

Procedures for the PhD Preliminary Exam in CEE-Hyd

The purpose of this document is to outline the standard operating procedure for the Civil & Environmental PhD Preliminary Exam for students specializing in Hydraulics. Presently, the faculty who administrate this program are:

- Valeriy Ivanov ivanov@umich.edu
- Aline Cotel acotel@umich.edu
- Avery Demond averyd@umich.edu
- Lissa MacVeen lissajm@umich.edu
- Jeremy Bricker jeremydb@umich.edu

Currently the Preliminary Exam Coordinator (PEC) is Valeriy Ivanov.

Planning and Scheduling

Departmental Policy

Preliminary Exams in the CEE department are held at two standard times of the year – the first week of classes during the Winter semester (i.e., early January), and the week immediately after Winter semester final exams (i.e., early May). Specific dates for these two exam windows will vary from year to year, depending on the University's academic calendar, and can be obtained from the CEE Graduate Program Coordinator.

Per the CEE departmental guidelines, each PhD student in Civil & Environmental Engineering must take the Preliminary Exam no later than 17 months after the beginning of their first semester as a PhD student at the University. Students may elect to take the exam sooner, but the exam will be administered the same way irrespective of how long a student has been enrolled at the University.

The research advisor of a student planning to take the Preliminary Exam is considered to be the Chair of the student's exam committee. As the Chair, they are required to send a memo to the Chair of the Graduate Committee, specifying the date of the exam, and requesting authorization to hold the exam. This memo should be sent no later than one week before the time of the exam. After the exam is over, the advisor is required to send another memo to the Chair of the Graduate Committee, notifying them of the outcome. Standard templates for both these memos can be obtained from the CEE Graduate Programs Coordinator. All memos sent to the Graduate Committee Chair should be cc'd to the Graduate Programs Coordinator, as well as the student's preliminary exam committee.

The student's research advisor is also responsible for notifying their advisee of the outcome of their exam. This should be done in the form of an official letter, sent to the student via email. A standard template for

the letter can be obtained from the Graduate Programs Coordinator.

Standard Exam Schedule

Students specializing in Hydraulics, who plan to take the Preliminary Exam during a given academic year, should first consult with their advisor and then must notify (via email) the PEC. In their email, the student must also state the four areas of specialization (see below) on which their exam will be based. Regardless of whether the student takes the exam in January or May, he or she must send this notification email **no later than the 12th week** of the prior semester. This will allow time for scheduling all the exams, forming the committees, and developing the exam questions.

Each student's Preliminary Exam committee will consist of 4 members, including at least 3 CEE faculty members from the Hydraulics area. The specific members of the committee will be assigned by the PEC, in consultation with each student's advisor.

The following scheduling deadlines will be observed:	January exam period	May exam period
Student notification to PEC of intent to take the Prelim	November 1	March 1
Committee assignments made by the PEC	December 15	April 15

Ad-hoc Exams

Students in the Hydraulics area are expected to take their exam at the standard January or May times, and students should begin planning for this exam upon arrival at the University of Michigan. However, if extenuating circumstances require a student to take the exam at a different time of the year, an ad-hoc exam can be administered on a case-by-case basis. However, ad-hoc exams should only be planned as a last resort.

A student wishing to plan an ad-hoc preliminary exam must petition to do so. Petitions should state the name of the student, the reason rescheduling the exam is required, and the proposed date for the rescheduled exam. These petitions should be emailed to Graduate Committee Chair, and cc'd to the Graduate Program Coordinator and the Hyd PEC. If approved, the ad-hoc exams are planned (including committee assembly, scheduling, and notifications to the Graduate Committee Chair) by the student's research advisor, not the PEC. However, petitions for Specialization Areas that are not covered by the current list (see below) must still be submitted to the Hydraulics PEC, and approved by the Hydraulics faculty.

Format

The CEE Hyd preliminary exam is an entirely oral exam, to be completed over three continuous hours. The student is not allowed to bring reference materials of any kind to the exam, unless explicit permission is given by their entire examination committee, prior to the day of the exam. The student is allowed to bring blank scratch paper, and a calculator. The student will be notified of the exam location at least 24 hours prior to the exam, but it will typically be held in a conference room.

At the beginning of the exam, the student is given four written questions – one in each of their areas of specialization. They are then given 60 minutes, alone, to read over the questions. During this time they may make some preliminary efforts on the problems but the intent is not for the student to solve the entirety of any of the problems during this time. Rather, the intent is to allow the student to collect their thoughts.

Following this 60 minute period, the examination committee will return, and for the remainder of the exam period (i.e., 120 minutes) the committee will ask the student questions about the four problems. The student is given the right to choose the order in which the four problems are discussed. However, once a problem is started, the student must continue the discussion on this problem until the committee decides to move on. It is not necessarily the case that the time for the four problems will be divided evenly. It is also not necessarily the case that the student must provide a complete solution to all parts of all the problems, in order to pass the exam. Additionally, on each problem, the committee can (and usually does) ask impromptu questions to the student that were not in the written space of problems provided to the student, but involve related concepts. The student's answers to such questions are considered part of the exam, and will be taken into account when determining the outcome of the exam.

During the exam period, all students choosing a given specialization area will be given the same question on that area. Students are prohibited from discussing the exam problems until after all exams have been administered, and violations of this rule will be considered a serious breach of the Honor Code.

At some time after all the exams for the exam period are administered, the examination committee will deliberate to determine the outcome of each exam. All faculty who participated on the exam committees for that year will deliberate as a group on all exams. Students will be notified of the decisions regarding the exams within 48 hours of the end of the last exam. This notification will be in the form of an official letter from the student's advisor, which states the outcome and provides feedback from the committee.

Specialization Areas

Each student must choose 4 specialization areas relevant to some aspect of Hydraulics research, on which to be examined. The preliminary exam is designed to test a student's proficiency with the specialization area,

and/or the application of their research interests to that specialization area. It is typical that the student will have taken at least one class, either at the University of Michigan or prior to arrival, on each specialization area. However, this is not explicitly required – if a student has acquired a good understanding of a specialization area without having taken a class in it, they will be permitted to choose this area. The student's performance in this subject will not be held to a different standard than for those who have taken courses in the subject, and the student should make such a decision carefully, and only after consulting with their advisor.

Standard Specialization Areas on which a student can be examined are given below. If a student wishes to be tested on a Specialization Area that is not on the list below, they may petition to the PEC. Petitions must be submitted by the student along with the letter of intent to take the exam, and are voted on by the Hydraulics faculty. Petitions will be granted, provided that three conditions hold for the proposed specialization area:

- a) The scope is not overly narrow;
- b) It has a fundamental scientific and/or mathematical foundation;
- c) It does not overlap significantly with the standard specialization areas.

List of Standard Specialization Areas

Hydraulic Structures

Flood Risk

Computational Fluid Dynamics

Surface Water Hydrology

Ecohydrology

Water Resources

Open Channel Flow

Environmental Fluid Dynamics

Turbulence

Physical Oceanography and Limnology

Sediment Transport

Ocean Waves

Coastal Dynamics

Groundwater Hydrology