

## Module (Course Syllabus) Catalogue

### 2023-2024

College/ Institute	Erbil Technical Engineering College		
Department	Mechanical and Energy Engineering		
Module Name	Hydroelectric Energy		
Module Code	HYE801		
Degree	Technical Diploma	Bachelor	
	High Diploma	Master	PhD
Semester	Eighth Semester		
Qualification	M.Sc. in Thermal Power		
Scientific Title	Lecturer		
ECTS (Credits)	5		
Module type	Prerequisite	Core	Assist.
Weekly hours	4		
Weekly hours (Theory)	(2) hr Class	(28) Total hrs Workload	
Weekly hours (Practical)	(2) hr Class	(26) Total hrs Workload	
Number of Weeks	12		
Lecturer (Theory)	Mr. Mohammed A. Suliman		
E-Mail & Mobile NO.	<a href="mailto:Mohammed.sulaiman@epu.edu.iq">Mohammed.sulaiman@epu.edu.iq</a> & 772 214 9090		
Lecturer (Practical)			
E-Mail & Mobile NO.			
Websites	<a href="https://academicstaff.epu.edu.iq/faculty/mohammed.sulaiman">https://academicstaff.epu.edu.iq/faculty/mohammed.sulaiman</a>		

# Course Book

<p><b>Course Description</b></p>	<p>Hydropower generates over 1000 GW globally, producing more than 4000 TWh each year, around 16.5% of the world's total electricity. This makes it by far the largest source of renewable electricity when the world is racing against time to combat climate change by greening its energy supply. Throughout this course, the students will learn the physics behind the hydropower electricity generated, the site selection, design of hydraulic turbines, structure design of hydroelectric plants, and several more topics.</p>
<p><b>Course objectives</b></p>	<p>The Bulk of this course will cover the following areas;</p> <ul style="list-style-type: none"> <li>• The basic physics of how falling water generates power, and describes the main types of modern hydroelectric systems in use today and their major components.</li> <li>• Describing how site selection and feasibility studies are carried out.</li> <li>• Explaining the principles behind how structures of hydroelectric plants are designed, including the intake, headrace, gravel trap, settling basin, forebay, penstock, and the powerhouse.</li> <li>• Exploring the design of different types of hydraulic turbines, which are in use and being developed.</li> <li>• Focusing on the electrical aspects of hydroelectricity including the workings of generators, controllers, and power transmission and distribution.</li> <li>• Discussing the economic analysis of infrastructure projects.</li> <li>• Describing the social and environmental challenges of hydroelectric project and participatory processes required for sustainable development.</li> </ul>
<p><b>Student's obligation</b></p>	<p>Throughout the academic Semester, students will be assessed with the following duties:</p> <ol style="list-style-type: none"> <li>1. Home works (No.: 2)</li> <li>2. Quizzes (No.: 2)</li> <li>3. Reports (No.:3)</li> <li>4. Essays (No.:1)</li> <li>5. Midterm and final examinations of the semester</li> </ol> <p>In addition, the attendance and participation in the Theoretical and Experimental lectures will be mandatory.</p>
<p><b>Required Learning Materials</b></p>	<ul style="list-style-type: none"> <li>• The most important learning source will be the related Books, alongside with the published lecture notes at Lecturer's site in Moodle.</li> <li>• Other required learning materials include; whiteboard, computer, and projector.</li> </ul>

<b>Evaluation</b>	<b>Task</b>		<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>
	Paper Review				
	Assignments	Homework	5%	3,7	
		Class Activity	2%	6	
		Report	5%	8	
		Seminar			
		Essay	5%	9	
	Quiz		8%	5,10	
	Lab.		10%	1,8,16	
	Midterm Exam		25%		
	Final Exam		40%		
	Total		100%		
<b>Specific learning outcome:</b>	Students who successfully complete the semester should be able to easily demonstrate the provided knowledge listed in the subsequent section of Course Topics.				
<b>Course References:</b>	<ol style="list-style-type: none"> <li>Hydroelectric Energy (Renewable Energy and the Environment), by Bikash Pandey, 2017.</li> <li>Energy Storage and Conversion Devices, by Anurag Gaur, 2022.</li> <li>Introduction to Hydropower, by Francesco Carrasco, 2011.</li> </ol>				
<b>Course Topics (Theoretical)</b>			<b>Week</b>	<b>Learning Outcome</b>	
Development of Hydropower			1		
Basics of Hydropower			2		
Site Selection and Feasibility Study for Hydropower Projects			3-4		
Hydraulic Turbines			5-8		
Electricity Generation			8-10		
Energy Analysis			11		
Economic Analysis			12		

Course Topics (Practical)	Week	Learning Outcome
Hydroelectric Energy Generation by Computer Simulation	1-3	
Studding the effect of the pertinent parameters of the performance of the power generation	4-9	
Site visiting	10-12	

### External Evaluator

I hereby confirm that the syllabus is sufficient  
for the subject.



Directorate of Quality Assurance and Accreditation

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