**Department of Chemistry Research Progress Report and Candidacy Exam**

**Guidelines, Procedure and Assessment Forms for Written Report & Oral Exam**

**For Advisory Committees and Students -** Students will review and submit this with their written report.

The procedures below are to aid both students and advisory committee members in preparing for the oral exam and to improve consistency across exams. Faculty completion of the attached forms is critical for student feedback and facilitating assessment of the Ph.D. program as a whole.

**PREPARATION**

* As part of the Annual Review in fall, 2nd year students will submit **study topics** for their thesis research area in order to get their advisor’s feedback/suggestions. Students should share the topics with their advisory committees prior to the poster session and discuss additional study topics with their committee at the poster session.

**REPORT WRITING AND SUBMISSION**

* Advisors should provide feedback and guidance on a small number of drafts and avoid heavy editing. Students should be sure to include all of the information required, per the handbook.
* Students must provide the following as part of report submission to the advisory committee & GPC:
  + the written report as hard copy to Valerie Bridge,
  + a pdf to their Advisory committee and Rea Freeland, and
  + these guidelines with assessment forms for the written report and oral preliminary exam.

**REMINDERS BEFORE THE ORAL EXAM**

* The scope of the oral candidacy exam should include questions providing substantive assessment of each of the following major criteria for passing to Ph.D. candidacy: **foundational background, obtaining and interpreting results, and future directions (near-term and 1-2 year thesis plan).**
* Advisors should expect that their student should prepare for in-depth questions on a wide range of topics. The student is encouraged to consult the advisor for feedback on their reading list and study topics.
* **Each committee member, including the advisor, should have in mind ~2-3 lines of questions based on the written report** which can then be adjusted based on the student’s presentation**.**
* **The Advisory Committee Chair will convene a very brief discussion at the start of the exam (~5 mins)** to coordinate topics of questioning to ensure sufficient breadth in the exam.
* **Students are responsible for bringing hard copies of the outcome/feedback form to the presentation** for all of the committee members to have as a reference. **Electronic forms are here:** [**http://www.chem.cmu.edu/grad/guide/forms/**](http://www.chem.cmu.edu/grad/guide/forms/)

**WRITTEN REPORT REVIEW AND FEEDBACK FORM – DUE 3 DAYS BEFORE ORAL EXAM**

* The fourth objective, **scientific writing,** will be assessed prior to the exam using a separate outcome/feedback form. Significant problems with the written report need to be addressed before the oral exam.
* **Both the advisor and Advisory Committee Chair** **must submit outcome/feedback forms for the written report to the student, other committee members, and Valerie** by at least three days before the oral exam.
* The student is strongly encouraged to remind the advisor(s) and Advisory Committee Chair one week before the oral exam to send the written report feedback/outcome form to the student, the other committee members, and to Valerie Bridge.

**ADVISORY COMMITTEE CHAIR’S ROLE**

The Advisory Committee Chair is responsible for:

* reminding the committee about the purpose of the candidacy exam and the oral exam procedure,
* giving feedback on quality of the student’s final written report at least 3 days before the oral exam
* ensuring sufficient breadth in the oral exam to address the requirement objectives within the two hours allotted,
* keeping track of the nature of the questions asked and noting the quality of the student’s responses,
* leading the discussion to complete the feedback form and arrive at the overall outcome and
* providing the outcome of the exam to the student and GPC in person and in writing on the department’s form.

**ADVISOR’S ROLE**

The Advisor’s responsibilities are:

* giving feedback on quality of the student’s final written report at least 3 days before the oral exam, and
* participating in asking questions, particularly to ensure that the background for the student’s specific research is assessed substantively.

**Department of Chemistry Research Progress Report and Candidacy Exam**

**Exam Procedure**

**ORAL EXAM PROCEDURE**

* The Advisory Committee Chair should briefly excuse the student from the exam room before the presentation so that the Committee members can compare and coordinate their planned topics for questions immediately prior to starting the exam (approximately 5 mins).
* **The student will present** **for 25-30 minutes** to review relevant literature context, up-to-date results (including results that may not be in the written report), and future directions. The student is reminded that this is an oral exam, not a formal presentation, so some interruptions for questions of clarification are to be expected. Generally, these will be kept to brief questions of clarification during the presentation.
* **At the Chair’s discretion, the major questions will either be grouped into three rounds of approximately 20-30 mins, a round for each of the oral exam objectives**, or **the Chair must ensure that each objective is substantively assessed by tracking the nature of questions asked** and soliciting or asking additional questions as needed so that each of the learning objectives is substantively assessed:
  + foundational background related to his/her work,
  + obtaining and interpreting results, and
  + future directions and thesis plan.
* **The Advisory Committee Chair will solicit questions from the committee**, including the advisor, and ask questions him/herself, in order to assess each of the major criteria for 1-1.5 hours.
  + All committee members, including the advisor, should ask questions. The advisor’s questions may be particularly important regarding the specific literature important to the student’s project.
  + To ensure appropriate breadth of questioning at all students’ exams, the Advisory Committee Chair will typically recommend when to move on to other topics, e.g. to avoid focusing on the limits of the student’s knowledge in one particular area. Otherwise, committee members should not intervene in each other’s questions, except to rephrase questions, if needed, after a student answers.
  + If the student’s responses may sometimes generate discussion among the committee members about research ideas, committee members should limit their discussion of the research with the other committee members. Comments should be limited to brief clarification of issues that the student would not be expected to know in order to keep the focus on the evaluation of the student’s knowledge and progress.
* **After Q&A, the committee will excuse the student for a period of deliberation (typically 10-20 mins)** to discuss the outcome and feedback.
* **The student will be invited back into the room to receive the outcome and feedback summarized orally by the Committee Chair.** As schedules permit, additional discussion of future research ideas might be included here.

**DELIBERATION AND FEEDBACK**

* If the advisor viewed any of the questions as unfair, he/she may state that at this time. Otherwise, the advisor(s) should withhold comments until after the initial assessment.
* **At the start of the deliberation, the Chair should gather preliminary overall impressions from each member independently** **to set the tone for the discussion** — for example, a simultaneous show of hands indicating a proposed overall outcome of 1 (fail), 2 (conditional pass), 3 (pass), 4 (high pass).
* **The committees should discuss the student’s performance on each of major criteria on the outcome and feedback form to id**e**ntify both strengths and key areas** for growth/improvement. If there is no consensus on an outcome, the majority outcome is the final outcome for each of the criteria.
* Specific examples and comments are especially important in areas of deficiency or failure to indicate what is needed in revisions or to pass the re-exam and the specific deadline for revisions or re-exam.
* **The Advisory Committee Chair should determine the outcome based on the criteria according to the feedback form and review or revise if the majority of the committee did not intend that outcome.** .
* **The Advisory Committee Chair is responsible for writing the feedback**, and is strongly encouraged to bring a computer and draft as much as possible during the deliberation.
* **In the case of failure, the GPC Co-chairs must also have the opportunity to review the feedback for specificity and consistency across exams.** Generally, the Chair should circulate the draft feedback to the committee prior to finalizing and sending it to the student.He/she should set a deadline (e.g. in 3 days) for response so that the student can receive the feedback soon.
* **Written feedback to the student, copied to Valerie Bridge, normally follows in 1-3 days.** Approximately 7-10 days may be needed in the case of failure to assure detailed feedback.

**Department of Chemistry**

**Candidacy Exam Assessment Form – Written Research Progress Report Component**

ADVISOR & CHAIR SHOULD EACH RETURN FORM TO STUDENT, OTHER COMMITTEE MEMBERS &

VALERIE BRIDGE AT LEAST 3 DAYS BEFORE ORAL EXAM.

**Student** **Date of Exam**

**Committee Member Completing this Form**

**Criteria 1. Substantial level of understanding of the theoretical and/or experimental background of the current project(s), including foundational areas relevant for future thesis work in the field**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (readily makes connections) | **Good**  (solid knowledge, appropriate for 2nd yr) | **Pass**  (surface knowledge; better with prompting) | **Deficient**  (significant gaps, major coaching needed) | **Fail**  (unsuccessful even with heavy coaching) |
| Describes importance of the field of research, including long-term implications of the project |  |  |  |  |  |
| Puts project aims in context of primary literature |  |  |  |  |  |
| **Overall Background** |  |  |  |  |  |

**Criteria 2. Appropriate progress in obtaining and interpreting results to indicate ability to complete the Ph.D. successfully**

**and with increasing independence**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (equiv. to publication or conference  presentation) | **Good**  (good trajectory for timely Ph.D.) | **Pass**  (fair progress, should improve) | **Deficiencies**  (pace is slow; understanding of results is unclear) | **Fail**  (serious concerns about ability to progress) |
| Presentation of results shows reproducibility |  |  |  |  |  |
| Analysis and interpretation of results is appropriate |  |  |  |  |  |
| Amount of work completed is sufficient to show promise of a timely Ph.D. |  |  |  |  |  |
| **Overall Results** |  |  |  |  |  |

**Criteria 3: Ability to discuss substantively his/her ongoing work, including near-term future research plans as well as the context, rationale, major questions and methods for 1-2 years of his/her thesis work.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (independent and feasible ideas for current work and the future) | **Good**  (viable ideas for current work, shows some independent thinking for future) | **Pass**  (some good ideas on current and future work but not yet well considered) | **Deficiencies**  (limited effort, heavy coaching needed) | **Fail**  (serious concerns about ability to progress) |
| Clear plan for 6-12 months ahead (3-4 pages) |  |  |  |  |  |
| Has in-depth understanding of next steps for thesis (vision, not operating as a technician) |  |  |  |  |  |
| Strategies for potential pitfalls |  |  |  |  |  |
| **Overall Future Plans** |  |  |  |  |  |

**Criteria 4: Scientific writing appropriate for Ph.D. level work**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (could be used directly in proposal or manuscript) | **Good**  (clear, some editing required) | **Pass**  (understandable overall, but some parts unclear, needs heavy editing) | **Deficiencies**  (logic and organization poor, major revision required) | **Fail**  (not understandable, needs remedial writing help) |
| Clear statement of problem or specific aims |  |  |  |  |  |
| Logical flow of ideas |  |  |  |  |  |
| Clear and concise; avoids jargon and long sentences |  |  |  |  |  |
| Professional format, with title page, abstract, well-labeled figures, and ACS-style references |  |  |  |  |  |
| Proper grammar and English usage; carefully proofread |  |  |  |  |  |
| **Overall Writing Quality** |  |  |  |  |  |

**Outcome of Written Progress Report**

**The completed form should be circulated to the other members of the advisory committee (see cover of student’s report) prior to sending the official copy to Valerie to send to the student.**

**High Pass** – Good or Excellent on all four criteria. Student may proceed to poster session and oral preliminary exam without revisions. The report is worth 6 units as evidence of substantive research progress accomplishment toward the M.S. in Chemistry.

**Pass** – At least pass on all four criteria. Student may proceed to poster session and oral preliminary exam. The report is worth 6 units as evidence of substantive research accomplishment toward the M.S. in Chemistry.

**Conditional Pass** – Deficiencies in 1-2 criteria but no failures. Revisions are required. At the discretion of the committee chair, revisions may be required prior to or following the oral preliminary exam. The maximum time allowed for revisions is 2-3 weeks. Pending revisions and the advisor’s and a GPC Co-Chair’s approval, the revised report may be worth up to 6 units as evidence of substantive research accomplishment toward the M.S. in Chemistry.

**Fail** – Deficiencies in most areas or failures in any areas. When either the Advisor or Advisory Committee Chair rates the written report as Fail, the oral exam may be delayed up to 3 weeks for revisions, or no later than one week before the end of the semester, as determined by the Advisor, Chair and GPC Co-Chairs. The student will be on probation in the department with the opportunity to revise and resubmit **at least one week before the oral exam date.** The deadline for the oral exam, set in agreement with the Advisory Committee Chair, the Advisor, and GPC Co-Chairs is .

Note that if there are suspected academic integrity issues, the person identifying the concern must gather the evidence and discuss the matter with the department head or GPC Co-Chairs according to the departmental academic integrity procedures and penalties, when warranted, will be determined separately from the outcome of the written progress report. The concern should be kept confidential and not be raised with the Advisory Committee at the exam.

**IMPORTANT:** **Please provide sufficient details about the expectations so that the criteria for proceeding to the oral preliminary exam are clear (attach explanation, as needed).** It is critical to consult with the GPC Co-Chairs regarding the appropriate level of detail for a student who is or will be on probation.

**Carnegie Mellon Department of Chemistry**

**Candidacy Exam Assessment Form – Oral Preliminary Component**

**COMMITTEE CHAIR:** PLEASE RETURN THIS FORM TO VALERIE BRIDGE WITHIN 1-3 DAYS.

**Student** **Date of Exam**

**Committee Member Completing this Form**

**Criteria 1. Substantial level of understanding of the theoretical and/or experimental background of the current project(s) and in foundational areas relevant for thesis work in the field**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (readily makes connections) | **Good**  (solid knowledge, appropriate for 2nd yr) | **Pass**  (surface knowledge; better with prompting) | **Deficient**  (significant gaps, major coaching needed) | **Fail**  (unsuccessful even with heavy coaching) |
| Puts project aims in context of primary literature |  |  |  |  |  |
| Can effectively discuss concepts and methods related to the written report and oral presentation |  |  |  |  |  |
| Facile with using chemistry fundamentals in discussion |  |  |  |  |  |
| **Overall Background Knowledge** |  |  |  |  |  |

**Criteria 2. Appropriate progress in obtaining and interpreting results to indicate ability to complete the Ph.D. successfully and with increasing independence**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (equiv. to publication or conference  presentation) | **Good**  (good trajectory for timely Ph.D.) | **Pass**  (fair progress, should improve) | **Deficiencies**  (pace is slow; unclear about understanding of results) | **Fail**  (serious concerns about ability to progress) |
| Explains goals and rationale for methods used |  |  |  |  |  |
| Appropriately interprets results and/or addresses hypothetical questions effectively |  |  |  |  |  |
| Facile with fundamentals to explain techniques and results |  |  |  |  |  |
| “Thinks on his/her feet” and reasons independently |  |  |  |  |  |
| **Overall Results** |  |  |  |  |  |

**Criteria 3: Ability to discuss substantively his/her ongoing work, including near-term future research plans (6-12 months) as well as the context, rationale, major questions and methods for 1-2 years of his/her thesis work.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (independent and feasible ideas for current work and the future) | **Good**  (viable ideas for current work, shows some independent thinking for future) | **Pass**  (some good ideas on current and, future work but not yet well considered) | **Deficiencies**  (limited effort, heavy coaching needed) | **Fail**  (serious concerns about ability to progress) |
| Engages effectively in discussion of alternative interpretations and approaches to resolve them (rigor) |  |  |  |  |  |
| Has in-depth understanding of next steps in relation to questions for thesis (vision, not operating as a technician) |  |  |  |  |  |
| Discusses new ideas for his/her project or for future thesis projects (creativity) |  |  |  |  |  |
| **Overall Future Plans** |  |  |  |  |  |

**Criteria 4: Scientific writing appropriate for Ph.D. level work**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Excellent**  (could be used directly in proposal or manuscript) | **Good**  (clear, some editing required) | **Pass**  (Overall understandablebut some parts unclear, needs heavy editing, understandable overall) | **Deficiencies**  (logic and organization poor, major revision required) | **Fail**  (needs remedial writing help) |
| **Overall Writing Quality** (use average of advisor’s and committee chair’s written assessments on written report form for final outcome) |  |  |  |  |  |

**Outcome of Exam** (check one):

**High Pass** indicates outstanding performance based on **overall assessments of excellent or good in all areas.**

**Pass** indicates clearly satisfactory knowledge of both fundamental theory and research methods, along with satisfactory research progress that is on a trajectory to successful completion of the Ph.D. **Students should have at least pass in all four areas.**

**Conditional pass** indicates that deficiencies in 1-2 criteria must be addressed over a short period (2-3 weeks) and the additional work is required to receive a pass. The student be required either to revise the written report or otherwise address deficiencies in writing or in person as requested by the committee **(specifics to be described below)**.

**Failure** indicates deficiencies in most criteria or failure in one or more criteria. Such performance leads to grave concerns about a student’s research progress, background knowledge, future directions, and/or writing such that the advisor and committee question the student’s ability to complete a Ph.D. in this research area in a timely way based on current rate of progress. **If a student fails, the committee must agree by majority on one of the following actions:**

**Revise and have re-exam in the current group.** The student may repeat the oral exam and revise the written report, continuing as a member of the group(s) on probation. The student must pass fully, without conditions, at the re-exam within 2-4 months to continue in the group and the Ph.D. program, with the specific deadline set by the Advisory Committee in consultation with one of the GPC Co-Chairs. Financial support from the advisor for the student must be continued during the probation. The student must pass fully on the second attempt to remain in the Ph.D. program.

**Termination from group with option to change groups on a probationary basis.** Note that in the case of co-advisors, a new, signed thesis agreement is needed if the student wishes to remain with one of the current advisors. If a change of groups is possible, the student must then fully pass the progress report requirement and oral preliminary exam in the new research group by the end of the sixth semester in residence to regain good standing and remain in the Ph.D. program. If the student is not able to join a new group officially within a 1-2 month grace period (funding for a grace period is not guaranteed), he/she cannot continue in the Ph.D. program. Students must have 3 or more months written notice in a probation letter prior to this result.

**Termination from the Ph.D. program.** The student cannot continue in the Ph.D. program and may transfer to the M.S. program, although funding cannot be guaranteed for M.S. students. Up to 6 units from the written research progress report may be applied toward the M.S. pending approval from their advisor and the GPC Co-Chairs. This outcome is reserved for re-exams or for students who have had 3 or more months written notice in a probation letter.

***Note that the student may appeal the outcome to the department head within 7 days of receiving the written outcome by following the university’s Summary of Graduate Student Grievance Procedures.***

**If the outcome is conditional pass or failure, what is the student required to do to earn a pass?** Check all that apply.

Revisions to the written report

Answering additional questions in writing

Re-exam with presentation of additional results to the advisory committee

Other

**Specific expectations for re-exam/revisions, if any (attach separate document or email, as needed):**

**The deadline for re-exam/revisions is .** **Please provide sufficient details about the expectations so that the criteria for passing are clear (continue on back or attach separate pages, if needed).** Please consult with the GPC Co-Chairs before setting the deadline for a student who is or will be on probation.

**Feedback for all students (attach email or separate page, as needed)**

**Overall strengths:**

**Areas for improvement:**

**IMPORTANT: The Advisory Committee Chair should normally submit the outcome and feedback in writing within one week to the student, Advisory Committee, and Valerie Bridge for the Graduate Program Committee. He/she will circulate the draft by email to the Advisory Committee and, in the case of failure, also the GPC Co-chairs, which is essential to ensure sufficient feedback about deficiencies and clear expectations for revisions or a re-exam. In the case of pass or high pass, a scanned copy of handwritten feedback is acceptable.**

**Advisory Committee Members**

**Advisor(s)**   **Chair**

**Member** **Member**

**Signature of Committee Chair:**  **Date:**