	1. Enzyme Kinetics 2. Cell Kinetics and fermentation design 3. Agitation and Aeration	(1) "Biochemical Engineering", by James M. Lee

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اسم المادة باللغة الانكليزية	اسم المادة باللغة العربية
Robotics.	**انسان الي**
Mathematics.	**رياضيات**
Numerical & Engineering analysis.	**تحليلات عدديةة وهندسية**
Electric Circuits.	**دوائر كهربائية**
Electronics.	**الكترونيك**
Strength of material.	**مقاومة مواد**
Control system.	**سيطرة**
Engineering Mechanics (Statics).	**ميكانيك هندسي (علم السكون)**
Digital system design (DSD).	**تصميم النظام الرقمي**
Measurement.	**قياسات**
Vibration.	**اهتزازت**

المفردات

Robotics

1- Mathematical modeling of robots
2- Robots as mechanical devices
3- Common cinematic arrangements of manipulators
4- Rigid motions and homogeneous transformations
5- Forward and inverse kinematics
6- Velocity kinematics - the manipulator Jacobian
7- Path and trajectory planning

Mathematics:

1. Derivative
2. Integration
3. Differential Equations
4. Convergence test

Numerical and engineering analysis

1. System of linear algebraic equations
2. Roots of equations
3. Interpolation.
4. Complex variables (complex function)

Electric Circuit:

1. Parallel – series combination (DC/AC).
2. Network analysis (Mesh , Nodal, superposition, Thevenin and Norton) (DC/AC)

Electronics

1. Diode
2. DC and AC analysis of BJT
3. 0p-amp circuit analysis (ideal)
4. Analog computer (solving Mathematical equations using op-amp)

Strength of Material:

1. Stresses and strain.
2. shear force and bending.
3. Bending stresses in beams.
4. Deflection of Beams.
5. Deflection of cantilevers

Control:

1. Time response first and second order control system.
2. Stability (Routh stability criterion).
3. Root locus.
4. Block diagram reduction.
5. Step and Ramp signal.

Statics:

1. Resultant- equilibrium.
2. Moment 2-D, 3-D
3. Friction.
4. Frames.

Digital System Design:

1. Sequential Logic cct.
2. Combination Logic cct.

Sensor and Measurements:

1. Introduction to Instrumentation
2. Instruments Classification
3. Performance characteristics
4. Transducers elements
5. Analog Transducers
6. Digital Transducers
7. Signals amplification and filtering
8. A-D and D-A converters

9. Motion and vibration measurements
10. Force measurements
11. Pressure measurements
12. Flow measurements
13. Temperature measurements
14. Power and torque measurements

Vibration:

1. Single Degree of Freedom system
2. Two Degree of Freedom

مواد الامتحان التنافسي للدراسات العليا ـ ماجستير
قسم هندسة المعلومات والاتصالات
2021-2022

	Subject	Reference
1	**Computer Networking**	Behrouz A. Forouzan, “Data Communications and Networking”, 5th edition, McGraw-Hill, 2012.
2	**Digital Communications**	John G. Proakis, “Digital Communications”, 5th ed. 2008.
3	**Information Theory and Error Correction Coding**	Thomas M. Cover, and Joy A. Thomas, “Elements of Information Theory”, 2006. Todd K. Moon, “Error Correction Coding: Mathematical Methods and Algorithms”, 2005.
4	**Cryptography**	William Stallings, “Cryptography and Network Security, Principles and Practices”, 4th edition, prentice-hall of India, 2006.
5	**Data Structure and Algorithms**	Clifford A. Shaffer, “ Data Structures and Algorithm Analysis”, Dover Publications, Edition 3.2(C++ Version), 2012.
6	**Wireless Communications**	Aditya K. Jagannatham,“Principles of Modern Wireless Communication Systems”, Publisher McGraw-Hill, 2016.
7	**Signals and Systems**	Sadiku, Matthew NO, and Warsame H. Ali, “Signals and Systems: A Primer with MATLAB®”, CRC Press, 2015.

مواد الامتحان التنافسي للدراسات العليا - ماجستير
قسم هندسة التصنيع المؤتمت 2021-2022

1- Feedback and control system

2- Manufacturing processes

3- Manufacturing system

4- Mathematics

5- Micro Electro Mechanical System (MEMS)

6- Materials Engineering

7- Hydraulics

8- Programmable logic controller systems (PLC)

9- Machine Design

10- Automation and Robotics

11-Computer aided design/Computer aided manufacturing (CAD/CAM)