

Graduate Program Guidelines for Ph.D. and/or M.S. in Physics

(Adopted by vote of the faculty: December 9, 1986; October 28, 1987; April 6, 1988; September 9, 1989; Jan. 19, 1990; Aug. 30, 1990; May 7, 1991; Sept. 24, 1995; Apr. 28, 1998, November 15, 1999, February 14, 2002, June 6, 2003, April 20, 2006, January 10, 2007; March 2007, March 2012, January 2018)

See '[Graduate Handbook](#)' for guidelines established by the Graduate council and administered by the graduate school which must also be followed by graduate students. In the following, 'semester' does not include summer semester unless explicitly stated.

I. ENTRANCE REQUIREMENTS. A prospective student must also submit a completed graduate school application form, transcripts of previous coursework, a statement of objectives, and three letters of recommendation.

II. GRADUATE STUDENT ADVISING. One faculty member is selected by the Department Head to serve as the Graduate Student Advisor. He/she advises each graduate student from the date of entrance to the time when the student chooses the Major Professor who supervises the M.S. or Ph.D. research. After selection of the thesis problem, the student is advised by both the Major Professor and Graduate Student Advisor, the former providing guidance primarily in the area of specialty and the latter contributing broader advice on overall departmental requirements on courses and procedures for the graduate degree. All students who have not successfully completed the core courses are required to consult with the Graduate Student Advisor each semester before enrolling. Only the Graduate Student Advisor or his/her designee can sign the enrollment form or set an enrollment flag on KSIS for a student who has not successfully completed all of the core courses. Once students have successfully completed all of the core courses they need only consult their major professor before enrolling. The major professor can sign the enrollment form and set an enrollment flag on KSIS for such students. Note that any students may if they wish consult the graduate student advisor.

III. ENTRANCE INTERVIEW. In order for the Graduate Student Advisor to help an entering graduate student in the selection of courses appropriate to the background of the student, an interview, which may include a placement examination, is held with each student. The student's background in undergraduate physics (classical mechanics, electricity and magnetism, quantum mechanics, thermal and statistical physics, and modern physics) will be evaluated. Neither the admission status nor the award of the assistantship is dependent on the results of this interview.

IV. COURSE SCHEDULE. Entering students will normally take the following course schedule in their first two years:

First semester	Methods of Math. Phys., Statistical Mechanics, an elective and Journal Club
Second semester	Advanced Dynamics, Quantum Mechanics I, and an elective
Third semester	Electrodynamics I, Quantum Mechanics II and an elective
Fourth semester	Electrodynamics II and electives

The graduate student advisor may, on the basis of the entrance interview, replace one or more of the above courses in the first year by courses chosen from senior level (400, 500) undergraduate physics courses and other graduate level physics courses. Each student not seeking a terminal M.S. degree must take at least one core course each semester until the core course requirement has been satisfied.

Each new physics graduate student must sign up for Journal Club for one hour credit the first semester.

V. GRADE REQUIREMENTS. The graduate school requires that a student maintain a GPA of 3.0 or better. Failure to meet this requirement will result in the student being placed on probation by the graduate school. Any student receiving more than two C's the first year in graduate school will not be eligible for further GTA or GRA support until such time that the above requirements are satisfied.

VI. REQUIREMENTS FOR THE PHD

A. SUPERVISORY COMMITTEE: Each student, with the aid of the graduate student advisor, is responsible for establishing a supervisory committee as required by the graduate school. This committee should be established before the end of the student's first year in graduate school. The supervisory committee shall consist of the Major Professor and at least three other members of the Graduate Faculty. One member of the committee must be a member of the Graduate Faculty not in the physics department. The supervisory committee member's names are submitted to the graduate school on the form 'Program of Study' by the student along with a list of credits (discussed in the next section) to be taken toward the Ph.D. The supervisory committee shall, in conference with the student, formulate the program of study, recommend the manner by which the student is to satisfy the teaching requirement and generally be charged with seeing that the student makes satisfactory progress toward the Ph.D. degree. Lack of normal progress will result in being placed on probation by the graduate school.

B. PROGRAM OF STUDY: The graduate school requires 90 hours for the Ph.D. degree, of which at least 30 hours are to be course work. The "core" courses, Meth. of Math. Physics, Quantum Mechanics I and II, Electrodynamics I and II, Advanced Dynamics and Statistical Mechanics, must be taken by each Ph.D. student. If a student is sufficiently strong in one or more of these areas, they may be excused from taking the corresponding course by being certified as proficient in that course through written recommendation by the professor currently responsible for the course at KSU. Certification should not be delayed, and must be done at least by the end of the student's first year in graduate school. Transfer of credit for courses equivalent to the core courses does not remove the certification requirement.

C. PRELIMINARY EXAM:

All graduate students working toward the Ph.D. degree should pass the preliminary examination .

The Preliminary Exam consists of two parts: A written report and an oral presentation. The successful completion of these two pieces will advance the student to PhD candidacy. Students are encouraged to complete both portions of the Preliminary Exam before the end of their third year, as per the graduate school's guidance. In the two parts of the Preliminary Exam students will introduce their supervisory committee to the project they will pursue for their dissertation. This may include an overview of the state of the field, key theories and/or methods to be used, and preliminary results. Both the written report and the oral presentation will be prepared with the guidance of the student's advisor and the student's advisor and supervisory committee must approve both.

The candidate must provide a copy of their written report to each member of their supervisory committee and all members of the committee must certify that they have received acceptable copies of the document. Candidates should allow at least 10 working days for review by the major professor and the supervisory committee prior to the oral presentation. Each committee member should provide feedback within 21 days or by the oral presentation, whichever comes first.

It is the student's responsibility to schedule the oral presentation with the graduate school at a time and place agreed upon by the student's committee. The written report part of the Preliminary Exam must be passed before the oral exam takes place. The oral presentation should be scheduled with the graduate school at least four weeks before the agreed upon date. A student will be deemed to have passed the oral presentation if at least three quarters of the supervisory committee approve the student's performance.

The student's committee should then discuss any necessary revisions and vote on the results of that students' Preliminary Exam. A student will be deemed to have passed their Preliminary Exam if at least three quarters of the student's supervisory committee approve of the student's performance.

Guidelines

The Preliminary Exam will be prepared with the advice and guidance of the student's thesis advisor.

The objective of the written report is to present the committee with a potential Ph.D. project. The presentation of this project proposal may include the following elements:

- Overview of the state of the field
- Review of theories and methods that are commonly used
- Statement of the problem to be studied and justification for why this problem is the logical next step
- Preliminary results (if available)
- Plan to address the chosen problem

An adequate presentation of the plan is expected to take 4000-6000 words.

Students who have written a Master's Thesis, a manuscript, or similar work in an area closely related to their proposed area of research can extensively use their previous written work in the composition of their written report. Clarifications on this guideline can be provided by the student's committee.

Students that change research areas after passing the written report part of the Preliminary Exam are NOT required to submit a new written report.

Students who change research areas after passing the oral exam are NOT required to retake the oral exam, since this would mean they have already passed the Preliminary Exam.

It is strongly recommended that students pass the written report part of the Preliminary Exam before scheduling the oral exam. However, the date of the oral exam can be as soon as 10 days after the report is given to the committee.

The outcome of the written report part of the Preliminary Exam will be decided by a three-quarters vote of the Thesis Committee. The vote, and any deliberations, can be conducted by email. The four suggested outcomes are:

- 1) Pass
- 2) Provisional Pass. This outcome is given when the written report requires revisions, but the revisions are sufficiently minor that the thesis advisor can approve the changes without going back to the committee.
- 3) Major revision. This outcome indicates that the revised document needs to be reviewed by the committee. Subsequent revisions may be deemed a pass or fail.
- 4) Fail. This outcome indicates that the student needs to start over on the written report part of the Preliminary Exam. Two failed written reports will be deemed a failure of the Preliminary Exam.

The old preliminary exam described below is only for students matriculating before fall 2023 who petition to take the Preliminary Exam in the format that existed when they started commonly referred to as a Departmental Exam (DE). Current students may also elect the option described in this document. They start with a “clean slate” in this case; any prior failed written DEs will be disregarded.

The DE is a written, closed book examination, and the material is at the senior undergraduate physics level. The written DE consists of five subjects: Mechanics, Quantum Mechanics, Electricity and Magnetism, Thermal and Statistical Physics, and Modern Physics. This exam is given over three consecutive days at the start of the fall and the spring semesters. Students should review their undergraduate physics materials and work on the sample problems on each subject that are available on the web site [here](#). The problems for the DE will be based on these sample problems [1] [2]. The selected problems might be changed slightly in detail but not changed with regard to the intent of the problem.

The five parts of the DE will be graded separately, and the committee will assign the passing and failing levels. A student who fails any part of the exam the first time is expected to review with his/her advisor and/or some member of the examination committee the reasons for his/her failure [3] [4] and to formulate, with the help of the advisor and/or committee member, a concrete plan of action which can reasonably be expected to remove his/her deficiency in the areas failed [5].

Each student must take the DE by the beginning of their FOURTH semester in graduate school in physics at Kansas State [6]. Students are encouraged to take the exam earlier if they are prepared. Exceptions to this rule must be approved in writing prior to the examination by the department head and the department graduate student advisor [7]. All five subjects must be taken on the first attempt.[8] Any subjects failed on the first attempt must be retaken the next time the DE is offered. If a student fails any part of the DE on the second attempt, they will receive no further GTA or GRA support beyond that semester [9].

Once the student has passed the written DE, chosen their committee and filed a program of study with the graduate school, the oral preliminary exam (PE) can be taken. The PE should be taken before the end of the eighth week of the semester following completion of these requirements. This exam should be completed by the end of the fifth semester. The supervisory committee determines the format of the PE. It is the student's responsibility to schedule the PE with the graduate school at a time and place agreed upon by the student's committee. This exam should be scheduled with the graduate school at least one month before the agreed upon date. A student will be deemed to have passed this exam if at least three quarters of the supervisory committee approve the student's performance.

D. TEACHING REQUIREMENT: Teaching experience is required for all graduate students pursuing a course of study toward the Ph.D. The kind of teaching by which this requirement is to be met is to be prescribed by the student's supervisory committee.

E. FINAL ORAL EXAMINATION OVER DISSERTATION: The examining committee (EC) will conduct a public final oral examination over the material of the student's thesis. The EC is made up of a chairperson appointed by the graduate school and the supervisory committee (including the major professor).

This final oral exam must be scheduled with the graduate school at least two weeks in advance. Note that before this exam is scheduled the student must present a copy of her/his thesis to each member of the EC and at least three quarters of the EC must sign the 'approval to schedule final examination' form that the thesis is in acceptable form for review. It is the responsibility of the student to schedule this exam with the graduate school

at a time and place agreed upon by the EC. A student will be deemed to have passed if at least three quarters of the EC approve the candidate's performance at the final oral exam.

F. ENGLISH REQUIREMENT: A student whose first language is not English must score:

a)	50 or higher on the "SPEAK" test or TSE by December or January of her/his first year or else will not receive TA support after the end of her/his second semester.
b)	40 or higher on the "SPEAK" test or TSE at least seven months before the final Ph.D. oral defense.

G. CREDIT HOUR ENROLLMENT REQUIREMENTS FOR GRA OR GTA STUDENTS:

Each graduate research or graduate teaching assistant (GRA or GTA) who is doing a Ph.D. is required to take a minimum of 9 credit hours during the fall and spring semesters of their first year of enrollment in graduate school at KSU. This will include GTA's and GRA's who are doing a non-terminal M.S. degree prior to their Ph.D. After their first year a student can enroll in a minimum of 6 credit hours each fall and spring semester provided they have completed Phys 801, Math Methods.

All terminal M.S. graduate students are required to take a minimum of 9 credit hours during each fall and spring semester in graduate school at KSU. Once a student has completed 18 graduate credit hours towards their M.S., they may enroll in a minimum of 6 credit hours during each fall and spring semester.

All GTA's and GRA's shall enroll in 3 credit hours during the summer semester.

VII. REQUIREMENTS FOR THE TERMINAL M.S. DEGREE

A. A student may seek the M.S. degree as part of her/his Ph.D. program on mutual agreement between the student and major professor that it will be beneficial to the development of the student. The decision to seek the M.S. degree will not relieve the student of the necessity to meet the normal requirements and timetable for the Ph.D. program unless the student wishes the M.S. to be his/her terminal degree in physics at KSU. A student may also pursue the M.S degree as a terminal degree at Kansas State by mutual agreement between the student and major professor. Note that in either case the student must maintain a GPA 3.0 or better on coursework.

B. If a student wishes to pursue the M.S. degree either as a part of his/her Ph.D. program or as a terminal degree in physics at KSU, the requirements are those for the thesis or report option in the graduate handbook. The student in consultation with the major professor will form the supervisory committee and select a program of study to fulfill the M.S. requirements. It is the student's responsibility to file this program of study with the graduate school by the end of the second semester in graduate school.

C. Before scheduling the final oral exam for the M.S. degree, the student must present a copy of the thesis or report to each member of their supervisory committee and each member must certify that the thesis or report is in satisfactory form to be examined. The supervisory committee indicates this by signing the 'Approval for Final Exam' form. It is the student's responsibility to file this form with the graduate school and to schedule the final oral exam with the graduate school at a time and place agreed upon by the supervisory committee.

D. Each graduate research or graduate teaching assistant (GRA or GTA) in the Department of Physics must enroll, and all graduate students, are expected to enroll for a minimum of nine credit hours every fall and spring semester and three hours in the summer until they have completed 21 hours. After completing 21 hours students may enroll for six hours a semester (and three hours in the summer) until their last semester in graduate

school. During the last semester the students need only enroll for the minimum number of credit hours required by the Graduate School.

VIII. REVIEW OF GRADUATE STUDENT PROGRESS. There will be a review of the progress of physics graduate students by the Physics Graduate Faculty close to the eighth week of the spring and fall semesters. All students who have not passed the written departmental exam will be reviewed. All students beyond their sixth year in graduate school in physics at KSU will be reviewed. All students on probation will be reviewed. Other students will be reviewed if their major Professor, one of their committee members, or the Department Head asks that they be reviewed. The graduate student advisor will remind faculty of this prior to the review. Initiation of the review will be the responsibility of the Graduate Student Advisor.

IX. SEMINARS BY GRADUATE STUDENTS. Every year graduate students beyond the second semester of graduate study are required to give a departmental seminar on some portion of the student's research. It is the responsibility of the student to insure that all members of the Supervisory committee are notified of the place and time of this seminar.

X. SAMPLE SCHEDULE FOR A PhD STUDENT. A (*) indicates a deadline from the Graduate Program Guidelines above.

Semester (fall, spring)	Schedule
Semester 1	Method of Math. Phys., Stat. Mech, Journal Club, elective. Take care of quizzing out of classes by end of semester.
Semester 2	Advanced dynamics, Quantum Mechanics I, elective. Start looking for major Professor (supervisor) if you have not already done so.
Semester 3	Electrodynamics I, Quantum Mechanics II, elective. Choose major Professor and form supervisory committee before start of 3rd semester. Begin research project. Take written DE before or at the start of this semester.
Semester 4	Electrodynamics II, electives (until required coursework completed), research.
Semester 5	Electives (until required coursework completed), research. Take oral PE before the end of this semester (schedule with graduate school 4 weeks in advance).
Semester 6	Research (typical semester until final semester).

Final oral exam over thesis is normally done in the student's last semester (usually 10th or 11th semester but can be earlier or later). Student needs to schedule the exam with the Graduate School two weeks in advance.

- [1] Should a student feel that a question is written at a level which is more advanced than senior undergraduate, is poorly worded, tricky or impossible, he/she has the responsibility to report that information to the Chair of the Departmental Exam Committee at least two weeks before the exam is to be given. The Committee has the responsibility to take appropriate action.
- [2] The Committee has the responsibility to post the questions in a timely manner so that students will have sufficient opportunity to study them before the exam.
- [3] A student may appeal a pass/fail decision by the Committee. The appeal must be in writing and provide specific reasons for why the failure resulted from very unusual circumstances. The Department Head will consult with the student and his/her adviser and then present the appeal to the full faculty for action. Not doing well, extenuating circumstance presented after the exam is completed (See note 6 below.) or stating that a question is unfair or poorly worded (See Note 1 above.) will not be acceptable grounds for appeal.

- [4] Students may request to discuss any exam or individual questions on any exam with a member of the Departmental Exam Committee. The chair of the Committee will designate the member who will discuss the questions with the student and/or his/her adviser.
- [5] For each part of the exam that has been failed, the student will prepare, in consultation with his/her adviser, a written statement that describes how he/she plans to study and correct the deficiency. This statement will be addressed to the Department Head who will review the actions and suggest changes as appropriate.
- [6] If extenuating circumstances cause a student to be unable to take the exam on the normal schedule or may cause the student to perform below his/her normal ability, he/she must inform the Department Head in writing as soon as possible. The Department Head will determine if the circumstances warrant a delay in the normal schedule and inform the student in writing of the revised schedule for his/her exam. Exams will not be given at alternative times. Thus a delay will require that the student wait until the next regularly scheduled Departmental Exam. If the student disagrees with the Department Head's decision, the Examination Committee will serve as an appeals committee.
- [7] A student who wishes to take the exam early must discuss his/her reasons for feeling prepared with the Graduate Student Adviser. After this discussion the student must present to the Department Head a written statement which describes in detail the reasons for taking the exam early and include in that statement the students' understanding of the consequences of failure on the exam. The details must include a description of completed courses which are relevant to each exam, performance in those courses, and actions taken outside of formal classes to prepare for the exam. In consultation with the Graduate Student Adviser, the Department Head will approve or deny the request. If the student disagrees with the Department Head's decision, the Examination Committee will serve as an appeals committee.
- [8] Failure to appear to complete a scheduled exam will be counted as a failure on that exam.
- [9] Once support is removed for failure on the Departmental exam it cannot be reinstated except by a vote of the full faculty. A student who has failed the exam twice may continue in our program without financial support but is encouraged to seek other careers choices.