

Meteorology Ph. D. Qualifying Examination

Rules and Procedures

Amendments approved by the SoM Faculty in Fall 2004

A. Rules

1. The exam will be entirely closed book and held on two days (separated by 2-3 days) during the week before Labor Day of each year. If the need arises, and pending approval by a majority vote of the faculty, either a partial or complete exam may be offered in January.
2. The exam will consist of the following five categories: Atmospheric Dynamics; Physical Meteorology; Climatology; Synoptic and Mesoscale Meteorology; Analytic and Computational Tools. The first 3 categories will be examined on Day 1, and the remaining 2 categories on Day 2. In each category, five questions will be given. Candidates will be required to answer a total of 8 questions from the 5 categories, with no more than 2 questions being counted from each category. If a candidate elects to attempt more than 8 questions, the candidate's total score will be the sum of the scores for his/her best 8 questions, subject to the condition that only 2 questions may count for any category. The total time allowed for a candidate will be ten hours over the 2 days, plus an extra 15-minute period on each day that candidates may devote to reading the questions.
3. The School of Meteorology will make available to candidates a list of five topic areas for each category of the exam. One exam question will be asked on each of these topics. The list of topics may be amended by a majority vote of the faculty at any time, but no later than four months before the exam.
4. Each question will be graded on a 0 - 5 scale.
5. The criteria for passing the Ph.D. qualifying exam are:
 - a. Unconditional Pass: An average ≥ 2.75 over all 8 questions.
 - b. Conditional Pass: An average < 2.75 but ≥ 2.25 over all 8 questions. The candidate passes the exam upon completing remedial actions that have been approved by a majority vote of the faculty. The remedial actions should insure competence in the breadth of meteorological knowledge, and reveal the intellectual capacity needed for Ph.D. research, at levels comparable to that of an unconditional pass on the qualifying exam. The candidate's advisory committee proposes the remedial actions to the faculty.
 - c. Unconditional Fail: An average < 2.25 over all 8 questions. The candidate must retake the entire exam. Normally, a candidate will be permitted only two attempts at the entire exam, and will not be permitted to transfer scores from the first to second attempt. If a candidate does not obtain at least a Conditional Pass on the second attempt, the faculty may elect by majority vote to use his/her performance in other aspects of our graduate program to assess the candidate's intellectual capacity to pursue the Ph.D.

B. Procedures

1. Faculty will submit questions to the Graduate Studies Committee, which will compile and edit

the exam. The questions will relate to fundamentals that have been presented in graduate courses in the School of Meteorology . Each question will be designed so that a perfect grade is attainable in about 45 minutes.

2. The questions should very clearly define notations.
3. Copies of the Qualifying exams given within the last five years are made available to candidates.
4. Normally, one faculty member will have the lead responsibility for preparing and grading a question, with a second faculty member verifying the appropriateness of the question and the score assigned to its answers.
5. The name of the faculty member who originated the question will appear on the exam, along with the name of the faculty member who is providing the verification. The Graduate Studies Committee will resolve any differences of opinion concerning the score for a question.
6. The name of the candidate should not be written on the candidate's paper. Instead, the candidate should write a pseudonym that has been registered with the departmental secretary.
7. The grades for the exam, consisting of a numerical score for each question and the 8 question average, will be released to the candidate after the examination process and results have been approved by a majority vote of the faculty.

List of Topics for the Ph.D. Qualifying Exam

Approved by the SOM faculty on April 22, 2004

Atmospheric Dynamics

1. Large-Scale Dynamics
2. Mesoscale and Convective Storm Dynamics
3. Waves and Instability
4. Vorticity Dynamics
5. Boundary Layers and Turbulence

Synoptic and Mesoscale Meteorology

1. Fronts and Jets
2. Extratropical Waves and Cyclones
3. Mesoscale and Convective-Scale Precipitation Systems
4. Tropical Weather Systems
5. Mesoscale Weather Systems Associated with the Interaction with Orography and Land-Sea Contrasts

Climatology

1. Seasonal, Interannual , and Decadal Variability
2. Global and Regional Climate Balances
3. Past Climate and Climate Change
4. Hydrometeorology and Hydrology
5. Climate Modeling

Physical Meteorology

1. Cloud and Precipitation Physics
2. Atmospheric Radiation
3. Remote Sensing and Measurement Systems

4. Atmospheric Electrodynamics
5. Atmospheric Heat and Mass Transport

Analytic and Computational Tools

1. Computational Fluid Dynamics
2. Numerical Weather Prediction
3. Objective Analysis and Data Assimilation
4. Time Series and Spatial Statistics
5. Dimensional Analysis and Similarity Theory