



---

## Mini Project # 7

### Measuring the Thermal Performance of a New Plate Heat Exchanger (25% of the Total Marks)

---

**Given:** Tuesday, February 28, 2023

**Due:** Monday March 20, 2023 (9:00 am)

---

#### OBJECTIVES

---

- Practicing the process of designing a *thermofluid* experiment
  - Learning the experiment planning
  - Applying the uncertainty analysis to selection of instrument
  - Practicing the scientific expression of your ideas in the form of a well structured and documented written report
  - Practicing the oral presentation of your proposal and communication of your results to a technical audience
- 

#### PROBLEM STATEMENT AND INSTRUCTIONS

A manufacturer of Plate Heat Exchangers has developed a new heat exchanger. They contract with your experimental design team to come up with a suitable plan for designing of an experiment for measuring the thermal performance of the new heat exchanger. In particular, they are interested to obtain the performance curves, i.e., the effectiveness-NTU curves. The company has requested you to start with the following options:

##### *Option 1*

	<i>Hot fluid</i>	<i>Cold fluid</i>
	Water	Water
<i>Mass flow rate:</i>	1-2 kg/s	0.25-1 kg/s
<i>Inlet Temperature:</i>	60-80°C	5-20°C

##### *Option 2*

	<i>Hot fluid</i>	<i>Cold fluid</i>
	Air	Water
<i>Mass flow rate:</i>	1000-1500 m <sup>3</sup> /h	0.1-0.25 kg/s
<i>Inlet Temperature:</i>	100-150°C	5-20°C



#### PROJECT OUTCOMES

##### **A) Report (15% of the Total Marks)**

You should submit your technical report no later than **9:00 am of Monday March 20, 2023** on Canvas for grading. A maximum eight-page report (hardcopy) including details of your proposed experimental set-up with related sketches and descriptions, your test matrix, expected results and uncertainties, overall cost estimation and time schedules for accomplishing the necessary experiments and post processing of data including writing the documentations.

##### **B) Oral Presentation (10% of the Total Marks)**

You should prepare a **12 min** oral presentation summarizing your experimental design, your test matrix, expected results and uncertainties, overall cost estimation, time schedules, and your recommendations for any improvements. You will present in the class during our lecture time. The date of your presentation is given in the Time Table on Canvas.

**NOTE: Project submitted lately will not be graded. Thanks.**