

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Hydrology		Module Delivery
Module Type	Support		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CIV015		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	
Administering Department	CV101	College	Civil Engineering College
Module Leader	Dr. Basheer Al-Hadeethi	e-mail	Ba81sheer@uoanbar.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ahmed Rahomi Rajab	e-mail	Ahmed.rahomi2@uoanabr.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<p>The Aims of this course are to enable students to:</p> <ol style="list-style-type: none"> 1. Develop problem solving skills and understanding of hydrology application. 2. Understand and establish its relevance in civil engineering. 3. This is addressing issues related to water balance and developing hydrological calculation methods and accuracy. 4. Understand water expenditures and forecasting future water expenditures. 5. Determine the volume of reservoirs and simple hydraulic components.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>By the end of successful completion of this course, the student will be able to:</p> <ol style="list-style-type: none"> 1. The students will learn hydrologic cycle, precipitation, streamflow measurements, return periods, aquifer and groundwater, design floods and their relationships to engineering designs. 2. The students will learn the basics of statistical theories, history of normal distribution and their applications in frequency analysis for hydraulic designs. 3. The students will learn the theory of water infiltration and evaporation and their effects on estimation of available water and flood analysis. 4. The students will learn theories of unit hydrograph and applications on flood forecast including peak discharge and time of peak occurrence. 5. The students will learn theories of flood routing including reservoir and channel routing in flood forecasting.
<p>Indicative Contents المحتويات الإرشادية</p>	<p><u>Chapter 1: Introduction</u></p> <ul style="list-style-type: none"> -The hydrology and hydrologic cycle, basic definitions. -Importance of the hydrologic cycle, Hydrology Definitions, - How The Hydrologic Process Works. - Water Utilization and production. - Catchment water balance and Water Budget Equation (10 hrs) <p><u>Chapter 2: Precipitation</u></p> <ul style="list-style-type: none"> - Types of precipitation (Frontal Precipitation, Convective Precipitation and Orographic Precipitation), Occurrence of Precipitation. - Rainfall, Measurement of Rainfall, Raingauges, Considerations in sitting a rain gauge station include - Estimation of Missing Data. (15 hrs) <p><u>Chapter 3: Abstract from Precipitation</u></p> <ul style="list-style-type: none"> - Evaporation, Physics of Evaporation, Measurements of Evaporation. - Methods to Reduce Evaporation Losses. - Evapotranspiration, Measurements of Evapotranspiration. - Initial Loss, Interception, Depression Storage - Infiltration, Infiltration Capacity, Measuring of Infiltration, Φ and W-Indexes (15 hrs)

	<p><u>Chapter 4: Stream Flow Measurements</u></p> <ul style="list-style-type: none"> - Direct and indirect determination of stream discharge. - Measurements of Velocity. - Flow-Measurements (15 hrs) <p><u>Chapter 5: Runoff</u></p> <ul style="list-style-type: none"> - Runoff, Overland Flow, interflow. - Importance of Studying Runoff, Some Main Factors Affecting Runoff. - Catchment Yield, Rainfall-Runoff Correlation. - SCS-CN Method of Estimating Runoff Volume, Rational Method. (20 hrs) <p><u>Chapter 6: Hydrographs</u></p> <ul style="list-style-type: none"> - Basic definitions, shape of a hydrograph, parts of hydrograph, hydrograph components. - Hydrograph analysis, Factors Affecting Flood Hydrograph. - Effective Rainfall. - Unit hydrograph, Synthetic hydrograph. (20 hrs) <p><u>Chapter 7: Groundwater</u></p> <ul style="list-style-type: none"> - Introduction, Basic Assumptions, Forms of Subsurface Water. - What is an Aquifer, Types of Aquifers, Aquifer Properties. - Flow through a confined aquifers and Unconfined Aquifers. - Equilibrium hydraulics. (25 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.</p>

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	8% (8)	5, 9	LO # 1 and 2, 3 and 4
	Assignments	2	5% (5)	6, 11	LO # 1 and 2, 3 and 4
	Projects / Lab.				
	Report / activity	1	3% (3)	15	
Summative assessment	Midterm Exam	2 hr	24% (24)	7	LO # 1-4
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Application of Hydrology in Engineering & Hydrologic cycle
Week 2	Hydrologic cycle, return periods and water balance
Week 3	Precipitation, types of precipitation and stream flow measurements
Week 4	Estimation of missed data, checking data consistency & Rainfall frequency analysis
Week 5	Theory of frequency analysis for design storms and design floods.
Week 6	Measurement of evaporation and estimation of potential evaporation
Week 7	Infiltration, Factors affecting infiltration, Measurement and estimation of infiltration process
Week 8	Mid-term Exam1
Week 9	Hydrographs, Introduction and Unit Hydrographs
Week 10	Hydrograph application, Time Area Models and Synthetic Unit Hydrographs
Week 11	Flood routing: channel & reservoir routing

Week 12	Mid-term Exam
Week 13	Introduction to groundwater and Movement of ground water and Transmissibility.
Week 14	Applications of binominal distribution for defining the return period in engineering design.
Week 15	Statistical distributions and their applications in flood analysis.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 3	
Week 5	
Week 7	
Week 10	
Week 13	
Week 15	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Warren vissman , Introduction to hydrology, 5th ed, 2003.	Yes
Recommended Texts	- Ven Te Chow, Applied hydrology. - Em. Wilson, Engineering hydrology	Yes
Websites	https://www.uoanbar.edu.iq/Bank-Section.php	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.