



Development of a Modern Higher Education System for Water Engineering in Syria

Tempus Project EDUCAT

Structure of HES for water engineering and management in (Syria, Aleppo University Faculty of Agriculture and Faculty of Civil Engineering)

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University of Aleppo is a public university, it established in 1958. It is the second largest and oldest university in Syria.

Aleppo University includes:

- ❖ 25 Faculties
- ❖ 10 Institutes
- ❖ 6 Academic Teaching Hospital
- ❖ a University Journal
- ❖ Higher Institute of Languages
- ❖ Publishing House and
- ❖ Central Library.

It includes

- 100,000 students,
- 1,500 of graduate students
- 1,400 staff members and
- 2,500 assistant staff.

Aleppo University seeks to meet the changing needs of society in achieving comprehensive and continued human resource development, promoting national, regional and international competition. The university equipped its faculties with the most modern laboratories and scientific equipments.

Important in our project in terms of colleges interested in water:

Faculty of Agriculture: It is at the forefront of advances in applied bioscience, food, nutritional and environmental sciences research and teaching. There is cooperation between the College and ICARDA, ACSAD, Remote Sensing Authority, Chamber of Agriculture, Ministry of Irrigation, Ministry of Environment and the Ministry of Agriculture.

The faculty of agriculture includes 10 departments:

- ✓ Crop Production
- ✓ Horticulture
- ✓ Soil Science and Land Reclamation
- ✓ Food Science
- ✓ Rural Engineering
- ✓ Fundamental Sciences
- ✓ Animal Production
- ✓ Natural Resources and Environment
- ✓ Agricultural Economy
- ✓ Plant Protection

The study in the Faculty admitted 10-semester (5 years of under graduate study).

During the first **three years**, general courses are taught ranging from mathematic, physic, chemistry, statistics, plant, animal, soil science, ecology, surveying, irrigation & drainage, fertility, food processing and economic. In the last two years students can complete the study in one of the ten departments in the faculty.

Department of Rural Engineering offers both undergraduate (B. agr. Eng) and postgraduate (M. sc. and Ph D) degrees. The mission of rural engineering department is to prepare agricultural engineers for high proficiency in fields of water resources management (hydrology, irrigation management, agricultural drainage and water quality), ecological engineering (ecosystem modeling, design and management), waste water management, agricultural machinery and renewable energies.

There is a tight collaboration between Rural Engineering, Natural and Renewable Resources and Soil Sciences Departments. As well as collaboration with the Faculty of Civil Engineering (Water Engineering and Environmental Engineering Departments) and agricultural research stations in Syria.

Also there is cooperation between the department and the institute of water resources management, hydrology and agricultural hydraulic engineering. Hannover.

In the old system there was two branches that follow the Department of Rural Engineering,

the first one was Irrigation & Drainage and the second branch was Agricultural Machinery.

In 2009 was the adoption of a new system in the department, where branches merge in a single partition on behalf of Rural Engineering.

Students study
practical & theoretical
in the following specialized courses:

Studying plan of Irrigation and Drainage Branch (old system):

Fourth Year					
Seventh semester			Eighth semester		
Course	Week Hours		Course	Week Hours	
	Lecture	Exercise		Lecture	Exercise
Hydrology	2	3	Irrigation	2	3
Mathematics	2	3	Engineering drawing	2	3
Land reclamation	2	3	Water resources	2	3
Surveying	2	3	Farm buildings	2	3
Soil mechanic	2	3	Tractors and engines	2	3
Strength of materials	2	3	Hydraulics	2	3
Sum	12	18	Sum	12	18

Fiveth Year					
Ninth semester			Tenth semester		
Course	Week Hours		Course	Week Hours	
	Lecture	Exercise		Lecture	Exercise
Agricultural drainage	2	3	Sewage water	2	3
Solid waste treatment	2	3	Water economy	2	-
Water laws	2	-	Irrigation instruments	2	3
Environmental engineering	2	3	Electrical engineering	2	3
Dams & hydraulic structures	2	2	Engineering system analysis	2	3
B sc. Project	-	6	B sc. Project	-	6
Sum	10	17	Sum	10	18

Studying plan of the Department of Rural Engineering (new system):

Fourth Year						
Seventh semester				Eighth semester		
Course	Week Hours			Course	Week Hours	
	Lecture	Exercise			Lecture	Exercise
Hydrology	2	2		Hydraulics	2	3
Engineering drawing	2	3		Agricultural irrigation	2	2
Mathematics	2	2		Harvesting machines	2	3
Machinery of soil and seed	2	3		Soil physics	2	2
Design and analysis of experiments	2	3		Inventory of agricultural land	2	2
Basics of Mechanic	2	2		Surveying	2	2
Tractors and engines	2	3		Sewage water	2	2
Sum	14	18		Sum	14	16

Fiveth Year						
Ninth semester				Tenth semester		
Course	Week Hours			Course	Week Hours	
	Lecture	Exercise			Lecture	Exercise
Agricultural buildings and farm power	2	3		Elements and machine design	2	2
Resources and water legislation	2	2		Horticulture and forestry machinery	2	3
Solid waste treatment	2	2		Agricultural drainage	2	3
Agricultural mechanization	2	2		Economics of agricultural machinery	2	2
Maintenance of agricultural machinery	2	2		Machinery and equipment of irrigation and drainage	2	2
B sc. Project	-	4		B sc. Project	-	4
Sum	10	15		Sum	10	16

The Department of Rural Engineering graduates engineers with a great potential for field work in managing farms. For securing water sources, for transferring and using available water resources efficiently, and for conducting technical operations agricultural needing.

Rural Engineering Department grants master's degree for students of the college of agriculture, requiring a minimum of three years, where the students teach courses in the first year and then conducting experiments and write a thesis in the next two years.

Studying plan of the Master of Rural Engineering Department

First Year					
First semester			Second semester		
Course	Week Hours		Course	Week Hours	
	Lecture	Exercise		Lecture	Exercise
Programming and Statistical analysis	2	3	Irrigation and drainage networks design	2	2
Irrigation machinery and instruments	2	2	Irrigation management	2	2
Crops machinery	2	2	Harvesting machines	3	2
Machinery of soil and seed	2	2	Environment engineering	2	2
Sum	8	9	Sum	9	8

Also taught courses on the field of water in the Department of soil science and department of natural resources, such as hydrology, soil physics, water pollution, water chemistry, soil and water microorganism and remote sensing.

A doctor of philosophy degree in irrigation and drainage engineering can also be granted. Where the students conducting experiments and write a thesis. The period of study at the doctoral level not less than 3 years.

Areas of research for master and doctoral

- Irrigation
- Water Management
- Water and Groundwater Pollution
- Agricultural Drainage
- Hydrology
- Wastewater Treatment
- Renewable Energy
- Management Agricultural Machinery

Faculty of Civil Engineering was founded in 1958, the mission of the faculty is to graduate engineers in different disciplines satisfying the needs of the national and international engineering sectors. The graduates are educated to be fully aware of basic knowledge and skills that satisfy the international standards. Mission is extended to upgrade engineers knowledge and skills through specialized short courses and workshops as well as enrollment in programs of higher studies (M. Sc. and Ph.D.).

The Faculty of Civil Engineering includes
7 departments:

- Transportation,
- Topographic,
- Management,
- Structural,
- Geotechnical,
- Water Engineering and
- Environmental Engineering.

There is cooperation between the College and

- the Ministry of Housing,
- the Ministry of Irrigation,
- the Ministry of Local Administration,
- the Municipality of Aleppo,
- the Ministry of Environment and
- Engineers Association.

Department of Water Engineering

offers both undergraduate (B. eng) and postgraduate (M. sc. and Ph D) degrees.

The mission of Water Engineering

Department is to prepare civil engineers with high proficiency in fields of water engineering and management (hydrology, hydrogeology, dams structures, hydraulics, water supply engineering, irrigation and drainage engineering). The period of study in the Faculty is five years.

Also taught courses on the field of water in the Structural Engineering Department, such as hydrology, hydraulics, irrigation, drainage, waste water treatment, hydraulic structures and water supply networks.

Studying plan of Water Engineering Department

First Year					
First semester			Second semester		
Course	Week Hours		Course	Week Hours	
	Lecture	Exercise		Lecture	Exercise
Mathematics for engineers I	2	2	Mathematics for engineers II	2	2
Physics for engineers	2	2	Chemistry for engineers	2	4
National socialistic culture	2	-	Engineering geology	2	2
Descriptive Geometry	2	4	Informatic engineering I	2	4
Engineering mechanics I	2	2	Engineering mechanics II	2	2
Arabic language	2	-	Foreign language II	4	-
Foreign language I	4	-			
Sum	16	10	Sum	14	14

Second Year					
Third semester			Fourth semester		
Course	Week Hours		Course	Week Hours	
	Lecture	Exercise		Lecture	Exercise
Mathematics for engineers II	2	2	Hydrology I	2	2
Strength of materials I	2	2	Strength of materials II	2	2
Building materials and tests	2	2	Hydraulic II	4	2
Informatic engineering II	2	2	Soil & water chemistry	2	2
Hydraulics I	2	2	Surveying II	2	2
Surveying I	2	4	Foreign language IV	4	-
Foreign language III	4	-	Drawing and engineering design	2	4
Sum	16	14	Sum	18	14

Third Year						
Fiveth semester				Sisth semester		
Course	Week Hours			Course	Week Hours	
	Lecture	Exercise			Lecture	Exercise
Hydraulics III	4	2		Structural mechanics II	2	2
Hydrology II	2	2		Soil mechanics II	2	2
Structural mechanics I	2	2		Mathematical simulation	2	2
Reinforced concrete I	4	2		Reinforced concrete II	4	2
Soil mechanic I	2	2		Irrigation I	2	2
Geographical Information Systems (GIS)	2	2		Water suply & sewer networks	4	2
Sum	16	12		Sum	16	12

Fourth Year						
Seventh semester				Eighth semester		
Course	Week Hours			Course	Week Hours	
	Lecture	Exercise			Lecture	Exercise
Irrigation II	2	2		Modern irrigation networks	2	2
Engineering systems analysis	2	2		Hydraulic Structures II	2	2
Hydraulic Structures I	2	2		Tunnels & buried structures	2	2
Hydrogeology I	2	2		Hydrogeology II	2	2
Drainage I	2	2		Drainage II	2	2
Foundation engineering	2	2		Networks & pump stations I	2	2
Steel structures	2	2		Reinforced concrete III	4	2
Sum	14	14	Sum	16	14	

Fiveth Year						
Ninth semester				Tenth semester		
Course	Week Hours			Course	Week Hours	
	Lecture	Exercise			Lecture	Exercise
Hydraulic structures III	2	2		Designe by computer	2	2
Networks & pump stations II	2	2		Hydraulic projects managements	2	2
Drainage III	2	2		Environment protection	2	2
Hydraulic projects technology	2	2		Investment & maintenance of hydraulic structures	2	2
Drink water treatment	2	2		Engineering economic & contracts	4	2
Coastal structures	2	2		Waste water treatment	2	2

Water Engineering Department grants master's degree for students of the college of civil engineering, requiring a minimum of two years; they study theoretical courses in the first year and the practical in the next year for thesis preparation.

Department of Environmental Engineering offers postgraduate (M. sc. and Ph D) degrees only. The mission of environmental engineering department is to prepare civil engineers with high proficiency in fields of environmental engineering (waste water treatment, solid waste management, environmental protection, sanitary and environmental engineering, water bio-environmental engineering and waste water networks design).

A master of civil engineering degree in water or environment engineering is granted, where the students teach courses in the first year and then conducting experiments in the next year for thesis preparation.

A doctor of philosophy degree in water or environment engineering was granted.

Where the students conducting experiments and write a thesis. The period of study at the doctoral level not less than three years .

Master plan of Water Engineering Department

First Year		
Course	Week Hours	
	Lecture	Exercise
Advancend Mathematics and Simulation	2	2
Advanced Hydrology and Hydrogeology	2	2
Hydraulic and supply & Sewer Networks	2	2
Coastal and river structures & maintenance	2	2
Drainage and land reclamation	2	2
Modern irrigation networks	2	2
Methods of scientific research & project		
Sum	12	12

Master plan of Environmental Engineering Department

First Year		
Course	Week Hours	
	Lecture	Exercise
Advancend Mathematics	2	1
Engineering of Drinking Water Supply	2	2
Engineering of Sewerage and Industrial	4	3
Environmental Pollution and its Protection	2	2
Water Chemistry and Microbiology	1	1
Solid Waste Treatment	2	2
Sum	13	11

Areas of research for master and doctoral

- Irrigation & Drainage
- Water Management
- Water and Groundwater Pollution
- Hydrology
- Hydraulic Structures
- Wastewater Treatment
- Solid waste Treatment
- Environmental Pollution
- Supply and Sewer Networks

Faculty of Technical Engineering was founded in 2003, today, the faculty comprises five departments that, together, are able to respond dynamically to the multiple modern technological challenges posed by fast-paced industries. The Faculty offers the opportunity to study in different engineering disciplines to help students achieve academic success the services and facilities provided are comparable to that of similar institutions.

The study in the faculty of technology engineering offers 5 years.

The faculty includes 5 departments:

- ✓ Biotechnology,
- ✓ Technologies for Environmental Engineering,
- ✓ Food Technology,
- ✓ Medical Engineering Technologies and
- ✓ Water Resources Engineering.

The Department of Water Resources Engineering did not start the study done so far.

The number of students:

Department of Rural Engineering

4 th year	5 th year	Master (1 st year)	Master	Ph D
10	13	5	17	4

Department of Water Engineering

1 st year	2 nd year	3 rd year	4 th year	5 th year	Master (1 st year)	Master	Ph D
70	58	37	32	31	9	8	1

Department of Environmental Engineering

Master (1 st year)	Master	Ph D
13	8	--

Thank you

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