Climatology Ph.D. Program Policy Handbook

College of Earth, Ocean, and Environment
University of Delaware

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Revised September 2013

Introduction

Rules, Policies, Guidelines, and Exceptions. This document contains a mixture of University of Delaware rules, and policy and consensus advice of the participating program faculty of the College of Earth, Ocean, and Environment (CEOE), intended to guide students seeking a doctorate degree through the required steps. The definitive rules regarding these degrees are found in the *Graduate Catalog* and other policy and deadline notices from the Office of Graduate and Professional Education (called the "Graduate Office" in most of the rest of this document). Each student is responsible for conforming to the rules published in those other documents. This policy document does not recapitulate all the details of the requirements, time limits, thesis formats, and so forth contained in the documents from the University and the Graduate Office. Any disagreement between this document and the Graduate Office or Graduate Catalog requirements will almost certainly be resolved by deferring to the Graduate Office and subsequently editing this document to bring it back into compliance.

Official regulations (URLs subject to change):

Office of Graduate and Professional Education:
http://www.udel.edu/gradoffice/
Application Procedures:
http://www.udel.edu/gradoffice/apply/
Thesis and Dissertation manual:
http://www.udel.edu/gradoffice/forms/thesismanual.pdf
UDThesis Styles:
http://www.udel.edu/topics/udthesis/

Some elements of this document are *policies* of the Climatology Ph.D. program, as opposed to guidelines or suggestions. These are expectations regarding such items as the normal composition of a thesis advisory committee and requirements for examinations and presentations. Most of the rest of the document is advisory only, although we regard this advice as very important. Whenever the imperative level of any piece of information is not obvious, please ask your adviser, staff, or college administration for clarification.

Each individual student in the Climatology graduate program will work on a unique thesis problem after arriving with a distinctive background and engaging in a set of core and thesis specific courses. Occasionally a rule becomes redundant or inappropriate for a particular dissertation program. Students may request *exceptions* to rules. Exceptions are granted on a case-by-case basis. Program exceptions require a request supported by the adviser and approved by the graduate program's Academic Council. University exceptions require a request from the Program Chair to the Graduate Office. The Graduate Office may make an immediate decision or may consult with other authorities as well. Appeals at either level are always possible, but will generally be considered only with additional information.

Degree Program. The Climatology Ph.D. offers students a science-based degree, expecting a foundation of general knowledge in the physics of climate, atmospheric dynamics, measurement and computational methods, and topical expertise in a recognized subfield such as climate dynamics, hydroclimatology, boundary layer climate, climatic interactions with the surface, and climate variability. Our students are expected to master skills as needed to be self-sufficient in the

research methods necessary for their dissertation areas usually requiring special emphasis on mathematical, statistical, and computational methods. The methods may also require courses or individualized study in remote sensing and geographic information science (GIS).

Entrance requirements. Students are only considered for the Ph.D. in Climatology with a completed master's degree that includes a thesis. Admission decisions based on a pending master's degree are always considered probationary until the master's degree is completed. The department does not allow a direct track to the Ph.D. following the bachelor's degree. A combined GRE score of at least 300 is also expected, and the undergraduate record will be examined, but the focus in Ph.D. admission is on the quality of work at the master's level. A mathematical background (calculus through ordinary differential equations) and computer analysis and programming skills are also required for admission to the Climatology Ph.D. Deficiencies in the topical core discussed below may be taken care of by course work during the degree program.

Most Ph.D. students enter from master's programs in geography, geology, atmospheric sciences, oceanography or environmental science. Students from other related disciplines are encouraged to apply, and students who are not sure of the appropriateness of their background are encouraged to consult with the Program Chair or a faculty member in the area of interest before applying. All applicants will be judged on the basis of both the quality and the range of their education, and the topical compatibility with areas of research by potential advisers.

Students completing a master's degree within a unit of CEOE who wish to continue towards the Ph.D. must submit a Change of Classification Form to enter the Climatology Ph.D. program. The faculty will evaluate these as they are received, without particular deadlines. Students completing other masters' degrees from UD who wish to enter the Climatology Ph.D. program, must complete a regular admission application as if entering the program from outside UD.

After graduation. Our Climatology Ph.D. graduates have been particularly successful in the academic sector, many becoming professors in Ph.D.-granting departments at major universities, as well as at regional universities. A number of Ph.D. graduates have found employment in federal research labs and private industry, including environmental services contracting companies and information technology fields.

Requirements for the Climatology Ph.D.

A minimum of three academic years of graduate academic work beyond the masters' degree is normally required for the Ph.D. degree. Students are expected to be in residence (enrolled full-time) at least two continuous years beyond the master's degree. The University requires at least one continuous academic year of full-time study (nine credit hours per semester) in residence at the University of Delaware (see the graduate Catalog for specific requirements).

Course requirements for the Climatology Ph.D. Students are expected to acquire general knowledge of climatology, including physics of climatology (thermodynamics, radiation, and cloud processes), atmospheric dynamics (forces and flows), measurement (microclimatological methods and instrumentation, remote sensing) and computational methods for data analysis and synthesis. A suite of regularly taught climatology courses covers the basic range of atmospheric science and climatology. The six courses listed below constitute a *core background* that all Ph.D. climate scientists should have, preferably from work towards the previous degrees before entering the

Ph.D. program. Familiarity with these areas will be expected for the written qualifying examination.

Geog612	Physical Climatology
Geog622	Atmospheric Physics
Geog623	Atmospheric Dynamics
Geog653	Synoptic Climatology
Mast609	The Ocean & Climate Variation
Geog651	Microclimatology

As with the other degree programs, students are expected to demonstrate mastery both of the topical knowledge of their research area and the technical and research methods needed to carry out independent research. Courses in mathematics, statistics, and related fields used to demonstrate this competence should be at the graduate level. Determining that a suite of courses adequately fulfills these requirements is the responsibility of the student's Advisory Committee.

Dissertation Credits. Each student must enroll in at least nine credits of *CLIM969 Doctoral Dissertation*. Enrollment for these credits is allowed only after achieving candidacy status (see below). *CLIM969* will be given a temporary grade (S or U) at the end of each semester, and a final grade will be submitted for the dissertation after completion of the defense. Precandidacy students needing credits to maintain full-time status for funding purposes may take *CLIM964 Pre-Candidacy Study* for a variable number of credits, pass/fail. Following completion of all requirements except the final dissertation, including the comprehensive examination and dissertation credits, a student may enter sustaining status.

The Dissertation. The requirements for a doctoral dissertation are intangible—not based on quantifiable limits. The most important role of any Advisory Committee is judging when a body of work has become a sufficient doctoral dissertation. The dissertation must be original research, largely carried out by the candidate. Close collaboration with an adviser is normal, but leadership in research and clear intellectual contributions by the candidate must be visible. The dissertation must be based on original research and make a significant contribution to knowledge —it will not be based solely on literature review but will include new data collection, data analyses, experimentation, or modeling. A typical understanding of "contribution to knowledge" is that the dissertation reports on work suitable for publication in high-quality, refereed journals.

Because academic positions are a common goal of Ph.D. students, the dissertation forms an important foundation for the entire career. The dissertation usually provides the core of the first few papers by an assistant professor, the basis for early funding proposals, and the initial research direction that will be taken during the early part of the academic career. A well-chosen dissertation topic that leads to useful, positive, publishable results and to topics for further research is essential to building a successful career. Dissertation research is usually presented as part of an interview for entry-level faculty positions, and the potential for a successful assistant professorship working from the foundation provided by the dissertation research will be an important factor in faculty hiring decisions. A poorly chosen topic or minimal effort towards finding positive and useful results will have life-long career consequences.

The Dissertation Committee. The student's Advisory Committee consists of four to six members. The Advisory Committee evaluates the program of courses, the examinations, and the dissertation.

The adviser must have established a record of scholarship in the field of the dissertation and be a member of the faculty of CEOE at the University of Delaware or professional staff that hold secondary faculty appointment within CEOE. The adviser, who is usually chosen before a dissertation topic is worked out, chairs the committee. The adviser will help refine the topic and choose other members of the committee. Faculty who have retired or resigned from the university may continue to chair committees of students whose work began under their direction before their retirement or departure from the university.

The Advisory Committee will contain a minimum of three additional members. One will be another member of the CEOE faculty in an area close to the research area. One will represent the secondary area of study; usually the methods or technical area of study, and one will be an external member. The external member may be from outside the University in order to broaden the perspectives of the committee, or the external member may have a primary appointment in a UD department outside of CEOE. The external member is a full, voting member of the committee. External members from outside the University should be chosen with an eye to the willingness and practicalities of having such a member either present or electronically connected during the oral comprehensive exam and the defense.

The Chair of the Academic Council of the Climatology Ph.D. program approves the composition of the Advisory Committee on behalf of the participating program faculty. As this approval comes late in the process, discussion with the Chair is important for any nonstandard composition of a committee. The Chair's signature on the final dissertation is taken to mean approval of the committee and its procedures by the program, rather than approval of the content of the dissertation itself.

Occasionally, during the lapse of time between the comprehensive exam and the final defense, changes in the job status of committee members (including sabbatical leaves) or metamorphosis of the dissertation topic may require or suggest changes in the committee. This will be acceptable, so long as the committee at each stage satisfies the requirements for a dissertation committee.

Doctoral committees strive to achieve consensus concerning the student's performance and quality of work. In the case of dissenting votes, the majority opinion rules and a majority vote in favor is needed for successful completion of comprehensive exams and the defense. In a committee with an even number of members, a "majority" required for passing or approval at any stage must include more than half of the members, not just exactly half of the members.

Written and Oral Examinations. The three major examinations required for the Climatology Ph.D. are a written qualifying examination while the dissertation topic is being developed, an oral examination that follows most coursework but is at the initial stages of dissertation research, and a final oral defense of the completed dissertation.

Written Qualifying Examination. The written qualifying examination will be developed collaboratively by the Academic Council of the Climatology Ph.D. program and the student's Advisory Committee. The exam is divided into two parts with two-thirds of the time and effort devoted to the general knowledge of climatology as outlined above and the other one-third to questions from the student's Advisory Committee related to the specific subfield engaged in by the student. The written examination should normally be taken during the second year.

The Academic Council in consultation with the student's Advisory Committee sets the conditions of the exam for each question (open book/closed book, use of computers, time limits).

The Academic Council in discussion with the Advisory Committee members evaluates the candidate's exam and will register a "pass" or "fail". The Council may also register a "conditional pass" in which a passing vote requires satisfying some additional piece of work, such as studying a particular topic and demonstrating improved understanding. If a candidate does not receive a majority of passing votes, then permission to retake the exam can be given if approved by a majority of the Academic Council.

Oral Comprehensive Examination. When the dissertation project has been fully designed, a formal written dissertation proposal will be circulated to the members of the student's Advisory Committee. Commonly, this proposal will have a statement of the problem, a literature review that might be an early draft of the dissertation's literature review, a description of research methods, data sources or experiments that will be undertaken for the dissertation, and some expected results. Once a proposal is circulated, an oral comprehensive exam is scheduled which is private—only the committee and the candidate attend. No formal rules govern the format of this exam, but commonly, a short (20 to 30 minute) presentation of the intended dissertation research by the candidate precedes questioning. Questions from the committee may be on anything relevant to the student's past training and future research plans typically focusing on the proposed dissertation research. The committee members use the oral examination as an opportunity to seek clarifications, suggest modifications, or deduce whether the candidate is properly prepared to engage in the proposed research.

The timing of the oral comprehensive exam is often controlled by the readiness of the dissertation proposal. The exam should not be scheduled before a topic has been studied sufficiently to show that a topic is interesting, useful, and plausible. The proposal should show that necessary data will be obtainable and that the research methods are practical. However, the committee should not be presented with a proposal that is nearly a first draft of the dissertation, on which suggestions and input seem too late to be relevant. The ideal time for the oral comprehensive examination, when ideas for the dissertation are well thought out but not yet ossified, will often need to be compromised by the availability of the committee members to meet at one time and location for the oral exam.

An important element of a successful oral comprehensive exam is communication with the committee members, preferably months in advance. Provide committee members with a proposal far enough in advance that you can discuss it with them after they have had a chance to read it. Ask for feedback before the oral exam. Committee members may choose to give no information whatsoever before the exam, but most would rather deal with a prepared candidate than a surprised candidate.

Each committee member will register a "pass" or "fail" for the examination. A passing grade by a majority of the committee admits the student to doctoral candidacy, conferring a change of status and eligibility to take dissertation credits. A committee member may also register a "conditional pass" in which a passing vote requires satisfying some additional piece of work, such as studying a particular topic and demonstrating improved understanding.

The Dissertation Defense. After the Advisory Committee has been presented with a complete draft of the dissertation, with all the elements and quality of a final version including all graphics, tables, references, and preliminary parts, a defense of the dissertation should be scheduled. The defense includes a public presentation of the dissertation research and an opportunity for public questioning. The committee may also choose to hold some of the questioning in closed session.

Students can gain a perspective on the format and tone by attending defenses during their time in residence.

The Advisory Committee must have the dissertation in hand at least two weeks before the defense. The degree of collaboration with committee members will vary. Some dissertations are done completely independently, with even the adviser only serving as first editor for completed chapters. More commonly, a considerable degree of collaboration exists among the candidate, the adviser, and one or two of the committee members. Some members will wish to see chapters as they come out, and some will prefer to only see the final dissertation just before the defense. As with the written and oral examinations, communication is important. It is to the candidate's advantage to have more committee members than just the adviser be familiar with the evolution of the project since the oral examination.

The Advisory Committee will convey minor editorial suggestions to the candidate at the defense. Committee members can also request substantial changes in a dissertation and make the final passing vote contingent on seeing the revised work.

When a majority of the Advisory Committee agrees to a passing vote for the dissertation defense, the candidate is responsible for making a final version of the dissertation in the required format (currently, the Graduate Office requires PDF), printing signature pages on the required paper, obtaining signatures from the committee members and the Chair of the Academic Council for the Climatology Ph.D., and getting these to the Graduate Office, along with various forms and fees. The UD Bookstore offers thesis binding for additional copies, if desired.

Rules and traditions for the comprehensive exams vary widely among academic units and universities. Communication with external members about roles and expectations of the committee members may be taken care of by the adviser, but it is in your interests to make sure that communication happens at that level as well.

Timetable for the Ph.D. Students moving into the Ph.D. program from CEOE master's programs will often have few additional courses to take, whereas students entering from master's programs in related fields outside of CEOE may need two years or more of full-time coursework to be properly prepared. Very roughly, an entering Ph.D. student may expect to spend several semesters taking courses and exploring dissertation ideas, half a year refining the proposal and preparing for the oral comprehensive examination, and one to two years in the research and writing of the dissertation. The Ph.D. degree is also subject to a university-specified time limit of five years following the master's degree.

Format of Doctoral Dissertation

The Office of Graduate Studies regulates the physical characteristics of the final copies of dissertation, including criteria for margins, page layout, typography, and the content of the preliminary pages. The dissertation must comply with all of these regulations at the time the final copies are submitted. The *Thesis and Dissertation Manual* is available online. The Information Technology User Services group on campus maintains template or macro packages, known as *UDThesis*, designed to provide thesis-style formatting in a few word-processing or text-formatting packages.

Dissertations must be in American English and must be literate and well written. Many readers, including perhaps the committee, will equate the quality of the ideas with the quality of their expression—if prose is jumbled and disorganized, then ideas and interpretations are probably also suspect. Scientific units and mathematical text have special typographical rules and conventions. Documents summarizing the U.S. National Institute of Standards and Technology views on use of units and mathematical typography may be obtained from http://physics.nist.gov/cuu/Units/rules.html.

Because of the wide range of topics covered in the Ph.D. degree program, we do not enforce the citation style and reference style of any particular organization. Commonly, dissertations will follow the reference style of the *Annals of the Association of American Geographers,* or the journals published by the American Meteorological Society or the American Geophysical Union, but other styles can and have been used. The adviser will typically suggest either a particular journal or recent thesis to emulate in reference style. The references must be complete and consistent within the thesis.

Annual Review

Each winter, graduate students are asked to summarize their academic activities for the previous year on a form provided by the Academic Council. These reports are reviewed by the Academic Council with input from the student's Advisory Committee, and a response based on consensus advice is provided to the student. The review serves as an adjunct to the adviser/student relationship and it provides the program with useful information regarding the progress of the students.

Funding

Funding types. The Climatology Ph.D. program tries to fund as many as possible of its full-time graduate students at a level that enables reasonable subsistence in the Newark area. Stipends do not vary with experience or type (RA, TA, or university-generated fellowship). University-generated fellowships and assistantships are provided with full-time graduate tuition. In addition, office space is made available to all funded graduate students in the advisor's home academic unit.

Fellowships carry no work obligation. Some are controlled by the academic unit or college to assign as it sees fit. The Graduate Office supervises competitively awarded fellowships of three types: for any outstanding graduate student, for Ph.D. students who have passed into candidacy status, and for students from challenging circumstances. Nominations for these must come from the academic unit, not from the individual student, and the academic unit is limited in how many nominations it is allowed to make. The academic unit selects nominees carefully, based on perceived chances of success when compared to students from other disciplines.

Delaware Space Grant fellowships are also available each year targeting those students contributing to the mission of NASA. Nominations for these normally come from the academic unit, but students are able to apply without an academic unit nomination.

Holders of university-based fellowships must maintain full-time graduate student status by taking at least nine graduate credits. Although no work obligation is required, holders of fellowships should engage in the usual level of departmental service.

Teaching Assistants provide 20 hours per week of work (on average) in the academic unit's educational mission. Assignments each semester are based on unit needs, student experience, and student schedules. Under the supervision of a faculty member, TAs may teach labs, prepare exercises, assist in gathering instructional materials, grade assignments and tests, proctor exams, run tutorial and review sessions, and hold office hours. Flexibility on the part of both TA and faculty supervisor is expected, in that assignments may vary greatly from week to week depending on the work being done in a course; TAs also have varying obligations to the courses they are taking for credit. Full-time status for a TA requires taking at least six graduate credits per semester.

Research Assistants provide 20 hours per week of work on a funded research project under the supervision of the principal investigator (the faculty member who obtained the grant under which the project is funded). As with TAs, RAs are expected to be flexible about workloads, which may vary greatly from week to week. Under ideal circumstances, the funded research project contains within it the student's dissertation research topic, in which case the actual time spent on the project may be much higher than 20 hours per week. Full-time status for an RA requires taking at least six graduate credits per semester.

Tuition Scholarships are occasionally available. As the name implies, these scholarships contain sufficient funding to pay full-time tuition, but they contain no subsistence funding. The academic unit is allowed to request 10 hours per week of work in return for a tuition scholarship.

External fellowships are in a different category, since they do not come to the student through the University of Delaware. Students have obtained funding from such sources as NASA's Global Change Fellowship program, NASA's Space Grant program, the American Meteorological Society's Fellowship program, the Science, Mathematics and Research for Transformation (SMART) Fellowship program, and the American Association of University Women. Stipends and conditions of these fellowships vary. Obtaining such fellowships is important, so faculty will assist any student applying for them as much as possible. We attempt to find tuition scholarships for externally funded students whose fellowships do not include tuition, and we provide office space for externally funded students.

Time limits. Internal funding awards are made at most one academic year at a time. The academic unit almost universally provides a second year of funding to students admitted with funding, so long as adequate progress has been made during the first year. Funding beyond three years for a Ph.D. student is considered exceptional and will be made only if justified by circumstances and allowed by financial conditions.

Funding period. The university considers students who receive internal fellowships or assistantships fully funded for the nine-month academic year. As a condition of receiving these fellowships and assistantships, they agree not to work more than 20 hours per week during the academic year without permission, which effectively eliminates additional outside employment. This restriction exists because the primary goal of these fellowships and assistantships is to help a student obtain a graduate degree. Hence, we wish to maintain a sufficient amount of time for personal coursework and research. The academic unit does not assign TA obligations during winter session *but funded students are expected to be in residence and working on research during these periods*. RAs vary with the project, but often expectations continue through winter session.

Summer funding is not automatically included in any of the standard funding packages. When possible, the department may offer summer funding to first-year graduate students, but these

have additional application requirements and are considered a form of RA. Many RA packages and some external fellowships provide additional funding to cover some or all of the summer months.

Advanced students who have TA experience in our introductory courses, and who have approval of the course's primary instructor, may be allowed to teach courses as primary instructor during winter and summer sessions. Besides providing an additional funding source, such teaching is an invaluable experience for students considering an academic career, however, such teaching opportunities should be considered in the context of a student's primary objective to complete their degree program in a timely fashion.

Sustaining status. Students who have completed every requirement for the Climatology Ph.D. degree except presenting or defending and submitting the dissertation may consider registering as sustaining, rather than as full-time students. Students who leave full-time student status while still working on a thesis are required to register as sustaining in every regular semester until they graduate (and in their last summer or winter session, if they are going to graduate at the end of that session). However, students are not allowed to register as sustaining, even if they leave the university and full-time student status, unless all courses, dissertation credits, and any other requirements for the degree are fulfilled. Payment of sustaining fees is required for continued use of university resources, including libraries, computer networks and resources, laboratories, and advisers.

Ethics, Rules, Problems

The University of Delaware expects all faculty and graduate students to maintain high ethical standards in all professional activities. The university provides occasional seminars on research ethics, and attendance at one of these during a graduate career is strongly recommended. Research involving human subjects requires approval by a university committee, and these restrictions may come into place with such seemingly minor activities such as surveys and interviews. Restrictions on handling of hazardous materials come into play with antifreeze used in rain gauges, lead-acid batteries, and mercury-contaminated soil samples for example. Students are expected to be in compliance with all such rules, but the university provides training and information, and the academic unit stands ready to provide information and advice. Please start by asking your adviser whenever in doubt.

Complaints of a more difficult nature arise rarely but are taken very seriously, such as disputes regarding a grade, accusations of academic misconduct, concerns about sexual harassment or any other kind of harassment. The university has well-defined procedures in place for dealing with most academic grievances, sexual harassment claims, and other problems. The contact offices maintain a strong web presence on the UD web site so that they can be contacted privately, but students should feel free to contact college staff or the academic unit heads to help find such resources.

One type of dispute that cannot always be resolved by grievance procedures and moderation is an academic dispute in which a student disagrees with a faculty member regarding a fundamental point about the validity of a scientific result, whether a contribution to a project is worthy of authorship credit, or whether a piece of work constitutes a satisfactory dissertation. As described above, judgment on such items is placed entirely in the hands of advisers and committees. The university administration will not override a purely academic or scientific judgment of one of the

faculty, so a student must be prepared to meet the concerns and standards of the committee. In extreme cases, late changes of adviser and committee will be permitted, but in such cases the academic unit will seek to make sure that research ideas from one faculty member are not being unfairly credited to another—a form of intellectual property theft.

Graduate Student Service and Activities

Graduate students engage in variety of activities generally in the category of professional service. None of these activities are required in any formal sense, however, just as the faculty serves on committees, review papers and grant proposals, and undertake responsibilities within national organizations and within the wider public community, service is also part of the professional development of graduate students.

Student governance. Within the CEOE academic units (Geography, Geological Sciences, and the School of Marine Science and Policy), graduate students meet regularly to discuss issues of their concern, including issues that may arise by questions to them from the faculty. These meetings are called and led by an elected graduate student representative. The graduate student representative may also be able to attend the academic unit's faculty meetings as a non-voting participant (except when personnel issues are being discussed) and serves as a communication conduit between faculty and students. Please inquiry with your academic unit. Another representative is elected by the students to represent the academic unit at the university's Graduate Student Association.

Academic Unit life. Graduate student volunteers help plan and take care of logistics for the academic unit seminar series (snacks, audiovisual setups, cleanup, etc.), and help plan and execute the social events, among other things. While seemingly mundane, these activities have a profound effect on the quality of life within the unit. Graduate students also provide an important educational service to the unit by proctoring exams.

Professional contacts. Some activities within the academic unit are undertaken primarily to provide a wider education, as well as contacts with people from other units and other campuses. Seminars provide contacts in addition to their educational value. Outside guests for seminars may spend some time in the academic unit on the day of their presentation, and meeting times are usually set aside to provide graduate students with an informal chance to learn from our visitors. Notices for related seminars from other units are also posted. *It is the expectation of the faculty that students will regularly attend the academic unit's seminars and that such attendance constitutes an integral component of their graduate program.*

The Climatology Ph.D. program encourages and subsidizes travel of students for professional activities, such as presentation of papers or posters at conference and outside training courses. (Attending the national meetings of the Association of American Geographers, American Meteorological Society, or American Geophysical Union at least once before one is ready to present a paper may also be subsidized—check with your academic unit office for current rules and amounts.) Women students may obtain a small additional travel subsidy from the university's Office of Women's Affairs. These conferences are an excellent opportunity for students to meet the people whose papers they read.

Resources

Institutional resources. Climatological research is supported by the Office of the State Climatologist and the Delaware Environmental Observing System (DEOS), both located within the department. Studies in geographic education are enhanced by the Delaware Geographic Alliance, a coordinated effort by the Geography Department, teachers, school administrators, and the Delaware Department of Education. Funded by the National Geographic Society and the State of Delaware, its mission is to help reinforce geography teaching and learning in the K-12 curriculum.

Computational resources. CEOE strives to provide graduate students with sufficient computing resources for all their course work, dissertation research, information gathering, writing, and preparation of graphics, presentations, and thesis drafts. All students entering the University of Delaware immediately receive access to central Unix systems for general purpose computing and email accounts. CEOE offers space for a personal web page, and access to the internet via udel.edu gateways. The college sponsors additional resources to allow graduate students to do research and maintain course files on individual academic units and central Unix systems.

Some of the best equipment owned by the college will typically be in the shared space, such as Pearson 203, which serves as a university-wide GIS teaching and research lab. All of the equipment in Pearson 203 is available whenever classes are not in session in that room.

Limitations on our budget and common courtesy require that students be reasonably conservative in the use of the more expensive resources, such as color printing, and that preference is given to students with pressing research and coursework problems at times when most of the shared computer space is full.

Requests for resources on the academic units' servers, reports of problems with machines, and inquiries about what resources we have and where they are located should be directed to academic unit's computer staff member. Requests for resources and questions about access on the central systems should be directed to Brian Hanson, who serves as the liaison to the university's Information Technology division for these requests. Requests for additional software installations in the GIS Lab should be directed to Tracy DeLiberty and Michael O'Neal, who evaluate our licensing costs and needs. The department is strict about maintaining only properly licensed software on the machines it controls.