

## PHY430 – Physics Lab Plan

Week	Activities	Nature	Time (minutes)	Learning Outcomes	Grading
1	<p>Students are divided into groups (3-4 students/group)</p> <p>Introduction to physics lab PHY430</p> <ul style="list-style-type: none"> <li>• Lab culture</li> <li>• Lab report format</li> <li>• Graphs &amp; Analysis</li> <li>• Significant figures</li> <li>• Measurement Uncertainty &amp; its propagation</li> <li>• Random &amp; Systematic Uncertainties (Errors)</li> <li>• Accuracy &amp; Precision</li> </ul>	An oral presentation by the lab instructor on Introduction to physics lab and Question & Answer from the students	10  30	<ul style="list-style-type: none"> <li>• Adhere to the lab culture</li> <li>• Write the report according to the given format</li> <li>• Linearize a graph</li> <li>• Draw and analyse a straight line graph</li> <li>• Write down the correct and appropriate significant figures for instruments as well as its resultant calculations</li> <li>• Determine and calculate uncertainties involved</li> <li>• Differentiate between accuracy and precision</li> </ul>	

	<p>Group Work</p> <ul style="list-style-type: none"> <li>• Answer and submit Pre-Lab Questions 1</li> </ul>	<p>A single submission for each group and graded by the lab instructor.</p>	30	<ul style="list-style-type: none"> <li>• Recognize important aspects of Expt. 1 in terms of the physics principles, procedures, apparatus and underlying assumptions.</li> </ul>	<p>Marks derived from the number of correct answers of the Pre-Lab Questions</p>
	<ul style="list-style-type: none"> <li>• Students carry out Expt. 1</li> </ul>	<p>The lab manual guides the students in carrying out Expt. 1 while the lab instructor facilitates the students.</p> <p>Group lab report for Expt. 1 is to be submitted to the instructor at the end of the lab period and graded by the lab instructor.</p>	110	<ul style="list-style-type: none"> <li>• Perform the expt.1</li> <li>• Collect and analyse data</li> <li>• Produce a report for the expt.</li> </ul>	<p>The report is graded based upon the Lab Report Rubrics (LRR) for PHY400</p>
2	<p>Group Work</p> <ul style="list-style-type: none"> <li>• Answer and submit Pre-Lab Questions 2</li> </ul>	<p>A single submission for each group.</p>	30	<ul style="list-style-type: none"> <li>• Recognize important aspects of Expt. 2 in terms of the physics principles, procedures, apparatus, underlying assumptions and relevance of the expt.</li> </ul>	<p>Marks derived from the number of correct answers of the Pre-Lab Questions</p>



		<ul style="list-style-type: none"> <li>Instructors highlight lessons learned from the report &amp; discuss answers to post-lab questions</li> <li>Students refer to returned graded Pre-Lab Questions 1 &amp; 2, and report of Expt. 1 &amp; 2</li> </ul>		<ul style="list-style-type: none"> <li>Describe the important lessons learned and the relevance of the experiment</li> </ul>	
4	<p>Group Work</p> <ul style="list-style-type: none"> <li>Answer and submit Pre-Lab Questions for expt. 3.</li> <li>Students carry out Expt. 3.</li> </ul>	<p>A single submission for each group.</p> <p>The lab manual guides the students in carrying out Expt. 3 while the lab instructor facilitates the students.</p> <p>Group lab report for Expt. 3 is to be submitted to the instructor at the end of the lab period.</p>	<p>30</p> <p>150</p>	<ul style="list-style-type: none"> <li>Recognize important aspects of Expt. 3 in terms of the physics principles, procedures, apparatus, underlying assumptions and relevance of the expt.</li> <li>Perform expt.3</li> <li>Collect and analyse data</li> <li>Produce a report for the expt.</li> </ul>	<p>Marks derived from the number of correct answers of the Pre-Lab Questions</p> <p>The report is graded based upon the Lab Report Rubrics (LRR) for PHY430</p>
5	<p>Group Work</p> <ul style="list-style-type: none"> <li>Answer and submit Pre-Lab Questions for expt. 4.</li> </ul>	<p>A single submission for each group.</p>	30	<ul style="list-style-type: none"> <li>Recognize important aspects of Expt. 4 in terms of the physics principles, procedures,</li> </ul>	<p>Marks derived from the number of correct answers of the Pre-Lab</p>

	<ul style="list-style-type: none"> <li>Students carry out Expt. 4.</li> </ul>	<p>The lab manual guides the students in carrying out Expt. 4 while the lab instructor facilitates the students.</p> <p>Group lab report for Expt. 4 is to be submitted to the instructor at the end of the lab period.</p>	150	<p>apparatus, underlying assumptions and relevance of the expt.</p> <ul style="list-style-type: none"> <li>Perform expt.4</li> <li>Collect and analyse data</li> <li>Produce a report for the expt.</li> </ul>	<p>Questions</p> <p>The report is graded based upon the Lab Report Rubrics (LRR) for PHY430</p>
6	<ul style="list-style-type: none"> <li>Group Presentation of Expt. 3 &amp; 4</li> </ul>	<ul style="list-style-type: none"> <li>Some groups present their data, results, analysis &amp; conclusions to the whole class</li> <li>There is a question &amp; answer session where the class or the instructor can ask questions related to the presentation</li> <li>The groups giving the presentation need to answer and defend their results.</li> </ul>	120	<ul style="list-style-type: none"> <li>Students can communicate and defend their experimental results, analysis &amp; conclusions.</li> </ul>	<p>Marks for the presentation are given by the instructor based on the Lab Presentation Rubrics (LPR)</p>

	<ul style="list-style-type: none"> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Instructors return &amp; discuss the Pre-Lab Questions 3 &amp; 4</li> <li>• Instructors highlight lessons learned from the report &amp; discuss answers to post-lab questions</li> <li>• Students refer to the returned graded Pre-Lab Questions 3 &amp; 4, and report of Expt. 3 &amp; 4</li> </ul>	60	<ul style="list-style-type: none"> <li>• Identify the mistakes and inadequacies of their answers &amp; report.</li> <li>• Describe the important lessons learned and the relevance of the experiment</li> </ul>	
7	<p>Group Work</p> <ul style="list-style-type: none"> <li>• Answer and submit Pre-Lab Questions for expt. 5.</li> <li>• Students carry out Expt. 5.</li> </ul>	<p>A single submission for each group.</p> <p>The lab manual guides the students in carrying out Expt. 3 while the lab instructor facilitates the students.</p> <p>Group lab report for Expt. 5 is to be submitted to the instructor at the end of the lab period.</p>	<p>30</p> <p>150</p>	<ul style="list-style-type: none"> <li>• Recognize important aspects of Expt. 5 in terms of the physics principles, procedures, apparatus, underlying assumptions and relevance of the expt.</li> <li>• Perform expt.5</li> <li>• Collect and analyse data</li> <li>• Produce a report for the expt.</li> </ul>	<p>Marks derived from the number of correct answers of the Pre-Lab Questions</p> <p>The report is graded based upon the Lab Report Rubrics (LRR) for PHY430</p>

8	<p>Group Work</p> <ul style="list-style-type: none"> <li>• Answer and submit Pre-Lab Questions for expt. 6.</li> <li>• Students carry out Expt. 6</li> </ul>	<p>A single submission for each group.</p> <p>The lab manual guides the students in carrying out Expt. 6 while the lab instructor facilitates the students.</p> <p>Group lab report for Expt. 6 is to be submitted to the instructor at the end of the lab period.</p>	<p>30</p> <p>150</p>	<ul style="list-style-type: none"> <li>• Recognize important aspects of Expt. 6 in terms of the physics principles, procedures, apparatus, underlying assumptions and relevance of the expt.</li> <li>• Perform expt.6</li> <li>• Collect and analyse data</li> <li>• Produce a report for the expt.</li> </ul>	<p>Marks derived from the number of correct answers of the Pre-Lab Questions</p> <p>The report is graded based upon the Lab Report Rubrics (LRR) for PHY430</p>
9	<ul style="list-style-type: none"> <li>• Group Presentation of Expt. 5 &amp; 6</li> </ul>	<ul style="list-style-type: none"> <li>• Some groups present their data, results, analysis &amp; conclusions to the whole class</li> <li>• There is a question &amp; answer session where the class or the instructor can ask questions related to the presentation</li> <li>• The groups giving the presentation need to answer and defend their</li> </ul>	120	<ul style="list-style-type: none"> <li>• Students can communicate and defend their experimental results, analysis &amp; conclusions.</li> </ul>	<p>Marks for the presentation are given by the instructor based on the Lab Presentation Rubrics (LPR)</p>

	<ul style="list-style-type: none"> <li>• Discussion</li> </ul>	<p>results.</p> <ul style="list-style-type: none"> <li>• Instructors return &amp; discuss the Pre-Lab Questions 5 &amp; 6</li> <li>• Instructors highlight lessons learned from the report &amp; discuss answers to post-lab questions</li> <li>• Students refer to returned graded Pre-Lab Questions 5 &amp; 6 report of Expt. 5 &amp; 6</li> </ul>	60	<ul style="list-style-type: none"> <li>• Identify the mistakes and inadequacies of their answers &amp; report.</li> <li>• Describe the important lessons learned and the relevance of the experiment</li> </ul>	
10	Learning Outcomes Inventory (LOI) for PHY430 Lab	Students take this pencil & paper test individually in the lab	60		Instrument: LOI – PHY430 Lab