**Lab 03 Propositional Equivalences**

**Objective**

Solving exercises from the textbook in chapter 1.3

**Current Lab Learning Outcomes (LLO)**

By completion of the lab, the students should be able to:

1. Understand propositional equivalences and .
2. prove the propositional equivalences using rules

**Lab Requirements**

Students allowed using their lecture notes in the lab in order to solve the exercises.

**Lab Assessment**

1- Divide students to groups and let them to solve the given example.

2- Discuss the answers with the groups and write on board the optimal solution.

**Lab Description**

1. Show that ￢*(p* ∨ ￢(*p* ∧ *q))* is contradiction using rules.
2. show that [*(p* ∨ *q)* ∧ *(p* → *r)* ∧ *(q* → *r)*] → *r is a tautology using rules*
3. Show that *[p* ^ *(p* → *q)]* → *q* is a tautology using rules
4. Show that [¬p ∧ (p ∨ q)] → q is a tautology using rules.
5. Show that ¬ p→ *(q* → *r) and q* →( p v r) are logically equivalent using rules.
6. Show that ¬p ↔ q and p ↔ ¬q are logically equivalent using rules
7. Determine whether¬(p∨(¬p∧q)) and (¬p ∧ ¬q) equivalent using rules?