

## Academic program description form for colleges and institutes

Northern Tech University : the university  
Technical Institute/Mosul : Institute/ College  
Chemical and petroleum industries Technologies : Scientific Department  
2023/11/9 :Date of filling out the file

: Signature :

  
Signature :

Name of department head

Name of the Scientific



A.Prof. DR. Wijdan Muhammad Saleh

Assistant : ENG

A.Prof. Dr.. Raghad Ghaleb

Sultan

Date:11/9/2023

Date:11/9/2023

Check the file befo

Division of Quality Assurance and University Performance

Name of the Director of the Quality


Assurance and University Performance Division:

Date;11/9/2023

Signature:

  
مسؤول شعبة ضمان الجودة وتقويم الأداء

Authentication of the Dean:

  
A. Prof. Shahla Abdel Wahab Abdel Qader

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## Academic Description Program

### Department of Chemical and Petroleum Industries Technologies

**2022-2023**

**The link to the academic program is published on the department's website**

<https://ntu.edu.iq/ar/%D9%82%D8%B3%D9%85-%D8%AA%D9%82%D9%86%D9%8A%D8%A7%D8%AA-%D8%A7%D9%84%D8%B5%D9%86%D8%A7%D8%B9%D8%A7%D8%AA-%D8%A7%D9%84%D9%83%D9%8A%D9%85%D9%8A%D8%A7%D9%88%D9%8A%D8%A9-%D9%88-%D8%A7%D9%84%D9%86%D9%81/?lang=en>

## program Description of the academic

This academic program description provides a succinct summary of the most important features of the program and the learning outcomes expected of it requester

Achieving it demonstrates whether he has made the most of the opportunities. It is accompanied by a description of each available course included

. The program

**1- Educational** Northern Technical University : **institution**

**2** Mosul/Chemical -Scientific Department/Center: Technical Institute - Technologies and Petroleum Industries

**3** Chemical and : Name of the academic or professional program - petroleum industries/operating industrial units and oil refining

- 4 Name of final certificate: Technical diploma in operating industrial .and oil units

5 of the two and second stages Academic system: Courses for the first - .branches

.The approved accreditation program: unit system-6

7 .Other external influences: training courses + field visits -

8 - :Date of preparing the description9/10/202 . 3

9 - :Objectives of the academic program

The Department of Chemical Industries aims to graduate qualified technical personnel to carry out operation, maintenance and control work

chemical factories, Devices for operating chemical industrial units in especially petroleum ones, and conducting tests

Laboratory tests on raw and finished manufactured materials and .their compliance with their standard specifications

Required program outcomes and teaching, learning and -  
:methods 10tionevalua

A- Cognitive objectives

A- Introducing the student to methods of operating and controlling various chemical industrial devices and units

Chemical production works and petroleum

A2 -compares chemical, physical, and laboratory The student tests for raw materials and those produced in factories

Chemical and petroleum, and contributing with specialized personnel in making modifications and improvements to the units

industrial

A3-

The student uses industrial drawings, maps, and plans related to chemical A4-

laboratories

Implementing quality control work for the purpose of conforming the product

to international and Iraqi standard specifications

A5-

student to using the electronic calculator to apply Introducing the curriculum vocabulary

-B

The program's skill objectives

B1

The student acquires the skill of conducting laboratory and - petroleum analyses

– B2

ensure Use quality laboratory and chemical workshop tools and the safety and accuracy of the results

– B3

## Implementing graphs and charts for the practical lesson

### Teaching and learning methods

,lecture , practical training in laboratories theoreticalPower point , seminars, seminars

Discussion, scientific developments, summer training, educational research video clips, scientific trips, graduation

### Evaluation methods

,tests, weekly reports-Daily evaluation, oral tests, pre

includes the first semester and the second The semester exam (practical + theoretical) semester

-C

.Emotional and value goals

-C1

The student learns about the work of industrial operating units and their role in building the country

-C2

practical experience and linking it Encouraging the student to gain to theoretical principles

-C3

Learn precision and discipline in receiving science and knowledge

-C4

Learn to communicate and interact during the lecture

### Teaching and learning methods

and listening to professors and Practical and theoretical lectures scholars within the field of specialization in the scientific section and through books

Methodological and external, through websites on the Internet, displaying scientific films, videos, and visits

Field

## methods Evaluation

Student quarterly and daily written and oral tests And scientific reports

– D

General and qualifying transferable skills (other skills related to .(employability and personal development

-D1

Communication and conversation skills such as English, informing the student of his computers, presentation skills, and rights

(And his duties (a basic standard for human rights

-D2

encouraging policy discussions so that the Teamwork skills and s scientific creativity student ha

-D3

teaching the student to link reliance, and-learning skills, self-Self mathematical formulas of scientific laws to chemistry

-D4

Training the student to use the Internet and modern scientific programs

## methods Teaching and learning

A- D

B- aily exams with home questions to solve on your own,  
-practical tests B

C- Oral exams during lectures

-C

Competitive tests between groups of students for one section

-D

Tests to encourage scientific competition between student groups and stages

### Evaluation methods

Commitment to assignments (such as preparing reports in the field (of specialization and then discussing the reports

Assigning grades to written and oral tests and weekly and annual reports



## 10 - : Program structure -

Study plan for the year(2023-2022)

Northern Technical University/Technical Institute/Mosul / Chemical and petroleum industry technologies /Operation of industrial units

							level one
code	Grader, if any	number of units	Number of practical hours	Number of theoretical hours	Course Name		Requirement type
					In English	In the arabic language	
NTU100		1	-	1	Human Rights	human rights	University requirements (units 14)  12 compulsory units + units 2 optional
NTU106		1	-	1	Democracy	Democracy	
NTU101		2	-	2	English Language 1	English language1	
NTU102		3	2	1	Principles of Computer 1	Computer principles 1	
NTU103	NTU102	3	2	1	Principles of Computer 2	Computer principles 2	
NTU104		2	-	2	Arabic language	Arabic (Mandatory )	
NTU105		2	1	1	Sport	Sports ( optional )	
_NTU107		2	-	2	French language	French language (optional)	
TIMO 110	-	2	-	2	Mathematics 1	Mathematics 1	Institute requirements 7)  compulsory ( units
TIMO111	-	3	3	-	Mechanical Workshops	Mechanical laboratories	
TIMO112	TIMO110	2	-	2	Mathematics 2	Mathematics 2	
ICTI120		6	3	3	Fluid	Fluid flow	Specialized requirements  lonliness 40 ) (  7 3 compulsory _ units + elective unit 3 -
ICTI121		6	3	3	Operation of Industrial Units	Operating industrial units	
ICTI122		6	3	3	Physical Chemistry	Physical chemistry	
ICTI123		6	3	3	Thermodynamics	Thermodynamics	
ICTI124		5	3	2	Generalchemistry	General chemistry	
ICTI129		5	3	2	Organic chemistry	organic chemistry	
ICTI125		3	3	-	Engineering Drawing 1	Engineering drawing 1	
ICTI126	ICTI125	3	3	-	Engineering Drawing 2	Engineering drawing 2 optional	
ICTI128		3	2	1	Pharmaceutical Chemistry	Pharmaceutical industries ( ( optional	
Total 61 units							

**Northern Technical University / ( 2023-Study plan for the year (2021  
And Chemical industries Technical Institute / Mosul / Technologies  
units operation oil/industrial**

Second Level							
code	Grader if any ,	number of units	Number of practical hours	Number of theoretic al hours	Course Name		Requirement type
					In English	In the arabic language	
NTU200	NTU100	2	-	2	English Language	2 English	University requirements compulsory 4 ) ( units
NTU201		2	-	2	Professional Ethics	Professional ethics	
TIMO207		2	-	2	Principles of Occupational Safety	Principles of occupational safety (my choice)	Institute requirements optional 2 modules
TIMO208	-	2	-	2	Industrial management	Industrial management (my choice)	
ICTI210	-	5	3	2	Crude oil technology	Raw Oil technology	Specialized requirements (units 53 ) compulsory 50 units + optional 3 module
ICTI211	ICTI210	5	3	2	Crude oil improvement techniques	Crude oil improvement techniques	
ICTI212	-	5	3	2	Heat transmission	heat transfer	
ICTI213	ICTI212	5	3	2	Mass transmission	Transmission of matter	
ICTI214	-	4	2	2	Measurement techniques	Measurement techniques	
ICTI215	-	4	2	2	Principles of control	Principles of control	
ICTI216	-	4	2	2	Materials Properties	Material properties	
ICTI217	-	4	2	2	Building of devices	Building devices	
ICTI218	-	5	3	2	Chemical industries 1	industries 1 Chemical	
ICTI219	ICTI218	5	3	2	Chemical industries 2	Chemical industries 2	
ICTI220	-	4	4	-	Project	(Project (mandatory	
ICTI221	-	3	2	1	Environmental pollution	Environmental pollution (optional(	
ICTI222	-	3	2	1	Quality control	Quality control (my choice)	
ICTI223		Interpolation only			Summer training	summer training	
units 59			2 3	27	the total		

## (2023-Study plan for the year (2021

Northern Technical University/Technical Institute/Mosul/Chemical and petroleum industry  
Oil refining /technologies

level one							Requirement type
code	Grader, if any	number of units	Number of practical hours	Number of theoretical hours	In English	In the arabic language	
NTU100		1	-	1	Human Rights	human rights	University requirements (units 14)  compulsory 12 units + units 2 optional
NTU106		1	-	1	Democracy	Democracy	
NTU101		2	-	2	English Language 1	English language 1	
NTU102		3	2	1	Principles of Computer 1	Computer principles 1	
NTU103	NTU102	3	2	1	Principles of Computer 2	Computer principles 2	
NTU104		2	-	2	Arabic language	Arabic (Mandatory )	
NTU105		2	1	1	Sport	Sports (my choice )	
_NTU107		2	-	2	French language	French language (optional)	
TIMO110	-	2	-	2	Mathematics 1	Mathematics 1	Institute requirements compulsory 7) (units
TIMO111	-	3	3	-	Mechanical Workshops	Mechanical laboratories	
TIMO112	TIMO110	2	-	2	Mathematics 2	Mathematics 2	
ICTR160		6	3	3	Fluid	Fluid flow	Specialized requirements units 38  35) compulsory + (optional 3
ICTR161		6	3	3	Operation of industrial units	Operating industrial units	
ICTR162		5	3	2	Physics of Crude oil	Crude oil physics	
ICTR163		5	3	2	Refining of crude oil	Crude oil refining	
ICTR164		5	3	2	Petroleum Chemistry	Oil chemistry	
ICTR168		5	3	2	Inorganic and Analysis chemistry	Inorganic and analytical chemistry	
ICTR166		3	3	-	Engineering Drawing 1	Engineering drawing 1	
9ICTR16		3	2	1	Physicalchemistry	Ownership transfer measurements my ) □ (choice	
ICTR167	CTR166	3	3	-	Engineering Drawing 2	Engineering drawing 2 (choice my)	
Total 59 units							

**Northern Technical ( 2023-Study plan for the year (2021  
University/Technical Institute/Mosul/Chemical Industry  
oil refining Oil and Technologies**

Second Level							
code	Grader if any ,	number of units	Number of practical hours	Number of theoretica l hours	Course Name		Requirement type
					In English	arabic In the language	
NTU200	-	2	-	2	English language	English (Mandatory)	University requirements compulsory 4) (units)
NTU201		2	-	2	Professional Ethics	Professional ethics	
TIMO202	-	2	-	2	Principles of Occupational Safety	Principles of occupational safety (my choice)	Institute requirements optional 2 modules
TIMO203	-	2	-	2	Industrial management	Industrial management (my choice)	
ICTR260	-	3	2	1	Oil Industrial	industrial equipment	Specialized requirements (units 56)  compulsory 53 + units optional3 module
ICTR261	-	5	3	2	Heat transfer	heat transfer	
ICTR262	ICTR261	5	3	2	Mass transfer	Transmission of matter	
ICTR263	-	5	3	2	Manufacture of lubricating oils	Lubricating oils industry	
ICTR264	-	5	3	2	Asphalt and Candles	Asphalt and candles	
ICTR265	-	3	2	1	Principles of industrial machinery	Principles of industrial mechanisms	
ICTR266	-	4	2	2	Measuring technique	Measurement technology	
ICTR267	-	4	2	2	Principles of control	Principles of control	
ICTR268	-	5	3	2	Thermodynamic	Thermodynamics	
ICTR269	-	5	3	2	Petrochemicals	T Petrochemical Industrial	
ICTR270	-	5	3	2	Industrial chemistry's	Industrial chemistry	
ICTR271	-	4	4	-	Project	The project	
ICTR272	-	3	2	1	Environmental pollution	Environmental pollution (my choice)	
ICTR273	-	3	2	1	Oil geology	Petroleum geology (my choice)	
ICTR274	-	-	Interpolation only		Summer training	summer training	
Total = 62 units					the total		

## Planning personal development- 11

Employing new teaching methods -

-

educational methods that serve Employing new and appropriate the student's acquired information to help him in the areas of public and professional life

-

Flexibility of the curriculum to make it subject to change to keep pace with scientific progress

-

Employing the necessary skills for the educational process and the

-1

the Ministry according to the conditions it Central admission prepared by sets

-2

The student's average in the preparatory stage

-3

The department's capacity

-13

The most important sources of information about the program

-1

Methodical scientific courses

-2

(the Internet -archives -External scientific sources (books

-3

Teaching staff

-4

Practical laboratory and research skills

necessary techniques to obtain information

-

Role model through the personality of the teacher and the extent of his influence on the student

12-Admission standard (setting regulations related to admission to the college or institute)

### Course description template n

#### Course class:

necessary summary of the most important a **provides** 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. It must be .scriptionlinked to the program de

Ministry of Higher Education and Scientific Research / Northern Technical University / Mosul Institute	1. Educational institution
Chemical and petroleum industries / operating industrial and petroleum units	2. Scientific department/center
Operating industrial and oil units	3. name/code Course
Is mandatory	4. Available attendance forms
quarterly	5. Semester/year
	6. Number of study hours (total)
11/9/2023	7. Date this description was prepared
8. Course objectives  carry out operation, Graduating technical personnel qualified to maintenance and control of chemical industrial unit operating devices in .chemical factories, especially petroleum ones	

Conducting laboratory tests on raw and finished manufactured materials, specifications, and linking theoretical conforming to their standard information to the process

Informing the student about the techniques used

Understanding and using scientific materials

Familiarity with industrial drawings and maps

units Carrying out maintenance work for industrial

#### 10. Course outcomes and teaching, learning and evaluation methods

-A

Cognitive objectives

-A1

Introducing the student to methods of operating and controlling various chemical industrial devices and units and carrying out chemical production work

-A2

The student compares laboratory tests of raw and resulting materials

-A3

The student uses industrial drawings, maps, and plans related to chemical laboratories

-A4

Implementing quality control work for the purpose of conforming the product international and Iraqi standard specifications to

-A5

Linking theoretical and practical information to benefit from improving the industrial reality

– B

.The skills objectives of the course

– B1

**analyses The student acquires the skill of conducting laboratory**

– B2

Use quality laboratory and chemical workshop tools and ensure the safety and accuracy of the results

– B3

Implementing graphs and charts for the practical lesson

-B4

The student acquires the skills of using a calculator

and learning methods Teaching

Using the theoretical and practical lecture system, electronic calculator, and electronic presentation  
)DATASHOW to learn the basics of chemical engineering and ( .chemistry

Evaluation methods

extent of their interaction with the lecture Testing students to determine the and conducting weekly, quarterly and annual tests

-C

Emotional and value goals

-C1

The student learns about the work of industrial and practical operating units and their role in building the country



-C2

Encouraging the student to gain practical experience and linking it to theoretical principles

-C3

Learn precision and discipline in receiving science and knowledge

-C4

Learn to communicate and interact during lectures

Teaching and learning methods

Practical and theoretical lectures, visual observations and listening to scientific rules in courses from professors and the Internet

Evaluation methods

Periodic oral exams and scientific discussions

– D

other skills related to ) Transferable general and qualifying skills  
(employability and personal development

-D1

Focus on those who have great mental ability and understanding

-D2

Encouraging a policy of discussions so that the student has the scientific creative ability

-D3

mental and scientific abilities Developing students'

-D4

Raising the level of students and following up on weak students

11. Course structure					
Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
industrial units The first stage/operating					
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Operating mechanical F1 units  And the flow of fluids in 2	the Studying properties and behavior of the fluid as it flows through various pipes and devices and introducing the student to mechanical units and special scientific foundations	P.3n 3	1
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Physical Part Chemistry 1  Thermodynamics V2	Studying the physical and chemical properties of materials and the laws related to that, and studying the laws related to converting thermal energy into work and vice versa	p.3n3	2
the	Lecture, discussion,	General	Identify the chemical and	n.3p2	3

test	presentation of explanatory posters, presentation of videos and films	1 Chemistry Organic Chemistry Part 2	physical properties of their ,materials chemical reactions, and methods of preparing them		
practical test	Lecture, discussion, presentation of illustrative posters, presentation of videos and films, practical training	Engineering drawing branch F1	Teaching the student the foundations of and rules engineering and industrial drawing, how to use the most important engineering tools necessary for this purpose, and learning how to photograph objects to draw their .projections	.p 3	4
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	1 Mathematics P1 Mathematics 2 P2	Strengthening : students' ability to understand mathematical relationships so that the student can understand the relationships Between different variables and linking them to .his specialty	n 2	5

To test	Lecture, discussion	Human rights 1 Democracy F2		n1	6
Practic al test	Lecture, ,discussion presentation of explanatory posters, presentation of videos and films	Computer Principles B1 F1 Computer principles 2 part 2	Introducing the student to the electronic its ,calculator operating systems, and benefiting from its programs and windows Identifying computer viruses and dealing with them	2 p.1n	7
the test	Lecture, discussion	English language 1		N2	8
the test	Lecture, discussion	Arabic		N2	9
the test	Lecture, discussion	Sports		n, 1p1	10
the test	Lecture, discussion	Mechanical laboratories		p3	11
Practic al test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Pharmaceutical industries		n,2p1	12
The second stage: operating industrial units					

the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Oil technology F1 awR  Crude oil improvement techniques V2	oil Identifying : and petroleum industries in terms of formation, extraction and processing  about oil <u>Learn</u> and gas derivatives, how to obtain them, global evaluation methods, their standard specifications, and their chemical and physical .composition	<u>n</u> n.3 2	8
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Heat transfer F1  Transfer of matter F2	Providing the student with knowledge of the various industrial processes in the chemical industries and the devices used in them to be able to operate them, control them, and maintain . their safety	n,3p2	9
the test	Lecture, discussion, presentation of tory explana	Chemical 1 industries  Chemical 2 industries	This course aims to identify production processes at their various	<u>n</u> n.3 2	10

	posters, presentation of videos and films		stages, starting from raw materials and ending with industrial .output		
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Measurements P1 and control  Measurement technique F2	Introducing the to the student electrical devices used in technological processes and chemical industries, as well as how to and measure control variables, and giving a practical idea about electrical devices and measuring .devices	p n.2 2	11
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Building F1 devices  Properties of Q2 materials	Acquainting the student in an accurate theoretical and practical way with the installation and construction of devices used in the chemical industries. Introducing the student to the effects of external forces on parts of machines and	n.2 p 2	12

			the resulting stresses and stresses deformations due to them, and how to deal with these cases based on mathematical relationships to determine the amounts of permissible forces, as well as introducing the student to the types of metals that are used in construction. Devices and machines used machinery in the chemical industries and the types of these metals, their properties, specifications, uses, how to extract them and how to protect them when exposed to corrosion.		
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos	Occupational F2 safety	Teaching the student all the occupational hazards in the work environment, the	2 .n	13

	and films		necessary means of preventing them, the most important pollutants air, of water, and soil, the standard equipment for each subject, and methods of preventing .them		
the test	,Lecture discussion	English 2		n2	14
The first stage/oil refining					
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Fluid flow F1 mechanics  Operating industrial units F2	the Studying properties and behavior of the fluid as it flows through various pipes and devices and introducing the student to mechanical units and special scientific .foundations	n,3p3	1



the test	Lecture, discussion, presentation of explanatory ,posters presentation of videos and films	Crude oil physics 1 Crude oil refining F2	Identify oil and petroleum industries in terms of formation, extraction and processing  about oil <u>Learn</u> and gas derivatives, how to obtain them, global evaluation methods, their standard specifications, and their chemical composition	n.3p2	2
the test	Lecture, ,discussion presentation of explanatory posters, presentation of videos and films	organic 1 chemistry Inorganic and analytical chemistry 2	Identify the chemical and physical properties of materials, their chemical reactions, and methods of preparing them	n.3p2	3
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	And measurements of transfer of P2 ) ownership	Transfer Measurements -:  In fluid measurements, it is known as the Custody TransferPoint .  Fluid Quantity ( ) and its quality	1	5

			Fluid Quality (are measured by known measurement methods)		
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	1 Mathematics P1 Mathematics 2 P2	Strengthening : students' ability to understand mathematical relationships that the so student can understand the relationships Between different variables and linking them to .his specialty	n 2	6
To test	Lecture, discussion	Human rights 1 Democracy F2		n1	7
Practic al test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	principles B1 Computer F1 Computer principles 2 part 2	Introducing the student to the electronic its ,calculator operating systems, and benefiting from its programs and windows Identifying computer viruses and dealing with them	2 p.1n	8
the test	Lecture, discussion	English language 1		N2	9

the test	Lecture, discussion	Arabic		N2	10
the test	Lecture, discussion	Sports		n, 1p1	11
the test	Lecture, discussion	Mechanical laboratories		p3	12
The second stage: oil refining					
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Transfer of F1 substance Heat transfer V2	Providing the student with theoretical information on the topics of heat transfer and matter (mass) transfer) and the equipment for these two topics that are used in the chemical industries	n,3p2	1
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	petrochemical P1 s Industrial Chemistry V2	Knowledge of primary petrochemical materials, which are the basis for petrochemical industries. They can be divided into three main groups in terms of their composition: 1 The olefins group. 2 The -aromatic group. 3- Industrial gas	n,3 p 2	2

			.		
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Industrial Equipment F1  Principles of industrial mechanisms, Part 2	The student's knowledge of operating and repairing industrial devices and equipment	n,2p1	3
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Lubricating oils industry F1  Asphalt and candles V2	Identify oil and petroleum industries in terms of formation, extraction and processing  about oil <u>Learn</u> and gas derivatives, how to obtain them, global evaluation methods, their standard specifications, and their chemical composition	p22 ,n	4
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Control F1 technology  Principles of measurement V2	Introducing the to the student electrical devices used in technological processes and chemical industries, as well as how to and measure	n2,2p	5

			control variables, and giving a practical idea about electrical devices and measuring .devices		
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Environmental pollution F2	Studies industrial pollutants of air, water and soil	n,2p1	6
The match	Discussion	The project	Developing the student's skills in research and manufacturing and finding useful conclusions as future works	2	7
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Professional ethics		n2	8
the test	Lecture, discussion, presentation of explanatory	Principles of occupational safety		n2	9

	posters, presentation of videos and films				
the test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	English		n2	10

## 12. Infrastructure

Operating mechanical units	Required prescribed books -1
<ol style="list-style-type: none"> <li>1. Part One, - Principles of Fluid Mechanics Malaika-written by Jamil Al</li> <li>2. -Fluid Mechanic Dr. Nima Hamad Emara University of Technology</li> <li>3. Fluid Mechanics, translated by Nabil Zaki Mortada and Dr. Fawzi Ibrahim Abdel Sadiq</li> <li>4. Unit. Operation of chemical Eng. By maccade, Published by maccraw-hill, 3<sup>ed</sup> edition 1967</li> <li>5. Unit operation by Brown, published by Willy London 1965</li> <li>6. Principles of unit operation by A.S. Faust published by Toppan and Willy 2<sup>nd</sup> edition 1961 Tokyo. Japan 1960</li> <li>7. Chemical Eng Vol 1 and 2<sup>nd</sup> Coulson and Richardason by preutice- Hill 1960</li> </ol>	(Main references (sources -2

<p>Unit. Operation of chemical Eng. By maccade published by macgraw hill 3<sup>ed</sup> edition 1967</p> <p>Unit operation by Brown, published by Willy London 1965</p> <p>Principles of unit operation, by AS Faust published by Toppan and Willy 2<sup>nd</sup> edition 1961 Tokyo, Japan 1960</p> <p>Chemical Eng Vol 1 and 2<sup>nd</sup> Coulson and Richardson by preutice- Hill 1960</p> <p>Fluid mechanics for Eng. By manrice published by preutice- hill 1960</p>	
<ol style="list-style-type: none"> <li>1. Iraqi Standards Authority 1974, first Hurriya Printing House, -edition, Al Baghdad</li> <li>2. Astm stands. Published in 1960 by American society for testing material.</li> <li>3. Chemical process industries by RN shreve, 3<sup>rd</sup> edition . McGraw. Hill 1967.</li> <li>4. Text book of practical organic chemistry by , Vogfl. 3<sup>rd</sup> edition 1954, published by Longman. London.</li> </ol>	<p>Recommended books and - A references (scientific journals, (...),reports</p>
<p>1- Strength of Material, R. C. Stephens, 1974</p> <p>Engineering Mechanics, by Singer, 3<sup>rd</sup> ed . , 1972</p> <p>2-Chemical Plant Technology – An Introduction by Manual, MAEllison &amp; Taylor,</p>	<p>Electronic references, -B ...Internet sites</p>

### 13. Course development plan

- 1- Access to modern scientific literature
  - 2- Participation in relevant scientific conferences
  - 3- The teaching and training staff is devoted to application and work in .operational and industrial institutions
  - 4- specialized professors Hosting
- Scientific pairing with other universities and corresponding colleges

:Admission plan

Graduates of scientific academic preparatory :**Qualifications**  
.school

**Employment** :**Minimum number for accepting students**  
students 58 :**branch**

63 :**Minimum number of students to accept: Refining branch**  
students