



Course Specification: Chemistry MTH021



1. Basic Information

Program Title	Biomedical Engineering
Department offering the Program	Biomedical Engineering
Department Responsible for the Course	Engineering Mathematics and Physics
Course Code	MTH021
Year/ Level	Level 000
Specialization	Minor
Requirements	None
Authorization data of course specification	

Teaching Hours	Lectures	Tutorial	Practical
	2	2	3

2. Course aims:

No.	Aim
1	Apply knowledge of mathematics and chemistry to solve mass and energy balance, chemical equilibrium, chemical thermodynamic, and gases problems.
4	Apply chemical principles to conduct experiments.

3. Intended Learning Outcomes (ILOs):

a. Knowledge and Understanding:

No.	Knowledge and Understanding
A ₁	Identify the concepts and theories of mathematics and sciences, concerning the phenomena and theories of chemistry.
A ₄	Recognize Chemical fertilizers industry.

b. Intellectual Skills

No.	Intellectual Skills
B ₁	Select appropriate mathematical for Evaluating the characteristics and performance of chemical systems and processes.

c. Professional Skills

No.	Professional Skills
C ₁	Apply integrally knowledge of computational facilities and techniques, measuring instruments, and laboratory equipment to collect, analyze and interpret chemical results.

d. General Skills

No.	General Skills
D ₁	Collaborate effectively within team.
D ₃	Communicate effectively through presentations.

4. Course Contents:

No.	Topic	Weeks
1	Equations of state.	1-2
2	Chemical Thermodynamics.	3-4
3	Material and heat balance in fuel combustion and chemical processes.	5-6
4	Properties of solutions. Experiment: 1-Oxidation-Reduction Titration (Redox Reaction). 2- Acid Base Titration (demonstrate the use of titration as an analytical tool). 3- Precipitation titration (the determination of chlorides present in water and wastewater in order to design a suitable method). 4-Measure Henry's law constant for oxygen in water in contact with air.	7
5	Dynamic Equilibrium in physical. Experiment: 1-Study the effect of addition of moderate amounts of acid or base to water with buffer and without	9



Course Specification: ChemistryMTH021



	buffer. 2-Measuring the pH of a solution and the method of calculating ionization constants for weak acids and weak bases.	
6	Electrochemistry.	10
7	Introduction to corrosion engineering. Experiment: Instrumental methods of analysis of water and wastewater.	11
8	Industry and chemistry of cement. Experiment: Determination of iron oxide in cement.	12
9	Chemical fertilizers industry. Experiment: Determine the concentration of phosphorus and phosphate in wastewater effluents	13
10	Dyes and dyeing industry.	14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Lectures
2	Discussion Sessions
3	Practical

6. Teaching and Learning Methods Disabled Students:

No.	Teaching Method	Reason
1	Asking small groups to do assignments; each composed of low, medium, and high performance students.	Knowledge and skills transfer among different levels of students.

7. Student Evaluation:

7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A ₁ , A ₄
2	Oral Examination	A ₁ , A ₄
3	Practical Examination	C ₁
4	Semester work	C ₁ , D ₁ , D ₃
5	Final Term Examination	A ₁ , A ₄ , B ₁

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Oral Examination	13
3	Practical Examination	13
4	Semester work	Every week
5	Final Term Examination	15

7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	15%
2	Oral Examination	10%
3	Practical Examination	10%
4	Semester work	15%
5	Final Term Examination	50%
Total		100%

8. List of References

No.	Reference List
1	Austin, G.T.; "Shreve's Chemical Process Industries" 5 th ed ⁿ ., McGraw-Hill Book Co, New York; 1984.
2	Lang / Goldsby; "General Chemistry " Seven Edition; McGraw-Hill Book Co.; London; 2014.
3	Brown, L. T, LeMay H. E. Jr; Bursten, B. E.; Murphy, C.J., and Woodward, P.; " CHEMISTRY THE CENTRAL SCIENCE", Pearson International Edition (11 th edn), Pearson Printice Hall, 2009.



Course Specification: ChemistryMTH021

4	Sawyer, C.N.; Mc-Carty, P.L.; "Chemistry for environmental Engineering" 3ed edn.; McGraw-Hill Book Co.; London; 1978.
5	David E.Goldberg; " 3000 solved problems in chemistry" McGraw-Hill Book Co, New York; 1988.
1	Austin, G.T.; "Shreve's Chemical Process Industries" 5 th ed ⁿ ., McGraw-Hill Book Co, New York; 1984.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Sound System
6	Presenter

10. Matrix of Knowledge and Skills of the Course:

No.	Topic	Aims	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
1	Equations of state.	1	A ₁			
2	Chemical Thermodynamics.	1	A ₄	B ₁		
3	Material and heat balance in fuel combustion and chemical processes.	1	A ₁			
4	Properties of solutions.	1,4	A ₁ ,A ₄		C ₁	D ₁ , D ₃
5	Dynamic Equilibrium in physical.	1,4	A ₄	B ₁	C ₁	D ₁ , D ₃
6	Electrochemistry.	1,4	A ₁			
7	Introduction to corrosion engineering.	1,4	A ₄		C ₁	D ₁ , D ₃
8	Industry and chemistry of cement.	1,4	A ₄		C ₁	D ₁ , D ₃
9	Chemical fertilizers industry.	1,4	A ₁		C ₁	D ₁ , D ₃
10	Dyes and dyeing industry.	1	A ₁			

Course Coordinator: Prof. Dr.

Head of Department: Assoc. Prof. Hossam Eldeen Moustafa

Date of Approval: