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, May 2024)

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 submit a completed graduate school application form, transcripts of previous coursework, a statement of objectives, three letters of recommendation, and English proficiency test results for those whose native language is not English, as required by the Graduate School.

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 a Major Professor, who supervises the M.S. or Ph.D. research. Students are strongly encouraged to select a Major Professor prior to their first summer at K-State, when they can gain research experience. After that, 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 (listed in VI.B) 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 consult the Graduate Student Advisor with any issues or concerns.

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 an assistantship is dependent on the results of this interview.

IV. COURSE SCHEDULE. Entering students might 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. Students with Graduate Teaching Assistantships or Graduate Research Assistantships must enroll in a minimum of 6 hours per semester.

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. The Graduate School requires students on probation to achieve a cumulative GPA of 3.0 or better within 2 semesters to return to good standing. 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. The Physics Department requires at least 30 hours to be course work. The Program of Study form that is submitted to the Graduate School before the end of the second semester of graduate study, lists all the courses and hours that a student will take to obtain their degree. 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 (known as quizzing out) through written recommendation by the professor currently responsible for the course at KSU, sent to the Graduate Student Advisor. 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 must pass the Preliminary Examination (PE). A student must be in good academic standing to take the PE, per Graduate school rules. The PE is taken after the Program of Study is submitted, and the Graduate School requires that it must be completed at least 7 months before the Final Oral Examination. A full-time doctoral student should normally complete the PE within 3 years of entry into the Ph.D. program. When it is completed, you are admitted to candidacy for the doctoral program, and your status becomes ABD (all but dissertation). The Graduate School requires continuous fall/spring enrollment after that and you have up to five years to complete your dissertation and defense after passing the PE.

The Preliminary Exam consists of two parts: A **written report** and an **oral exam**. The successful completion of these two pieces will advance the student to Ph.D. 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. Both the written report and the oral exam will be prepared with the guidance of

the student's advisor and the supervisory committee must approve both in separate votes. Students who change research areas after passing the Preliminary Exam are not required to retake it.

Written Report. 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 a vote on the written report by the supervisory committee prior to the oral exam.

The outcome of the written report part of the Preliminary Exam will be decided by a three-quarters vote of the Supervisory Committee. The vote, and any deliberations, can be conducted by email. Committee members will each select one of the following four outcomes:

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.

The student is considered to have passed the written part of the Preliminary Exam and may proceed to the Oral Exam if at least three fourths of the supervisory committee votes Pass or Provisional Pass. The student is considered to have failed if more than one fourth of the Committee votes Fail.

If the student does not pass or fail at the first vote, they will be advised of the vote count and provided guidance on the revisions required to get a passing vote. The Committee will vote a second time if a revised document is submitted. The voting options will be restricted to Pass and Fail in this vote and the student will be considered to have passed if at least three fourths of the Committee votes to pass.

Two failed written reports will be deemed a failure of the Preliminary Exam.

Each committee member should vote on the written report within 21 calendar days of receiving it or by the oral exam, whichever comes first. The written report must be passed before the oral exam takes place.

Guidelines for the Written Report

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

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 written report is given to the committee.

Students who entered before Fall 2023 may, upon petition to their supervisory committee, take the old format written Departmental Exam that existed when they started, in lieu of submitting a written report. The request must be made in writing at least 30 days before the start of the semester that the exam is to be done. A description of the old DE can be found in the January 2018 version of the Graduate Program Guidelines. This option will be discontinued and not available after Fall 2024.

Oral Exam. It is the student's responsibility to schedule the oral exam with the Graduate School at a time and place agreed upon by the student's supervisory committee. The Graduate School requires the oral exam to 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 exam if at least three quarters of the supervisory committee approve of the student's performance. When the student passes the oral exam, they have successfully passed their Preliminary Exam. After the oral exam, the ballot on the Preliminary Exam is sent to the Graduate School.

D. TEACHING REQUIREMENT: Teaching experience is recommended for all graduate students pursuing a course of study toward the Ph.D. The kind of teaching can be recommended by the student's supervisory committee.

E. 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.

F. 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 at least 8 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.

There is no minimum enrollment requirement during summer semesters. Students should discuss with their major professor how summer enrollment affects their timeline for graduation and consider any special circumstances (such as scholarships) that may require summer enrollment.

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

G. FINAL ORAL EXAMINATION OVER DISSERTATION: The student's supervisory committee will conduct a public Final Oral Examination over the material of the student's dissertation (i.e., defense of dissertation). The chairperson will be the major professor. The public may ask questions, after which they are dismissed and there may be further questions and discussion among only the supervisory committee and the student.

This Final Oral Exam must be scheduled with the Graduate School at least two weeks in advance, per Graduate School Rules. Note that before this exam is scheduled the student must present a copy of her/his dissertation to each member of the committee and at least three quarters of the committee must sign the 'approval to schedule final examination' form that the dissertation 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 committee. A student will be deemed to have passed if at least three quarters of the committee approve the candidate's performance at the Final Oral Exam.

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 a supervisory committee and select a program of study to fulfill the M.S. requirements. It is the student's responsibility to choose the thesis or report option and file their 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 and to schedule the Final Oral Exam with the Graduate School at a time and place agreed upon by the supervisory committee.

D. All terminal M.S. graduate students are required to take a minimum of 8 credit hours during fall and spring semesters of their first year in graduate school at KSU. Once a student has completed 16 graduate credit hours, they may enroll in a minimum of 6 credit hours during each fall and spring semester.

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 School.

Semester (fall, spring)	**Schedule**
Semester 1	Methods of Math. Phys., Stat. Mech. or Electrodynamics I, 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 and supervisory committee if you have not already done so.
Semester 3	Electrodynamics I or Stat. Mech., Quantum Mechanics II, elective. Choose major Professor and form supervisory committee before start of 3rd semester. Begin research project.
Semester 4	Electrodynamics II, electives (until required coursework completed), research.
Semester 5	Electives (until required coursework completed), research. Work on the written report part of the preliminary exam.
Semester 6	*Take oral PE before the end of this semester (schedule with Graduate School 4 weeks in advance), at least 7 months before the Final Oral Exam. Passing means admission to candidacy for the Ph.D. degree, which lasts for 5 years maximum. Research (typical semester until final semester).
PhD Defense	*Dissertation provided to supervisory committee at least 10 working days before Final Oral Exam, open to the public. 3/4 affirmative vote of the committee is passing.

Final Oral Exam over dissertation is normally done in the student's last semester (usually 10th or 11th semester but can be earlier or later).