Republic of Iraq

Ministry of higher education & scientific research

Supervision and scientific evaluation directorate

Quality assurance and academic accreditation

Academic Program Specification Form For The Academic

University : Northern Technical University

College or Institute: Kirkuk Technical Institute

Department: Chemical Industry Techniques

Date of form completion: 11/1/2024

Assit.Prof. Dr. : Ashty Mahdi Aarif

Dean`s Name

Date: 14/1/2024

Signature ashty

Dr. Sawash shaheen ibrahim

Dean's Assistant for Scientific Affairs

Date: 14/1/2024

Signature

Head of Department

Ali. A. Hussain

Date: 14/1/2024

Signature

Assis. Prof. Zuhair Shakor

Quality Assurance and University performance manager

Date: 14/1/2024

Signature

Academic Program Description

This academic program description provides a brief summary of the most important program characteristics and the learning outcomes the student is expected to achieve, indicating whether he has made the most of the available opportunities. It is accompanied by a description of each course within the program

1. Educational institution	**Northern Technical University**
2. Scientific Department / Center	Technical Institute of Kirkuk
3. Name of academic or professional program	Chemical Industry Technologies Department
4. The name of the final certificate	Technical Diploma - for two calendar years equivalent to three years of study
5. School system: Annual/decisions/other	Annual system
6. Accredited Accreditation Program	ABET
7. Other external effects	There is a close relationship between the department's outputs and the labor market and the opinion of the labor market is taken into account in the curriculum. Depending on the graduate follow-up form.
8. Description setting date	3 / 9 / 2023
9. Objectives of the academic program	
A) Graduation of technical staff qualified to carry out the operation, maintenance and control of the operating equipment of the various chemical industrial units.	
b) Conduct chemical and laboratory physical tests of the resulting raw materials and contribute with specialized cadres in making modifications and improvements to industrial units.	
C) Knowledge of drawings, maps and industrial plans.	
D) Carrying out the work of quality control for the purpose of conforming the product to the standard specifications.	
E) Carrying out preventive and periodic maintenance of chemical industrial units.	

10. Required learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

A1- Clarifying theoretical information about the operation of mechanical and thermal units and the movement of matter.

A2- Learn about oil and gas derivatives, how to obtain them, and the methods of evaluation globally and their standard specifications and chemical and physical composition.

A3- Study the physical and chemical changes of production plans that take place on a number of industries while recognizing how to conduct the physical and energy budget for various chemical industrial processes.

(a) Theoretically accurate identification of the installation and construction of devices used in chemical industries.

B- Program's skills objectives

B1- Study the devices for mechanical and thermal units and learn how to operate and maintain them.

B2- Study of the equipment for oil operations and methods of measuring the specifications of oil and its derivatives.

B3- Knowledge of drawings, maps, industrial plans and the use of Auto CAD to implement them.

4- Taking advantage of the skill of the computer and the Internet within the field of competence.

Teaching and learning methods

1) Workshops and practical experiments.

2) Laboratories and laboratory tests.

3) Summer training and practical practice on equipment in oil institutions and laboratories departments of countries.

4) Scientific travel and field visits to factories.

Evaluation methods

1) Electronic oral tests. 2) Electronic tests. 3) Daily assessment.

4) Laboratory reports. 5) Practical exam my attendance. 6) The first quarterly exam.

7) Second quarterly exam. 8) Final exams.

C- Emotional and value objectives.

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory equipment.

Teaching and learning methods
1) Workshops and practical experiments. 2) Laboratories and laboratory tests. 3) Summer training and practical practice on equipment in oil institutions and laboratories departments of countries.
Evaluation methods
1) Electronic oral tests. 2) Electronic tests. 3) Daily assessment. 4) Laboratory reports. 5) Practical Exam my attendance. 6) The first Term Exam. 7) Second Term Exam. 8) Final Exams.

D- General skills transferred (other skills related to employability and personal development).

D1- The work of the Plumbing and carpentry .

D2- Welding and refrigerator work.

D3- The work of turning and plumbing.

D4- Computer and Internet business.

Teaching and learning methods
1) Workshops and practical experiments. 2) Manufacturing models by workshop.
Evaluation methods
1) Oral tests. 2) Electronic tests. 3) Daily evaluation of the student's performance in the workshop. 4) Practical Exam. 5) Continuous evaluation.

Department: Chemical Industries Technologies/ Industries Unit operation

First Level / (2024–2023)

Symbol	No.of Unit	عدد الساعات Pract.	عدد الساعات Thio.	Course أسم المقرر		نوع المتطلب
				باللغة الانكليزية	باللغة العربية	
NTU100	**2**	**-**	**2**	**Human Rights and Democracy**	حقوق الإنسان الديمقراطية (إجباري)	University Requirements المتطلبات الجامعية (12 وحدة) 10 وحدة إجباري + 2 وحدة اختياري
NTU101	**2**	**-**	**2**	**English Language 1**	اللغة الانكليزية 1(إجباري)	
NTU102	**2**	1	**1**	**Computer Principles 1**	مبادئ الحاسوب1 (إجباري)	
NTU103	**2**	**-**	**2**	**Arabic Language**	اللغة العربية (اجباري)	
NTU104	**2**	**1**	**1**	**Sport**	الرياضة (اختياري)	
NTU107	**2**	**-**	**2**	**French language**	اللغة الفرنسية (اختياري)	
TIMO110	**2**	**-**	**2**	**Mathematics 1**	الرياضيات1	Institute Requirements متطلبات المعهد 7 وحدة إجبارية
TIMO111	**2**	**-**	**2**	**Mathematics2**	الرياضيات2	
TIMO113	**3**	**3**	**-**	**Mechanical workshop**	المعامل الميكانيكية	
ICTI120	**6**	**3**	**3**	**Fluid Flow**	جريان الموائع	Specialized Requirements المتطلبات التخصصية وحدة(39) 36 وحدة إجبارية + 3 وحدة اختياري
1CTI121	**6**	**3**	**3**	**Operation of Industrial Units**	تشغيل الوحدات الميكانيكية	
1CTI122	**6**	**3**	**3**	**Physical Chemistry**	الكيمياء الفيزيائية	
1CTI123	**6**	**3**	**3**	**Thermodynamic**	الثرموداينمك	
1CTI124	**5**	**3**	**2**	**General Chemistry**	الكيمياء العامة	
1CTI125	**5**	**3**	**2**	**Organic chemistry**	الكيمياء العضوية	
ICTI128	**3**	**3**	**-**	**Engineering Drawing**	الرسم الهندسي	
1CTI126	**3**	**2**	**1**	**Food Chemistry**	الصناعات الغذائية (اختياري)	
1CTI127	**3**	**2**	**1**	**Pharmaceutical Chemistry**	الصناعات الدوائية (اختياري)	
	58	**28**	**30**			المجموع

Department: Chemical Industries Technologies/ Industries Unit operation

Second Level / (2024–2023)

الرمز	عدد الوحدات	عدد الساعات العملية	عدد الساعات النظرية	أسم المقرر		نوع المتطلب
				باللغة الانكليزية	باللغة العربية	
NTU200	2	-	2	English Language 2	اللغة الانكليزية 2	University Requirements المتطلبات الجامعية (10 وحدة) 10 وحدة إجبارية
NTU102	2	1	1	Computer Principles 2	مبادئ الحاسوب2	
NTU204	2	-	2	Professional Ethic	اخلاقيات المهنة	
NTU203	2	–	2		جرائم نظام البعث	
NTU202	2	-	2	Arabic Language	اللغة العربية	
TIMO207	2	-	2	Principles of occupational safety	مبادئ السلامة المهنية (اختياري)	Institute Requirements متطلبات المعهد 2 وحدة اختياري
TIMO208	2	-	2	-Industrial Management	الادارة الصناعية (اختياري)	
ICT210	5	3	2	Crude oil technology	تكنولوجيا النفط	Specialized Requirements المتطلبات التخصصية وحدة(53) 50 وحدة إجبارية + 3 وحدة اختياري
1CT211	5	3	2	Technical & energy technology	تقنيات تحسين النفط الخام	
1CT212	5	3	2	Heat transfer	انتقال الحرارة	
1CT213	5	3	2	Mass transfer	انتقال المادة	
1CT214	4	2	2	Measurement techniques and control	تقنيات القياس والسيطرة	
1CT215	4	2	2	Principles of Electricity	مبادئ الكهرباء	
1CT216	4	2	2	Material properties	خواص المواد	
1CT217	4	2	2	construct of devices	بناء الأجهزة	
1CT218	5	3	2	Water treatment	معالجة المياه	
1CT219	5	3	2	Chemical industries	الصناعات الكيمياوية	
TIMO220	4	4	-	project	المشروع (اجباري)	
1CT221	3	2	1	Environmental pollution	التلوث البيئي (اختياري)	
1CT222	3	2	1	Quality control	السيطرة النوعية (اختياري)	
ICTI223	استيفاء فقط			Summer training	التدريب الصيفي	
	65	33	32			المجموع

11.Planning personal development

1) Development courses. (Lecturer or participant) 8) Participation in scientific conferences.
2) Specialized seminars. 9) Submit a search
3) Regular meetings.
4) Cultural activities.
5) Sports activities.
6) Artistic activities.
7) View scientific developments.

12.Admission standard (regulations on college or institute admissions)

1) The total obtained by the student after passing the general examinations of the sixth grade of education.
2) To be a graduate of the scientific branch only.
3) The results of the medical examination that the student should be healthy and fit to study in the department.
4) Desire.

13.Top sources of information about the program

1) Principles of fluid mechanics - Part I / Beautiful Composition of Angels.

2) Unit Operation of chemical Eng . By maccade , Published by maccraw- hill ,3ed edition 1967

3) Unit Operation by Brown , published by willy London 1965 .

4) Physical Chemistry, translated by The Writer Denial Al-Barti, Dr. Maurice Wahba, Issa Mustafa Issa.

5) Fuel Technology, Dr. Jaber Shanshul Aesthetic, Technological University.

6)Ip Standard for petroleum and its products , Vol . 1& 2 . 37th ed., 1978

7) ASTM Standard < by American Society for testing Material, 1955

8) Element of heat transfer by Mjackob & A. hawk 3rd edidtion 1951 . john willy London . New York .

9) Unit operation of Chemical Eng . By W.L. McGrwa . Hill

10) Modern communication methods (Internet).

11) Paper sources (books and sources in the Institute's library).

12) Electronic sources (no books in the electronic library of the Institute)

13) Virtual Library of the Ministry of Higher Education and Scientific Research.

Curriculum Skills Chart																			
Department of Chemical Industries Technologies / First School Year																			
				Learning outputs required from the program															
Year/Level	**Decision code**	**The name of the rapporteur**	**Basic(a) Or not basic (g)**	**Cognitive goals**				**Skills goals Program-specific**				**Emotional goals And value.**				**Transferred** general and **rehabilitative** skills**(other skills related to employability and personal development)**			
				A1	**A2**	**A3**	**A4**	**B1**	**in two**	**By 3**	**by 4**	**c1**	**c2**	**C3**	**C 4**	**D1**	**D2**	**D3**	**D7a nd 8**
2023-2024		Operation of mechanical units/ fluid flow	fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Physical chemistry/thermodynamic	Non-essential	F	F	F	F	F	F	F	F	F	F	F	F	Non	Non	Non	F
		Chemistry	Non-essential	F	F	F	F	F	F	F	F	F	F	F	F	Non	Non	Non	F
		Geometric drawing	Non-essential	Non	Non	Non	Non	F	F	F	F	F	F	F	F	F	F	F	F
		Math1 , 2	Non-essential	F	F	F	F	Non	Non	Non	Non	F	F	F	F	Non	Non	Non	F
		Occupational safety	Non-essential	F	F	F	F	Non	Non	Non	Non	F	F	F	F	F	F	F	Non
		modulus	Non-essential	Non	Non	Non	Non	Non	Non	Non	Non	F	F	F	F	F	F	F	F
		Computer applications	Non-essential	Non	Non	Non	Non	Non	Non	Non	Non	F	F	F	F	F	F	F	F
		Human Rights and Democracy	Non-essential	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	F
		English	Non-essential	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non

Curriculum Skills Chart

Department of Chemical Industry Technologies / Second School Year

				Learning outputs required from the program															
Year/Level	**Decision code**	**The name of the rapporteur**	**Basic(a) Or not basic (g)**	**Cognitive goals**				**Skills goals Program-specific**				**Emotional goals And value.**				**Transferred** general and **rehabilitative** skills**(other skills related to employability and personal development)**			
				A1	**A2**	**A3**	**A4**	**B1**	**in two**	**By 3**	**by 4**	**c1**	**c2**	**C3**	**C 4**	**D1**	**D2**	**D3**	**D7a nd 8**
2023-2024		Oil technology	fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Operation of thermal units	Fundamental	F	F	F	F	F	F	F	F	F	F	F	F	Non	Non	Non	F
		Chemical Industries	Fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Measurements and control	Fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Material properties	Fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Building devices	Fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Project	Fundamental	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
		Copperand B applications	Non-essential	Non	Non	Non	Non	Non	Non	Non	Non	F	F	F	F	Non	Non	Non	F
		English	Non-essential	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non

Course description form (1)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1. Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2. Scientific Department / Center	Chemical Industries Technologies
3. Name/code decision	Fluid flow /Operation of mechanical units/ First Stage
4. Available attendance forms	Presence education
5. Chapter/Year	course system
6. Number of school hours (total)	Study 5 × week15 = 75 hours (course)
7. The date of setting this description	3 /9 / 2023
8. Objective of the decision	
Studying the properties and behavior of the fluid as it flows through different pipes and devices, and introducing the student to the mechanical units, their scientific foundations, and the operations they perform (separation, mixing, miniaturization, fragmentation, and installation).	

9. Learning outcomes, teaching, learning and evaluation methods

Cognitive Objectives

Clarification of theoretical information about the operation of mechanical units by conducting various experiments and introducing the student to the laboratory units (sieves, crushers, filters, ... etc.).

Teaching and learning methods

Theoretical lecture (with various explanations) google class room, practical lecture (with various explanations), scientific reports. google meet.youtube section.

Workshops and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value Objectives

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory equipment.

Teaching and learning methods

Workshops and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam
7) Second final quarterly exam.

General and transferred skills (other skills related to employability and personal development).

D1- Plumbing

D2- Welding

10. Decision structure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
5 - 1	**7 hours a week**		Defining units and studying fluid properties Density, viscosity, pressure	Theoretical + Practical	attendance exams
10 - 6	7 hours a week		Continuity equation, Bernoulli equation	Theoretical + Practical	attendance exams
- 11 15	7 hours a week		Pumps, their types, how to connect them	Theoretical + Practical	attendance exams
15 - 20	7 hours a week		Operation of mechanical units, hydration, sedimentation	Theoretical + Practical	attendance exams
- 21 29	7 hours a week		Filtration, sieves...	Theoretical + Practical	attendance exams
30	7 hours a week		**storage**	Theoretical + Practical	Electronic and attendance exams

11. Infrastructure	
1- Required textbooks	2- مبادئ ميكانيكي الموائع – الجزء الاول تأليف جميل الملائكة 3- ميكانيكي الموائع الدكتور نعمة حمد عمارة – الجامعة التكنولوجية 4- ميكانيكي الموائع ترجمة نبيل زكي مرتضى والدكتور فوزي ابراهيم عبد الصادق **5- Unit. Operation of chemical Eng. By maccade, Published by maccraw-hill, 3ed edition 1967** **6- Unit operation by Brown, published by willy London 1965** **7- Priciples of unit operation by A. S . Faust published by Toppan and Willy 2nd edition 1961 Tokyo. Japan 1960** **8- Chemical Eng Vol 1 and 2nd Coulson and Richardason by preutice- Hill 1960**
9- Key references (sources)	1)Element of heat transfer by Mjackob & A 2)hawk 3rd edidtion 1951 . john willy London . New York .) Unit operation of Chemical Eng . By W.L. McGrwa . Hill
أ- Electronic references, websites....	**1- Virtual Library of the Ministry of Higher Education and Scientific Research** **2- There are no books in the institute's electronic library.**

Course description form (2)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1. Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2. Scientific Department / Center	Chemical Industries Technologies
3. Name/code decision	occupational safety / stage one
4. Available attendance forms	Presence education
5. Chapter/Year	course system
6. Number of school hours (total)	Study 2 × 15 weeks = 30 hours
7. The date of setting this description	3 /9 / 2023
8. **Objective of the decision**	• Electricity hazards study • Study the risks of radiation and methods of prevention • Study dealing with electricity on the job • Study of the prevention of toxic gases and methods of prevention

9.Learning outcomes, teaching, learning and evaluation methods

A- Cognitive aims
A 1- Knowing the methods of prevention
A 2- Take advantage of the types of civil defense in the event of an emergency
A3- To develop a student's ability to develop solutions when risks occur

The course's skills objectives

- Electricity hazards study
- Study the risks of radiation and methods of prevention
- Study dealing with electricity on the job
- Study of the prevention of toxic gases and methods of prevention

Teaching and learning methods

Theoretical lecture (with various explanations) google class room, practical lecture (with various explanations), scientific reports. google meet. youtube section learning methods.

Workshops and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam. .

C- Emotional and value goals
C1- Implementation of student project designs as part of graduation requirements.
C2- Maintenance of idle laboratory equipment.

Teaching and learning methods

Workshops and practical experiments.

Evaluation methods

Electronic oral tests. 2) Electronic tests. 3) Daily assessment. 4) Laboratory reports. 5) Practical exam my attendance. 6) The first quarterly exam. 7) Second quarterly exam. 8) Final exams.
General and transferred skills (other skills related to employability and personal development). D1- Plumbing D2- Welding

12. Decision structure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1-4	**2 hours a week**		Meaning and objectives of occupational safety	Theoretical + Practical	Electronic and attendance exams
4-7	**2 hours a week**		Accidents and ways to escape from them	Theoretical + Practical	Electronic and attendance exams
7-12	**2 hours a week**		Hazards with chemicals and first aid when poisoning	Theoretical + Practical	Electronic and attendance exams
12-13	**2 hours a week**		Electrical hazards and ways to solve them	Theoretical + Practical	Electronic and attendance exams
14	**2 hours a week**		environmental pollution risks	Theoretical + Practical	Electronic and attendance exams
15	**2 hours a week**		Fire hazards and ways to escape from them	Theoretical + Practical	Electronic and attendance exams

13. Infrastructure	
10- Required textbooks	**ادارة الانتاج ، كاظم جواد شبر 1973**
ب- Electronic references, websites....	**3- Virtual Library of the Ministry of Higher Education and Scientific Research** **4- There are no books in the institute's electronic library.**

Course description form (3)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1.Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2.Scientific Department / Center	Chemical Industries Technologies
3.Name/code decision	Mathematical 1,2 / stage one
4.Available attendance forms	Presence education
5.Chapter/Year	course system
6.Number of school hours (total)	Study 2 × 15 weeks = 30 hours (course 1,2)
7.The date of setting this description	3/9 / 2023
Objective of the decision	Strengthening students' ability to understand mathematical relationships so that the student can understand the relationships between different variables and link them to his specialization

9.Learning outcomes, teaching, learning and evaluation methods

A- Cognitive aims
A1- Learn about the different complex problems
A2- use mathematics in application.

b- Subject-specific skill objectives

B1- To develop a student's ability to find solutions to complex problems
B2- Mathematics applications in reality
A3 - Using the Mat lab program and linking them to math equations

Teaching and learning methods

Theoretical lecture (with various explanations) google class room, practical lecture (with various explanations), scientific reports. google meet. youtube section learning methods.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value goals
A1- Identify student to solve complex equations
A2 - Teaching the student the basics of mathematics, how they solve
A3- Training the student on the use of Mat lab in mathematics
A4- Building practical electronic circuits

Teaching and learning methods

Theoretical lecture (with various explanations) google class room, practical lecture (with various explanations), scientific reports. google meet. youtube section learning methods.

Evaluation methods

Electronic oral tests. 2) Electronic tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam my attendance. 6) The first quarterly exam.
7) Second quarterly exam. 8) Final exams.

10.Decision structure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 – 9	**2 hours a week**		Logarithms	Theoretical + Practical	Electronic and attendance exams
10 – 15	**2 hours a week**		Matrices	Theoretical + Practical	Electronic and attendance exams
15 – 23	**2 hours a week**		Vector Types	Theoretical + Practical	Electronic and attendance exams
24 – 25	**2 hours a week**		Differentiation	Theoretical + Practical	Electronic and attendance exams
26 – 28	**2 hours a week**		Integration	Theoretical + Practical	Electronic and attendance exams
29 - 30	**2 hours a week**		The Seven Methods Of Integration	Theoretical + Practical	Electronic and attendance exams

11.Infrastructure	
Required textbooks and references	.1 2. Applied calcalus by L. J . adams New York , London 1963 3. Introductory to the college Mathematic by William E. Milne .4 اسس الاحصاء باللغة العربية ، اعداد الدكتور صبري العاني 5. Introduction to differential equation by S.L. Green 1945 .6 حساب التفاضل والتكامل والهندسة التحليلية ، توماس 1968 7. Applied calcalus by L. J . adams New York , London 1963 8. Introductory to the college Mathematic by William E. Milne .9 اسس الاحصاء بالغة العربية ، اعداد الدكتور صبري العاني 10. Introduction to differential equation by S.L. Green 1945
ت- Electronic references, websites....	**5- Virtual Library of the Ministry of Higher Education and Scientific Research** **6- There are no books in the institute's electronic library.**

Course description form (4)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1.Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2.Scientific Department / Center	Chemical Industries Technologies
3.Name/code decision	Heat transfer/ Mass transfer
4.Available attendance forms	Presence education
5.Chapter/Year	Course system
6.Number of school hours (total)	Study 5 × week 15 = 60 hours (every course)
7The date of setting this description	3 /9 / 2023
8.Objective of the decision	
1) Identify devices for the topics of heat transmission and material transmission (mass).	
2) Turn on heat transmission devices and conduct practical experiments.	
3) Provide the student with theoretical information on the topics of heat transmission and material transmission (mass).	

9.Learning outcomes, teaching, learning and evaluation methods
Cognitive Objectives A1- Providing the student with theoretical information on the topics of heat transmission and material transmission (mass). A2- Introducing the student to laboratory scientific units. A3- Introducing the student to the units, thermal devices and material transmission units A4- Making calculations on the topics of heat transmission and substance transmission (distillation, fumigation, absorption..... etc.)
The course's skills objectives Study the devices for heat transfer and make measurements of physical variables. B2- Identify the devices for the topics of heat transmission and material transmission and operation. 3- Making calculations for industrial devices and units.
Teaching and learning methods
Workshops and practical experiments.
Evaluation methods
1) oral tests. 2) Presence tests. 3) Daily assessment. 4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam. 7) Second final quarterly exam.
C- Emotional and value goals C1- Implementation of student project designs as part of graduation requirements. C2- Maintenance of idle laboratory equipment.
Teaching and learning methods
Workshops and practical experiments.
Evaluation methods
General and transferred skills (other skills related to employability and personal development). D1- Turning D2- Welding

1. Decision structure					
The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 - 9	**5 hours a week**		Heat transmission methods and calculations	Theoretical + Practical	Electronic and attendance exams
10 - 15	5 hours a week		Distillation	Theoretical + Practical	Electronic and attendance exams
20 - 23	5 hours a week		Reclamation	Theoretical + Practical	Electronic and attendance exams
24 - 25	5 hours a week		Cooling	Theoretical + Practical	Electronic and attendance exams
26 - 28	5 hours a week		Drying	Theoretical + Practical	Electronic and attendance exams
29 - 30	5 hours a week		Adsorption and crystallization	Theoretical + Practical	Electronic and attendance exams

2. Infrastructure	
11- Required textbooks	**1- Operation of Thermal Units / Written by Azzam Abdul AziG** **2- Thermal Unit Operation**Laboratory /**AbdulKarim Jabbar**
12- Key references (sources)	1)Element of heat transfer by Mjackob & A 2)hawk 3rd edidtion 1951 . john willy London . New York .) Unit operation of Chemical Eng . By W.L. McGrwa . Hill
30 Recommended books and references (scientific journals, reports,....)	1- Introduction to heat transfer. Frank p.incropera.4th edition. 2- **Virtual Library of the Ministry of Higher Education and Scientific Research**
31 Electronic references, websites....	**7- Virtual Library of the Ministry of Higher Education and Scientific Research** **8- There are no books in the institute's electronic library.**

3. Course Development Plan

1- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.

2- Take advantage of scientific websites in the development of the course by showing scientific films and updates in the field of the rapporteur.

3- Linking the theoretical and practical part of the course through the subject of the student project.

Course description form (5)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1. Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2. Scientific Department / Center	Chemical Industries Technologies
3. Name/code decision	Oil technology/ second stage
4. Available attendance forms	Presence education
5. Chapter/Year	Course system
6. Number of school hours (total)	Study 5 × week 15 = 150 hours (every course)
7. The date of setting this description	3 /9 / 2023
8. Objectives of the decision	
1) Identification of oil and petroleum industries in terms of composition, extraction and processing	
2) Learn about oil and gas derivatives and how to obtain them and on the methods of evaluation globally and their standard specifications and chemical and physical composition	
3) Conduct laboratory experiments to assess the specifications of crude oil and its derivatives.	

9. Learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

A1- Providing the student with theoretical information on the subject on oil and oil industries in terms of training, extraction and treatment.

A2- On oil and gas derivatives and how to obtain them.

A3- Introducing the student to the methods of evaluation globally and its standard specifications and chemical and physical composition

A4- Introducing the student to ways to improve the specifications of crude oil and its derivatives.

The course's skills objectives

1- Study the devices on the subject of oil assessment and oil industries.

2- Identifying the devices for the topics of oil refining and liquidation.

3- Making calculations for industrial devices and units.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value goals

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory equipment.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam
7) Second final quarterly exam.

General and transferred skills (other skills related to employability and personal development).

D1- Plumbing

D2- Welding

10. Decision structure					
The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 - 3	5 hours a week		Origin of oil and chemical composition, oil classification	Theoretical + Practical	attendance exams
4 - 5	5 hours a week		Assessment of crude oil specifications	Theoretical + Practical	attendance exams
6 - 9	5 hours a week		Crude oil processing, distillation, furnaces	Theoretical + Practical	attendance exams
10 - 22	5 hours a week		Refining products, derivatives processing,	Theoretical + Practical	attendance exams
23 - 27	5 hours a week		Gas manufacturing, processing	Theoretical + Practical	attendance exams
28 - 30	5 hours a week		Environmental pollution as a result of the oil industry	Theoretical + Practical	attendance exams

11. Infrastructure	
13- Required textbooks	**1- Fuel Technology, Dr. Jaber Shanshul Jamali, Technological University 1986**
14- Key references (sources)	**1-IP Standard for petroleum and its products , Vol. 1 & 2 , 37th ed. , 1978** **2-ASTM Standard < by American Society for testing Material , 1955** **3-Petroleum Refinery , by W. Nelson , 4th ed. Mc Graw Hill , 1969.**
32 Recommended books and references (scientific journals, reports,....)	**1-Virtual Library of the Ministry of Higher Education and Scientific Research**
33 Electronic references, websites....	**1-Virtual Library of the Ministry of Higher Education and Scientific Research** **2-The books in the electronic library of the Institute**

12. Course Development Plan

4- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.
5- Take advantage of scientific websites in the development of the course by showing scientific films and updates in the field of the rapporteur.
6- Linking the theoretical and practical part of the course through the subject of the student project.

Course description form (6)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1. Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2. Scientific Department / Center	Chemical Industries Technologies
3. Name/code decision	Water treatment/Chemical Industries/
4. Available attendance forms	Presence education
5. Chapter/Year	Course system
6. Number of school hours (total)	Study 5 × week 15 = 75 hours (every course)
7. The date of setting this description	3 /9 / 2023
8. Objective of the decision	
1) This article aims to identify production processes in different stages, from raw materials to industrial output.	
2) Studying this subject the student is able to study the physical and chemical changes of the production plans that take place on a number of industries.	
3) Conducting laboratory experiments for chemical industry laboratories.	

9. Learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

A1- Providing the student with theoretical information on the subject of chemical methods,

Treatment of sewage and industrial waste.

A3- Introducing the student to some chemical industries, glass, cement, soap.

A4- Introducing the student to ways to improve the specifications of crude oil and its derivatives.

The course's skills objectives

1- Study the devices on the subject of oil assessment and oil industries.

2- Identifying the devices for the topics of oil refining and liquidation.

3- Making calculations for industrial devices and units.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam. assessment

C- Emotional and value objectives

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory devices.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

General and transferred skills (other skills related to employability and personal development).

D1- Turning

D2- Welding

10.Decision structure					
The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 – 3	5 hours a week		Water filtration and treatment methods	Theoretical + Practical	attendance exams
4 – 5	5 hours a week		Sewage water treatment	Theoretical + Practical	attendance exams
6 – 15	5 hours a week		Industrial water treatment	Theoretical + Practical	attendance exams
15 - 22	5 hours a week		Ceramic, bricks, porcelain	Theoretical + Practical	attendance exams
23 - 27	5 hours a week		Cement and glass	Theoretical + Practical	attendance exams
28 - 30	5 hours a week		Industrial gases. Citrus	Theoretical + Practical	attendance exams

10. Infrastructure	
15- Required textbooks	**5- Fuel Technology, Dr. Jaber Shanshul Jamali, Technological University 1986**
16- Key references (sources)	**1-IP Standard for petroleum and its products , Vol. 1 & 2 , 37th ed. , 1978** **2-ASTM Standard < by American Society for testing Material , 1955** **3-Petroleum Refinery , by W. Nelson , 4th ed. Mc Graw Hill , 1969.**
34 Recommended books and references (scientific journals, reports,....)	**1- Virtual Library of the Ministry of Higher Education and Scientific Research**

35 Electronic references, websites....	**1- Virtual Library of the Ministry of Higher Education and Scientific Research** **2. The books in the institute's electronic library**

11. Course Development Plan

7- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.

8- Take advantage of scientific websites in the development of the course by showing scientific films and updates in the field of the rapporteur.

9- Linking the theoretical and practical part of the course through the subject of the student project.

Course description form (7)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1.Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2.Scientific Department / Center	Chemical Industries Technologies
3.Name/code decision	Electrical Principle/Measurements and control/
4.Available attendance forms	Presence education
5.Chapter/Year	Course system
6.Number of school hours (total)	Study 4 × week15= 60 hours (every course)
7.The date of setting this description	3/9 / 2023
8.Objective of the decision	
1) Introduce the student to electrical devices used in technological processes and chemical industries, as well as how to measure and control variables, and give a practical idea about electrical and measuring devices.	
2) Expand the student's awareness of the use of devices and how to deal with them and to control chemical variables. and expand their theoretical knowledge.	

9.Learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

Providing the student with theoretical information on the subject of connecting electrical devices used in technological processes.

A2 How to deal with the devices used in the chemical industries and how to control them.

.

B - Skills objectives of the course

B1 - Studying the devices related to the subject of measurements and control evaluation on industrial devices.

B 2 - Familiarization with the devices related to the two topics of oil refining and liquidation.

B 3- Carrying out calculations for industrial equipment and units.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value objectives

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory devices.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam
7) Second final quarterly exam.

General and transferred skills (other skills related to employability and personal development).
D1- Turning
D2- Welding

Decision structure

12. Infrastructure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 – 3	4 hours a week		Purposes of Measurements and Control technology, Used terms	Theoretical + Practical	attendance exams
4 – 5	4 hours a week		Principals of Electricity, Electrical energy and Electrical Power, Ohm's Law, Resistors, Capacitors, Signal transmitting	Theoretical + Practical	attendance exams
6 – 15	4 hours a week		Pointing and Recording instruments, the Units	Theoretical Practical	attendance exams
15 – 22	4 hours a week		Electrical Machines, Generators, Motors	Theoretical Practical	attendance exams
23 – 27	4 hours a week		Pressure measurement, Electrical methods	Theoretical Practical	attendance exams
28 – 30	4 hours a week		Environmental pollution as a result of the oil industry	Theoretical Practical	attendance exams

1.Required textbooks

1.Industrial Instrumentation by E.Eck man New York, John wiley and sons .Inc London Cham an and Hall Limited 5th printing July 1975.

2.Process Instrumentation and controls Hand Book by Considine .Douglas M. McGraw. Hill Book company copyright first edition 1957.

3.Chemical Engineering hand book by Perry forth editing McGraw. Hill 1957.

2.Key references (sources)

3.Recommended books and references (scientific journals, reports,....)

4.Electronicreferences, websites....

1. Virtual Library of the Ministry of Higher Education and Scientific Research

2. The books in the institute's electronic library

1. Virtual Library of the Ministry of Higher Education and Scientific Research

Course description form (8)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1.Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2.Scientific Department / Center	Chemical Industries Technologies
3.Name/code decision	properties of materiel/second stage
4.Available attendance forms	Presence education
5.Chapter/Year	course system
6.Number of school hours (total)	Study 4 × week15 = 60 hours (Course)
7.The date of setting this description	3/9 / 2023
8.Objective of the decision	
1) Introducing the student about the effects of external forces on the parts of the machines and the consequent stresses and deformations because of them and how to treat these cases depending on the mathematical relations to determine the permissible forces, as well as introducing the student to the types of minerals that are used in the construction of devices and machines used in the chemical industries and the types of these minerals, their properties Its specifications, uses, how to extract it and how to protect it when exposed to corrosion	

2） Teaching the student how to test metals to know their mechanical properties (hardness, shocks, toughness, tensile and compressive resistance) according to industrial requirements and providing the student with information about the properties and specifications of metals and how to preserve them from corrosion

9.Learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

Teaching the student how to test metals to know their mechanical properties (hardness, shocks, toughness, tensile and compressive resistance) according to industrial requirements and providing the student with information about the properties and specifications of metals and how to preserve them from corrosion

.

B - Skills objectives of the course

B1 - Studying the devices related to the subject of measurements and control evaluation on industrial devices.

B 2 - Familiarization with the devices related to the two topics of oil refining and liquidation.

B 3- Carrying out calculations for industrial equipment and units.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value objectives

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory devices.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

General and transferred skills (other skills related to employability and personal development).

D1- Turning

D2- Welding

10.Decision structure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 – 3	4 hours a week		Introduction, objective and definitions of forces, stresses, deformations, mechanical properties and mathematical problems about forces	Theoretical + Practical	attendance exams
4 – 5	4 hours a week		Stresses and Compressions (Hooke's Law, Stress-Strain Diagram)	Theoretical + Practical	attendance exams

6 – 8	4 hours a week		Shear stresses	Theoretical + Practical	attendance exams
9 - 11	4 hours a week		Metallurgy	Theoretical + Practical	attendance exams
11 – 13	4 hours a week		non-ferrous metals	Theoretical + Practical	attendance exams
14 – 15	4 hours a week		corrosion	Theoretical + Practical	attendance exams

13. Infrastructure	
1.Required textbooks 2.Key references (sources)	-Strenth of Material, R.C. Stephens , 1974 --Engineering Mechanics, by Singer , 3rd ed. , 1972
3.Recommended books and references (scientific journals, reports,....)	**1- Virtual Library of the Ministry of Higher Education and Scientific Research**
4.Electronic references, websites....	**1- Virtual Library of the Ministry of Higher Education and Scientific Research** **2. The books in the institute's electronic library**

Course description form (9)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1.Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2.Scientific Department / Center	Chemical Industries Technologies
3.Name/code decision	Construction of Equipment/ second stage
4.Available attendance forms	Presence education
5.Chapter/Year	course system
6.Number of school hours (total)	Study 4 × week15 = 60 hours (Course)
7.The date of setting this description	3/9 / 2023
8.Objective of the decision	
1) Introducing the student about the effects of external forces on the parts of the machines and the consequent stresses and deformations because of them and how to treat these cases depending on the mathematical relations to determine the permissible forces, as well as introducing the student to the types of minerals that are used in the construction of devices and machines used in the chemical industries and the types of these minerals, their properties Its specifications, uses, how to extract it and how to protect it when exposed to corrosion	

2) Teaching the student how to test metals to know their mechanical properties (hardness, shocks, toughness, tensile and compressive resistance) according to industrial requirements and providing the student with information about the properties and specifications of metals and how to preserve them from corrosion

9.Learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

Teaching the student how to test metals to know their mechanical properties (hardness, shocks, toughness, tensile and compressive resistance) according to industrial requirements and providing the student with information about the properties and specifications of metals and how to preserve them from corrosion

.

B - Skills objectives of the course

B1 - Studying the devices related to the subject of measurements and control evaluation on industrial devices.

B 2 - Familiarization with the devices related to the two topics of oil refining and liquidation.

B 3- Carrying out calculations for industrial equipment and units.

Teaching and learning methods

Workshops, laboratories and practical experiments.

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value objectives

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory devices.

Teaching and learning methods
Workshops, laboratories and practical experiments.
Evaluation methods
1) oral tests. 2) Presence tests. 3) Daily assessment. 4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam. 7) Second final quarterly exam.
General and transferred skills (other skills related to employability and personal development). D1- Turning D2- Welding

10.Decision structure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 – 3	4 hours a week		Purposes of Measurements and Control technology, Used terms	Theoretical + Practical	attendance exams
4 – 5	4 hours a week		Principals of Electricity, Electrical energy and Electrical power, Ohm s Law, Resistors, Capacitors	Theoretical + Practical	attendance exams
+6 – 9	4 hours a week		Signal transmitting, Pointing and Recording instruments, the Units	Theoretical + Practical	attendance exams
10 - 12	4 hours a week		Electrical Machines, Generators, Motors	Theoretical + Practical	attendance exams
12-14	4 hours a week		Pressure measurement, Electrical methods	Theoretical + Practical	attendance exams

14-15	4 hours a week		Environmental pollution as a result of the oil industry	Theoretical + Practical	attendance exams

14. Infrastructure	
1.Required textbooks	القياسات التكنولوجية واجهزة القياس المستعملة في الصناعات الكيمياوية ، تأليف م . كولاكوف. دار مير للطباعة والنشر ، الاتحاد السوفياتي / موسكو
2.Key references (sources)	1.Industrial Instrumentation by E.Eck man New York, John wiley and sons .Inc London Cham an and Hall Limited 5th printing . July 1975. 2.Process Instrumentation and controls Hand Book by Considine Douglas M. McGraw. Hill Book company copyright first edition 1957. 3.Chemical Engineering hand book by Perry fifth edition McGraw. Hill 1957. -
3.Recommended books and references (scientific journals, reports,....)	**1- Virtual Library of the Ministry of Higher Education and Scientific Research**
4.Electronic references, websites....	**1- Virtual Library of the Ministry of Higher Education and Scientific Research** **2. The books in the institute's electronic library**

Course description form (10)

Description of the decision

This description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the learning opportunities available.

1.Educational Institution	Northern Technical University/ Technical Institute / Kirkuk
2.Scientific Department / Center	Chemical Industries Technologies
3.Name/code decision	Computer applications / second stage
4.Available attendance forms	Presence education
5.Chapter/Year	course system
6.Number of school hours (total)	Study 2 × week30 = 60 hours (annual)
7.The date of setting this description	3/9 / 2023
8.Objective of the decision	
1) Providing the student with theoretical information related to a topic about applied programs (internet, Excel, AutoCAD) and their windows and methods of operation.	

9.Learning outcomes, teaching, learning and evaluation methods

Cognitive objectives

B1 - Study AutoCAD

Get to know the different program work environment for the screen

Menus , Screen , Scroll Bars , Tool Bars , Properties Bar

Teaching and learning methods

Theoretical lecture (with various explanations) google class room, practical lecture

(with various explanations), scientific reports. google meet.youtube

Evaluation methods

1) oral tests. 2) Presence tests. 3) Daily assessment.
4) Laboratory reports. 5) Practical exam. 6) The first final quarterly exam.
7) Second final quarterly exam.

C- Emotional and value objectives

C1- Implementation of student project designs as part of graduation requirements.

C2- Maintenance of idle laboratory devices.

Teaching and learning methods

Workshops, laboratories and practical experiments.

10.Decision structure

The week	Hours	Required learning outcomes	Unit name/subject	The way you teach	Evaluation method
1 – 5	4 hours a week		**Operating system, word**	Theoretical + Practical	attendance exams
5 – 10	4 hours a week		**Excel**	Theoretical + Practical	attendance exams
11 – 15	4 hours a week		**POWER POINT**	Theoretical + Practical	attendance exams
16 - 22	4 hours a week		**AutoCAD**	Theoretical + Practical	attendance exams

23 – 27	4 hours a week		**Ucs , Vports , Elev , thickness**	Theoretical + Practical	attendance exams
28 – 30	4 hours a week		**3D Surfaces**	Theoretical + Practical	attendance exams

15. Infrastructure	
1.Required textbooks	القياسات التكنولوجية واجهزة القياس المستعملة في الصناعات الكيمياوية ، تأليف م . كولاكوف. دار مير للطباعة والنشر ، الاتحاد السوفياتي / موسكو
2.Key references (sources)	1.Industrial Instrumentation by E.Eck man New York, John wiley and sons .Inc London Cham an and Hall Limited 5th printing . July 1975. 2.Process Instrumentation and controls Hand Book by Considine Douglas M. McGraw. Hill Book company copyright first edition 1957. 3.Chemical Engineering hand book by Perry fifth edition McGraw. Hill 1957.
3.Recommended books and references (scientific journals, reports,....)	**1- Virtual Library of the Ministry of Higher Education and Scientific Research**
4.Electronic references, websites....	**1- Virtual Library of the Ministry of Higher Education and Scientific Research** **2. The books in the institute's electronic library**