# Course Syllabus

**The university of Jordan**  
**Faculty of Engineering**  
**Course Title:** Hydraulics  
**Course Number:** 0901362  
**Department:** Civil Engineering  
**Designation:** Compulsory  

**Prerequisite(s):**  

**Instructor:** Dr. Nidal Hadadin  
**Instructor's Office:** E 316  
**Instructor's E-mail:** n.hadadint@ju.edu.jo  
**Office Hours:** Mon and Wed. 8:00-9:30  
Sun. Tue, and Thurs 10:00-11:00  
Sun through Thurs  
**Time:** 8:00 – 9:00  
**Class Room:** CE 101  

**Course description:** Basic principles, Fluids in motion, Open channel flow, Uniform flow, Non-uniform flow, Flow under varying head, Flow through pipelines, Water turbines, Water pumps  
**Course objectives:** This course is intended for junior or senior level students who have completed a course in basic fluid mechanics. The objectives of this course is to:  
1. Apply energy and momentum principles in hydraulic systems,  
2. Distinguish between flow through pipes and open channels,  
3. Know the main equations governing flow in open channels,  
4. Analyze flow types, hydraulic jump and Design cross section for open channels,  
5. Calculate backwater curves,  
6. Analyze flow in pipelines and design of networks,  
7. Understand the performance of water pumps and design of pumping stations,  

**Topics covered:**  
1. Hydrostatics  
2. Fluids in Motion  
3. Flow Through Pipelines and closed conduits  
4. Flow under Varying Head  
5. Flow in Open Channels  
6. Turbines and pumps  

**Class/laboratory schedule:** 3 class sessions each week; 60 minutes each  
**Grading Plan:**  
- Midterm Exam (30 Points)  
- Final Exam (50 Points)  
- Will be announced by the registrar  
- Others (20 Points)  
- Quizzes and/or assignments  
**General Notes:** Assignments should be submitted on time.
Course contribution:

<table>
<thead>
<tr>
<th>Professional Component</th>
<th>Course Contribution</th>
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<tbody>
<tr>
<td>General Education</td>
<td>None</td>
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<tr>
<td>Basic Science and Mathematics</td>
<td>Applying numerical analysis, differential equation, integration to solve some hydraulic problems</td>
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<tr>
<td>Engineering Science</td>
<td>Present each topic clearly and completely enough that the student will develop, identify, formulate, understand, and solve engineering problems in depth by utilizing the governing conservation equations of mass, momentum and energy</td>
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<tr>
<td>Engineering Design</td>
<td>Design of open channels, pipe networks, flow transitions, some hydraulic structure, such as spillway, outlet works protection for culverts, canals and related structure for irrigation.</td>
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Course outcomes:

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<tr>
<th>ABET a-k</th>
<th>CE Program Outcomes</th>
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<tbody>
<tr>
<td>a</td>
<td>An ability to apply knowledge and principles of mathematics, science, and engineering to solve engineering problems</td>
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<tr>
<td>b</td>
<td>An ability to design a system, component or process to meet desired needs.</td>
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<td>c</td>
<td>An ability to identify engineering problems.</td>
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<tr>
<td>d</td>
<td>The broad education necessary to understand the impact of engineering solutions in a regional and local context</td>
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<tr>
<td>e</td>
<td>An ability to use the techniques, skills, and, modern engineering tools necessary for engineering practice.</td>
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ABET Program Criteria for Civil Engineering Achieved:

CIVIL ENGINEERING PROGRAM CRITERIA

Programs must demonstrate that graduates have:

- A. proficiency in mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry;
- B. proficiency in a minimum of four (4) recognized major civil engineering areas;
- C. the ability to conduct laboratory experiments and to critically analyze and interpret data in more than one of the recognized major civil engineering areas;
- D. the ability to perform civil engineering design by means of design experiences integrated throughout the professional component of the curriculum; and
- E. an understanding of professional practice issues.

Prepared by: Dr. Hadadin Date: 2/2016