

Alternatives to classroom teaching

## How to choose the right examination for the winter term 2020

As of January 3, 2021



**After the start of the digital winter semester, the question now arises as to what the examination at the end of the summer semester might look like. Will a presence examination be possible? What are the alternatives to a presence examination? In this guideline we give you an overview of your options.**

The goal of this handout is to outline your exam options to the extent that you have enough information to make a decision about which exam format you want to offer at the end of the semester. On the one hand, students should be informed about the examination format at an early stage; on the other hand, you need time to adjust to the examination and to coordinate your teaching and examination. Since the didactic examination repertoire is strongly limited by legal and organizational factors, this handbook was compiled in intensive exchange with the legal team at the TUM Center for Study and Teaching.

In this guideline you will not find detailed instructions on how exactly the different tests can be designed and run. Such instructions can be found in the teachers' forum at <https://wiki.tum.de/display/prolehreforum/Fernprüfungen> .

This document has already passed a number of rounds of discussion. The most recent version of this document can be found at <https://www.prolehre.tum.de/aktuelles/coronavirus>.



## Under These Conditions You Will Be Able To Test

Around 6,500 exams will be held in the 2020/21 winter semester. During exam weeks, up to 200 exams with up to 20,000 students will take place daily. The maximum number of examinees within an examination slot is 5,000 students. This volume of exams is matched by limited resources for both face-to-face exams (e.g., rooms, invigilators) and remote exams (e.g., upload slots).

**Attendance tests** are generally permitted, provided that the rules of distance and hygiene are observed; these complex rules are described in detail in two manuals ([conduct of written attendance tests](#), [conduct of oral attendance tests](#)). It is becoming apparent that in many cases presence tests will not be possible:

- e.g. because there are **not enough examination rooms** available, since the hygiene and distance rules mean that only half of the usual examination places can be occupied. The university is planning to rent additional examination rooms, but even these will probably not be sufficient.
- e.g. because **not enough supervisory staff** is available to organise large tests under the extensive hygiene and distancing rules.
- e.g. if the proportion of your international students who are currently unable to enter Germany and take the examination is too large.

**Distance learning examinations** are generally permitted and possible in the summer semester according to the amendment §13a of the General Examination and Study Regulations (APSO). In view of the shortage of space, teachers are asked to give preference to distance learning, especially for large examinations with more than 400 candidates. Our university will provide you with the technology to carry out supervised remote examinations, but they are associated with practical restrictions:

- In some cases, written distance learning exams **in open-book-format** must be provided. This means that practically all written aids are admitted to the examination, e.g. lecture notes, collection of formulas, notes, any books. Examination papers which require pure knowledge only make limited sense under these circumstances; instead, examination papers must be set which aim at the application and transfer of knowledge (e.g. arithmetic, application to case studies). Such tasks are usually very valuable from a didactic point of view, but are usually more difficult to formulate and more difficult to correct.
- The failure of the internet connection or the crash of the computer can possibly (but not necessarily) lead to the cancellation of a remote exam; since it is not possible to differentiate between a technical failure caused by no fault of the student or a provoked one, a "reason beyond the student's control" is always assumed and the exam is not evaluated. You may therefore have to reckon with a **higher number of repeating exams** later.
- As distance learning exams are often unfamiliar exam formats, students need to be informed about the technical and legal details. In particular, students must be given the opportunity to familiarise themselves with the electronic examination system before the examination. This can take the form of a **training exam**, for example, but some techniques can also be practised during the semester.

- We expect that some students may not have a sufficiently good **internet connection** (streaming quality) for online proctoring and therefore may not be able to take supervised distance learning exams. If necessary, interview your students (e.g. in Moodle via the activity "survey" or with EvaSys). In a university-wide survey in June 2020, 11% of the students stated that they had a poor or very poor internet connection.

As an alternative to supervised distance examinations, there are also unsupervised distance examinations (e.g. electronic exercise performances according to §41 [Muster-Fachprüfungs- und Studienordnung](#)). As a rule, these examination formats must be in open-book-format.

There is no ideal examination format that fits all situations equally well. Some solutions could exclude students due to insufficient technical equipment, some solutions are unsuitable for certain examination formats due to their technical limitations, some solutions can only be realized with small numbers of students, other solutions require too much preparation and preparation. It is therefore important to find the best possible examination format for you and your students in the current situation.

The Vorstand Lehre has set the goal of getting as many students as possible into the examinations so that they complete as normal a semester as possible and we don't have a mountain of exams to put off. At the same time, however, the deadlines for the various forms of study progress checks are being extended so that students who cannot or do not wish to take an examination do not have to fear any disadvantage in this respect - beyond the inevitable loss of time. As soon as the corresponding legal text has been published, the legal team of the Center for Study and Teaching will provide information on the concrete implementation.

The form of examination should be **announced** at the latest four weeks after the start of lectures. Due to the current exceptional situation, you will find a [formulation module](#), which will give you a little more time to select a practical form of examination (you must give binding notice of this at least 14 days before the planned examination date). In order to enable you and your students to prepare well for the exams, we recommend that you decide on an exam format and register it centrally so that the distribution of resources (attendance rooms, upload slots, Proctorio slots) can be coordinated.

## Your Options For Testing

With the newly issued §13a in the General Examination and Study Regulations (APSO), you will have the opportunity in the summer semester 2020 and in the winter term 2020/21 to replace the examination format originally provided in the Modulbeschreibung with another examination format listed in the Examination Regulations. In addition to the classic attendance examinations (such as the oral attendance examination, written examination, student research paper), these are also some formats that have always been possible without attendance, such as homework, learning portfolios, reports or academic papers – see [overview over already existing examination formats](#).

You also have the option of carrying out a **remote test**. On the following pages we present you with sample examples of remote testing:



### [Oral Remote Exam](#)

n < 50 | Closed Book | Internet connection requirements: high



### [Remote Student Presentation](#)

n < 50 | Open Book | Internet connection requirements: light



### [Written Remote Exam On Computer \(supervised by „Proctorio“\)](#)

n < 500 | Closed Book | Internet connection requirements: medium



### [Written Remote Exam With Pen and Paper \(supervised with „Zoom“\)](#)

n > 500 | Open Book | Internet connection requirements: high

An unsupervised remote examination ("take home exam") is not possible according to the current legal assessment, but you may consider whether you choose the already existing format of "Elektronische Übungsleistung" as described in §41c of the [Mustersatzung](#) (or a variant thereof) as examination format. In this case, you should briefly coordinate your examination concept with the legal team of the Center for Study and Teaching.

## Oral Remote Exam

Oral exams can be implemented quite easily as a distance examination, and thus change their character and familiarity only slightly. A distance oral exam can be done with Meet, Zoom or Skype; participants are usually examiner, assessor and examinee. Sketches or calculations can be exchanged via a shared screen or by holding a piece of paper in the camera. Oral remote examinations can be conducted as individual examinations or as group examinations.



Distance oral examinations do not differ too much from normal oral presence examinations and are therefore a reasonably familiar, calculable format.



Students need an internet connection in streaming quality, because the exam is performed as a live stream.



Students need a computer with webcam and microphone or a modern mobile phone.



The effort of oral exams can be optimized (see [Teaching Trick by Professor Kristina Edström](#)), so that an oral exam can be completed in less than 40 minutes; thus, an oral exam with up to 30 students can be less time-consuming than a written exam. The examination protocol cannot be replaced by a video recording of the examination



The possibilities to prevent deception are quite high in oral examinations, even in distance examinations. It is forbidden to urge students to make a 360° pan with their webcam at the beginning. A weak point could be standardized sets of questions that get around so that students who are examined later have an advantage.



Data protection is relevant because students may need to show their private room and personal data of students may be transmitted via the Internet and via the video conferencing system (however, no data is stored). For this reason, an explicit voluntary declaration of consent by the examinee is required prior to the examination; students who do not wish to do so may instead choose the form of examination provided for in the subject examination regulations and take it after the end of the corona crisis, without having to fear any disadvantages with regard to the study progress control.



Students who do not have a streaming quality internet connection, an internet device with microphone and webcam are excluded from this format. Students may also be able to [borrow laptops](#) free of charge for the exam. We recommend that you carry out a test with students in advance.



Reduction of exclusion: If students who cannot or do not want to take part in the oral distance examination due to a lack of equipment, poor Internet connection or data protection concerns are offered an alternative to an oral presence examination, an examination format is available that would have to exclude very few students. Oral presence examinations are currently much more complicated due to the hygiene and distance rules, but in our opinion they are feasible.



Well suited for up to 50 students.



Limitations: Since the effort required for oral examinations increases linearly with the number of students, we estimate that this format is only suitable for courses with up to 50 students.

In our view, a hybrid oral examination, which is designed as a remote examination, but in justified individual cases is also permitted as an attendance examination, is a very good examination format: it is familiar and proven, largely foolproof and excludes comparatively few students. If it is possible to keep the time required per examinee to less than 40 minutes, we believe that this examination format is suitable for courses with up to 50 students. Around 60% of all examinations in the summer semester fall into this category.

## Written Remote Exam With The Computer

Supervised written examinations on the computer are conducted on the Moodle learning platform. The exam itself is displayed as the activity "test" with various question types in Moodle, the plugin "Proctorio" takes over the authentication and supervision of the examinee. The supervision is automated by video and audio analysis, and the computer of the examinee is additionally secured so that the maximized browser window cannot be left during the test. Proctorio offers various security, supervision and evaluation options that can be adapted to the requirements of the respective test.



The test itself is not much different from a normal Moodle test, but there are different steps for authentication and technical testing before the test starts. Many students are unfamiliar with the exam framework; therefore, a mock exam must be offered beforehand, in which students can familiarize themselves with the technology.



Students need a stable Internet connection so that the system can perform continuous video and audio monitoring. You can configure the system to allow for short downtimes (Internet connection failure, computer crash).



Students need a computer with webcam and microphone.



The workload is determined in advance by the creation of sample testing and verification in Moodle and the configuration of Proctorio; in addition, there may also be the training in the testing tool of Moodle. After the test, in addition to the correction effort, the reported suspicious results must be viewed and evaluated. Correction of multiple choice tasks can be automated and can significantly reduce the correction effort. During the exam, it is a good idea to set up a telephone hotline or similar, which students can contact if they have problems or questions; for technical problems, a Proctorio hotline is available. Faculties that wish to use this examination format must appoint a person to advise and support lecturers in the use of this examination format at the faculty; this person should have experience with Moodle and Moodle tests. If you are interested, please contact your study office to find out whether your faculty has someone available for this purpose. Please note that this can reduce the number of supervisors and (if you are using multiple-choice assignments) the number of correction staff.



Computer security, authentication and supervision can limit deception, but there are also limits to what can be controlled (as with any audit supervision in a lecture hall). The procedure is widely used internationally and is continuously developed and improved.



Data protection: the format requires the processing and storage of sensitive personal data (image and sound). For this reason, an explicit voluntary declaration of consent by the candidates is required before the examination can be held; students who do not wish to do so can instead choose the examination form provided for in the subject examination regulations and take it after the end of the corona crisis, without having to fear any disadvantages with regard to progress monitoring.



Students who do not have a stable Internet connection and do not have a computer with microphone and webcam are excluded from this format. Students may also be able to [borrow laptops](#) free of charge for the exam. We recommend that you carry out a test with students in advance.



Reduction of exclusion: In principle, it is relatively easy to offer students a presence examination as an alternative to the distance examination in justified individual cases (at their own computer in a supervised lecture hall or seminar room). In view of the shortage of space and the complex contact and hygiene rules, this alternative is only an option if a clear majority of those to be examined will not make use of it.



Currently suitable for up to 1,000 students. In the future (probably from 2021) also suitable for groups of any size.



**Limitations:**

- This type of examination is only suitable for examinations whose answers can be typed into a text editor. For drawings and calculations with formulas, text input is not yet suitable.
- Due to video and audio monitoring, this examination form is not suitable for open book exams (because turning your gaze away from the screen can be interpreted as a possible attempt to deceive).
- Multiple examiners cannot use Proctorio at the same time if this would result in the maximum number of participants of 1,000 being exceeded.



For the use of Proctorio there are costs per examinee. The financing is not charged to the individual professors, but is shared between the Chancellor and the faculties.

In our view, a supervised written remote computer examination is well suited for large cohorts. Moodle offers a good selection of question types, different contents (picture, sound, film, formulas) can be built in and programs outside the test (e.g. Excel) can be used. If your students have a good internet connection, you do not want to do an Open Book exam and your exam questions can be answered easily by mouse click or text input, we recommend this format.



## Written Remote Exam With Pen And Paper

In this form of examination, the candidates can have the task displayed on their computer screen at a fixed time (for example in Moodle as a download), but the students develop their solutions with a pen and on their own paper. They sit in front of a computer with webcam or in front of their smartphone, because the supervision is done live via video conference with zoom by an exam supervisor. At the end of the examination period, the solution sheets are photographed and uploaded, e.g. in Moodle or TUMexam or sent to the examiner by e-mail. The original solution sheets are then sent by the students by post.



Supervision at home is unfamiliar, but the examinee is familiar with processing an exam with pen and paper. Nevertheless, there should be at least one trial run (e.g. by editing a practice sheet) to gain experience with online supervision, photographing the solution sheets and uploading the solutions.



Students need a stable internet connection because the exam is streamed live. Short downtimes (Internet connection failure, computer crash) can be tolerated by the supervising staff.



Students need a computer with webcam and microphone or a smartphone; they need a smartphone to photograph their solutions later.



In preparation, the effort involved is comparable to a presence check; in Moodle, the download and upload of the check must be set up. Since one supervisor can supervise a maximum of 25 candidates online, more supervisors may be required.



The possibilities to prevent deception are limited by the small camera aperture. As a rule, such an examination should be carried out as an open-book examination, so that the supervisor only has to check that the students do not communicate with other people.



Data protection is relevant because students may need to show their private room and personal data of students may be transmitted via the Internet and via the video conferencing system. To be on the safe side, the video call can also be recorded, but must be deleted after the announcement of the examination results.



Students who do not have a streaming quality internet connection, an internet device with microphone and webcam are excluded from this format. Students may also be able to [borrow laptops](#) free of charge for the exam. We recommend that you carry out a test with students in advance.



Reduction of exclusion: In principle, it is relatively easy to offer students a presence examination as an alternative to the distance examination in justified individual cases (in a supervised lecture hall or seminar room). In view of the shortage of space and the complex contact and hygiene rules, we would rather advise against this option.



Well suited for up to 250 students (corresponds to 10 supervisors), but larger cohorts are also possible if you can organize enough supervisors.



**Limitations:**

- Usually requires an open book exam.
- Scales only conditionally for mass testing due to the relatively high need for supervisory personnel.
- No more than 2,000 students can upload their solutions to Moodle at any one time. This is coordinated and ensured by the central exam organization.
- No more than 2,000 students can upload their solutions to TUMexam at the same time. If you want to use TUMexam, your faculty has to assign a person to advise and support your faculty for this type of exam; this person should already have experience with TUMexam.

A check with a piece of paper and pen is a familiar and proven format that offers a high degree of flexibility. If you can provide an open-book exam and organize the supervisory staff, and if not too many students are excluded due to internet connection requirements, we recommend this exam format, especially for courses with 25 to 250 students.

## Remote Student Presentation

Student presentations can also be given quite easily as an oral distance examination in an online semester: either as live stream or as video upload. A presentation can be given as an individual or group performance.

### Presentation via Live-Stream

In an online seminar, students can, for example, give a presentation in Meet or Zoom in front of the examiner and, as a rule, in front of other students and, if necessary, moderate a follow-up discussion or answer questions. The visualization of information can be realized e.g. by screen sharing. You can, for example, record the presentation (only allowed with the examinee's consent) and later create your grading or feedback in a screencast of the video (video feedback).



This format does not differ too much from normal presentations and is therefore a reasonably familiar, calculable format for students and lecturers.



Students need an Internet connection in streaming quality, because the lecture is carried out via a live stream.



Students need a computer with webcam and microphone.



The effort for the examiners is comparable to the effort for the examiners if they accept classical papers as examination papers.



The possibilities to prevent deception are about the same as for classical lectures.



Students who do not want to show their private room for privacy reasons can be allowed to show a virtual background in Zoom, because it does not matter if other people are present in the room.



Students who do not have a streaming quality internet connection, an internet device with microphone and webcam are excluded from this format. Students may also be able to [borrow laptops](#) free of charge for the exam. We recommend that you carry out a test with students in advance.



Well suited for up to 25 students.



Reduction of exclusion: We recommend the "Upload" variant to reduce exclusion.

Presentations can easily be shown as a live stream; however, this will exclude students with poor Internet connections. It is advisable to have the slides, presentation material etc. sent to you by the student in advance, since splitting the screen can also reduce the streaming quality. From our point of view the presentation as video upload is in many cases a better alternative.

## Presentation via Video-Upload

Students can create their presentations at home and submit them as video. A difference to a classic seminar presentation is that students can repeat the presentation as often as they wish before submitting it.



This format differs slightly from normal presentations, but is still a reasonably familiar, calculable format for students and teachers.



Students need an internet connection to upload the video.



Students need a computer with webcam and microphone or a smart phone to create the video.



The effort for the examiners is comparable to the effort that one has to make if one takes classical papers as examination papers. However, the prior clarification of requirements and evaluation criteria for the video is now more important. If, in addition to the presentation, an asynchronous discussion is to take place among the students, a corresponding forum can be created in Moodle, for example; then guiding questions/tasks must be pre-formulated to stimulate and control the discussion. This requires little additional effort in preparing and moderating the forum.



The possibilities to prevent deception are about the same as for classical lectures. Even with normal presentations, students have the possibility to get support in preparing and elaborating the presentation, or to rehearse the presentation.



In our view, data protection is generally not a problem here.



Students who do not have an Internet connection, a computer with microphone and webcam or smartphone are excluded from this format. These should be very few students. Students may also be able to borrow laptops free of charge for the exam. We recommend that you take a test with students in advance.



Well suited for up to 30 students.



Reducing exclusion: This format is already very inclusive, especially if you also allow mobile phone videos.

From our point of view, the presentation as a video upload is a good alternative to the presentation in a live stream, however, additional effort may be required to make the presentation effective as part of the teaching (e.g. as an input or subject of discussion).