|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Beginning** | **Developing** | **Accomplished** | **Exemplary** |  |
| Presentation/Format | o Lab report is handed in below the expectations of the course.  o Sections are missing | o Lab report is hard to follow due to presentation/format | o Standard lab report format is followed | o Crisp, neat, organized and professional lab report format | /5 |
| Purpose | |  |  | | --- | --- | | o ***No*** purpose included |  | | o Purpose is unclear and/or not concise.  o Purpose reveals ***ONE of the following***:  - ***why*** you are doing the lab but not ***how*** we are doing it  - ***how*** you are doing it but not ***why*** you are doing the lab | o Purpose is ***mostly*** clear and concise.  o Purpose ***mostly*** reveals both ***why*** you are doing the lab (***theory)*** and ***how*** you are doing it (***application***) | o Purpose ***is*** clear and concise (1-2 sentences)  o Purpose ***reveals*** both ***why*** you are doing the lab (***theory***) and ***how*** you are doing it (***application***) | /5 |
| Procedure | o Lab could ***not*** be reproduced if procedure repeated by an outside party  o Disorganized; hard to follow.  o ***No*** diagrams included  o ***Many steps*** are missing or unclear | o Lab could be ***somewhat*** reproduced if procedure repeated by an outside party  o Organized and ***somewhat*** easy to follow.  o Diagrams are ***unclear***  o Words commands are ***unclear***  o ***Some*** steps are missing or unclear | o Lab could be ***mostly*** reproduced if procedure repeated by an outside party  o Organized and ***mostly*** easy to follow.  o Diagrams clear  o Clear word commands, but not concise  o ***Few minor steps*** missing | o Lab would be ***easily*** reproduced if procedure repeated by an outside party  o Excellent organization, easy to follow.  o Diagrams clear and help reader to understand steps  o Clear, concise word commands  o ***All steps*** included | /5 |
| Free Body Diagrams | o FBD(s) are NOT included | o FBD’s (and surfaces) are ***not*** drawn with a ruler  o More than 1 force is ***missing OR misplaced*** on the FBD  o Forces are:  - ***Sometimes*** labeled correctly  - ***Sometimes*** drawn proportional to size of force  - ***Sometimes*** drawn in the correct direction | o FBD’s (and surfaces) are drawn with a ruler  o 1 force is ***missing OR misplaced*** on the FBD  o Forces are:  - ***Mostly*** labeled correctly  - ***Mostly*** drawn proportional to size of force  - ***Mostly*** drawn in the correct direction | o FBD’s (and surfaces) are drawn with a ruler  o All forces included and ***correctly placed*** on the FBD  o Forces are:  **- All** labeled correctly  - **All** drawn proportional to size of force  - **All** drawn in the correct direction | /5 |
| Data | o No table is provided | o All tables are completed using computer software but organized in an illogical manner  o **Columns** contain no headings or proper units  o Data is ***clear*** but i***ncomplete*** *(only one trial completed for each data set)* | o All tables are presented using computer software  o **Columns** include headings but without proper units  o Data is ***clear*** but i***ncomplete*** *(multiple trials completed for each data set but avg. values not provided)* | o All tables are presented using computer software and organized in a logical manner  o All **columns** include headings with proper units  o Data is ***clear*** and *complete (multiple trials completed for each data set)* | /5 |
| Calculations | o Major calculations are missing OR contain major errors  o It is difficult/impossible to follow calculation progression | o ***Some*** calculations includes a statement of understanding: (Fnet = Fg1-Ff)  o Calculations are ***somewhat*** ordered in a step-wise fashion  o ***Some*** calculations are easy to follow as they move from solving one variable to the next, often unclear  o Calculations contain more than 1 minor error OR 1 major error | o ***Most*** calculations includes a statement of understanding: (Fnet = Fg1-Ff)  o Calculations are ***mostly*** ordered in a step-wise fashion  o ***Most*** calculations are easy to follow as they move from solving one variable to the next  o Calculations contain 1 minor error | o ***All*** calculations includes a statement of understanding: (Fnet = Fg1-Ff)  o Calculations are ordered in a step-wise fashion  o ***All*** calculations are easy to follow as they move from solving one variable to the next  o Calculations are free from errors | /5 |
| Graphs | o Graph is not completed on a computer or graph paper  o ***No*** title  o ***No*** axis labels  o ***No*** units on axis  o ***No*** line or curve | o Title does not follow “Y vs. X” or improper placement of independent (X) and dependent (Y) variables  o ***Incorrect*** placement of independent (X) and dependent (Y) variables  o Axis ***not labelled*** with ***both*** title and units  o Line/curve not best fit | o Title follows “Y vs. X”, without description of process being analyzed  o Correct ***but improper*** ***placement*** of independent (X) and dependent (Y) variables  o Axis ***labelled*** with measurement but not units  o Line of best fit “forced” through origin | o Graph is complete on a computer or graph paper  o Title follows “Y vs. X”, and includes description of process being analyzed  o Correct and ***proper placement*** of independent (X) and dependent (Y) variables  o Axis ***labelled*** with title and units  o Line/curve of best fit represent data plots | /5 |
| Uncertainty Analysis | o Uncertainties estimates missing o Uncertainty questions are not answered | o Uncertainty estimates do not include reasoning  o Uncertainty questions partially answered | o Uncertainty estimates include reasoning but are not sound  o Uncertainty questions answered, lack insight | o Uncertainty estimates and reasoning are sound  o Uncertainty questions answered fully and with insight | /5 |
| Discussion | o Discussion not included | o Discussion does not relate measured and predicted values  o If the theory is not supported, does not identify a reason | o Discussion relates measured and predicted values but does not state whether the theory is supported  o If the theory is not supported, a reason is identified but not explained | o Discussion relates measured and predicted values and states whether the theory is supported with specific reference to results  o If the theory is not supported, a reason is identified and explained | /5 |
| Conclusion | o Conclusion not included | o Purpose not restated  o Values not restated  o No sources of error included | o Purpose not clearly stated  o Values restated but not connected to theory  o A source of error is discussed but not correctly explained | o Purpose is clearly restated  o State whether the values agree and whether the theory is supported by your data  o A source of error is discussed and explained | /5 |