Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	Erbil Technical Engineering College	
Department	Civil Engineering	
Module Name	Engineering Hydrology	
Module Code	ENH 605	
Degree	Technical Diploma ☐ Bachler ☒ High Diploma ☐ Master ☐ PhD	
Semester	6th	
Qualification	B.SC	
Scientific Title	Engineer	
ECTS (Credits)	5	
Module type	Prerequisite ☐ Core ☒ Assist. ☐	
Weekly hours	3 hrs	
Weekly hours (Theory)	(3) hrs. Class	(135) Total hrs. Workload
Weekly hours (Practical)	(0) hr. Class	(0) Total hrs. Workload
Number of Weeks	15	
Lecturer (Theory)	Assist. Prof. Basil Younus Mustafa; Assist. Lecturer Alend W. Abdulrazaq	
E-Mail & Mobile NO.	basil.mustafa@epu.edu.iq alend.abdulrazaq@epu.edu.iq	
Lecturer (Practical)	N/A	
E-Mail & Mobile NO.	N/A	
Websites	N/A	

Course Book

Course Description	**The course serves as an introduction to the field of engineering hydrology. It covers fundamentals such as the hydrological cycle, catchment, losses, hydrographs and hyetographs. Design topics covered will be selected from: flood frequency analysis, determination of design rainfall intensity and hyetographs, peak flow estimation, design hydrograph estimation.**
Course objectives	**The course will focus on explaining the background of Applied hydrology, The application of hydrology in different engineering structures. Students will gain experience by solving problem assignments throughout the semesters.**
Student's obligation	**1. Students should attend the class in order to understand and participate during teaching sessions; otherwise, the lecturer will not be responsible to re- repeat the lecture.** **2. Student absent list will be submitted to the civil engineering department weekly or monthly.** **3. Students will need to submit the required homework, reports, seminars and/or any other assignments requested by the lecturer in time and in accurate method.**
Required Learning Materials	**The different types of teaching-learning materials are, video TLMs, textbooks, overhead projector, Power Point slides, computers and other reading materials.** **Other Reading Materials: The other reading materials are referred to articles, documents, reports, assignments, projects, newspapers, magazines and books.**

			Weight (Marks)	Due Week	Relevant Learning Outcome
Evaluation	Task				
	Paper Review				
	Assignments	Homework	10%	4,6,10	1,2,3
		Class Activity	2%	1-12	1-3
		Report	8%	6	1,2,3
		Seminar	8%	10	1,2,3
		Essay			
		Project			
	Quiz		8%	4,6,8	1,2,3
	Lab.		N/A		
	Midterm Exam		24%	7-8	1-2
	Final Exam		40%	13-15	1-3
	Total		100%		

Specific learning outcome:

By the end of the course, students should be able to

1- Demonstrate knowledge of physical processes in the context of flood hydrology, including the hydrological cycle in general, and rainfall, loss as Evaporation, Infiltration and ground water transport mechanisms. Demonstrate knowledge of the methods that can be used to measure rainfall and flow, as well as their relative advantages and disadvantages.

2- Apply a range of common techniques, such as flood frequency analysis, probabilistic rational, regional methods to estimate design peak flows in rural areas.

3- Define and comprehend key concepts related to flood hydrology, such as relative and cumulative frequency, the use of statistical data distributions, time of concentration, runoff hydrographs, rainfall hyetographs, model calibration, and catchment storage.

Course References:	▪ Key references: 1- Engineering hydrology 3rd edition, E.M Wilson. 2- Engineering Hydrology, 4th edition, K. Subramanya, McGraw Hill. 3- Hydrology and Quality of water resources by Mark J. Hammer and Mackichan. ▪ Useful references: 1- Handbook of Hydrology by David R. Maidment. 2- Introduction to Environmental Engineering by Davis. 3- علم المياه وتطبيقاته د. باقر كاشف الغطاء. 4- علم الهيدرولوجى د.وفيق حسين. 5- ترجمة الهيدرولوجي / ترجمة الدكتور على إسماعيل

Course topics (Theory)	Week	Learning Outcome
Ch.1 Introduction and Definition	**1**	**1**
Ch.2 Precipitation	**2**	**1**
Ch.2 Precipitation/Cont.	**3**	**1**
Ch.3 Evaporation and Evapotranspiration	**4**	**1**
Ch.4 Infiltration	**5**	**1**
Ch.5 Ground Water	**6**	**1**
Ch.6 Runoff and Stream Flow Measurement	**7**	**2**
Ch.6 Runoff and Stream Flow Measurement/Cont.	**8**	**2**
Ch.7 Flood and Flood Estimation and Frequency Analysis	**9**	**2**
Ch.7 Flood and Flood Estimation and Frequency Analysis/Cont.	**10**	**2**
Ch.8 Elemental Hydrographic and Unit Hydrographic	**11**	**3**
Ch.8 Elemental Hydrographic and Unit Hydrographic/Cont.	**12**	**3**

Practical Topics N/A	Week	Learning Outcome

Questions Example Design

Ex. Calculate the discharge through a stream using velocity - area method, for the from the following data
given in the table. Assume the current meter constants a = 0.32 and b = 0.032.

Distance from side of the river (X) in m	0	1	3	5	7	9	11	12
Average depth of the river (D) in m	0	1.1	2	2.5	2	1.7	1	0
No. of revolutions (R)	0	39	58	112	90	45	30	0
Time in sec	0	100	100	150	150	100	100	0

Answer: V= a +b*N = 0.32 +0.032*N (m/sec)
N = R/time
A = X * D (m^2) , and Q = V*A (m^3/sec)

X(m)	D(m)	R	time (sec)	N = R/time	V (m/sec)	A (m^2)	Q (m^3/sec)
0	0	0	0.0	0	0	0.00	0.00
1	1.1	39	100.0	0.39	0.33	1.10	0.37
3	2	58	100.0	0.58	0.34	4.00	1.35
5	2.5	112	150.0	0.75	0.34	5.00	1.72
7	2	90	150.0	0.60	0.34	4.00	1.36
9	1.7	45	100.0	0.45	0.33	3.40	1.14
11	1	30	100.0	0.30	0.33	2.00	0.66
12	0	0	0.0	0	0	0.00	0.00
						Sum	6.59

Q = 6.59 m^3/sec

Extra notes:

External Evaluator

I have reviewed the contents of the course book and the syllabus of the subject covers all the important information of Engineering Hydrology subject for 3rd year civil engineering students, and I approve the contents of the course book.

Prof. Dr. Mereen Hassan Fahmi
Professor in Civil Engineering