

# Thesis and Oral Exam Grading

Below are a set of parameters that will be judged by both the thesis readers and advisors. Because there is some information that is only known to the advisor and not the readers, there are two separate grading sheets. Finally, some of the criteria have been modified for those students who have undertaken non-laboratory theses. The grading criteria for the oral exam are given as well.

**(1 is highest, 5 is lowest) for all of the criteria listed below.**

**NOTE: Most students should get a 3 for each criterion**

## Laboratory Thesis – Advisor’s evaluation form Evaluation of the thesis work and the written document

**Originality** – This student’s thesis:

- 1 – Originated the thesis project (Wish I had thought of it!).
- 2 – Developed a project from a vague suggestion of the advisor.
- 3 – Elaborated a project mostly suggested by advisor.
- 4 – Carried out a project entirely laid out by the advisor.
- 5 – Couldn’t follow the plan for the project.

**Work Ethic** – This student:

- 1 – Worked as much as a good graduate student.
- 2 – Worked significantly more than 20 hours a week.
- 3 – Worked about 15-20 hours a week, a few hours every day.
- 4 – Worked sporadically, a few hours a few days a week, or went long stretches without appearing.
- 5 – Worked rarely or not at all.

**Independence** – This student:

- 1 – Worked almost completely on his/her own in the lab.
- 2 – Worked with occasional (weekly?) guidance from a post-doc or graduate student.
- 3 – Worked with daily consultation from mentors, but planned many of the experiments.
- 4 – Needed frequent help with the planning and/or execution of most experiments.
- 5 – Needed extensive help with the planning and execution of all experiments.

**Completion** – This thesis:

- 1 – Is a complete story and essentially publishable in its own right.
- 2 – Needs just one or two additional experiments or controls to get it ready for publication.
- 3 – Contains most of the elements of a nice result that someone will follow up.
- 4 – Is not complete enough to decide whether there is a result or not.
- 5 – Is obviously incomplete.

**Perseverance** – This student:

- 1 – Worked through and solved difficult technical problems on his/her own.
- 2 – Did not get discouraged and solved technical problems with some advice.
- 3 – Needed some encouragement to keep going in spite of technical problems.
- 4 – Seemed averse to solving technical problems.
- 5 – Folded up at the first problem.

**Experimental Quality** – The experimental work by this student:

- 1 – Was beautiful, clear-cut, and well-controlled, equivalent to an excellent graduate student’s.
- 2 – Was clearly superior, perhaps equivalent to most graduate students.
- 3 – Was average, several nice experiments but with occasional problems in consistency, or reproducibility.
- 4 – Was frequently sloppy and uncontrolled.
- 5 – Was essentially without merit, no believable or controlled experiments.

**Thesis Experimental Description:**

- 1 – Outstanding. All experiments were clearly described and their rationales explained. Understandable by a general science reader. Description conveyed more than sufficient information to repeat the experiments.
- 2 – An excellent summary of the experimental procedures. A knowledgeable reader could repeat the experiment with little difficulty.
- 3 – A very good description of the experimental procedures. A knowledgeable reader could understand and repeat the experiments with some effort. The rationale was not always clear. There were some instances where the author assumed knowledge on the part of the reader, or used lab jargon.
- 4 – A good summary of the experiments. Occasionally, relevant experimental details were either inappropriate or missing. The experiment would be difficult to repeat. The author used a lot of lab jargon without explanation.
- 5 – A poor description of the experiments. It would be impossible for a knowledgeable reader to reconstruct the experiments.

**Experimental Design:**

- 1- Experiments are incisive, rigorous and powerful. They allowed the student to rigorously test the hypothesis and distinguish between all reasonable models. Both positive and negative results are interpretable.
- 2- Experiments as designed provide strong support for (or falsify) the hypothesis. Most outcomes are interpretable.
- 3- Experiments provide clear support for a hypothesis, but do not distinguish between all possible models. Several possible outcomes are not interpretable.
- 4- Experiments have little power to distinguish among multiple possible models. They provide some support for a hypothesis, but multiple models are consistent with outcomes.
- 5- Experiments do not test the hypothesis. Experiments have insufficient power to distinguish different models.

**Thesis Results:**

- 1 – Outstanding. Results were presented in a logical, effective and creative manner. Data were presented accurately and clearly and could be easily understood by a general reader. Controls and their significance clearly and thoroughly described. Conclusions were valid, insightful and not over-interpreted.
- 2 – Excellent. The data are described accurately and completely. Conclusions about data and controls were appropriate and not over-interpreted, but not particularly insightful or thoughtful.
- 3 – Very good. Data were presented in an effective manner. Most of the conclusions about the data and controls were solid, but in rare occasions may lack accuracy. A general reader might have minor difficulty following the conclusions.
- 4 – The results section is a collection of data with little information to explain the significance. Some portions were unclear or missing. Data were presented in a confusing or incomplete fashion. The author may have misunderstood some of the results, or failed to include or communicate them in an effective manner. Some conclusions may not have fit the data or were absent (under-interpreted).
- 5 – Little attention beyond a quick statement of the results. Missing context or controls. The author did not understand data or failed to draw conclusions.

**Discussion (Analysis):**

- 1 – The author provided an in-depth analysis of the results and demonstrated exceptional insight into the broader implications.
- 2 – The author provided an excellent critical analysis of the data. Interpretation went significantly beyond the simplest interpretation.
- 3 – The author provided a very good discussion of the results but stayed mostly within the bounds of current thinking.
- 4 – The author provided a limited analysis of the data; however, the author mostly reiterated the results without further expansion.
- 5 – The author failed to provide a thorough critique of the experiments and results.

**Discussion (Future Research):**

- 1- The student was thinking about experiments, results and future directions at the level of a professional in the field.
- 2- The thesis contained several good ideas for future work. The ideas build upon the student's findings, incorporate additional scholarship and are worthwhile suggestions for future research.
- 3- The thesis provided one or two good ideas for future work. These are relevant to the field but may be only incremental in nature.
- 4- The student made a very limited attempt to suggest future experiments or directions.
- 5- The student made an unsuccessful attempt or failed to explain future directions.

**Thesis Scholarship** – This thesis:

- 1 – Is a model of impeccable scholarship. The background material has been thoroughly researched and properly referenced. It is an authoritative assessment of the relevant primary literature. The author has mastered the issues and integrated them to make an original and complete intellectual contribution. The author has provided the reader with the relevant information to understand the significance of the problem at hand.
- 2 – Shows careful scholarship and frequently cited the primary literature. The author has mastered most of the relevant material and has integrated it well to set up the thesis research.
- 3 – Shows average scholarship. The author accurately presented findings from the literature, but relied heavily on reviews rather than primary sources. The significance of the thesis research may not be immediately clear to an outside reader or may be difficult to extract because of excessive detail.
- 4 – Shows below average scholarship. The author has mastered only a part of the relevant literature. Significant parts of the thesis are not supported by cited material. References are almost exclusively reviews and secondary sources. Important material has been neglected. Not enough information has been provided to understand the thesis research question.
- 5 – Shows seriously poor scholarship. The author knows or understands little of the relevant literature or has made major errors in interpretation and/or citation.

**Thesis Writing** – This thesis:

- 1 – Is a pleasure to read. It is crisp, clear and concise. Needs no editing and reads as though it has been written by a professional in the field.
- 2 – Is easy to read, needs only minor editing. Represents excellence in student writing and appears to be the end product of multiple drafts.
- 3 – Is well written, but requires revisions and editing. Usually clear, but some sections need to be re-read to get at the meaning. Reads like a good, proof-read draft.
- 4 – Is poorly written. Significant portions are sloppy or unclear. There are many misspellings and ambiguities. Reads like a rough draft.
- 5 – Is very difficult to read. Most sections are unclear, ungrammatical and convoluted. Unquestionably a rushed draft that has not been proof-read.

**Overall Evaluation:**

- 1 – This student was one of the best I have seen, within the top 5%.
- 2 – This student was really excellent, within the top 15%.
- 3 – This student was good but not exceptional, within the top 80%.
- 4 – This student was fairly weak student, within the bottom 20%.
- 5 – This student was one of the weakest I have seen, within the bottom 5%.

## **Laboratory Thesis – Reader’s evaluation form**

### **Evaluation of the thesis work and the written document**

**Originality** – This student’s thesis:

- 1 – Demonstrated exceptional originality.
- 2 – Clearly went beyond the literature in several areas.
- 3 – Contained one or more good ideas that extended the current thinking.
- 4 – Stayed within the bounds of current thinking from the literature.
- 5 – Was basically a repeat of other ideas or discussion without modification.

**Completion** – This thesis:

- 1 – Is a complete story and essentially publishable in its own right.
- 2 – Needs just one or two additional experiments or controls to get it ready.
- 3 – Contains most of the elements of a nice result that someone should follow up.
- 4 – Is not complete enough to decide whether there is a result or not.
- 5 – Is obviously incomplete.

**Experimental Quality** – The experimental work by this student:

- 1 – Was beautiful, clear-cut, and well-controlled, equivalent to an excellent graduate student’s.
- 2 – Was clearly superior, perhaps equivalent to most graduate students.
- 3 – Was average, several nice experiments but with occasional problems in consistency, or reproducibility.
- 4 – Was frequently sloppy and uncontrolled.
- 5 – Was essentially without merit, no believable or controlled experiments.

**Thesis Experimental Description:**

- 1 – Outstanding. All experiments were clearly described and their rationales explained. Understandable by a general science reader. Description conveyed more than sufficient information to repeat the experiments.
- 2 – An excellent summary of the experimental procedures. A knowledgeable reader could repeat the experiment with little difficulty.
- 3 – A very good description of the experimental procedures. A knowledgeable reader could understand and repeat the experiments with some effort. The rationale was not always clear. There were some instances where the author assumed knowledge on the part of the reader, or used lab jargon.
- 4 – A good summary of the experiments. Occasionally, relevant experimental details were either inappropriate or missing. The experiment would be difficult to repeat. The author used a lot of lab jargon without explanation.
- 5 – A poor description of the experiments. It would be impossible for a knowledgeable reader to reconstruct the experiments.

**Experimental Design:**

- 1 – Experiments are incisive, rigorous and powerful. They allowed the student to rigorously test the hypothesis and distinguish between all reasonable models. Both positive and negative results are interpretable.
- 2 – Experiments as designed provide strong support for (or falsify) the hypothesis. Most outcomes are interpretable.
- 3 – Experiments provide clear support for a hypothesis, but do not distinguish between all possible models. Several possible outcomes are not interpretable.
- 4 – Experiments have little power to distinguish among multiple possible models. They provide some support for a hypothesis, but multiple models are consistent with outcomes.
- 5 – Experiments do not test the hypothesis. Experiments have insufficient power to distinguish different models.

**Thesis Results:**

- 1 – Outstanding. Results were presented in a logical, effective and creative manner. Data were presented accurately and clearly and could be easily understood by a general reader. Controls and their significance clearly and thoroughly described. Conclusions were valid, insightful and not over-interpreted.
- 2 – Excellent. The data are described accurately and completely. Conclusions about data and controls were appropriate and not over-interpreted, but not particularly insightful or thoughtful.
- 3 – Very good. Data were presented in an effective manner. Most of the conclusions about the data and controls were solid, but in rare occasions may lack accuracy. A general reader might have minor difficulty following the conclusions.
- 4 – The results section is a collection of data with little information to explain the significance. Some portions were unclear or missing. Data were presented in a confusing or incomplete fashion. The author may have misunderstood some of the results, or failed to include or communicate them in an effective manner. Some conclusions may not have fit the data or were absent (under-interpreted).
- 5 – Little attention beyond a quick statement of the results. Missing context or controls. The author did not understand data or failed to draw conclusions.

**Discussion (Analysis):**

- 6 – The author provided an in-depth analysis of the results and demonstrated exceptional insight into the broader implications.
- 7 – The author provided an excellent critical analysis of the data. Interpretation went significantly beyond the simplest interpretation.
- 8 – The author provided a very good discussion of the results but stayed mostly within the bounds of current thinking.
- 9 – The author provided a limited analysis of the data; however, the author mostly reiterated the results without further expansion.
- 10 – The author failed to provide a thorough critique of the experiments and results.

**Discussion (Future Research):**

- 6- The student was thinking about experiments, results and future directions at the level of a professional in the field.
- 7- The thesis contained several good ideas for future work. The ideas build upon the student's findings, incorporate additional scholarship and are worthwhile suggestions for future research.
- 8- The thesis provided one or two good ideas for future work. These are relevant to the field but may be only incremental in nature.
- 9- The student made a very limited attempt to suggest future experiments or directions.
- 10- The student made an unsuccessful attempt or failed to explain future directions.

**Thesis Scholarship** – This thesis:

- 1 – Is a model of impeccable scholarship. The background material has been thoroughly researched and properly referenced. It is an authoritative assessment of the relevant primary literature. The author has mastered the issues and integrated them to make an original and complete intellectual contribution. The author has provided the reader with the relevant information to understand the significance of the problem at hand.
- 2 – Shows careful scholarship and frequently cited the primary literature. The author has mastered most of the relevant material and has integrated it well to set up the thesis research.
- 3 – Shows average scholarship. The author accurately presented findings from the literature, but relied heavily on reviews rather than primary sources. The significance of the thesis research may not be immediately clear to an outside reader or may be difficult to extract because of excessive detail.
- 4 – Shows below average scholarship. The author has mastered only a part of the relevant literature. Significant parts of the thesis are not supported by cited material. References are almost exclusively reviews and secondary sources. Important material has been neglected. Not enough information has been provided to understand the thesis research question.
- 5 – Shows seriously poor scholarship. The author knows or understands little of the relevant literature or has made major errors in interpretation and/or citation.

**Thesis Writing** – This thesis:

- 1 – Is a pleasure to read. It is crisp, clear and concise. Needs no editing and reads as though it has been written by a professional in the field.
- 2 – Is easy to read, needs only minor editing. Represents excellence in student writing and appears to be the end product of multiple drafts.
- 3 – Is well written, but requires revisions and editing. Usually clear, but some sections need to be re-read to get at the meaning. Reads like a good, proof-read draft.
- 4 – Is poorly written. Significant portions are sloppy or unclear. There are many misspellings and ambiguities. Reads like a rough draft.
- 5 – Is very difficult to read. Most sections are unclear, ungrammatical and convoluted. Unquestionably a rushed draft that has not been proof-read.

**Overall Evaluation:**

- 1 – This student was one of the best I have seen, within the top 5%.
- 2 – This student was really excellent, within the top 15%.
- 3 – This student was good but not exceptional, within the top 80%.
- 4 – This student was fairly weak student, within the bottom 20%.
- 5 – This student was one of the weakest I have seen, within the bottom 5%.

## **Non-Laboratory Thesis – Advisor’s evaluation form**

### **Evaluation of the thesis work and the written document**

**Originality** – This student’s thesis:

- 1 – Originated the thesis project (Wish I had thought of it!).
- 2 – Developed a project from a vague suggestion of the advisor.
- 3 – Elaborated a project mostly suggested by advisor.
- 4 – Carried out a project entirely laid out by the advisor.
- 5 – Couldn’t follow the plan for the project.

**Work Ethic** - This student:

- 1 – Worked unusually hard researching the thesis, spent an enormous amount of time finding material, was always prepared for discussions.
- 2 – Worked very hard researching the thesis, going beyond the expected level of effort.
- 3 – Worked hard on the thesis, was usually well prepared for discussions.
- 4 – Worked sporadically, or went long stretches without appearing.
- 5 – Worked rarely or not at all.

**Independence** - This student:

- 1 – Found, understood, and analyzed the source material completely on his/her own. Needed minimal guidance to complete the thesis.
- 2 – Needed very occasional guidance in the identification, comprehension, or analysis of source material.
- 3 – Needed regular (weekly or biweekly) guidance to stay on track. Student was able to identify, comprehend and analyze most of the source material on own.
- 4 – Much of the research needed direct supervision from the advisor.
- 5 – Got nothing done without the direct involvement of the advisor.

**Completeness** - This thesis:

- 1 – Is complete and could be publishable in its own right.
- 2 – Needs just one or two additional areas to be complete.
- 3 – Contains most of the elements of an interesting idea/review but would need significant additional material to be complete.
- 4 – Contains the bare minimum of an idea for a thesis. Would need extensive fleshing out to be complete.
- 5 – Is obviously incomplete.

**Resourcefulness/Perseverance** - This student:

- 1 – Was unusually brave/adept at hunting down/developing unusual sources (e.g. attended conferences or interviewed people) or identifying original material.
- 2 – Found some really great original material in some unusual places.
- 3 – Used the standard sources.
- 4 – Missed some relevant sources.
- 5 – Missed important, relevant and obvious sources.

**Research Design:**

- 1 – Studies are incisive, rigorous and powerful. They allowed the student to rigorously test the hypothesis and distinguish between all reasonable models. Both positive and negative results are interpretable.
- 2 – Studies as designed provide strong support for (or falsify) the hypothesis. Most outcomes are interpretable.
- 3 – Studies provide clear support for a hypothesis, but do not distinguish between all possible models. Several possible outcomes are not interpretable.
- 4 – Studies have little power to distinguish among multiple possible models. They provide some support for a hypothesis, but multiple models are consistent with outcomes.
- 5 – Studies do not test the hypothesis. Experiments have insufficient power to distinguish different models.

**Research Description:**

- 1 – Outstanding. A brilliant exposition of the questions and hypotheses, showing deep insight into the problem. Very clear and logical development and resolution. Easily understandable by a general science reader.
- 2 – An excellent summary of the research question. Hypotheses were clearly described, logical and the approaches to their resolution were adequately explained. A knowledgeable reader could easily understand the research.
- 3 – A very good description of the research question/hypothesis. A knowledgeable reader could understand with some effort. The rationale was mostly clear and logically presented. A few instances where the author assumed knowledge on the part of the reader, or used jargon.
- 4 – A good summary of the research. Occasional sections were inappropriate, illogical or missing. The author used a lot of jargon without explanation.
- 5 – A poor description of the research. It would be impossible even for a knowledgeable reader to understand the approach.

**Thesis Results/Findings:**

- 1 – Outstanding. Research findings presented in a logical, effective and creative manner. Findings presented accurately and clearly, easily understandable by a general reader. Significance clearly and thoroughly described. Conclusions valid, insightful and not over-interpreted.
- 2 – Excellent. Results/findings described accurately and completely. Conclusions were appropriate and not over-interpreted, but not particularly insightful or thoughtful.
- 3 – Very good. Results/findings presented in an effective manner. Solid conclusions, but in rare occasions may lack accuracy. A general reader might have minor difficulty following some of the conclusions.
- 4 – Good. Results/findings presented in a somewhat random or illogical manner. Little information to explain the significance. Some portions unclear or missing. The author may have misunderstood some of the findings, or failed to include or communicate them. Some conclusions may not have fit or were absent (under-interpreted).
- 5 – Poor. Little beyond a quick statement of the findings. Missing context or significance. The author did not understand significant sections of the findings or failed to draw conclusions.

**Discussion (Analysis):**

- 1 – The author provided an in-depth analysis of the results and demonstrated exceptional insight into the broader implications.
- 2 – The author provided an excellent critical analysis of the data. Interpretation went significantly beyond the simplest interpretation.
- 3 – The author provided a very good discussion of the results but stayed mostly within the bounds of current thinking.
- 4 – The author provided a limited analysis of the data; however, the author mostly reiterated the results without further expansion.
- 5 – The author failed to provide a thorough critique of the experiments and results.

**Discussion (Future Research):**

- 1 – The student was thinking about experiments, results and future directions at the level of a professional in the field.
- 2 – The thesis contained several good ideas for future work. The ideas build upon the student's findings, incorporate additional scholarship and are worthwhile suggestions for future research.
- 3 – The thesis provided one or two good ideas for future work. These are relevant to the field but may be only incremental in nature.
- 4 – The student made a very limited attempt to suggest future experiments or directions.
- 5 – The student made an unsuccessful attempt or failed to explain future directions.

**Thesis Scholarship** – This thesis:

- 1 – Is a model of impeccable scholarship. The background material has been thoroughly researched and properly referenced. It is an authoritative assessment of the relevant primary literature. The author has mastered the issues and integrated them to make an original and complete intellectual contribution. The author has provided the reader with the relevant information to understand the significance of the problem at hand.
- 2 – Shows careful scholarship and frequently cited the primary literature. The author has mastered most of the relevant material and has integrated it well to set up the thesis research.

- 3 – Shows average scholarship. The author accurately presented findings from the literature, but relied heavily on reviews rather than primary sources. The significance of the thesis research may not be immediately clear to an outside reader or may be difficult to extract because of excessive detail.
- 4 – Shows below average scholarship. The author has mastered only a part of the relevant literature. Significant parts of the thesis are not supported by cited material. References are almost exclusively reviews and secondary sources. Important material has been neglected. Not enough information has been provided to understand the thesis research question.
- 5 – Shows seriously poor scholarship. The author knows or understands little of the relevant literature or has made major errors in interpretation and/or citation.

**Thesis Writing** – This thesis:

- 1 – Is a pleasure to read. It is crisp, clear and concise. Needs no editing and reads as though it has been written by a professional in the field.
- 2 – Is easy to read, needs only minor editing. Represents excellence in student writing and appears to be the end product of multiple drafts.
- 3 – Is well written, but requires revisions and editing. Usually clear, but some sections need to be re-read to get at the meaning. Reads like a good, proof-read draft.
- 4 – Is poorly written. Significant portions are sloppy or unclear. There are many misspellings and ambiguities. Reads like a rough draft.
- 5 – Is very difficult to read. Most sections are unclear, ungrammatical and convoluted. Unquestionably a rushed draft that has not been proof-read.

**Overall Evaluation:**

- 1 – This student was one of the best I have seen, within the top 5%.
- 2 – This student was really excellent, within the top 15%.
- 3 – This student was good but not exceptional, within the top 80%.
- 4 – This student was fairly weak student, within the bottom 20%.
- 5 – This student was one of the weakest I have seen, within the bottom 5%.

## **Non-Laboratory Thesis – Reader’s evaluation form**

### **Evaluation of the thesis work and the written document**

**Originality** – This student’s thesis:

- 1 – Demonstrated exceptional originality.
- 2 – Clearly went beyond the literature in several areas.
- 3 – Contained one or more good ideas that extended the current thinking.
- 4 – Stayed within the bounds of current thinking from the literature.
- 5 – Was basically a repeat of other ideas or discussion without modification.

**Completeness** – This thesis:

- 1 – Is complete and could be publishable in its own right.
- 2 – Needs just one or two additional areas to be discussed to be complete.
- 3 – Contains most of the elements of an interesting idea/review but would need significant additional material to be complete.
- 4 – Contains the bare minimum of an idea for a thesis. Would need extensive fleshing out to be complete.
- 5 – Is obviously incomplete.

**Research Design:**

- 1 – Studies are incisive, rigorous and powerful. They allowed the student to rigorously test the hypothesis and distinguish between all reasonable models. Both positive and negative results are interpretable.
- 2 – Studies as designed provide strong support for (or falsify) the hypothesis. Most outcomes are interpretable.
- 3 – Studies provide clear support for a hypothesis, but do not distinguish between all possible models. Several possible outcomes are not interpretable.
- 4 – Studies have little power to distinguish among multiple possible models. They provide some support for a hypothesis, but multiple models are consistent with outcomes.
- 5 – Studies do not test the hypothesis. Experiments have insufficient power to distinguish different models.

**Research Description:**

- 1 – Outstanding. A brilliant exposition of the questions and hypotheses, showing deep insight into the problem. Very clear and logical development and resolution. Easily understandable by a general science reader.
- 2 – An excellent summary of the research question. Hypotheses were clearly described, logical and the approaches to their resolution were adequately explained. A knowledgeable reader could easily understand the research.
- 3 – A very good description of the research question/hypothesis. A knowledgeable reader could understand with some effort. The rationale was mostly clear and logically presented. A few instances where the author assumed knowledge on the part of the reader, or used jargon.
- 4 – A good summary of the research. Occasional sections were inappropriate, illogical or missing. The author used a lot of jargon without explanation.
- 5 – A poor description of the research. It would be impossible even for a knowledgeable reader to understand the approach.

**Thesis Results/Findings:**

- 1 – Outstanding. Research findings presented in a logical, effective and creative manner. Findings presented accurately and clearly, easily understandable by a general reader. Significance clearly and thoroughly described. Conclusions valid, insightful and not over-interpreted.
- 2 – Excellent. Results/findings described accurately and completely. Conclusions were appropriate and not over-interpreted, but not particularly insightful or thoughtful.
- 3 – Very good. Results/findings presented in an effective manner. Solid conclusions, but in rare occasions may lack accuracy. A general reader might have minor difficulty following some of the conclusions.
- 4 – Good. Results/findings presented in a somewhat random or illogical manner. Little information to explain the significance. Some portions unclear or missing. The author may have misunderstood some of the findings, or failed to include or communicate them. Some conclusions may not have fit or were absent (under-interpreted).
- 5 – Poor. Little beyond a quick statement of the findings. Missing context or significance. The author did not understand significant sections of the findings or failed to draw conclusions.

**Discussion (Analysis):**

- 1 – The author provided an in-depth analysis of the results and demonstrated exceptional insight into the broader implications.
- 2 – The author provided an excellent critical analysis of the data. Interpretation went significantly beyond the simplest interpretation.
- 3 – The author provided a very good discussion of the results but stayed mostly within the bounds of current thinking.
- 4 – The author provided a limited analysis of the data; however, the author mostly reiterated the results without further expansion.
- 5 – The author failed to provide a thorough critique of the experiments and results.

**Discussion (Future Research):**

- 1 – The student was thinking about experiments, results and future directions at the level of a professional in the field.
- 2 – The thesis contained several good ideas for future work. The ideas build upon the student's findings, incorporate additional scholarship and are worthwhile suggestions for future research.
- 3 – The thesis provided one or two good ideas for future work. These are relevant to the field but may be only incremental in nature.
- 4 – The student made a very limited attempt to suggest future experiments or directions.
- 5 – The student made an unsuccessful attempt or failed to explain future directions.

**Thesis Scholarship** – This thesis:

- 1 – Is a model of impeccable scholarship. The background material has been thoroughly researched and properly referenced. It is an authoritative assessment of the relevant primary literature. The author has mastered the issues and integrated them to make an original and complete intellectual contribution. The author has provided the reader with the relevant information to understand the significance of the problem at hand.
- 2 – Shows careful scholarship and frequently cited the primary literature. The author has mastered most of the relevant material and has integrated it well to set up the thesis research.
- 3 – Shows average scholarship. The author accurately presented findings from the literature, but relied heavily on reviews rather than primary sources. The significance of the thesis research may not be immediately clear to an outside reader or may be difficult to extract because of excessive detail.
- 4 – Shows below average scholarship. The author has mastered only a part of the relevant literature. Significant parts of the thesis are not supported by cited material. References are almost exclusively reviews and secondary sources. Important material has been neglected. Not enough information has been provided to understand the thesis research question.
- 5 – Shows seriously poor scholarship. The author knows or understands little of the relevant literature or has made major errors in interpretation and/or citation.

**Thesis Writing** – This thesis:

- 1 – Is a pleasure to read. It is crisp, clear and concise. Needs no editing and reads as though it has been written by a professional in the field.
- 2 – Is easy to read, needs only minor editing. Represents excellence in student writing and appears to be the end product of multiple drafts.
- 3 – Is well written, but requires revisions and editing. Usually clear, but some sections need to be re-read to get at the meaning. Reads like a good, proof-read draft.
- 4 – Is poorly written. Significant portions are sloppy or unclear. There are many misspellings and ambiguities. Reads like a rough draft.
- 5 – Is very difficult to read. Most sections are unclear, ungrammatical and convoluted. Unquestionably a rushed draft that has not been proof-read.

**Overall Evaluation:**

- 1 – This student was one of the best I have seen, within the top 5%.
- 2 – This student was really excellent, within the top 15%.
- 3 – This student was good but not exceptional, within the top 80%.
- 4 – This student was fairly weak student, within the bottom 20%.
- 5 – This student was one of the weakest I have seen, within the bottom 5%.

## Evaluation of the oral exam

### **Factual/Conceptual Knowledge:**

- 1 – Outstanding. This student demonstrated mastery of the larger area of their thesis topic. The student would do well on a graduate level general exam.
- 2 – Above average. The student mastered both the basis of the thesis as well as areas directly related to the thesis. The student would be on the borderline for a graduate general exam.
- 3 – Average. The student has mastered the basic facts and concepts for the thesis. The student knows some of the facts or concepts that are direct extensions of the thesis.
- 4 – Below average. The student did not know or understand some of the basic material for their thesis.
- 5 – Poor. The student exhibited serious deficits in understanding/knowledge of the basis of their thesis.

### **Ability to Integrate Knowledge/Formulate Hypotheses:**

- 1 – Outstanding. The student was remarkably adept at formulating specific hypotheses as well as suggesting well-controlled tests of their ideas. The student could easily integrate material to formulate a fundamental mechanistic model to explain observations.
- 2 – Above average. The student could independently formulate several hypotheses, or integrate disparate concepts. The student could suggest experiments to test the hypothesis.
- 3 – Average. With help, the student could be lead to formulate a specific hypothesis to explain a set of observations. The hypotheses were narrow or simple extensions of given paradigms, or required little integration of additional concepts. The student could be lead to suggest a test of their hypothesis.
- 4 – Below average. The student was able to understand hypotheses provided to explain observations and provided either a test or an extension of the hypothesis.
- 5 – Poor. The student was unable to understand provided hypotheses or to suggest either tests or extensions of the hypotheses.

### **Ability to Propose Future Directions/Experiments:**

- 1 – Outstanding. The student had great/novel ideas about the new/best directions to pursue in areas related to their research.
- 2 – Above average. The student had a good grasp of the gaps in our understanding related to their thesis and was able to suggest ways to approach its study.
- 3 – Average. The student was able to suggest the obvious next steps in the thesis. These would be incremental in nature.
- 4 – Below average. The student could be aided to propose the next step.
- 5 – Poor. The student had serious difficulty in identifying directions for future research.