Cookbook Education Spaces

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TU Delft internal use only: scientific references have been removed

In this updated version of the original Cookbook Education Spaces (dated February 2016) the design guidelines are refined and sharpened. New insights and lessons learned which are gained in the realisation of several new and renovated education spaces on campus are used to improve this Cookbook Education Spaces towards a version 1.1.
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Summary

Education spaces at Delft University of Technology (TU Delft) are organized in a central pool in order to use and maintain the education spaces of the several faculties with a higher efficiency. It is important that all education spaces in the pool follow standardised functionality, installation and operation guidelines. A diversity of teachers, instructors, students and staff has defined in close collaboration a generic set of requirements for the educations spaces as described in this Cookbook.

How the Cookbook Education Spaces came into being

The Cookbook Education Spaces has been drawn up in close co-operation with teaching staff, students and supporting staff. Teachers who represent faculties have been bringing in their thoughts about education space classifications during workshops and in meetings with the advice council Education Spaces, chaired by the vice-chancellor. Subsequent steps have been taken to come to a generally accepted Cookbook:

1. Set-up for classification of education spaces (accepted by advice council Education Spaces)
2. Consultative group of instructors and students
   a. Workshop per space classification (collection of requirements)
   b. Reflection per space classification (accepted by consultative group)
3. First draft of Cookbook describing the specific space classes including general requirements
4. Addition of requirements from departments of FMRE and ICT
5. Approved by Advice council Education Spaces
6. Specification of functional requirements
7. Specification of technical requirements

Cookbook Education Spaces has a multifaceted objective:
- To provide an overview of education spaces and related teaching practices for instructors and lecturers
- To offer requirements per education space as checklist for designers and other external parties
- To set guidelines for standardization, operation and usability for AV and support staff

The Cookbook provides functionalities and affordances for instructors that remain the same while in course of time the ICT and AV technology is updated. This Cookbook Education Spaces is a dynamic document that is regularly monitored and updated.
Classification of teaching practices

Several teaching practices have been clustered and analysed to define education spaces from there. The following teaching practices were distinguished: (within a course often a combination of these is applied)

**Frontal Teaching** is teacher-centred. The lecturer situated at the front elaborates on a subject, shows a presentation on the screen or chalks a formula on the board. The expert explains and elaborates about a topic, and the students take home individual work or group assignments. Active learning components are gradually being brought into these practices, such as direct interaction with a feedback tool.

**Mixed Practice** is student-centred. Students follow classes with alternating practices, such as a frontal introduction and subsequently working in student groups on assignments. The teacher and assistants walk around to help where needed.

**Collaborating** focuses on team work and group assignments. Students have to apply their knowledge in projects and learn to communicate, collaborate and cooperate in teams while they are coached by the instructor.

**Testing** is for students to demonstrate what they have learned. Digital tests on computers bridge the online practices of tomorrow. Digital exam halls can also be used for computer practical.

Note: Specialised spaces, such as lab spaces, studios and workrooms that are typically faculty-bound, are accounted for by the faculty and are therefore not discussed within this Cookbook Education Spaces.
Education space typologies and requirements

The several teaching practices are translated into a diversity of education space typologies. In the space typologies there is a differentiation in basic facilities and advanced facility options. The advanced facilities can differ in interior settings, in teaching technology, in streaming and in recording facilities. Combinations of different advanced facilities are possible.

The following space types are distinguished dependent on the size of the student groups:

<table>
<thead>
<tr>
<th>Seat capacity</th>
<th>X Small</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
<th>X Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-60</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Lecture hall Tiered floor Furniture in rows</td>
<td>Lecture hall Tiered floor Furniture in rows</td>
<td>Lecture hall Tiered floor Furniture in rows</td>
<td></td>
</tr>
<tr>
<td>60-90</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction hall Terrace floor Moveable furniture in rows and groups</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>90-150</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction hall Terrace floor Moveable furniture in rows and groups</td>
<td>Instruction hall Terrace floor Moveable furniture in rows and groups</td>
<td>Exam hall Flat-level floor Furniture in rows</td>
<td></td>
</tr>
<tr>
<td>150-350+</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction hall Terrace floor Moveable furniture in rows and groups</td>
<td>Exam hall Flat-level floor Furniture in rows</td>
<td></td>
</tr>
</tbody>
</table>

The Cookbook Education Spaces provides requirements for the teaching environment, such as:

- Writing surface and teaching practice
- Proper relation between space typology, flexibility and its uses
- Audio-visual installation and lighting
- Service & support

The Cookbook Education Spaces also provides requirements for the learning environment, such as:

- Readability of presentation screens and writing boards
- Furniture and moving space for the students

The Cookbook Education Spaces provides general descriptions for:

- Basic space indicators
- Climate, lighting, acoustics & electrification
- Safety & security
Why this Cookbook

**Cookbook Education Spaces has a multifaceted objective:**

- To provide an overview of education spaces and related teaching practices for instructors and lecturers
- To offer requirements per education space as checklist for designers and other external parties
- To set guidelines for standardization, operation and usability for AV integrators and support staff

At Delft University of Technology (TU Delft) student numbers have grown drastically in the last decade. Nowadays teachers often need to give their course in several education spaces over campus within different buildings. Moving around the campus has been revealing that education spaces in the different buildings are divergent and often outdated. Moreover, problems have arisen because of different audio-visual (AV) systems and deviant teacher support resulting in delayed lectures and complaining staff.

Several education developments, such as blended practices, online courses, response systems and flipped classrooms have confronted TU Delft with a situation that curricula are changing while outdated learning spaces remain. The university is urged to start streamlining the present lecture halls and classrooms in order to facilitate the education practices of tomorrow while maintaining those of today.

This Cookbook Education Spaces recognises the given teaching practices of today and those of the coming years and presents four classes of education spaces with their corresponding affordances. It is built up from practical experiences, evaluation insights, and empirical evidence. Education space parameters have been discussed with a variety of teaching practitioners.

The departments of Facility Management & Real Estate (FMRE), Education and Student Affairs (ESA) and Shared Service Centre ICT (ICT) have recognised that interdisciplinary cooperation is vital to realise futureproof education spaces, which sustain the inevitable education change. In line with the “Roadmap Education Spaces” (June 2014) and the “Transformation Development Plan Education Spaces” (January 2016) this Cookbook Education Spaces is developed under the guidance of the Taskforce Education Spaces.

*For the update of this cookbook in February 2017 the New Media Centre TU Delft is closely involved. The Taskforce Education Spaces is now replaced by the Program Group Education Spaces and Studyplaces.*
How to use this Cookbook

The Cookbook Education Spaces informs several stakeholders within and around TU Delft. The document contains a clear structure with recognizable tabs on each page in order to find the relevant information easily.

Part A - Classification of teaching practices

An introduction to common teaching practices within TU Delft
Target group: Teaching staff and education support staff

Part B - Education space typologies

Projection of teaching practices onto space typology
Target group: Teaching staff, education support staff, designers and advisors

Part C - Education space requirements

Compulsory and optional guidelines per space typology
Target group: Designers and advisors, suppliers and technical support staff

A consistent colour scheme is used throughout the Cookbook to identify the four teaching practices.
Classification of teaching practices
Frontal teaching practices are teacher-centered. The lecturer situated at the front elaborates on a subject, shows a presentation on the screen or chalks a complex formula on the board while talking-writing its structure. The expert explains and elaborates about a topic, and individual learning happens during homework and other out of place assignments. Lectures expect a “practice and drill” follow-up from students to internalise the subject matter. Active learning components are gradually being brought into these practices to retain the attention, such as introducing more short breaks in the program, implementing short group assignments in the lecture and direct interaction with the tool ‘feedback fruits’ (in which students can vote on multiple choice questions).

Frontal teaching is suitable for large groups. However, when groups become larger, interaction between teacher and students become more difficult. A tiered space like a theatre is necessary to make sure that everyone has good sight on the presented information and lecturer.

In general, the halls exceed the capacity of 120 seats, up to an average of around 300 seats. Often such halls are arranged in rows of joint seats and pathways on either side of the space. The seats are fixed to the floor.

Characteristics of Frontal teaching:

- Writing surface (chalkboard / whiteboard) is used to teach reasoning and know-how
- ICT applications can facilitate the connection between on-campus education activities and blended or online practices
- Training and repetition during homework is used for internalisation of knowledge
- Frontal teaching becomes more active
- Spaces with advanced options can be equipped with streaming, conference and recording facilities
Writing surface (chalkboard / whiteboard) is used to teach reasoning and know-how

Chalkboards are often used by teachers at the TU Delft. It provides teachers their “talking-writing” way of reasoning. While thinking aloud they simultaneously produce and write arguments in successive order on the board. In such way their reasoning becomes visible; students see the process and structure of the several step-by-step arguments that appear on the board.

Example of chalkboard teaching (Aula)

ICT applications can facilitate the connection between on-campus education activities and blended or online practices

Courses at TU Delft become more blended. Sometimes on-campus lectures can be used in online education tracks. Several computer applications are used in teaching practices to do in-between demonstration, animation, simulation, presentation or intervention. Such applications can be alternately presented in class, one by one or simultaneously.

An advanced AV-IT system is able to present several video signals at once. Within the TU Delft a system for four-quadrant teaching is developed, with an interactive SMARTboard as teacher’s input and navigation console, but first of all as digital chalkboard. The feel and touch of such interactive SMARTboard for digital chalk should be close to their physical chalk experience. The relative small writeable SMARTboard surface has been overcome with the introduction of four parallel video signals.
Streaming and recording facilities enhance the possibilities to address larger classes. Streaming provides live classes regardless of place, and recording facilities provide time and place independency.

Training and repetition during homework is used for internalisation of scientific knowledge

Frontal teaching is only one part of the learning objective. Students listen to the lecturer and take notes about a subject. The explanation, argumentation and reasoning within the lecture hall are for the students’ comprehension. The second part of the learning objective is to internalise the discoursed method or technique by training and repetition during homework.
Frontal teaching becomes more active

Education is changing into more active classes. Flipped and inverted classes focus more on practicing homework assignments in class in attendance of a coaching lecturer. This demands classroom layouts that facilitate a more collaborating setting between students. In the next chapter mixed teaching practices will be introduced.

For frontal teaching additional practices were introduced to make lectures also a more active learning experience. Teachers may make use of response clicker tools, such as ‘feedback fruits’ in order to measure the students’ knowledge level. Another method is introducing periodical pauses to increase the students’ activity: each fifteen minutes students have to clarify their notes with a companion in a two-minute break.

Spaces with advanced options can be equipped with streaming, conference and recording facilities

Lecture capture is used to record what instructors do in their classes to make it available for students to look back. It records the movements of the teacher (and, if applicable, chalkboard) together with audio from microphone and computer. These signals are combined with the computer’s data signal such as a PowerPoint presentation. The compound audio-visual signal can be live-streamed over the Internet to be followed at a remote location or made available at a university portal for replay.

Sometimes the seat capacity of a lecture hall is insufficient for the number of students. In such case two or more lecture halls are combined and facilitated with audio-visual streaming capabilities or hard-wired signal distribution.
Videoconference is used when two or more classrooms at different locations want to communicate simultaneously. There is a huge difference in signal quality between dedicated videoconference systems and software add-on’s for laptop or computer. Add-on software is more suitable for personal and temporary use while dedicated codecs have high quality streams for a more permanent installation.
Mixed Practice is student-centred. It focuses on classes with alternating practices, such as frontal introduction about a topic and subsequently tutoring student groups while working in groups on assignments. Student-centred teaching has an all-in-one learning objective. Students have to understand a certain criterion, method or technique and have to apply it within the assignment. Mixed Practice demands classroom layouts that facilitate collaborating settings for students.

Therefore classrooms for Mixed Practice are flat levelled and have moveable furniture to be arranged for several education practices, such as alternating between frontal and group layouts, different group settings or debating arrangements. The capacity for small groups is up to 60 and for moderate groups up to 90 seats. Sometimes flat-level spaces are demanded even for larger groups up to 150 seats. However, such larger spaces need special care for sightlines and acoustics and are therefore in need of several floor levels (terraces). Hence, a maximum capacity for flat level classrooms is advised to be about 90 seats.

Characteristics of Mixed Practice:

- The lecturer’s role alternates between frontal instruction and group coaching
- Flipped classes attempt to enhance the quality of contact hours
- Peer-learning is important for cognitive and communication skills
- Project assignments are useful for students to develop problem solving skills and application of taught methods
The lecturer’s role alternates between frontal instruction and group coaching

Mixed practice focuses on classes with alternating practices, such as frontal introduction about a topic and subsequently tutoring student groups while working in teams on assignments. Mixed teaching practices have built-in activities for understanding and deep learning, which are designed around themes and try to improve the engagement of the participating students.

The instructor fulfils different roles when the teaching practice changes in the classroom; sometimes as lecturer when a topic is treated in-depth or elaborated further on the chalkboard, and sometimes as coach wandering through class when students work at assignments.

Flipped Classes attempt to enhance the quality of contact hours

Flipped classroom scenarios reform the traditional transmissive lecture. The teacher-centric lecture is replaced by short videos and made available for online homework. Students need to take notice of the online materials in advance and may post questions about subjects that are hard to understand. Successively in class, the difficult study materials are extensively explained by instructor or student-assistants. At the same time students practice the learning objectives more in-depth through assignments, both personal and in groups. In such way contact hours are used intensively and more specifically focussed on the taught topic.

(preparing for lectures at home)

(illustration by Mark van Huystee)
Peer-Learning is important for cognitive and communication skills

Classrooms with flexible furniture can facilitate arrangements in which students work together, be it to train techniques personally or to work out group assignments in teams. Especially practices where students work together have additional learning objectives, often called peer learning.

Peer learning is acquisition of knowledge and development of skills through active helping and supporting among fellow students. It involves sharing and discussion of knowledge and is mutual beneficial. Students learn intensely by explaining their own ideas to others when they participate in group activities. They develop skills such as organizing and planning when working collaboratively with others, when they give and receive feedback, and when they evaluate their own learning.

Students do not only form partnerships in class, but may team up afterwards (buddies) to work collaboratively on tasks, both in formal and informal ways.

Example of advanced education space for mixed practice (Wim Crouwel hall Industrial Design)
Project assignments are useful for the development of students’ problem solving skills and application of taught practices

Project assignments are active and hold collaborative or cooperative elements. It typically involves a significant amount of self-directed learning for students.

Project assignments for coached and self-directed teams aim at mastering problem solving skills. Problem solving is a behavioural process that collects and selects alternatives for dealing with a complex situation. Students learn how to discover the most effective way of responding.

Example of basic education space for mixed practice (Building 26, hall 1). Table rows with smaller tops (60cm) and broader tops (80cm) for easy switch from rows to groups. Only chairs have to be turned.
Collaborating focuses on team work and group assignments. Students work on problem-based scenarios and learn to communicate, collaborate and cooperate in teams. The co-creation in mono- and multidisciplinary collaboration, under the supervision of a teacher/coach, will provide the student with valuable information about these sorts of processes.

Education spaces facilitate one or several groups up to about 10 participants. When in need, the student-teams may use a dedicated space for longer periods and leave their project stuff in available storage.

Characteristics of Collaborating:

- Communication and collaboration skills can be developed and trained through groupwork assignments

Writing facility per group  Group table(s)  Advanced option: virtual writing  Advanced option: conference facility
Communication and collaboration skills can be developed and trained through groupwork assignments

Information and communication technologies are integrated in today's learning processes. Changing and emerging skills are shared decision-making, (online) information sharing, (online) collaboration, continuing innovation, speed and agility.

Collaborative skills are trained when students work together in order to accomplish group tasks. Students can learn about subject matter and develop interpersonal skills at the same time to work with peers in teams. They learn about communication, leadership and conflict management during such cooperative learning sessions.
Classification - Testing

Education spaces for Testing are the situations where students demonstrate what they have learned. It is about knowledge, understanding and application, and about comparing their personal construct with the TU Delft’s learning objectives. It is an instrument for determining the students’ progress. Computer halls often facilitate both practicals and digital exams.

Characteristics of Testing:

• Large groups doing exams are in need of silence
• The demand for digital exams is growing
Large groups doing exams are in need of silence

Paper exams are easily to facilitate. Large halls with sufficient lighting, clear sightlines and acoustic protection for environmental sounds will do. Tables and chairs are arranged in separate rows and columns. Silence during the test is obligatory and long aisles provide the invigilator to walk slowly around the hall to prevent cheating.

Multiple synchronised clocks inside and outside the hall are necessary. Of course signage with information concerning the planned exams is required.

The demand for digital exams is growing

Digital assessment is growing. It also increases under the influence of open and online education. Initially the growth was only due to summative exams. Now formative exams are gaining a serious part because of its possibility to enlarge the students’ success rate. Furthermore, the increasing number of students at the university asks for more efficient exam procedures.
It is important to assess both student and instructor experiences with respect to security, reliability and question type.
Example of advanced exam hall for digital exams (Drebbelweg)
Education Space Typologies

From teaching practice to space typology
Education Space Typologies

The four teaching practices, which are distinguished in part A, request different education space typologies. In this chapter the teaching practices are translated into several types of spaces that facilitate the different teaching practices best, with seat capacity as a determining variable.

Each space typology is differentiated into a basic and an advanced format for AV-IT installation and interior design.

<table>
<thead>
<tr>
<th>Seat capacity</th>
<th>X Small &lt; 30</th>
<th>Small 30-60</th>
<th>Medium 60-90</th>
<th>Large 90-150</th>
<th>X Large 150-350+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frontal teaching</strong></td>
<td>X</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Lecture hall Tiered floor Furniture in rows</td>
<td>Lecture hall Tiered floor Furniture in rows</td>
<td>Lecture hall Tiered floor Furniture in rows</td>
</tr>
<tr>
<td><strong>Mixed practice</strong></td>
<td>X</td>
<td>Instruction room Flat-level floor Moveable furniture in rows and groups</td>
<td>Instruction room Flat-level floor Moveable furniture in rows and groups</td>
<td>Instruction hall Tiered floor Moveable furniture in rows and groups</td>
<td>X</td>
</tr>
<tr>
<td><strong>Testing (paper)</strong></td>
<td>X</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction room Flat-level floor Furniture in rows</td>
<td>Instruction hall Flat-level floor Furniture in rows</td>
<td>Exam hall Flat-level floor Furniture in rows</td>
</tr>
<tr>
<td><strong>Digital testing</strong></td>
<td>PC-hall Flat-level floor Furniture in rows or groups</td>
<td>PC-hall Flat-level floor Furniture in rows or groups</td>
<td>PC-hall Flat-level floor Furniture in rows or groups</td>
<td>PC-hall Flat-level floor Furniture in rows or groups</td>
<td>PC-hall / Advanced exam hall Flat-level floor Furniture in rows</td>
</tr>
<tr>
<td><strong>Collaborating</strong></td>
<td>Project room Flat-level floor Furniture in groups</td>
<td>Project room / Advanced instruction room Flat-level floor Furniture in groups</td>
<td>Project room / Advanced instruction room Flat-level floor Furniture in groups</td>
<td>Project hall / Advanced instruction hall Flat-level floor Furniture in groups</td>
<td>X</td>
</tr>
</tbody>
</table>

Table: Space typologies differentiated by teaching practice and seat capacity

**Multifunctional Space Typologies**

Education spaces can be arranged in such a way that several teaching practices could be supported in a single space. In the text below logical combinations are proposed. When requirements for a multifunctional space are too divergent, the most demanding education practice requirements get priority.
**Small instruction room for Frontal teaching, Mixed practice and Testing**
A small education room is sometimes able to facilitate Frontal teaching, Mixed practice and Testing (paper). The seat capacity for testing could be less, because of the space needed between students.

![Frontal teaching](image1) + ![Mixed practice](image2) + ![Testing (paper)](image3)

**Medium or large instruction room for Mixed practice and Testing**
Medium and Large sized education spaces for Mixed practice can also be made suitable for Testing (paper). The seat capacity for testing could be less, because of the space needed between students. Due to the flat-leveled floor in combination with the space depth, these education spaces are less suitable for Frontal teaching.

![Mixed practice](image4) + ![Testing (paper)](image3)

**Small, medium or large advanced instruction room for Mixed practice, Collaborating and Testing**
When the furniture is arranged in group mode Small, Medium or Large sized education spaces for mixed practice could also be used for Collaborating. For testing (paper) the furniture should be arranged in rows.

![Mixed practice](image4) + ![Collaborating](image5) + ![Testing (paper)](image3)

**PC-halls for Digital testing and computer practical**
Computer halls could be used for computer practical and digital exams.

![Digital testing](image6) + ![Computer practical](image7)
Space typologies Frontal teaching

Lecture hall – Basic – M/L

Lecture hall – Basic – XL

Lecture hall – Advanced - XL

advanced option: SMARTboard and four quad projection
Space typologies Mixed practice

**Instruction room – Basic – XS S M**
- Frontal layout
- Table rows with smaller and broader tops
- Group layout - chairs are turned

**Instruction room – Adv. – XS S M**
- Frontal layout – digital writing and LCD-screens
- Group layout - tables and chairs are moved

**Instruction hall – Basic – L**
- Frontal layout - table rows with smaller and broader tops
Space typologies Mixed practice

Instruction hall – Basic – L

- group layout - chairs are turned

Instruction hall – Adv. – L

- moveable furniture in group layout – advanced option: digital writing

Special – Advanced – L

- advanced option: discussion layout
Space typologies Collaborating

Project room – Adv. - XS

Project room – Basic. – S M L

whiteboard per group table

Project room – Adv. – S M L

LCD-screen per group table
Space typologies Exams

Instruction room – Basic – S, M, L

- Basic exam hall
- Basic instruction rooms can be made suitable for paper exams

Exam hall – Basic – XL

PC hall – Advanced – S, M, L

- PC-hall for digital exams and computer practical
Examples of Education spaces for Frontal teaching

AE – Hall A (Advanced option: digital writing)
Architecture – Hall A

Examples of Education spaces for Mixed practice

Building 26 – Hall 1
TNW South – Franklinhall (Adv. option: digital writing)

AE – Hall K
IDE – IDE Arena (Special: discussion arrangement)
Examples of Education spaces for Collaborating

Fellowship – Projectroom 3
Drebbelweg – Projectroom 5 (Adv. option: LCD-screen)

Examples of Education spaces for Testing

Drebbelweg – Hall 2
Drebbelweg – Hall 1 (paper exams & digital testing)
IDE – SHIFT (digital testing & computer practical)
CITG – PC-hall 1.97 (digital testing & computer practical)
Education Space Requirements

Compulsory and optional guidelines per space typology
Requirements - Common

The following requirements count for all education spaces:

**Space indicators**

- Ceiling height in relation to space depth is crucial. Ceiling height is dependent on student sight lines on projection screens and boards.
- No construction elements in sight lines students and lecturer
- Entrance preferably at the side or back of the education space
- Provision for one or two wheelchairs dependent on space capacity. Places for wheelchairs should be integrated in the space planning with good sight on lecturer and boards and screens.
- (Door) window to see if education space is vacant/occupied
- Silent closing doors
- Blinds and/or shades dependent on sun and daylight circumstances
- Materialisation and detailing for easy cleaning and low maintenance
- Sink installed in case of chalkboards

**Furniture & accessories**

- Materials of furniture resistant to food and drinks
- Coat rack for teacher
- Bins inside and outside the education space
- Synchronised KNX-clock with hands at sidewall in education space and adjacent corridors. Visible for both instructor and students.

**Presentation screens & writing boards**

**Presentation screens**

- Projection screen and writing boards positioned next to each other to be used simultaneously
- Presentation screen’s underside approximately 200 cm above floor level for larger education spaces, so the lecturer and/or the SMARTboard are not in front of the projection
- Presentation screen’s underside at least 140 cm above floor level for smaller education spaces, preferably higher
- Projection screen’s aspect ratio is 16:9
- Written and presented character heights must be between 17 and 20 arc minutes (17’-20’) for proper readability
- Written characters are preferably presented white on a dark background (also on LED displays)
- Vertical viewing angle to presentation screen at first row is preferably about 25 degrees
- Horizontal viewing angle to presentation screen and writing boards at the first row are preferably about 35 degrees
- Projection screen surface, ceiling height and character height are dependent on reading distance at the last row. See table below.
- Maximum reading distance of SMARTboards is about 10 m. For larger reading distances the signal of the SMARTboard should be projected on a screen.

**Writing boards**

- Chalkboards preferably height adjustable
- Dry erasable whiteboards have a maximum reading distance of about 8 m. Chalkboards are still readable at a distance of 30 m.
AV & IT

Computer & laptop
- Classroom computer available
- Standardised operation panel and connection assembly with 5" operation panel, key lock, 2 * USB connector, connectors for one laptop, i.e. VGA with audio, HDMI and DisplayPort, (optional) 2 * network connector, 2 * power socket, and light control buttons

Dimensions: width = 80 cm, height = 13.65 cm, depth = 12.5 cm

- AV-IT operation behind key lock or campus card
- 19" AV-rack close to or under lectern or desk (19"*12HE, ca 52x52x60 cm bxdxh)

Projection
- Projector or LED display available in every education space
- LED/LASER projector(s) or LED displays, default 1920*1080
- Projector’s illumination between 600 to 1000 lumen per m²
- Brightness of LED display dependent on space circumstances
- Pixel density of electronic displays at least 30 PPI
- Image mute available in order to mute the projection screen for in between interventions

Sound
- Speakers
- Ear-worn microphone dependent on space dimensions. Voice amplification preferably with ceiling speakers
- Ducking is default (when talking in microphone then other sound sources are suppressed for two seconds).

Cameras:
- AV-IT control units and cameras connected to network for remote monitoring and service

Network & cabling
- Wi-Fi in each education space, for specifications see ‘Blueprint TU Delft Wireless Network’.
- Network data cabling at least UTP CAT6, for specifications see ‘Basis Netwerk Voorziening SSC-ICT’
- Network fibre must be single core OS2, for specifications see ‘Basis Netwerk Voorziening SSC-ICT’
- AV installation able to be shut down with master sweep pulse
- AV installation connected to alarm system
- AV cabling is dependent on installation, for specifications refer to AV integrator
- Telephone with fixed line for instant help

Climate, electrification, acoustics & lighting
- Sufficient climate dependent on capacity of education space (fresh air, CO2, temperature). For specifications see ‘Ruimtematrix TU Delft – CONCEPT’ by FMVG
- Blinds and window shades operational both at door and lecturer’s desk
- Electrification preferably from wall. In some cases electrification from the floor is more suitable.
- Spatial acoustics tuned for speech. For specifications see ‘Ruimtematrix TU Delft – CONCEPT’ by FMVG
- Acoustic insulation from surroundings (hallway, adjacent education space). For specifications see ‘Ruimtematrix TU Delft – CONCEPT’ by FMVG
- Operation of lighting with pre-set buttons both at door and lecturer’s desk. At least two separate lighting scenes for presentation/teacher environment and for student seats. For specifications see ‘Ruimtematrix TU Delft – CONCEPT’ by FMVG
- Lighting to be shut down with master sweep pulse
Service & support

- Functional pictograms and seat capacity indication at space entrance (analogue or digital).
- Preferably a service bag at Service Desk holding HDMI cable, VGA+audio cable, (optional) DisplayPort cable, presentation tool, fresh whiteboard markers (4 colours). Otherwise available in class.
- Every morning clean space, floor and furniture
- Cleaned or erased chalk- and whiteboards after each class (instructions for lecturer to leave a clean board)
- Fresh water bucket with sponge to erase chalkboards, when sink is not available
- Sufficient dust-free chalk available in class
- List of direct telephone numbers for instant support close to telephone
- Bilingual support standby to avoid delay in beginning of class, professional and reliable (hospitality)
- Operational teacher problems must be taken seriously, whether simple or complex. Support is only to be dismissed when the problem is solved
- Standardised documentation of education space AV-IT installations, diagrams, data sheets and program sources at service department

Safety & security

- No loose cables and wirings
- Doors of education space are preferably locked electronically; entrance with RFID card
- Standardised protocol how to handle in alarming situations. Emergency factsheet available with help numbers. Guidelines for evacuation available.
- An emergency situation switches lighting to full, opens blinds and shades, and shuts down the AV-IT installation. Optional: the AV installation shows escape plan on screen

<table>
<thead>
<tr>
<th>Reading Distance</th>
<th>Projected Character Height (17'-20')</th>
<th>Minimum Projected Image Dimensions</th>
<th>Minimum Ceiling Height in Tiered Lecture Halls</th>
<th>Minimum Ceiling Height in Flat Level Lecture Halls</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 m</td>
<td>4.0 - 4.7</td>
<td>180 * 101 cm</td>
<td>-</td>
<td>100 + 140 + 20 = 260</td>
</tr>
<tr>
<td>10 m</td>
<td>4.9 - 5.8</td>
<td>240 * 135 cm</td>
<td>-</td>
<td>135 + 140 + 20 = 295</td>
</tr>
<tr>
<td>12 m</td>
<td>5.9 - 7.0</td>
<td>280 * 158 cm</td>
<td>158 + 200 + 20 = 378 cm</td>
<td>160 + 140 + 20 = 320</td>
</tr>
<tr>
<td>14 m</td>
<td>6.9 - 8.1</td>
<td>330 * 186 cm</td>
<td>186 + 200 + 20 = 406 cm</td>
<td>-</td>
</tr>
<tr>
<td>16 m</td>
<td>7.9 - 9.3</td>
<td>380 * 214 cm</td>
<td>214 + 200 + 20 = 434 cm</td>
<td>-</td>
</tr>
<tr>
<td>18 m</td>
<td>8.9 - 10.5</td>
<td>430 * 242 cm</td>
<td>242 + 200 + 20 = 462 cm</td>
<td>-</td>
</tr>
<tr>
<td>20 m</td>
<td>9.9 - 11.6</td>
<td>480 * 270 cm</td>
<td>270 + 200 + 20 = 490 cm</td>
<td>-</td>
</tr>
<tr>
<td>22 m</td>
<td>10.9 - 12.8</td>
<td>530 * 298 cm</td>
<td>298 + 200 + 20 = 518 cm</td>
<td>-</td>
</tr>
<tr>
<td>24 m</td>
<td>11.9 - 14.0</td>
<td>580 * 326 cm</td>
<td>326 + 200 + 20 = 546 cm</td>
<td>-</td>
</tr>
</tbody>
</table>

Table: advised minimum dimensions of projection for given reading distances

NB 1: The table shows the projected image dimensions without frame
NB 2: About 20 cm extra height is considered for ceiling heights due to projection screen assembly
Requirements - Frontal pedagogy

### Space indicators

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daylight</td>
</tr>
<tr>
<td>Space ratio preferably 2:3</td>
</tr>
<tr>
<td>Capacity 30 - 60 seats &gt; flat level floor</td>
</tr>
<tr>
<td>Capacity 60 - 350+ seats &gt; tiered floor</td>
</tr>
<tr>
<td>Learning Place Area ≈ 1,0 m² per student (FNO, user space) in case of fixed college furniture</td>
</tr>
<tr>
<td>Maximum distance to last row is up to about 24 m</td>
</tr>
</tbody>
</table>

### Advanced options

<table>
<thead>
<tr>
<th>Furniture &amp; accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathways on either side of the space</td>
</tr>
<tr>
<td>Lateral pathways for easy accessibility and moving space for lecturer</td>
</tr>
</tbody>
</table>

**Student facilities**

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rows of folding seats and folding table tops over multiple levels</td>
</tr>
<tr>
<td>Row distance &gt; 95 cm</td>
</tr>
<tr>
<td>Row passage &gt; 45 cm</td>
</tr>
<tr>
<td>Seating fixed to the floor</td>
</tr>
<tr>
<td>Centre-to-centre distance seats ≈ 55 cm</td>
</tr>
<tr>
<td>Table surface large enough for laptop and notebook (depth ≈ 40 cm, width ≈ 50 cm)</td>
</tr>
<tr>
<td>At least 1 power socket per student</td>
</tr>
<tr>
<td>A folding table for person in wheelchair could be considered</td>
</tr>
</tbody>
</table>

**Lecturer’s facilities**

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectern or desk positioned on the side, not in line with / in front of projection screen</td>
</tr>
<tr>
<td>In case of large tiered lecture hall:</td>
</tr>
<tr>
<td>Lectern, workplace on lecture min. 80 x 60 cm</td>
</tr>
<tr>
<td>In case of smaller, flat level halls:</td>
</tr>
<tr>
<td>Height adjustable chair on casters</td>
</tr>
<tr>
<td>Desk 140 x 70 cm prepared for standardized control panel and monitor arm</td>
</tr>
<tr>
<td>Front panel at desk to hide cables and 90” rack</td>
</tr>
<tr>
<td>Optional: movable table available for demonstrations</td>
</tr>
</tbody>
</table>

### Boards & screens

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two to four height adjustable chalkboards or whiteboards dependent on space possibilities (at least 6 up to16 m²).</td>
</tr>
<tr>
<td>Sizes chalkboards as large as possible, for example double boards in front of each other</td>
</tr>
<tr>
<td>Projection screen, see common requirements</td>
</tr>
<tr>
<td>Wall behind presentation screen(s) could have a dark</td>
</tr>
</tbody>
</table>

**Boards & Screens**

| Quad signal projection screen, ceiling height and character height dependent on reading distance at the last row. The table lists advised dimensions for given reading distances. see table below |

---

---
- Colour (preferably night shade dark blue) for better contrast and easier reading of the projection
- As fall-back scenario a traditional chalkboard can be provided too

### AV & IT

- LED Laser projector 1920*1080
- Computer display for lecturer to see projected slides during lecture
- Provision for the hearing impaired dependent on education space
- Provision for the vision impaired dependent on education space

### Advanced options

- 3D Visualizer (document camera)
- Virtual writing: Interactive SMARTboard (scaled to 1920*1080 pixels) and UHD projector (3840*2160) with up to 12,000 ANSI-lumen (4 quadrants, each 1920*1080).
- Advanced operation assembly with: 10” panel, key lock, USB connectors, power sockets, light buttons and connectors for two laptops, i.e. network, VGA with Audio, HDMI, and DisplayPort. Dimensions: w=116 cm, h=20.25 cm, d=17 cm
- Second ear-worn microphone and/or handheld microphone
- Lecture capture and recording
- AV streaming
- Video conferencing facilities

### Safety & security

- Tiered lecture halls have guiding lights on stair steps
- Precaution and safety arrangements in case of an elevated teacher platform

### Advanced options

Table: reading distance and ceiling height in case of quad projection screen

<table>
<thead>
<tr>
<th>Reading Distance</th>
<th>Projected Character Height (14'-17')</th>
<th>Projected Image Dimensions</th>
<th>Minimum Ceiling Height for 4Q Lecture Halls</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 m</td>
<td>4.9 - 5.9</td>
<td>409 * 230 cm</td>
<td>230 + 200 + 20 = 450</td>
</tr>
<tr>
<td>14 m</td>
<td>5.7 - 6.9</td>
<td>477 * 268 cm</td>
<td>268 + 200 + 20 = 488</td>
</tr>
<tr>
<td>16 m</td>
<td>6.5 - 7.9</td>
<td>545 * 307 cm</td>
<td>307 + 200 + 20 = 527</td>
</tr>
<tr>
<td>18 m</td>
<td>7.3 - 8.9</td>
<td>613 * 345 cm</td>
<td>345 + 200 + 20 = 565</td>
</tr>
<tr>
<td>20 m</td>
<td>8.1 - 9.9</td>
<td>681 * 383 cm</td>
<td>383 + 200 + 20 = 603</td>
</tr>
<tr>
<td>22 m</td>
<td>9.0 - 10.9</td>
<td>750 * 422 cm</td>
<td>422 + 200 + 20 = 642</td>
</tr>
<tr>
<td>24 m</td>
<td>9.8 - 11.9</td>
<td>818 * 460 cm</td>
<td>460 + 200 + 20 = 680</td>
</tr>
</tbody>
</table>

Table: reading distance and ceiling height in case of quad projection screen

NB 1: The table shows the projected image dimensions without frame
NB 2: About 20 cm extra height is considered for ceiling heights due to projection screen assembly
## Requirements - Mixed pedagogy

### Space indicators

<table>
<thead>
<tr>
<th>• Daylight</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aspect ratio space preferably 3:4</td>
</tr>
<tr>
<td>• Capacity 30 - 90 seats &gt; flat level floor</td>
</tr>
<tr>
<td>• Capacity 90 - 150 seats &gt; terrace floor</td>
</tr>
<tr>
<td>• Learning Place Area ≈ 2,2 m² (FNO, user space)</td>
</tr>
</tbody>
</table>

### Advanced options

| • Learning Place Area ≈ 2,5 m² (FNO, user space) |
| • When space dedicated to debating, student seats may be positioned in U-shape with tiered floor |

### Furniture & accessories

#### Student facilities

Furniture must facilitate different arrangements (rows, groups, U-shape) for different teaching practices.

For example:

- Table rows with smaller tops (60cm) and table rows with broader tops (80cm) for easy switch from rows to groups. Only chairs have to be turned.
  - Revolving chairs on casters, height adjustable
  - Simple tables which can be used on both sides
- Movable tables and chairs to facilitate maximum flexibility
  - Stackable chairs
  - Lightweight tables on casters
- Distance between rows of tables 80-90 cm
- Table surface large enough for laptop and notes (preferably 80 x 60 cm for single, 140 x 70 cm for double)
- At least 1 power socket per student (attention to cable management)
- Lateral pathways for safer student entrance and easier teacher access to students, preferably 90 cm
- Terrace floors have two rows of tables and seating per level
- In halls with a capacity of >100 seats furniture should be arranged in such way, that chairs do not need to be fixed to the floor or connected to each other. (See Bouwbesluit article 7.13)

#### Lecturer’s facilities

- Height adjustable chair on casters
- Desk at least 140 x 70 cm prepared for standardized control panel and monitor arm
- Front panel at desk to hide cables and 90° rack
- Desk positioned on the side, not in line with / in front of projection screen
- Optional: movable table available in case of demonstration

| • More comfortable seats with finer upholstery |
| • Larger tables and more space around them |
| • A grid of electricity outlets in the floor for maximum freedom of furniture arrangements |
| • FlexStool furniture |
### Boards & screens

<table>
<thead>
<tr>
<th><strong>Advanced options</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Chalkboard or whiteboard for the lecturer (readability whiteboard &lt; 8m)</td>
</tr>
<tr>
<td>• Multiple erasable whiteboards or continuous whiteboard strip on sidewalls for break-out sessions, at least 100 cm from floor level. Height of whiteboard (strip) is about 100 to 125 cm</td>
</tr>
<tr>
<td>• Wall behind presentation screen(s) could have a dark colour (preferably night shade dark blue) for better contrast and easier reading of the projection</td>
</tr>
</tbody>
</table>

| **8084i Interactive SMARTboard with 84" LED display as second screen** |
| **Computer display for teacher to see projected slides during lecture** |
| **LED display on side walls for each table to facilitate groupwork** |
| **As fall-back scenario a traditional chalkboard can be provided too** |

### AV & IT

<table>
<thead>
<tr>
<th><strong>Advanced options</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• LED laser projector (about 7000 ANSI-lumen &lt; 12m and about 12000 ANSI-lumen &gt; 15 m)</td>
</tr>
</tbody>
</table>

| **Second ear-worn microphone and/or handheld microphone** |
| **3D Visualizer (document camera)** |

### Other

<table>
<thead>
<tr>
<th><strong>Advanced options</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Optional: Classroom available as informal workspace after teaching hours</td>
</tr>
</tbody>
</table>

| **Second ear-worn microphone and/or handheld microphone** |
| **3D Visualizer (document camera)** |
Requirements - Collaborating

<table>
<thead>
<tr>
<th>Space indicators</th>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daylight</td>
<td>• Learning Place Area ≈ 2,8 m² (FNO, user space)</td>
</tr>
<tr>
<td>• Space ratio optimally 3:4</td>
<td></td>
</tr>
<tr>
<td>• Flat level floor</td>
<td></td>
</tr>
<tr>
<td>• Learning Place Area ≈ 2,7 m² (FNO, user space)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Furniture &amp; accessories</th>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Single group-table 6-10 persons. Several group-tables in larger project spaces</td>
<td>• Wider distance between seats</td>
</tr>
<tr>
<td>• Electrification from centre of table (attention to cable management)</td>
<td>• More comfortable seats with finer upholstery</td>
</tr>
<tr>
<td>• At least 1 power socket per participant</td>
<td></td>
</tr>
<tr>
<td>• Table depth at least 80 cm, table(s) may be moveable</td>
<td></td>
</tr>
<tr>
<td>• Simple chairs</td>
<td></td>
</tr>
<tr>
<td>• Centre-to-centre distance chairs at least 55 cm (dependent on seat width)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boards &amp; screens</th>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sufficient writing surface (about 2 m²) per group table</td>
<td>• LED display per group-table for presentations, dimensions see table below</td>
</tr>
<tr>
<td>(whiteboard and/or flip-over), fixed on the wall or moveable</td>
<td>• SMARTboard in combination with LED display for interactive sessions</td>
</tr>
<tr>
<td>• Maximum reading distance whiteboard ≈ 8 m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AV &amp; IT</th>
<th>Advanced options</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Video conferencing facilities</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reading Distance</th>
<th>Displayed Character Height (14')</th>
<th>LED Diagonal for Excel, drawings, etc</th>
<th>LED Diagonal for PowerPoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 m</td>
<td>1.2</td>
<td>70&quot;</td>
<td>32&quot;</td>
</tr>
<tr>
<td>4 m</td>
<td>1.6</td>
<td>84&quot;</td>
<td>46&quot;</td>
</tr>
<tr>
<td>5 m</td>
<td>2.0</td>
<td>98&quot;</td>
<td>55&quot;</td>
</tr>
<tr>
<td>6 m</td>
<td>2.4</td>
<td>-</td>
<td>70&quot;</td>
</tr>
<tr>
<td>7 m</td>
<td>2.9</td>
<td>-</td>
<td>84&quot;</td>
</tr>
<tr>
<td>8 m</td>
<td>3.3</td>
<td>-</td>
<td>98&quot;</td>
</tr>
</tbody>
</table>

Table: central LED display recommendations
# Requirements - Testing

## Space indicators

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • Robust flat level floor, e.g. no computer floor (because of acoustics and floor movements)
  | • Learning Place Area = 2,5 m² (FNO, user space)
  | • Clear sight lines and multiple aisles for invigilators
  | • In large exam halls the student enters preferably at one end (entrance) and leaves at another (exit). Such fixed route is easier to control and less disturbing
  | • Perhaps an elevated platform at the front for invigilators to provide better view in large exam halls
\end{itemize} |

## Furniture & accessories

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • **Student facilities**
    |   o Height adjustable chair
    |   o Single person table 80 x 60 cm (or 70 x 70 cm workspace per student)
    |   o Distance between student’s workspaces at least 60 cm
    |   o Centre-to-centre row distance = 120 cm
    |   o Aisle width Small = 60 cm
    |   o Aisle width Large = 100 cm
  | • **Invigilator’s facilities**
    |   o Height adjustable chair on casters
    |   o Desk 140 x 70 cm
    |   o Locker to store paper exams
  | • Often an education space for frontal teaching or mixed practices is also used for testing. In case of two-person-tables only half of the table can be used to prevent fraud. In such case the testing capacity of the room is lower than its seat capacity.
\end{itemize} |

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • Preferably one locker per student to store phone, bag, computer near the exam hall
  | • **Computer instruction- and testing:**
    |   o Desk 140 x 70 cm prepared for standardized control panel and monitor arm
    |   o Front panel on desk to cover cables and 90" rack
    |   o Robust digital exam furniture
\end{itemize} |

## Boards & screens

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • Whiteboard or chalkboards available for exam information (inside and outside the hall). Multiple information screens in larger halls
\end{itemize} |

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • Projection screen in case of computer instruction and computer testing
\end{itemize} |

## AV & IT

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • Automatic entrance control (card readers) for authorized exam taking
\end{itemize} |

<table>
<thead>
<tr>
<th>Advanced options</th>
</tr>
</thead>
</table>
| \begin{itemize}
  | • **Computer instruction and –testing:**
    |   o Wired network and power (no Wi-Fi)
    |   o Secured environment
    |   o Possibility for instructor to take over all
\end{itemize} |
Computers’ displays during computer practical
- Projector with specific colour lens in order to project the different functional colours clearly which are used within computer programming applications

### Climate, acoustics & lighting:
- Exam hall must be acoustically dim. For specifications see ‘Ruimtematrix TU Delft – CONCEPT’ by FMVG
- Sound amplification for exam halls larger than 60 seats
- Acoustics should lock out disturbing environmental noises, also between education spaces. For specifications see ‘Ruimtematrix TU Delft – CONCEPT’ by FMVG
- The hall doors should close softly and silently

### Safety & security
- Invigilators must be trained how to handle alarming situations
- Emergency aid (BHV) must be present during exam periods
- Guidelines for evacuation available, especially in temporary halls

### Service & support
- Finished paper exams are collected by invigilators at the exit
- Students with disabilities should be name-placed in quiet zones
- Protocols available how to proceed with digital exams in case of power failures
- ICT support must be present during digital exams

### Other
- During exams no disturbing noisy events may take place
- Catering services nearby
- Sufficient number of toilets nearby. Certainly with large cohorts.
- Copying services in the vicinity (e.g. to print paper exams in case of computer failure).
- Bilingual invigilators or proctors (Dutch and English)
- Spaces that are temporarily used for exams (such as Sports Hall) need special arrangements for logistics, entrance, silent zones, etc.
- During exam periods an officially ‘loading and unloading zone’ must be declared near the entrance of every building to bring paper exams.
- Spare time of around half an hour before and after exam for facility management to convert the exam hall for instance from paper exam to digital exam
Studiewerkplekwijzer

Study places guide
Version 1.0 - published 3 November 2015

Initiated by:
Working group Studyplaces

Made by:
Kelvin Berghorst (FMRE)
Catelijne Elissen (FMRE)
Paul Uiterdijk (FMRE)
Dennis Cruijen (FMRE)
Liesbeth Mantel (Library)
Iris van Loon (ESA)

In collaboration with:
Bram de Kruijff (SR 2014-2015)
Locatie
Fontys Eindhoven

Type
Studiewerkplek

Omschrijving
✓ Studieplek waar studenten langdurig kunnen studeren

Bedoeld voor
✓ langdurige, solistische zelfstudie met gebruik van een PC of laptop

Locatie
Library TU Delft

Type
Stiltewerkplek laptop

Afmetingen en indeling
✓ Het advies is uit te gaan van 4m² per plek en een tafelblad van minimaal 1*0,8m

Voorzieningen
✓ Verstelbare stoel met verstelbare armleuningen
✓ Wandcontactdoos op elke werkplek
✓ Deels uitgevoerd met beeldscherm en muis, of een PC
✓ WIFI vereist
✓ Geluidswerende maatregelen (bijv. Schotjes)
✓ In de nabijheid van een printer (mits rekening houden met geluid)

Situering
✓ Bij voorkeur is de studieplek gelegen aan een buitengevel en voorzien van direct daglicht
✓ Situering van de ruimte bijvoorkeur in een rustig gebied binnen het gebouw

Locatie
EWI TU Delft

Type
Digitale werkplek met vaste PC

Bron
Gispen.nl
Locatie
Library TU Delft

Type
Aanlandplek

Omschrijving
✓ Studieplek waar studenten kortstondig kunnen studeren.

Bedoeld voor
✓ Kortdurende, solistische of projectgerichte zelfstudie.

Locatie
EWI TU Delft

Type
Mix van aanlanden (groep/individueel)

Situering
✓ Aanlandstudieplekken hoeven niet dicht bij de buitengevel te liggen en direct daglicht te hebben, omdat ze bedoeld zijn voor tijdelijk gebruik
✓ Situering in de buurt van een trap, lift, entree, pantry, restaurant of onderwijszalen is aantrekkelijk. Een zichtbare locatie nodigt uit tot gebruik en kan bovendien de drukte op stilte studieplekruimte verminderen.

Afmetingen en indeling
✓ Het advies is uit te gaan van 2,5m² per plek en een tafelblad van minimaal 0,8*0,6m

Voorzieningen
✓ Vaste stoel of in hoogte verstelbare stoel
✓ WCD op werkplek of in de directe nabijheid (1 op 2wp)
✓ Kan deels uitgevoerd worden met beeldscherm en muis
✓ WIFI vereist
✓ Optioneel: hoge tafel/sta werkplek
✓ Horeca in nabijheid

Locatie
IO TU Delft

Type
Aanlandplek

Locatie
FMVG TU Delft
C. Ontmoetingsstudieplek

**Locatie**
Library

**Type**
Groepsontmoetingsplek

**Omschrijving**
✓ Multifunctionele plek met zitjes en stoelen

**Bedoeld voor**
✓ Eten, drinken, ontmoeten en overleggen

**Situering**
✓ Kan inpandig gelegen zijn, want hij hoeft niet direct daglicht te hebben,
✓ Situering in de directe nabijheid van de horecavoorziening

**Kan ook gebruikt/ ingericht worden als:**
✓ Studieplek
✓ Bijeenkomstruimte
✓ Stapelk

**Afmetingen en indeling**
✓ Het advies is uit te gaan van 2m² per plek.
✓ Het is aan te raden de ruimte zodanig in te richten dat hij ook gebruikt kan worden als werk- en studieruimte buiten de reguliere pauzetiden

**Voorzieningen**
✓ Vaste stoel, bank of kruk
✓ WCD in de nabijheid, maar niet op elke plek
✓ WIFI vereist
✓ In de horecavoorziening