

East Carolina University

Tomorrow starts here.



GRADUATE STUDENT HANDBOOK

**Department of Physics
Graduate Program**

East Carolina University

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Graduate Program**

**Graduate Student Handbook
April 2007**

Please note that this document is in a continual stage of update. As tuition changes, new graduate policy is adopted, etc., the basic content might change. For up-to-date information contact the Assistant Chair for Graduate Studies in Physics.

Table of Contents

INTRODUCTION	1	
The University and the School of Medicine	1	
The City	1	
PROGRAMS OF STUDY	2	
MS Program	2	
PhD Program	2	
Faculty	2	
Financial Aids	3	
DEGREE REQUIREMENTS	4	
Course Requirement	4	
Grade Requirement	4	
Examination Requirement	4	
MS Thesis Requirement	5	
PhD Dissertation Requirement	5	
Research Skill Requirement	6	
NC Resident Status	6	
Graduation	6	
THE PHYSICS CURRICULUM	7	
MS Students - Applied Physics Option	7	
MS Students - Medical Physics Option	7	
PhD Students	8	
CHRONOLOGICAL LINE OF PROGRESS	9	
MS Students – Applied Physics Option	9	
MS Students – Medical Physics Option	9	
PhD students:	10	
APPENDIX 1	GRADUATE ADVISING POLICY (1/13/89)	11
APPENDIX 2	PHYSICS DEPARTMENT GRADUATE EXAMINATION POLICY (4/2/04, 1/6/06)	13
APPENDIX 3	PHYSICS DEPARTMENT MS THESIS POLICY	16
APPENDIX 3A	PHYSICS DEPARTMENT PHD DISSERTATION POLICY	18
APPENDIX 3B	INSTRUCTIONS FOR PREPARING THE DISSERTATION PROPOSAL	20
APPENDIX 4	RESEARCH SKILL REQUIREMENTS IN A COMPUTER LANGUAGE (5/1/87)	23
APPENDIX 5	MISCELLANEOUS UNIVERSITY POLICIES & GENERAL INFORMATION	23
	Auditing Courses	25
	Failing Grades and Reinstatement: (4/5/04)	25
	Annual Evaluation of PhD Students	26
	Official Withdrawal	27
	Readmission	27
	Schedule Changes	28
	Termination Or Continuance Of Graduate Study	28
	Policies For Graduate Assistantships And Fellowships: Awards And Assignments	29
	Financial Aid	31
	Full-time Status for International Students (Gail Pinkham, 6/1/04)	33
APPENDIX 6	FINAL REVIEW OF THESES AND DISSERTATIONS	35
APPENDIX 7	GRADUATE FACULTY LISTING	37
APPENDIX 8	ESTABLISHING NC RESIDENT STATUS	39
APPENDIX 9	TAXES	41
APPENDIX 10	FORMS	43

Introduction

The University and the School of Medicine

ECU is located in Greenville, North Carolina. The east campus is adjacent to downtown; the School of Medicine campus is adjacent to Pitt County Memorial Hospital in west Greenville. “With a mission of teaching, research, and service, East Carolina University is a dynamic institution connecting people and ideas, finding solutions to problems, and seeking the challenges of the future.”

The Department of Information Technology & Computing Services serves as an instructional laboratory facility in direct support of computer-related course work. The academic computing unit maintains various instructional and research software packages and provides technical assistance to faculty and graduate research users.

East Carolina University has renewed and strengthened its commitment to research, scholarship, and creative activity for both faculty and students, becoming a national research university with an enrollment of nearly 23,000. Graduate students represent 21% of that enrollment. Extramural support for university activities has gone from \$18 million to \$33 million in the last nine years.

The School of Medicine is a national leader in the education and training of general physicians and the delivery of health services to a rural population through innovations such as telemedicine. It is also a constituent of University Health Systems of Eastern Carolina, which includes the Pitt County Memorial Hospital.

The City

Greenville is the hub of eastern North Carolina. Growing from an economy founded on agriculture, the city has branched into an attractive site for international manufacturing, medical facilities, and educational institutions. A strong economy, temperate climate and access to world class medical, education, and recreation facilities make Greenville a great place to live and work.

The City of Greenville, home to more than 68,000 people, is located 80 miles east of Raleigh and Research Triangle Park (<http://www.rtp.org>) and is accessible by four-lane highways and nearby airports. Research Triangle Park is one of the largest research parks in the United States, and is home to 135 organizations, 100 of them research and development related. With over 44,000 employees entering the 8-mile by 2-mile Park each day, it is a vital foundation to both the state's and Southeastern region's economies.

In addition, Greenville is within easy driving distance to several major natural and entertainment resources in the US. Driving seventy miles to the east you can enjoy the beautiful sand beaches of the Atlantic Ocean and ferry to the famous North Carolina outer-bank islands. Within a circle of 200 miles radius, you can either enjoy the spectacular entertainment shows in Myrtle Beach, South Carolina or go to the historical town of Williamsburg in Virginia to find several historical and amusement parks including the Busch Gardens, Colonial Williamsburg and Water Country USA. The Great Smoky Mountain National Park is located about 300 miles to the west of Greenville on the border of North Carolina and Tennessee and attracts many mountain hikers and campers.

Programs of Study

MS Program

The MS program in physics at East Carolina University offers two options – applied physics and medical physics. Both options are designed as two-year programs. The applied physics option is built around a core curriculum designed to give the candidate a thorough foundation in applied physics. Students interested in working in business, industry, education, or continuing toward a PhD degree are encouraged to pursue the MS degree in this option.

East Carolina was the first university in North Carolina to offer the master degree program in medical physics. The program was initiated in 1990 and has now graduated more than 50 students (some entered the program having earned doctoral degrees in other fields). Most of the graduates have found jobs in major hospitals although some have gone on to pursue doctoral programs. This option is designed as a terminal degree for professional work in medical physics and includes a substantial clinical component that enables its graduates to move into a career in diagnostic or therapeutic medical physics. The track record of our graduates is excellent.

Many graduates from the master's program in applied physics have gone to work in industry as scientists or engineers, and some have continued their education in prestigious PhD programs. Our graduates have many career options available to them: some have received faculty appointments in other universities, others have accepted positions at hospitals and university medical centers around the country.

PhD Program

The physics department offers a PhD program in biomedical physics. It is preferred that students enrolled in this program have a master degree in physics, but students with MS degrees in biology, physiology or related fields, have been accepted and been successful in the doctoral program. The PhD program will also accept students who have a BS degree in physics or a related science; these students must follow the MS–Applied Physics curriculum prior to being accepted for candidacy in the PhD program. This program draws on faculty members in ECU's physical, chemical, biological, and medical science departments to meet the need for highly trained scientists who can integrate knowledge of the physical sciences with biomedical research. It also provides interdisciplinary studies in physics, biology, chemistry, and medicine to allow students to pursue solutions to problems of medical interest by studying the application of physical processes to an understanding of biological material or processes.

Students who enter PhD program will be limited to taking only one course listed as a requirement for the MS–Medical Physics per semester, as deemed appropriate by the Assistant Chair for Graduate Studies. If by the time of his/her doctoral graduation, a student have independently fulfilled the requirements for both the MS–Medical Physics and PhD degrees, the Department will recommend that the student be granted a dual degree – PhD and MS–Medical Physics – to the Graduate School.

Faculty

The Department of Physics currently has nineteen graduate faculty members with a wide range of research interests that include atomic and molecular physics, acoustic

physics, biophysics, computational physics and modeling, laser physics, and solar physics. The application of laser scattering and absorption, as well as electron and ion transport in tissue and tissue-like media, combined with theoretical modeling provide unique insight into the biomedical techniques for diagnosis and treatment of disease. The work of our faculty has demonstrated that a fertile environment exists here for advanced study and research.

Financial Aid

Graduate students typically receive either teaching or research assistantship from Physics department for performing duties specified by the sponsor(s) during the academic or calendar year. For MS students, assistantships are offered for the academic year, although summer research stipends may be available to those graduate students conducting research or clinical study under supervision of faculty members. MS students enrolled in the Spring Semester and pre-enrolled for the Fall Semester do not need to enroll in the summer session to receive the stipend. Others, such as the students graduating during a summer session or new students admitted for the summer, are required by Graduate School Policy to enroll in the summer session to receive a stipend and/or to graduate.

For Ph.D. students, teaching and research assistantships are offered on a 12-month basis with students expected to engage in research studies during the summer. For Ph.D. students entering the graduate program with a BS (or BA) degree, the academic and teaching loads of the first two years are typically the same as for students in the MS program.

Because of the limited funds available for Departmental teaching assistantships, students in the Ph.D. program should make arrangements to work with a faculty member with an externally funded research project offering a research assistantship as soon as they expect to become actively involved in research. Students are also encouraged to apply for research fellowships offered by many state and federal agencies. *Support of graduate students by state funds is limited to no more than 12 semesters, excluding summer sessions. A student may apply for an extension of no more than two (2) semesters.*

For out-of-state and international students, out-of-state tuition remission is generally available from the Graduate School on a semester-by-semester basis. The in-state tuition and fees are the responsibility of the student [The Graduate School is trying to change this and the past three semesters the in-state portion of the tuition of PhD students has also been remitted] The maximum allowance set by the Graduate Administrative Board allows up to four semesters for MS students and up to 6 semesters for PhD students. The criteria for the out-of-state tuition waiver is that the student must have completed admission to a graduate program; have an overall or senior year GPA of 3.0 or higher; and have a GRE score (V+Q) of 1000 or larger (with no one score less than 400), or a MAT score of 50 or higher, or a GMAT score of 500 or better.

Academic Common Market: The Academic Common Market (ACM) is a collection of regional states that allow in-state tuition to out-of-state students for specific unique academic programs. The PhD program in Biomedical Physics is listed in the ACM and thus students from ACM states can apply to attend this program at the in-state tuition rate. In addition the MS – Medical Physics option is recognized by the State of Virginia for ACM “instate” tuition. Thus for a student in Virginia, it is possible to attend ECU to study for the MS degree in Medical Physics and be considered a North Carolina

resident with regard to tuition costs. To apply for in-state tuition the student must apply through their state office of the ACM to get certified for in-state tuition. Information on procedures for ACM acceptance is given on the ACM web site <http://www.sreb.org/programs/acm/acminindex.asp>.

Degree Requirements

Course Requirement

MS students are required to complete a minimum of 34 semester hours (SH) of graduate courses of the 5000 or higher level. These courses have to be approved by the graduate student advisor (see Appendix 1).

PhD students are required to have minimum of 12 SH of formal course work beyond the master's degree, including 6 hours from a physics core and 6 hours from a biomedical core. These must be 6000 level courses open only to Graduate Students. Additional courses may be required by the Executive Committee, or dissertation director, depending on the individual student's preparation.

Normal course load for a full-time graduate student is a minimum of 9 SH and may not exceed 15 SH in one semester.

Grade Requirement

A physics graduate student is expected to maintain steady progress toward the degree. He or she is expected to achieve a grade of “excellent” or “good” (A or B) in each course taken for graduate credit. An accumulation of a grade C on courses totaling in excess of 6 SH will result in termination of a MS student’s enrollment. For students in the MS-Medical Physics option, a grade of C or F on any one required graduate course will result in the termination of enrollment. PhD students must maintain a cumulative B average in all formal course work. If the cumulative average falls below B, the student’s program is subject to termination.

A student who receives notice of termination may appeal his or her case to the Graduate Committee, Medical Physics Committee, or the PhD Executive Committee in Biomedical Physics in writing by means of a letter to the Chair of the Department of Physics.

Examination Requirement

MS students are required to pass a written Qualifying Examination. Please refer to the Appendix 2 for the department policy on the written Qualifying Examination.

PhD students are required to pass the doctoral candidacy examination. Students have two chances to pass the candidacy examination. When a student has passed the examination, the student will be admitted to *candidacy* for the PhD degree in Biomedical Physics. Please refer to Appendix 2 of this handbook for the department policy on the Candidacy Examination.

Seminar Requirement

In the semester immediately following their becoming candidates to the degree (summer sessions excluded), PhD students are required to enroll in PHYS 6817 and present a seminar on a subject outside their immediate area of research. The topic for the seminar will be chosen by the Department of Physics Graduate Committee and provided to the student seven calendar days prior to the scheduled date of the presentation. Students will be responsible for developing a representative bibliography on the topic, preparing, and delivering a professional forty-five minute presentation to the Department of Physics followed by a question and answer period not to last more than forty-five minutes. Students may seek advice towards the preparation of their seminar from the Assistant Chair for Graduate Studies in Physics and from their dissertation advisers (if they have already chosen an adviser). The PhD candidates will be graded on the quality of their seminar by the Department of Physics Graduate Committee in consultation with the students' dissertation adviser (when applicable).

MS Thesis Requirement

Upon successful completion of the Qualifying Examination, MS students in the applied physics option are required to write and defend a thesis based original research. MS students in the medical physics option are *not required* to write a thesis, but may choose to do so. Please refer to Appendixes 3 & 4 for departmental policy and requirement on the MS thesis.

PhD Dissertation Requirement

Before a PhD candidate begins dissertation research, his or her advisory committee must approve a dissertation proposal containing

- a brief review of the pertinent literature,
- a short statement on the nature of the problem and the objectives of the proposed study,
- an outline of a feasible research plan.

The proposal is to be presented in the format of a typical proposal prepared for the National Institute of Health, i.e., NIH format (see Appendix 3a). The student shall present his/her research proposal to the candidate's dissertation committee and the faculty in a seminar and defend the proposed work in terms of its originality and significance. The presentation will be public, but the student is to be questioned only by faculty; the success of the proposal and its defense will be judged by the dissertation committee.

Upon completion of the proposed research the candidate must document the research and the findings in a written dissertation. The goal of the dissertation is to reflect original research that contributes significant knowledge to the field of biomedical physics. It must be effectively written and demonstrate a clear understanding of the historical foundations of the work. Further, it must present a clear description of the research methods and a thorough analysis of the strengths, weaknesses, and significance of the research results.

Research Skill Requirement

MS Students are strongly recommended to take the course on *Introduction to Research* (PHYS 6900) in their first year for active involvement with the research projects conducted with a faculty member in either the Physics Department or the School of Medicine. Additional research courses including PHYS 6526/27/28 can be taken in the second year. These courses will provide excellent opportunity for MS students to prepare for their thesis or clinical training in the second year. In addition, competence in one or more computer languages is required for graduate students. Please refer to Appendix 5 for more details.

A graduate course in research ethics is required of all Doctoral students entering the university beginning August 2003 or later. This requirement can be met by enrolling in GRAD7004 offered by the Graduate School or HUMS7004 offered by the Brody School of Medicine. Training in Radiation Safety and/or Chemical safety is also required for those students conducting research in laboratories involving these potential hazards. Training in these areas is offered by the respective safety offices.

All graduate students are required to attend departmental colloquiums except for medical or university related scheduling conflicts. A student who is consistently absent from the departmental colloquiums without proper reasons may be suspended from the teaching or research assistantship offered by the department.

NC Resident Status

Domestic students (US citizen or permanent resident) are eligible to have NC residency after 1 year of residence at Greenville. These students are recommended to establish this status after the 1st year. Those who choose not to do so may be responsible for the out-of-state portion of tuition by themselves. See Appendix 8 for more details.

Graduation

Upon successful completion of all requirements for an MS or PhD degree, a student should prepare for graduation by contacting the Graduate Administrative Assistant who will review the student's record to verify that all requirements have been met. In addition, the GAA will prepare the Graduation Summary and submit it to Registrar's Office. The student must file the application for graduation form with the registrar one semester prior to the completion of the degree program.

The Physics Curriculum

MS Students - Applied Physics Option

Required Courses (minimum 28 SH):

Course Number	SH	Name	Offer Period
PHYS 5311	3	Mathematical Physics I	1 year (fall)
PHYS 5400	3	Introduction to Quantum Mechanics	2 year (07F/09F)
PHYS 5600/01	3	Modern Electronics	2 year (06S/08S)
PHYS 5900/01	3	Computational Physics	1 year (Spring)
PHYS 6200	3	Thermodynamics and Statistical Physics	2 year (06F/08F)
PHYS 6300	3	Electrodynamics I	2 year (07F/09F)
PHYS 6450	3	Solid State Physics	2 year (07S/09S)
PHYS 6816/17	1	Student Seminars	- Fall
PHYS 7000	6	Thesis	-

Elective Courses (minimum 6 SH):

Course Number	SH	Name	Offer Period
PHYS 6250	3	Classical Mechanics	2 year (06S/08S)
PHYS 6700	3	Health Physics (formerly PHYS5700)	2 year (06F/08F)
PHYS 6715	3	Biomedical Physics (formerly PHYS5715)	2 year (07S/09S)
PHYS 6900	3	Introduction to Research	-
PHYS 7110	3	Mathematics Physics II (formerly PHYS6100)	1 year (spring)

MS Students - Medical Physics Option

Required Courses (minimum 32 SH)

Course Number	SH	Name	Offer Period
PHYS 5600/01	3	Modern Electronics	2 year (06S/08S)
PHYS 5900/01	3	Computational Physics	2 year (07S/09S)
PHYS 6700	3	Health Physics (formerly PHYS5700)	2 year (06F/08F)
PHYS 6710	3	Nuclear Medicine Physics	2 year (07F/09F)
PHYS 6715	3	Biomedical Physics (formerly PHYS5715)	2 year (07S/09S)
PHYS 6720	3	Physics of Medical Imaging	2 year (06S/08S)
RONC 6718	3	Radiological Physics	1 year (Spring)
RONC 6992	3	Radiation Therapy Physics	1 year (Fall)
RONC 6993	3	Clinical and Medical Dosimetry	1 year (Fall)
PHYS 7816/17	1	Student Seminars (formerly PHYS6816/17)	Fall
RONC 7370	4	Biological Effects of Radiation	1 year (Fall)

Elective Courses (minimum 3 SH):

Course Number	SH	Name	Offer Period
PHYS 5400*	3	Introduction to Quantum Mechanics	1 year (fall)
PHYS 6300	3	Electrodynamics I	2 year (07F/09F)
PHYS 6900	3	Introduction to Research	As requested

*required if no undergraduate quantum mechanics has been taken;

Medical Physics students also need to obtain proficiency in medical terminology; can take either

BIOL 2130	4	Survey of human physiology and anatomy	1 year (F,S, SS)
or			
HIMA 3000	2	Medical Terminology for Health Professionals	

PhD Students

Physics Core (minimum 6 SH)

Course Number	SH	Name
PHYS 6200	3	Thermodynamics and Statistical Physics
PHYS 6250	3	Classical Mechanics
PHYS 6300	3	Electrodynamics I
PHYS 6400	3	Quantum Mechanics I
PHYS 6620/6621	2, 1	Advanced Techniques in Experimental Physics
PHYS 6710	3	Nuclear Medical Physics
PHYS 6720	3	Physics of Medical Imaging
PHYS 7110	3	Mathematical Physics II (formerly PHYS 6100)
PHYS 7310	3	Electrodynamics II (formerly PHYS 6310)
PHYS 7410	3	Quantum Mechanics II
PHYS 7450	3	Solid State Physics (formerly PHYS 6450)

Biomedical Core (minimum 6 SH)

Course Number	SH	Name
BIOS 6021/22	3,3	Biostatistics for Health Professionals (formerly BIOS5021/22)
BIOC 6202	4	Cell Biology
RONC 6718	3	Therapeutic Radiological Physics
RONC 6992	3	Radiation Therapy Physics
RONC 6993	3	Clinical and Medical Dosimetry
RONC 7370	4	Biological Effects of Radiation
BIOC 7301	7	Graduate Biochemistry (formerly BIOC 6301)
PHLY 7701/7702	4,4	Graduate Physiology (formerly PHL Y 6701/6702)

PHYS 9000 Dissertation – up to 24 hours

GRAD7004 or HUMS7004 (Research Ethics required by the university.) – 2 hours

Supplementary Core

Course Number	SH	Name
PHYS 5311	3	Mathematical Physics I
PHYS 6700	3	Health Physics (formerly PHYS5700)
PHYS 6715	3	Biomedical Physics (formerly PHYS5715)
		Research Problems in Biomedical Physics (formerly PHYS 6910)
PHYS 8910	3	
BIOL 5800/5810	3,3	Principles of Biochemistry I, II
BIOL 5870	3	Molecular Genetics
HPRO 5011/5012	5	Gross Anatomy
PHLY 7705	3	Cardiovascular Physiology (formerly PHL Y 6705)
PHLY 8720	2	Respiratory Physiology (formerly PHL Y 6720)

Chronological Line of Progress

This section is designed to assist graduate students in organizing their schedules and tracking their progress toward degrees. The beginning semester is assumed to be Fall semester.

MS Students – Applied Physics Option

<u>Time</u>	<u>Tasks</u>	<u>Deadline</u>
1 st semester	Registration of courses: late registration; tuition payment Faculty visitation for research topics Prepare and take the MS Qualifying Exam	Tue. of 2 nd week end of 8 th week By the beginning of 2 nd semester
2 nd semester	Pre-registration for spring courses: Take PHYS 6900 (if not taken last semester) to find a topic for summer research and advisor Find thesis advisor and thesis committee member and finish the thesis proposal form Register for fall classes (incl. PHYS7000)	~10 th week 2 nd week End of 2 nd semester ~ 10 th week
1 st summer	Conduct research and report (preferably with the thesis advisor) Prepare and re-take the Qualifying Exam (if not passed 1 st)	Beginning of Fall semester By the beginning of 3 rd semester
3 rd semester	late registration; tuition payment Find thesis advisor and committee members and fill out thesis proposal form (if advisor is changed) Take PHYS 7000: thesis work Register for spring classes	Tue. of 2 nd week 4 th week of the 3 rd semester End of 3 rd semester ~10 th week
4 th semester	late registration; tuition payment Take PHYS 7000: thesis work Fill out graduation form and pay the fee at Registrar's office Thesis defense: thesis must be sent to committee members Graduation: Checkout procedures *	Tue. of 2 nd week End of 4 th semester 3 months prior to planned graduation 7days prior to defense date 2 weeks after the thesis defense
2 nd summer (optional)	Continuation of thesis work, defense and checkout procedures.	End of 2 nd summer session

* Deliver signed and approved thesis to the Graduate School and then subsequently deliver it to the library. This will provide proof to the registrar that the thesis requirement is finished. The registrar uses the degree checklist to certify that the student has completed all requirements. For students who need to transfer credits from outside of ECU to satisfy the credit hour requirement for the degree, he or she has to fill out a need sheet that is available in the departmental office.

MS Students – Medical Physics Option

Schedule is similar to the AP option, except that a thesis is not required. If a student chooses to write a thesis, the schedule is identical to that of the AP option students.

PhD students:

Entry is assumed to occur following the MS degree

<u>Time</u>	<u>Tasks</u>	<u>Deadline</u>
1 st semester	Registration of courses: late registration; tuition payment Faculty visitation to select research topics Prepare and take the Candidacy Examination Pre-register for the spring semester; tuition payment	Tue. of 2 nd week end of 8 th week By the beginning of 2 nd semester ~10 th week
2 nd semester	Identify dissertation advisor and research committee members. Initiate research with research advisor. Pre-register for fall classes	End of 2 nd semester ~10 th week
1 st summer	Conduct dissertation research Prepare to re-take the Candidacy examination if it was not passed the 1 st time	By the beginning of 3 rd semester
3 rd semester	Take PHYS 9000: Dissertation research Pre-register for spring semester	~10 th week
4 th semester	Complete and present dissertation proposal Take PHYS 9000: Dissertation research Pre-register for fall semester	By end of 3 rd semester ~10 th week
2 nd Summer	Conduct dissertation research	
5 th semester	Take PHYS 9000: Dissertation research Begin writing dissertation Pre-register for spring semester	End of 5 th semester ~10 th week
6 th semester	Physics 9000; complete writing dissertation Fill out graduation form and pay the fee at Registrar's office Dissertation defense: Dissertation must be delivered to committee members Submit Research Committee approved dissertation to Graduate school*	March 15 3 months prior to planned graduation 7days prior to defense date 7 days before Graduate School deadline
3 rd summer (optional)	Graduation: Checkout procedures - see Graduate Administrative Assistant for check out procedures Continuation of thesis work, defense and check-out procedures.	After the dissertation accepted by Graduate School As required

* Deliver signed and approved dissertation to Graduate School and then subsequently deliver it to the library. This will provide proof to the registrar that the dissertation requirement is finished. The registrar uses the degree checklist to certify that the student has completed all requirements. For students who need to transfer credits from outside of ECU to satisfy the credit hour requirement for the degree, he or she has to fill out a need sheet that is available in the departmental office.

Appendix 1 Graduate Advising Policy (1/13/89)

1. The Assistant Chair for Graduate Studies is the official advisor to all graduate students.
2. The graduate student must
 - a. declare in the first week of each semester courses to be taken in the subsequent semester,
 - b. register for all courses during the first two days of the early registration period,
 - c. have course registration signed by the Assistant Chair for Graduate Studies,
 - d. when applicable, have schedule change forms signed by the Assistant Chair for Graduate Studies.
3. In addition, Teaching/Research Assistants must
 - a. take all required courses at the earliest offering,
 - b. not drop the required courses except by special permission (given by the departmental graduate committee only under unusual circumstances),
 - c. inform the Assistant Chair for Graduate Studies within a week of an effective drop-out from any course. (The effective drop-out is defined as no attendance of classes during one full week; professor in charge of the course is also asked to report any occurrence of a drop-out as well as any situation that might automatically trigger an F in the course.)

►Note: TA/RA students failing to follow the above rules will have their assistantships suspended in the subsequent semester.

Appendix 2 Graduate Examination Policy (revised 4/27/2007)

I.—Qualifying Examination

A. Purpose

The purpose of the Qualifying Examination is to determine whether a student enrolled in the Physics graduate program qualifies to become a candidate for the MS degree in Physics and whether he/she is prepared to enter the PhD program. All students entering the Physics graduate program are required to take this exam upon entering the program.

B. Examination Dates

The examination will be given every Fall semester, one day prior to the official beginning of classes. When necessary, a second examination will be given one day prior to the beginning of classes in the Spring semester.

C. Length

The examination shall not exceed two hours in length.

D. Content

The examination will consist of the online Major Field Test in Physics offered by Educational Testing Service (Princeton, NJ). The test will cover the main topics in physics at the undergraduate level. Topics covered include Classical Mechanics and Relativity, Electromagnetism, Optics & Waves, Thermodynamics and Statistical Mechanics, Quantum Mechanics and Atomic Physics, Special Topics (e.g. condensed matter physics, nuclear and particle physics, Lagrangian and Hamiltonian formalism), and Miscellaneous Topics (e.g. astrophysics, computer applications, mathematical methods). A detailed list of topics and subtopics with their specific weights in the exam are available from the Department of Physics Office of Graduate Studies.

E. Administering the Examination

The Assistant Chair for Graduate Studies in Physics is responsible for administering the examination, he/she shall obtain the scores and statistical analysis of the results from Educational Testing Service and report them to the Physics Graduate Committee.

F. Passing Score

The Graduate Committee will convene upon receipt of the student grades and statistical analysis to make a final decision on the result. The Graduate Committee may use comparative data gathered from other institutions to establish the passing score on the examination. The general guideline observed is that students are expected to score 60 or better in Classical Mechanics and Relativity, and Electromagnetism and obtain a minimum score of 40 in the remaining four areas of the exam.

G. Students Who Must Take the Examination

All graduate students entering the Department of Physics Graduate Program must take the Qualifying Examination on one of the dates indicated above.

H. Outcomes of the Examination

The outcome of the Qualifying Examination varies according to the program in which the student is enrolled. In all cases, students found lacking knowledge deemed funda-

mental for their success will be directed to enroll in PHYS 6528 – Readings in Physics during their first semester in the program, and, under the direct supervision of the Assistant Chair for Graduate Studies in Physics, will develop and carry out a plan of study that will mitigate the detected weakness(es). Otherwise, the outcomes of the exam will be as follows:

1. MS – Medical Physics and Applied Physics options: Students that pass the Qualifying Examination can proceed without restrictions. Those students who do not pass the exam must follow the procedure above and will be allowed to proceed without further restrictions upon passing PHYS 6528 with a grade of B or better.
2. PhD: Students that pass the Qualifying Examination can proceed without restrictions. Those students who do not pass the exam must follow the procedure above and will be allowed to proceed without further restrictions upon passing PHYS 6528 with a grade of B or better. These students might further be required, at the discretion of the Department of Physics Graduate Committee, and taking into consideration other factors such as performance in their coursework and recommendation of the Physics Graduate Faculty to complete and defend a Masters Thesis prior to their Candidacy Examination.

II. Doctoral Candidacy Examination

A. Purpose

The doctoral candidacy examination evaluates students for their understanding of the broad fields of physics and life sciences related to biomedical physics. The examination modules for each student are determined by recommendation of the student's advisor with the final decision on content made by the Department of Physics Graduate Committee. The candidacy exam will consist of a written examination.

B. Examination

1. Examination Dates

The examination will be given on a scheduled date and time at the beginning of the Fall and Spring semesters.

2. Length

The examination will be given in two parts to be completed in two consecutive weekends. Part I of the examination, of approximately six hours in length, will be given on Saturday the first weekend. On the second weekend the three modules of Part II will be given according to a schedule set by the Assistant Chair for Graduate Studies in Physics.

3. Content

The examination will consist of questions that cover the graduate curriculum of the student. Any member of the faculty can submit questions to the Department of Physics Graduate Committee, however, that Committee has the sole responsi-

bility to organize the questions into modules and finalize the examination. The candidacy examination may be individualized for each student, but shall consist of two parts: Part I is a test of general physics (four hours duration), and graduate level Quantum Mechanics, and Electrodynamics (two hours duration) required of all students and Part II is a specialized set of three modules covering the graduate curriculum and research interests of the student. For example, Part II may consist of modules chosen from, but not limited to, thermodynamics and statistical physics, physiology, medical physics, biophysics, biochemistry, computational physics, and cell and molecular biology.

4. Administration of the Examination

The Department of Physics Graduate Committee shall administer the examination and oversee its evaluation.

5. Passing Score

The Department of Physics Graduate Committee will convene upon receipt of the graded examinations to make the final decision on the results. A passing score of the overall examination is 60% on Part I combined with a score of more than 60% on each of at least two of the three modules included in Part II.

6. Students Required to Take the Examination

Students enrolled into the Ph.D. program must take the Candidacy Examination at the first opportunity following the completion of the required graduate courses as determined by the Department of Physics Graduate Committee.

7. Retaking the Examination

The Candidacy Examination may not be taken more than twice. If a student fails the examination on his/her first attempt, then he/she must retake all sections of the examination. Under special conditions, as determined by the Department of Physics Graduate Committee, a student might be allowed to retake only specific sections of the Candidacy Exam the next time the examination is offered (generally the following semester).

C. Candidacy

When a student has passed the Doctoral Candidacy Examination, the Department of Physics Graduate Committee will direct the Assistant Chair for Graduate Studies in Physics to forward to the Dean of the Graduate School its recommendation that the student be admitted to candidacy for the degree, Doctor of Philosophy in Biomedical Physics.

Appendix 3 Physics Department MS Thesis Policy (Approved by the Faculty – January 6, 2006)

This policy is for the protection of the students as well as the benefit of the physics department. The student will benefit from knowing the steps and timeline that should lead to a timely completion and a proper defense of his/her thesis. The physics department will have an opportunity to monitor the thesis progress and will abide by uniform procedures pertaining to the demonstration of this progress.

Schedules for students taking less than three courses per semester will be determined on an individual basis in consultation with the Assistant Chair for Graduate Studies in Physics.

Failure to follow this policy might result in a poor or failing grade in PHYS 7000 (thesis), suspension and/or dismissal from the graduate program.

1. The thesis must be on a basic or applied physics research topic. It is recommended that the student should obtain updated information on the format and style of the thesis from the Graduate School. References in the thesis should follow the style of articles in any journal published by the American Institute of Physics.
2. By the sixth week of the second semester, the student should submit to the Assistant Chair for Graduate Studies the name of his/her thesis director and the general topic of the area of research.
3. The thesis committee, composed of three members in addition to the thesis director, is to be selected by the student with the consent of the thesis director and the Assistant Chair for Graduate Studies. The responsibility for the choice of the thesis committee rests with the student and the thesis director. This entails the selection of two persons from the Graduate Faculty of the ECU Physics Department plus one person from outside of the department. In case the thesis director is from a department other than physics the outside member on the thesis committee shall be of the same department as the thesis director.
4. The thesis proposal outlines the work to be performed for the thesis. This proposal must be submitted to the thesis committee. Copies of the thesis proposal form are available in the physics office. By the end of the second semester, the thesis proposal is due. Once accepted by the thesis committee, the thesis topic shall be forwarded to the Assistant Chair for Graduate Studies.
5. By the eighth week of each semester following submission of the thesis proposal, the student shall present an informal half-hour progress report to the thesis committee. After the first presentation to the thesis committee only, these presentations are open to all interested people. Following each presentation, the thesis committee will submit a confidential report to the Graduate Committee. A copy of the report will be made available to the student.

6. The date for submission of the thesis should be no later than the end of the second year in the program.
7. At least seven working days prior to the defense date, the student shall provide identical copies of the thesis to all four members of the thesis committee and one copy to the Assistant Chair for Graduate Studies who will make it available to the Faculty for review.
8. The thesis defense should:
 - a. start with a brief introduction by the thesis director,
 - b. continue with a seminar-like presentation by the student: it should at least summarize the thesis work with particular and clear emphasis of the student's contribution to the subject, be finished with a question-and-answer period,
 - c. and be followed with a short session in which only faculty will be present. During this period, general comments will be heard from non-thesis committee members concerning the thesis and its defense.
 - d. In the following session with the student and the thesis committee, additional questions will be asked; the Assistant Chair for Graduate Studies may be present as an observer. Note: During parts (b) and (d) of the thesis defense, all questions except those posed directly to others or those that go beyond the scope of the thesis work should be answered by the student.
 - e. The thesis defense ends with a meeting in which the thesis committee will decide on the result of the defense to pass this information to the student with suggestions, if any, for corrections to the written copy of the thesis.
9. All corrections should be accommodated in the final version of the thesis to the satisfaction of those members of the thesis committee who made the particular suggestions; only then will the thesis be signed by the thesis director and Chairman of the Physics Department.
10. Two copies of the thesis abstract must be prepared and delivered, with the properly signed thesis, to the Dean of the Graduate School.

NOTE: A student desiring to graduate in a given semester (including summer semesters) shall adhere to all Graduate School regulations and shall schedule his/her thesis defense at least two weeks prior to the Graduate School thesis submission deadline for that semester.

Appendix 3a Physics Department PhD Dissertation Policy

Time lines incorporated in the text below assume that a student enters the PhD program with a Master's degree, and requires no additional pre-requisites in physics. For those students entering the program with a Baccalaureate degree the guidelines for the first two years of PhD study are provided in the curriculum portion of the Graduate Student Handbook describing the MS program.

1. The dissertation may be on any research topic related to the application of physics in biology and/or medicine. References in the dissertation should follow the style of articles in journals published by the American Institute of Physics, or a journal appropriate to the subfield of the research, i.e., Radiation Research, Physics in Medicine and Biology, Journals of the IEEE, etc. The format of the dissertation must meet the requirements of the Graduate School of East Carolina University.
2. The student should take the PhD Candidacy examination at the first opportunity, generally this is given during the first month of each semester.
3. By the sixth week of the second semester, the student should submit to the Assistant Chair for Graduate Studies the name of his/her dissertation director and the general topic of the area of research to be conducted for the PhD dissertation. The student is advised to conduct preliminary research for the preparation of a dissertation proposal under the supervision of the dissertation director.
4. An advisory committee, composed of 4 members in addition to the dissertation director, is to be selected by the student with the consent of the dissertation director and the Assistant Chair for Graduate Studies, and submitted to the PhD executive Committee for approval. The composition of the dissertation committee should include a minimum of three persons from the Graduate Faculty of the ECU Department of Physics and at least one person from outside of the department. The advisory committee should be formed and approved by the end of the second semester.
5. The proposal outlining the work to be performed for the dissertation research must be written in NIH format (Appendix 3b), submitted to the advisory committee, and presented orally to his/her advisory committee members; this presentation is open to the public. Approval of the proposed work is the responsibility of the student's advisory committee. An extra copy of the proposal should be placed in the Office of the Department of Physics one week before the scheduled defense for review by faculty members. The defense and approval of the dissertation proposal should be completed by the end of the third semester
6. By the eighth week of each semester following approval of the dissertation proposal, the student shall orally present an informal half-hour progress report to the advisory committee. After the first presentation to the advisory committee, these presentations shall be open to all interested people. Following each presentation, the dissertation director will submit a report on the progress made in the proposed work to the PhD Executive Committee. A copy of the report will be made available to the student.
7. At least 7 working days prior to the dissertation defense date, the student should provide identical draft copies of the dissertation to all members of the advisory committee and one copy to the Assistant Chair for Graduate Studies who will place it in the Physics Office for review by physics faculty and students. At this time, an announcement of the date and topic of the defense will be made to all faculty and students of the Departments of Physics, Radiation Oncology, Physiology, and to any other departments deemed appropriate by the student, or his dissertation director. The defense of the dissertation is open to the public and the decision on the acceptability of the dissertation is the responsibility of the student's advisory committee.

8. The dissertation defense should:
 - a. begin with a brief introduction by the dissertation director,
 - b. continue with a presentation by the student: the student should summarize the research work with particular and clear emphasis of the student's contribution to the subject.
 - c. This is followed by a session involving only faculty who can present specific questions or provide general comments regarding the research work and the dissertation.
 - d. This is followed by a session with the student and the advisory committee where additional questions may be asked; the Assistant Chair for Graduate Studies may be present as an observer.
 - e. The thesis defense ends with a meeting of the advisory committee who will decide on the success of the defense and what suggestions or corrections, if any, are to be included in the final dissertation.

9. Because of possible variations in the requirements of the Graduate School regarding the style, and format of the dissertation, the student is urged to contact the appropriate official (Dean, or associate Dean) for updated information on the requirements before he/she starts to prepare the manuscript.

10. Any exceptions to the above guidelines and/or requests for time extensions must be submitted by the student and his/her dissertation director in writing to the PhD Executive Committee in advance for approval. Failure to adhere to the deadlines without prior approval can lead to loss of financial support and other disciplinary actions against the student.

Appendix 3b Instructions for Preparing the Dissertation Proposal

Once you have selected your dissertation committee and your area of research has been approved, the next step in the dissertation process is to complete and present a proposal for research. The format to be followed in the proposal is the same as that used for NIH grants for the U.S. Department of Health and Human Services, Public Health Service, (Grant Application PHS 398*). Excepts are included here, but more detailed information can be found at: <http://grants2.nih.gov/grants/funding/phs398/phs398.doc>

REMINDERS

- Prepare a succinct Research Plan. There is no requirement for applicants to use the maximum allowable pages allotted to the Research Plan (Items A-D). The remaining sections (E-J) of the Research Plan have no maximum allowable pages, but should be succinct.
- Use a font size of 11 or larger, single or double space lines.
- Use English and avoid jargon.
- If terms are not universally known, spell out the term the first time it is used and note the appropriate abbreviation in parentheses. The abbreviation may be used thereafter.

PROPOSAL CONTENT:

THE PARTS OF A PROPERLY PREPARED PROPOSAL ARE AS FOLLOWS IN THE ORDER GIVEN: PROJECT SUMMARY, TABLE OF CONTENTS, RESOURCES, RESEARCH PLAN, LITERATURE CITED, APPENDIX. SPECIFIC INFORMATION FOR EACH SECTION IS GIVEN BELOW.

Project Summary and Relevance

The first and major component of the Description is a **Project Summary**. It is meant to serve as a succinct and accurate description of the proposed work when separated from the application. State the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project (i.e., relevance to the **mission of the agency**). Describe concisely the research design and methods for achieving the stated goals. This section should be informative to other persons working in the same or related fields and insofar as possible understandable to a scientifically or technically literate reader. Avoid describing past accomplishments and the use of the first person.

The second component of the Description is **Relevance**. Using no more than two or three sentences, describe the relevance of this research to **public** health. In this section, be succinct and use plain language that can be understood by a general, lay audience.

Table of Contents

Resources

State where the work will be performed and what special resources are available to assure that the work can be done successfully.

Research Plan

The PHS recommends the following format and page distribution. Organize *Items a-d* of the Research Plan to answer these questions: *What do you intend to do? Why is the work important? What has already been done? How are you going to do the work?*

The Research Plan should include sufficient information needed for evaluation of the project, independent of any other document. The format for preparing this section is provided below. Be specific, informative, and avoid redundancies. For grant writing tips, see http://grants.nih.gov/grants/grant_tips.htm.

Page Limitations: Do not exceed 25 pages for *Items A-D*. All tables, graphs, figures, diagrams, and charts must be included within the 25-page limit. Be succinct and remember that there is no requirement to use all 25-pages allotted to *Items A-D* of the Research Plan.

- A. SPECIFIC AIMS
- B. BACKGROUND AND SIGNIFICANCE
- C. PRELIMINARY STUDIES/PROGRESS REPORT
- D. RESEARCH DESIGN AND METHODS
- E. HUMAN SUBJECTS RESEARCH (IF APPLICABLE)
- F. VERTEBRATE ANIMALS (IF APPLICABLE)

Literature Cited.

List all references. Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication in a style accepted by publishers in the scientific field of the applicant.

See example at: <http://www.niaid.nih.gov/ncn/grants/app/app.pdf>

The references should be limited to relevant and current literature. While there is not a page limitation, it is important to be concise and to select only those literature references pertinent to the research proposal

Final Step

After distribution to, and approval by, your dissertation committee, submit the proposal to the Vice-Chair for Graduate Studies who will then schedule an oral defense of the proposal.

*Instructions for PHS 398 on Form Approved Through 09/30/2007. Last revision 09/2004. Form OMB No. 0925-0001

Appendix 4 *Policy on Satisfaction of Research Skill Requirements in a Computer Language*
(5/1/87, revised 1/6/2006)

A declaration of how the student expects to satisfy the Research Skill Requirement in a computer language will be required upon entry into the program.

Satisfactory knowledge of a computer language may be demonstrated in any one of the following ways:

1. Satisfactory completion of PHYS 5900/5901.
2. Satisfactory completion of courses, such as, CSCI 2610 or equivalent.
3. Evidence of the use of a computer language in research or course projects at a level comparable to CSCI 2610.
4. Satisfactory performance on an exam in which the student is asked to convert an algorithm to a program in an acceptable computer language. This exam will be drafted by the departmental computer committee.

Satisfactory completion of this requirement will be judged by the Graduate Committee

Appendix 5 *Miscellaneous University Policies and General Information*

From the office of Interim Dean, Paul Tschetter

Auditing Courses

Auditing a course consists of attendance at classes and listening but taking no part in the class. An auditor is not responsible for any assignments, nor is he or she allowed to take any tests or examinations. However, in order to have the audited course recorded on the official transcript, a student must attend classes regularly. An auditor may not enroll in a participation course (art classes, laboratories, etc.). Under no circumstances will a grade be assigned, evaluations be made, or performance reports be issued on a student auditing a course. Auditing a course or part of a course is contingent upon the approval of the instructor and the appropriate departmental chairperson, school director, or college dean. Students may not register to audit a course until the last day of the drop/add period. Persons who wish to attend university classes without earning credit must be admitted to the university before seeking approval to audit any course. Individuals enrolled as nondegree undergraduate students will be assigned to the University College for assistance with registration. The applicants shall then complete the prescribed procedure for registering through the Office of the Registrar and pay the audit fee to the cashier's office before attendance in classes is permitted.

Students regularly enrolled in the university wishing to audit course(s) must initiate the approval process with their advisor.

Failing Grades and Reinstatement: (April 5, 2004)

Because the Graduate Catalog explicitly says that a C grade means termination from the MS-Medical Physics Program, reinstatement is difficult. It is however, a Physics Department rule and can be overridden by the Physics Department with special consideration.

Reinstatement to the Medical Physics Degree Program would involve a petition to the Graduate School (Graduate Administrative Board) as a student retention issue.

Petition for retention should include the condition required for waiving the failing grade, e.g., retaking the course with a passing grade, doing extra work to provide proficiency in the weak area, etc.

For a PhD student wanting to receive a MS degree in Medical Physics, but who received a C (acceptable in the PhD program) in a MS-Medical Physics required course – again the student should retake the class, or be required to do additional work to develop proficiency in the area of weakness. At the time the petition to the Graduate School to receive the MS is presented, it would need to explain the circumstances in which the C grade was overcome.

Always a 3.0+ GPA must be retained

Annual Evaluation of PhD Students

(Graduate School Administrative Board, February 25, 2002)

All doctoral programs are required to annually evaluate each student's progress toward their degree. The evaluation will minimally include:

- (1) a written statement by the student indicating his/her accomplishments during the past academic year
- (2) a written evaluation of the student's progress completed by the major professor
- (3) a statement indicating the major professor has discussed the evaluation with the student
- (4) an appeal process if the student disagrees with the evaluation.

Implementation Procedures for the Department of Physics (effective Fall, 2006)

- All graduate students will be notified in September that a written statement by the student of **their** evaluation of progress toward degree **must be provided** to the DGSP **by November 1**.
- Each major professor mentoring a student (e.g., Thesis Director) will be notified in September that he/she **must provide a written evaluation** of the student's progress toward degree to the DGSP **by November 1**.
- A meeting of the student, his/her advisor, and the Assistant Chair for Graduate Studies will be held prior to the end of the fall semester. Following this meeting, a report of the student's progress will be prepared and submitted to the Graduate Committee and the PhD committee for review prior to the start of the spring semester. A copy will be placed in the student's official record.

These evaluations will be reviewed by the Graduate Committee and the PhD Executive Committee and used as a basis for continuation of the financial support to the respective students. A poor recommendation does not require termination of financial support, since many factors may be involved. Any decisions by the graduate committees, or any evaluation of a student to which he/she disagrees can be appealed by the student to the PhD Executive Committee and a re-evaluated can be mandated by a concurring vote of four of that five-member committee.

Any decision to terminate financial support to a student must be provided to the student in writing by January 15. This support can then only be terminated at the end of that current academic year.

The "essence" of this policy is that a student for the doctoral program is "guaranteed" two years of support once admitted to the program, but any successive year support is based on an evaluation of past performance. This results because first year students can be evaluated only on the basis of class registration and performance to November 1. This timing is necessary, however, because funding decisions must be made by January in order to make recruiting decisions for the fall of the following year.

The following policies are quoted from the 2005-2006 Graduate Catalog.

Official Withdrawal

When a graduate student drops all courses in a semester in which he or she is enrolled the student must officially withdraw. Students registered on campus must apply for official withdrawal to the Office of Registrar. Students registered through Continuing Studies must apply for withdrawal through the Office of Student Services in the Division of Continuing Studies. Students withdrawing for medical/counseling reasons should complete the procedure within thirty days after the last class attendance. All other students withdrawing should complete this procedure immediately after the last class attendance. After classes have ended, no withdrawal, except in the case of severe medical emergency, can be filed. A graduate student withdrawing by the last day for graduate students to drop courses without grades as given in the Graduate School calendar will not receive grades for the semester. A graduate student withdrawing from school after the last day for graduate students to drop courses without grades shall receive a grade of F for all classes which he or she is failing at the time unless, in the judgment of the dean of the Graduate School the failures were caused by circumstances beyond the student's control. (p.22)

Readmission

Any student who interrupts his or her graduate program by not registering for courses on or off campus during any one semester of the regular academic year must apply for readmission before being allowed to resume graduate work. Applications for readmission are to be made on forms furnished by the Graduate School. There is no fee for readmission. These applications should be presented to the Graduate School at least one week prior to the opening of registration for the semester or summer term in which the student wishes to resume graduate work. Degree or CAS students who do not enroll on or off campus during the semester or summer term to which they were admitted must file an updated application. Forms can be obtained from the Graduate School office. There is no fee for filing an updated application.

When a graduate program is interrupted for one calendar year, the student will not be readmitted unless he or she meets admission requirements current at the time of the request for readmission. The Graduate School Administrative Board will consider requests to waive this rule in specific cases when a student's major school or department recommends waiver.

A student who has had a graduate program terminated by the Graduate School for any reason may apply for readmission to the terminated program or to another program. In either case, the student will complete an application for readmission, which will be forwarded to the academic program for its review. If the graduate faculty of the academic program does not approve readmission, they will convey that decision in writing to the Graduate School office and the dean of the Graduate School will communicate that decision to the student in writing (copy to the Assistant Chair for Graduate Studies). If the graduate faculty of the academic program wishes to admit the student, they will forward

that decision in writing to the Graduate School Administrative Board for review. The academic program must state the specific conditions the students must meet to be admitted and complete the program. If approved by the Administrative Board, the dean of the Graduate School will communicate the decision of the graduate faculty and the Administrative Board to the student in writing (copy to the Assistant Chair for Graduate Studies). (p.22)

Schedule Changes

A graduate student may add a course or courses through the day following the last day to register for the semester. The student must process and take to the Office of the Registrar the schedule change form but needs only the signature of the advisor, indicating the advisor's awareness of the action, and the signature of the instructor or departmental chairperson, indicating the space is available in the class.

A graduate nondoctoral student may drop a course and receive no grade according to the date given in the Graduate School calendar. The student must process the schedule change form by taking the form signed by the program advisor to the Office of the Registrar and having it entered into the computer. The advisor's signature indicates awareness of the change. **A student who drops a course after the last day for graduate students to drop a class without a grade will receive a final grade of F unless he or she has permission from the dean of the Graduate School to drop for medical reasons or other justification.**

Doctoral students may drop courses only with permission of their departmental chairperson or graduate committees.

Students should pay particular attention to procedural directions printed on the forms. No course is officially dropped or added until the required procedure is completed. (p.33)

Termination Or Continuance Of Graduate Study

Each graduate student is admitted to study on the recommendation of the graduate faculty of a college, school, or department, or its authorized agent, who are responsible for courses and research in the major field of the student's program. When a student's record indicates that he or she has failed to maintain standards described in this section, or specific standards of the student's program described elsewhere in the graduate catalog or in school or departmental program descriptions, the dean of the Graduate School will notify the student by letter (copy to the advisor of the student) that his or her program must be terminated unless special arrangements for continuance are recommended by his or her major faculty, or an authorized agent, and approved by the Administrative Board of the Graduate School. The advisor will confer with the unit graduate faculty, or its au-

thorized agent. Any appeal by the student must be considered at this stage in the process. Following conference and possible student appeal, the advisor will forward a written recommendation (copy to the student) to the chairperson of the Administrative Board of the Graduate School. If the recommendation is for termination, the student's program is terminated. A recommendation for continuance should stipulate requirements through which the student could complete his or her graduate program.

The Administrative Board may either accept the requirements or request that the student's major faculty modify them. When the requirements are acceptable to the Administrative Board, the dean of the Graduate School will inform the student by letter of the approved requirements (copy to the advisor of the student). The Graduate School office will ensure that these requirements are met before the student graduates. (p. 35)

Policies For Graduate Assistantships And Fellowships: Awards And Assignments

Graduate Assistantships

Assistantships may only be awarded to graduate students enrolled in on-campus programs (minimum registration of 3 hours) that lead to a graduate degree or a certificate of advanced study at East Carolina University. Assistantship eligibility does not extend to students who have been admitted by exception, non-degree seeking students, or undergraduates.

A full time graduate assistantship (20 hours per week - fall and spring semesters) will be worth a minimum of \$7,500. Graduate assistants should not work more than twenty hours per week during the academic year. Graduate assistants are limited to thirty hours per week in the fall and spring semesters in any combination of appointments – GA/RA/TA, self-help, College Work Study, EPA/SPA. **Foreign students are limited to twenty hours per week, no exceptions** (this is a federal requirement). During first and second summer sessions, all graduate students are limited to thirty-eight hours per week.

Requests for exceptions to the 30-hour rule must be made via petition to Dr. Paul Tschetter. All requests must state the following: Student's name and social security number, where they are in their program of study, e.g., 1st semester, 2nd year, etc., what impact working more than 30 hours a week will have upon their graduation, why this request is necessary, a summary of the job's responsibilities and list any other options that have been considered prior to making the request.

Assistantship funds will be allocated based upon each unit's established rate. Units may opt to pay their assistants at a higher rate per F.T.E. if they deem it appropriate, by

using one source or multiple sources of funds. **No three-quarter or higher fte state employee may hold a graduate assistantship.**

Students are ineligible for assistantships if they are not registered by census day. Census day is defined as the day that enrollment is captured and, concurrently, how ECU's funding is awarded. A good rule of thumb to follow is to make sure that anyone on an assistantship is registered on or before the last day to add classes each semester.

In order for graduate assistants to be exempt from FICA tax, they must have a minimum registration of 4 hours for the fall and spring semesters and 3 hours in the summer. If the GA is registered for less than the stated hours FICA will be withheld. Departments paying students from sources other than state appropriated dollars should note that the university's portion of the FICA (7.65%) will be taken from the funding source used to pay the assistantship and should therefore budget accordingly.

Students in a 30-hour program should not receive assistantship support for more than six semesters, and those in a 45-hour program should not receive assistantship support for more than nine semesters, this excludes summer sessions.

Teaching assistants assigned primary responsibility for the administration, instruction, and evaluation of students enrolled in courses must have satisfactorily completed a minimum of 18 semester hours of graduate course work in the field in which instruction is given (SACS 18-hour rule). They must also receive in-service training, be under the direct supervision of an experienced faculty member in the field, and be evaluated each semester. The Graduate School requires units to submit a request for exception to hiring non-degree or undergraduate teaching assistants when using funds awarded to them via the Graduate School. The unit should submit an e-mail request to Dr. Paul Tschetter requesting the exception and stating that the student has the qualifications for admission to the program and will be admitted. The request should also state whether or not the student meets the 18 hour rule (if they are responsible for a class) and that they are being trained and monitored. Units utilizing their own funding, e.g., operating dollars, unexpended faculty salary dollars, grants, do not need to request exceptions.

Departments must issue a signed assistantship/fellowship agreement for each graduate assistant or fellowship recipient – (Revised August 2004). For teaching assistants the agreement must state what course(s) they are teaching, name the individual responsible for the course, name of the supervising faculty, state that the TA has been/will be trained, will be monitored and evaluated, and name the individual responsible for the evaluation. All other assistantship agreements must briefly describe the GA's duties using the descriptions listed in the Graduate Assistant Categories and include the name of the supervising faculty. **It is necessary that all units hiring graduate assistants have a copy of the completed agreement in the student's personnel file and forward a copy of the signed contract to the Graduate School office by Census Day.**

Graduate Assistants do not keep time sheets.

GENERAL INFORMATION

Financial Aid

(Excerpted from the minutes of the Graduate School Administrative Board, March 28, 2005)

Rose Mary Stelma, Director of the Office of Financial Aid, was present to discuss issues related to graduate students and financial aid. Answers to a number of questions regarding graduate students are attached. ...

FINANCIAL AID AND GRADUATE STUDENTS

March 28, 2005

Graduate Students and financial aid –

- What are the total number of different graduate students receiving financial aid in an academic year?
 - *Approximately 1800*

Overview of rules for graduate students –

- Degree
 - *Student must be enrolled at least half-time to receive most types of student financial aid. We define half-time as 5 credits per semester. We consider students enrolled in the dissertation or thesis course (9000 or 7000) as full time students.*
 - *Most common type of financial aid administered through our office – loans.*
 - *There are some alternative loans available for students who are less than half-time.*
- Nondegree
 - *Unless the student is working on teacher certification or taking prerequisites for admission to a degree program, he/she cannot borrow a loan or receive other federal student financial aid assistance through our office.*
 - *Teaching certification students of any type are generally eligible for aid if enrolled as at least a half-time student*
 - *The Financial Aid office looks for the word “prerequisite” in the letter – if we do not see it we cannot allow the student to have financial aid. You do not have to guarantee admission to the program if the student successfully completes the prerequisites, but you have to say that you consider the courses to be prerequisites for this student to be considered for admission to the program.*

Steps to apply?

- FAFSA – do graduate students need it?
 - *Student has to complete Free Application for Federal Student Aid (FAFSA) annually. 4/15 is the priority deadline. www.fafsa.ed.gov.*

- Types of aid – subsidized & unsubsidized
 - *Subsidized Federal Stafford Loan – available to those with demonstrated financial aid eligibility (as determined by the FAFSA) – no interest accumulating on the loan while the student is enrolled at least half-time – repayment begins 6 months after no longer enrolled – up to 10 years to repay - maximum annual loan is \$8500.*
 - *Unsubsidized Federal Stafford Loan – available to all regardless of financial need – interest accumulates while in school – same repayment – maximum annual loan is \$10,000***
- ** The student’s total loans cannot exceed the student’s cost of attendance, so no all graduate students can borrow the \$10,000.*

Financial aid budgets

- What costs are included in student budgets – tuition, housing, transportation, etc.?
 - *Tuition*
 - *Required student fees*
 - *Room allowance*
 - *Board allowance*
 - *Books & supplies allowance*
 - *Transportation allowance*
 - *Personal and miscellaneous expenses allowance*
 - *For 2004-05 we use \$14426 as the cost of attendance for full time NC residents and \$24,566 as the cost of attendance for full time out-of-state students.*
- What effect does an assistantship and/or tuition remission have on student budgets
 - *The assistantship does not count as financial aid – it should be reported by the student as income.*
 - *The tuition remission is considered “other” financial aid and reduces a student’s eligibility to borrow a loan.*
- Out-of-state tuition remissions are not guaranteed from year-to-year and sometimes not guaranteed from semester-to-semester. How do you factor them into your award determinations for graduate students?
 - *We usually assume a two semester award when notified about a fall term award. We do not assume that the student will receive the award in future years.*
- When an out-of-state student becomes classified as an In-state student after the semester begins, does the student receive a refund of the tuition? Or is it credited back to financial aid?
 - *Often the refund is returned to student financial aid programs to avoid an over-award situation where the student has received financial aid in excess of his/her eligibility.*
- What effect does family (spouse, children) have on student budgets
 - *None – the student’s cost of attendance is his/her expenses only – not the expenses incurred by his/her family.*

Is there a limit on total financial aid?

- Graduate
- Nondegree graduate – does FA here affect aid for degree studies
 - *Annually, a student cannot receive financial aid in excess of his/her cost of attendance.*
 - *The cumulative limit for undergraduate and graduate borrowing is \$138,500.*

Under what conditions do you deny future support? In other words is there a maximum amount that can be awarded; Are there a maximum number of semesters that can be funded; Do you monitor the number of course drops? How do you regulate students who are apparently abusing the system?

- *The satisfactory academic progress requirement is that the student is allowed to continue enrollment as a degree graduate student. There is not a maximum number of terms. We do monitor enrollment changes that occur during the 100% refund drop/add period. We make adjustments to those awards.*
- *We would be happy to implement a satisfactory academic progress requirement that looked at successful completion of a percentage of credits attempted – if the appropriate academic body requests it of us.*
- *We sometimes can identify students who have a pattern of withdrawing early in the term – and we stop their future borrowing. Without a formal policy this is difficult.*

At a joint meeting of the Graduate Committee and the PhD Executive Committee a motion was passed to limit the number of years that a graduate student could be expected to be funded by state funds. That motion was stated as:

Support of graduate students by state funds is to be limited to no more than 12 semesters, excluding summer sessions. A student may apply for an extension of no more than two (2) semesters.

This limit is not meant to apply to funding sources other than funds for teaching and research provided by the State of North Carolina. This policy is drafted in accord with similar policy currently in effect in the School of Medicine.

Full-time Status for International Students (Gail Pinkham, 6/1/04)

International students who have a full assistantship are considered full time students with a minimum of 6 SH. If they do not have an assistantship they must enroll in at least 9 SH for the full time status.

Appendix 6 *Final Review of Theses and Dissertations Prior to Acceptance by the Graduate School*

1. Background:

The “Manual of Basic Requirements for Theses and Dissertations” (August 1991, 3rd ed.) as prepared by the members of the Graduate Faculty specifies that “...theses or dissertations that do not follow the form prescribed in this manual will not be accepted by the dean of the Graduate School.” Furthermore the manual specifies that theses and dissertations are subject to a “complete review” by the Graduate School.

2. Major Review Points:

The following are the major reasons that theses and dissertations are not initially accepted by the Graduate School:

- a. Improper format of abstract.
- b. Improper margins in any part of the thesis or dissertation.
- c. Improper pagination (especially in the prefatory material).
- d. Incorrect pagination listed in the Table of Contents.
- e. Inconsistent hierarchy of organization from section to section. The same level of organization should be treated consistently as to indentation, underlining, fonts, bold lettering, alphanumeric denotations (ex. A,b,I,1) etc.
- f. Inconsistent hierarchy of organization between that listed in the Table of Contents and found in the text.
- g. Inconsistent use of fonts.
- h. Prefatory material missing List of Tables, List of Figures, etc. Also table/ figure titles are not included in the List of Tables, Figures etc. or they have incorrect pagination.
- i. Incomplete references (Text referrals are not cited in the bibliography/references section).
- j. Inconsistent style in citing the references in both the text and the bibliography/references section.
- k. Improper grammar and/or misspellings (to a lesser extent).

Although all theses and dissertations must comply with the “Manual of Basic Requirements,” the Graduate School strongly suggests that each program decide upon a particular style or format which all of their theses or dissertations will follow beyond that described in the “Manual of Basic Requirements...” This format may be either a specific style manual (i.e. APA, Turabian, MLA) or the format of some respected journal in the field.

Appendix 7 Graduate Faculty Listing

Martin Bier, Assist. Prof. Tel: 6428 bierm@ecu.edu
Membrane biophysics, Energy conversion in proteins and nanotechnological constructions, Brownian and non-Brownian fluctuations in microscopic systems

George Bissinger, Prof. Tel: 1860 bissingerg@ecu.edu
Computer simulation and experimental measurement of acoustic radiation from violin using mode analysis; experimental atomic physics.

Orville W. Day Jr., Visiting Assoc. Prof. Tel: 4228 dayo@ecu.edu
Quantum mechanics of atoms and molecules including one-electron amplitudes, energies and occupancies; distribution of energy within an atomic or molecular system; density functional theory.

Michael Dingfelder, Assist. Prof. Tel: 0882 dingfelderm@ecu.edu
Theoretical atomic physics; interaction of charged particles with matter; radiation physics, modeling and Monte Carlo simulation of radiation transport and radiation damage in biological relevant systems;

Mumtaz A. Dinno, Prof. Tel: 6476 dinnom@ecu.edu
Effects of physical agents such as temperature , electric fields, and ultrasound on biological systems; interactions between ultrasonic devices and biological tissues.

Kenneth Flurchick, Assist. Prof. Tel: 2941/2669 flurchickk@ecu.edu
Calculations of the properties of solids using both Hartree-Fock (HF) and Density Functional theory (DFT). In particular, organic molecular crystals (OMC) are of special interest. Some of these crystals exhibit a unique decrease in vibrational motion as pressure increases.

Xin-Hua Hu, Assoc. Prof. Tel: 1864 hux@ecu.edu
Interaction between short laser pulses and biological tissues and cells; coherent imaging of turbid medium.

James M. Joyce, Prof. Tel: 6739 joycej@ecu.edu
Electrical activity of the stomach; biological physics of membrane; development of medical devices; atomic and nuclear physics.

Edson L. B. Justiniano, Assoc. Prof. Tel: 1855 justinianoe@cu.edu
Experimental atomic physics, ion-atom collisions, charge transfer, recombination and excitation in electron-ion collisions, laser assisted electron-ion and ion-atom collisions.

Ruth Kempf, Prof. Tel: 4981 kempfr@ecu.edu
Physical and radioanalytical chemistry, international and domestic safeguards, national security, international arms control and nonproliferation, scientific and technical management.

John Kenney, Assist. Prof. Tel: 2028 kenneyj@ecu.edu

Fibril, amyloid-like structures - synuclein, spider silk and PAI-1 serpins; hexagonal bilayers of giant haemoglobins; development and use a broad application of different imaging and spectroscopic techniques, principally transmission electron microscopy (TEM) and synchrotron radiation circular dichroism.

Gregory Lapicki, Prof. Tel: 6894 lapickig@ecu.edu

Theoretical atomic physics: atomic collisions, penetration of charged particles through matter, inner-shell ionization and stopping power problems.

Yong-qing Li, Assist. Prof. Tel: 1858 liy@ecu.edu

Optical biosensors; interactions between light fields and biological systems; optical heterodyne detection; quantum optics and atomic physics.

Jun Qing Lu, Assist. Prof. Tel: 1856 luj@ecu.edu

Theoretical condensed matter physics on light scattering from random media; biomedical physics on characterization of inhomogeneity in tissue using non-contact laser speckle techniques.

Edward J. Seykora, Prof. Tel: 6429 seykora@ecu.edu

Solar physics and atmospheric physics relating to high resolution optical imaging of the solar disc through the earth's atmosphere.

Jefferson L. Shinpaugh, Assoc. Prof. Tel: 1852 shinpaughj@ecu.edu

Experimental atomic physics on atomic collision processes and atomic structure; application of atomic physics to biological physics and trace element analysis.

Claudio Sibata, Prof. Tel: 744-3712 sibatac@ecu.edu

Radiation dosimetry, treatment planning systems, photodynamic therapy, light dosimetry, and image guided radiation therapy

Mark W. Sprague, Assoc. Prof. Tel: 1862 spraguem@ecu.edu

Atmospheric and underwater acoustics; computational studies of convective effects on sound propagation; acoustic characterization of Sciaenid fish calls.

Larry H. Toburen, Prof. Tel: 1861 toburenl@ecu.edu

Measurement of cross sections for collisions involving ions and neutral particles; application of cross section data in the Monte Carlo modeling of charged particle track structure; electron transport in condensed matter; trace element analysis of archeological, biological, environmental, and medical specimens.

Appendix 8 Establishing NC Resident Status

The following information is for incoming graduate students who are not residents of North Carolina and who intend to take up residence in the state. It is provided solely to clarify section 4 of the graduate catalog: "Residence Status for Tuition Purposes."

Two inquiries are made of students enrolled in North Carolina universities and colleges who desire to be classified as in-state students for tuition purposes; first, students must demonstrate that they have in fact lived in North Carolina for a minimum of twelve months immediately prior to enrollment or re-enrollment; and second, students must be able to demonstrate that their presence in the state constituted legal residence.

Under North Carolina law, legal residence means more than simply living in the state. More specifically, it means maintaining a domicile (permanent home of indefinite duration) as opposed to a temporary residence incident to enrollment in a university, college or technical institute of the state. As a starting point, if a student has living parents, the domicile of the student is presumed to be that of his/her parents but may be changed to qualify for in-state tuition if other requirements for residence can be demonstrated. It should also be realized that marriage does not prevent a student from becoming a legal resident for tuition purposes, nor does marriage ensure that a person will become such a resident.

The individual seeking to become a North Carolina resident must demonstrate that he/she is financially independent of parent(s) or guardian if the parent(s) or guardian are non-residents of North Carolina and demonstrate a visible means of support substantiating the claim of financial independence. If the individual has not been entirely self-supporting during the last 24 months, a completed affidavit may be required from the parent(s) to indicate the amount of support provided.

Further and equally important, once the intent and financial independence have been clearly established, North Carolina residence must be maintained for 12 months immediately prior to the semester in which the in-state status can be made effective.

In order to determine whether any given student has established a legal residence in North Carolina, school admission officials must be able to conclude (from information supplied by the student) that the conduct of the student, taken as a whole, demonstrates his/her intent to make North Carolina a permanent dwelling place.

Residence officials include the following information in reviewing the application. **This is not the only information they consider.** Any changes in this documentation must be completed by the end of the first 10 days of classes to be eligible for consideration in the corresponding term the following year (12 months later).

Driver's License and Car Registration

A. NC Driver's License (or NC Identification Card if student does not drive):

Location: Division of Motor Vehicles, 3400 S. Memorial Drive, Greenville, NC 27858.

Information - 830-3456. [If a student drives but does not own a car or carry insurance, a waiver may be signed at the Driver's License office saying the student will not drive until he/she is insured.]

1. Read booklet on NC driving regulations.
2. Take written driver's test and eye test.

3. Having passed tests, NC license is issued immediately and is good for about 4 years.
4. Driver's license from prior state of residence is taken.
5. Cost - \$15.00, payable in cash or check only. No credit cards accepted.
6. Cost of identification card only - \$10.00.

B. NC Motor Registration

Location: Rivergate Shopping Center, Greenville, NC 27858, Information: 758-8247

1. Contact insurance company and obtain insurance forms.
2. Take insurance forms, title and a valid registration card from the state of prior registration to closest DMV office to have car registered and title transferred.
3. Obtain permanent license plate and validation stickers.
4. Costs: First-time registration - Minimum \$218.00 payable in cash or check only. No credit cards accepted. Take current registration, title (if you own the car) or lien holder information and current insurance information with you. Fee covers plates, title fee, highway use, tax and notary fee. Annual renewal fee – varies; payable in cash only.

Appendix 9 Taxes

There are several tax benefits for higher education in the U.S. tax code. Students should refer directly to the IRS website (<http://www.irs.gov>) where any forms needed, (1040,1040EZ, and Form 8863 for lifelong learning credit) and the IRS Publication 970: Tax Benefits for Education can be downloaded.

Appendix 10 Forms

East Carolina University	Physics Department	MS Thesis Proposal
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(To be submitted by the student to the Assistant Chair for Graduate Studies prior to commencing work on thesis project)

Anticipated date for thesis defense _____
Month Year

Title of Research Topic: _____

Student's Name _____ Degree: Master of Science
(check one) Master of Physics in Applied Physics
Master of Physics in Medical Physics

The purpose of this outline is to help the student to devise a general plan for development of the thesis. The plan is a starting point. Acceptance of this general plan in no way implies that the thesis developed in accordance with the general plan will be accepted. The thesis director and the thesis committee specifically reserve the right to require that the student modify this general plan at any time during the student's work on the thesis.

Outline of Proposed Thesis Work (Must fit on this page).

Thesis Director: _____ Date: _____

Physics Faculty members of Thesis Committee:

_____ Name	_____ Date	_____ Name	_____ Date
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Non-Physics Faculty member of Thesis Committee:

_____ Name	_____ Date	_____ Name	_____ Date
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East Carolina Department of Physics
Requirements and Electives for Students Seeking A Master's Degree

Name: _____

Requirements from the ECU Graduate Catalog 2005-2006.

Applied Physics option				Medical Physics option			
Required Courses (28 SH)	Date	Grade	SH	Required Courses (31 SH)	Date	Grade	SH
PHYS 5311			3	PHYS 5600/5601			3
PHYS 5400			3	PHYS 5900/5901			3
PHYS 5600/5601			3	PHYS 6700 (5700)			3
PHYS 5900/5901			3	PHYS 6715 (5715)			3
PHYS 6200			3	PHYS 6710			3
PHYS 6300			3	PHYS 6720			3
PHYS 6816/6817			1	PHYS 6816/6817			1
PHYS 7450 (6450)			3	PHYS 6718 or RONC 6718			3
PHYS 7000			6	PHYS 6992 or RONC 6992			3
				PHYS 6993 or RONC 6993			3
Elective Courses (6 SH)				RONC 7370			3
PHYS 6700 (5700)			3	BIOL 2130 or HIMA 3000			4,2
PHYS 6715 (5715)			3				
PHYS 7110 (6100)			3	Elective Courses (3 SH)			
PHYS 6250			3	PHYS 5400			3
PHYS 6900			3	PHYS 6300			3
				PHYS 6900			3

Other Requirements

- Comprehensive Exam _____
- Computer/Foreign Language (PH5900) _____
- Thesis Defense _____
- Presentation of Thesis to Dean of Graduate School _____
- Delivery of Thesis to Library for Binding _____
- Application for Graduation _____

Rev. 2/21/2006

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**EAST CAROLINA DEPARTMENT OF PHYSICS REQUIREMENTS AND ELECTIVES
FOR STUDENTS SEEKING A PHD IN BIOMEDICAL PHYSICS**

Name: _____ SS or Banner # _____

Requirements from the ECU Graduate Catalog 2005-2006 (If student does *not* have an MS upon entry into the PhD program, additional courses may be required to show the competency of a Masters degree before graduation. These courses will be outlined on an additional page.)

Required Hours: 30 beyond the Masters Degree.

Physics Core (min 6 SH)				Supplementary Courses			
Course #	Date	Grade	SH	Course #	Date	Grade	SH
PHYS 7110 (6100)			3	PHYS 5311			3
PHYS 6200			3	PHYS 5400**			3
PHYS 6250			3	PHYS 5600/5601			3
PHYS 6300			3	PHYS 6700 (5700)			3
PHYS 6400			3	PHYS 6715 (5715)			3
PHYS 7310 (6310)			3	PHYS 5720/5721			3
PHYS 7410			3	BIOL 5800/5810			3,3
PHYS 7450 (6450)			3	BIOL 5870			3
PHYS 6620/6621			3				
PHYS 6710			3				
PHYS 6720			3	PHLY 7705 (6705)			3
Biomedical Core (min 6 SH)				PHLY 8720 (6720)			2
BIOC 7301 (6301)			4	HPRO 5011/5012			5,0
BIOS 6021/6022 (50xx)			3,3				
PHLY 7701/7702(67xx)			3,5				
PHYS 7715			3	**For students entering the program with a BS			
RONC 6718			3				
RONC 6992			3	Electives			
RONC 6993			3				
RONC 7370 (5370)			4				
Research Courses (18 SH)							
PHYS 9000							
PHYS 6900(research)			3				
PHYS 8910 (6910)			3	Required (does not count toward total degree SH)			
PHYS				GRAD7004/HUMS7004			3/2

* Competency in these requirements may have been acquired at an undergraduate level or through the taking of courses other than those recommended here. Permission of Graduate Director and Graduate Committee is required for such substitutions.

Entered Program: _____
 Entering Degree: _____
 Advisor: _____
 Reviewed: _____; _____;
 _____; _____

Written Candidacy Exam

Pass _____ Fai _____ Date _____
 Oral Candidacy Exam
 Pass _____ Fai _____ Date _____
 Dissertation _____

Other Requirements

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PERMISSION REQUEST FOR SPECIAL PHYSICS GRADUATE COURSES

This form must be completed, including all required signatures, before a student can register for PHYS 6526, 6527, 6528, 6900, 8910 (formerly 6910), 7000, 9000, GRAD7004/HUMS7004 or any other course taken as independent study.

I, _____ request permission to take
PHYS _____ during the _____ semester of 20____. This project will be directed by Professor _____.

A brief description of my proposed project follows:

Signature - Student Date

Office Use Only

PHYS _____ SEC _____

Session _____ Date _____

Student's Social Security Number

Signature - Director of Student's Research

Signature - Assistant Chair of Graduate Studies

Signature - Chairman of the Physics Department