**Aswin’s short blurbs**

**Conceptual Challenges and Teaching Strategies Regarding Physics Equations**

Physicists commonly use equations to guide their reasoning thus an essential part of physics education is to teach students to do so. However, in the teaching-learning process, the focus is typically on calculating and identifying the symbols rather than on gaining a conceptual understanding of the principles underlying the equations. Students can obtain a genuine knowledge of physics equations if they can develop a conceptual understanding of the principles involved.

Physics equations embody a substantial amount of conceptual knowledge of physics and mathematics. Through analyzing physics equations deeply, one can learn many “hidden” important physics concepts. My research will reveal students’ main conceptual difficulties in understanding the physical meaning of the physics equations that are mostly represented in mathematical symbols. This research will attempt to uncover the reasons why those difficulties arise. This study will also consider various teaching strategies that may assist students more effectively to develop a conceptual understanding of the physics equations. Physics education should not be measured merely by a student’s knowledge of mathematical symbols. A student should also have a thorough, conceptual understanding of the principles those symbols represent.

Possible research question:

* What are the assessment tools that can investigate students’ conceptual understanding of the physics equations?
* What are innovative teaching strategies that can help students acquire a deep understanding of the physics behind the physics equations?

**Physics for interdisciplinary learners**

In higher education, physics courses introduce students to many fundamental principles used to explain the theories underlying the other natural sciences. Students majoring in the natural sciences unwittingly use many essential concepts of physics. However, mandatory physics courses, such as physics introductory, usually explain physics concepts without linking them to interdisciplinary scientific knowledge. This gives rise to the perception that the physical sciences are not meaningful or applicable. As a result, students lose interest in studying this subject. This research will uncover how to teach physics effectively to interdisciplinary learners. Teaching strategies will also be created to support active learning processes in the classroom.

Possible research question:

* What are physics teaching materials that are appropriate and related to interdisciplinary learners’ knowledge background?
* What are innovative learning strategies that can address the specific needs of interdisciplinary learners and ensure that the subjects being taught are meaningful and relevant to the students?