COURSE SYLLABUS

1. **Department, Number ,Course Title, and Design**

Department	Course Number:	Course Title	Design
Civil Engineering	CVEN 4432	Hydraulic Engineering-LAB	Required course

2. **Catalog Description**

The lab session is designed to give the students hands-on experience with the equipment, methods, and procedures to be followed in Hydraulic engineering lab.

The main objective of this course is to understand the laminar and turbulent flow, flow losses in pipes, and characteristics of the centrifugal pump,

3. **Prerequisite**

GEEN 3311; INTODUCTION TO FLUID MECHANICS

4. **Textbook(s) and/or other Required Material**

Text book:
Roberson, John A., John J. Cassidy, and M. Hanif Chaudhry. Hydraulic Engineering, 2nd Edition. New York: John Wiley & Sons, Inc., 1997. ISBN: 047124664.

References:
Houphtalen, Robert J., Hwang, Ned H., and Akan, Osman A. Fundamentals of Hydraulic Engineering Systems. 4th Edition. Pearson Education Inc., 2010. ISBN: 10: 0136016383, ISBN-13: 978-0136016380

Other supplemental materials:
Class notes, images, videos from the internet and state of the art software. Assignments' and projects' solutions are uploaded on the blackboard for the students use.

5. **Course Coordinator**

Engr. Danish Ahmed

Civil Lab Technician:

Mr. Rusty De Leon

6. **Experiments covered**

List of Topics
- Energy losses in pipes,
- Energy losses in bends,
- Laminar flow visualization,
- Centrifugal pumps characteristics
- Computer controlled deep bed filter unit,

7. **Class/Laboratory Schedule:** 3 hours lab.

REPORT FORMAT:

In developing the above experiments of this lab much focusing will be on report preparation which will reflect the student understanding to the conducting experiment. Therefore, the following steps and format must be followed:

1- Cover Page and End Page

Follow the sample attached in blackboard.

2- Table of Content

Include all headings with the appropriate page number.

3- Objective and Practical Applications of the test

- Objective: State the purpose of the laboratory experiment (few sentences only).

- Applications: State the practical purpose of the experiment. Ask yourself why do we need to perform the test, what information will the results provide us with.

4- List of Equipment, Tools, Specimens and Sketches

- Equipment and Specimens: Include a list of all materials used in to complete the experiment.

- Draw all necessarily sketches of the apparatus used in the lab neatly.

5- Procedure

Include a brief description to all steps taken to complete the experiment in numbered lists. Show deviations if any.

6- Data Sheets

Use Excel program to create the data sheets. Class data sheets must be attached at the end of the report.

7- Calculations and Results

- Show all symbols and formulas used in experiment. All variables used in formulas must be defined directly below the formula in your report.

- Include a sample calculation for each formula used. Show the result of the sample calculation along with the appropriate units.

- Show all the results in a suitable tabulated form which will be analogous to the sample calculation.

8- Graphs and Charts

Graphs must be generated by a spreadsheet with an appropriate title and axis definitions in best representation.

9- Discussion and Conclusion

- Make a judgment call on the results you obtained. Explain why you came up with those results.
- Discuss whether or not you met the objectives of the experiment.
- Provide numbers, be specific and discuss the adequacy of your results.
- Draw conclusions from your results and explain what you learnt from the experiment.
- Discuss the practical applications of this experiment (suggest other equivalent methods if available).
- Include an error analysis. Provide information on what may have caused errors in your results.

10- Bibliography

Include the textbook and laboratory manual and any other reference material you use to complete the report.

Here is an example for a reference:
Chow, V. T., (1988). Applied Hydrology. McGraw Hill Publishing Co., New York.

LABORATORY POLICIES:

- Always read the experiment in the manual before you come to class so, we can complete the lab as quickly as possible.
- Laboratory reports are due the next time your lab group meets. Late reports will not be accepted.
- All laboratory reports must have a cover sheet as a first sheet.
- All drawing must be neat.
- At least two references outside of the laboratory manual, class notes, and text must be incorporated into and cited in each report.
- Always maintain a high level of professionalism. Be honest and truthful with the assistant and your fellow student.
- If you miss an experiment or a test, a zero grade will be assigned for that experiment or test.
- If you feel an error has been made in grading experiment, it must be turned-in at the end of the lab period it was distributed.
- To maintain a positive environment, please come on time, switch off mobile phone, and avoid side discussions in the class.

ATTENDANCE:

Attendance is **MANDATORY.** There will be no make-ups. You must come to the lab and help perform the experiment so you can write a good report. Be sure to sign the attendance sheet at the beginning of the class period.

University Attendance Policy :

According to the University policy, if you miss more than 15% of the lectures, then the Registrar will be informed and a withdrawal from the course may be initiated against the students.

GRADING POLICY:

The grading system for this lab will include the following :

a) Lab reports: 10 points for each lab report.
b) Final exam: will be fixed at the end of the lab experiments.
c) This lab worth 100% independent of the Civil Engineering course, distributed as follows :

1) Reports:	50%
2) Final Exam:	30%
3) Attendance and lab regulations:	20%
Total	100%