

The background is a dark, abstract composition. It features several bright, glowing rays of light in blue, orange, and yellow, radiating from a central point on the left. These rays are set against a backdrop of dark, semi-transparent geometric shapes, including triangles and circles. Thin, white, curved lines and small dots are scattered throughout the scene, adding a sense of motion and depth.

GRUBER & PETTERS

Untis Kursplanung

grupet.at

Inhaltsverzeichnis

I Introduction	5
II Students timetables	5
1 Workflow for completed student timetable.....	6
2 Student master data	6
Import	8
3 Specifying courses.....	8
No lesson couplings	9
4 Class/Level selection.....	9
5 Course-student overview	9
Course window	10
Student window	12
Detail window	13
Course assignment	14
Assignment with double-click.....	14
Assignment using drag&drop.....	14
Assignment using toolbar icons.....	15
Assignment using element marking.....	16
Toolbar functions	17
6 Simultaneous courses (clusters).....	18
7 Scheduling dialogue.....	20
8 Timetable optimisation.....	21
9 Diagnosis.....	21
10 Timetables.....	22
11 Course-student lists.....	23
Course/Students-List	24
Students/Course-List	25
Courses list	25
Students list	26
Studs/Course-List (short)	26
Course/Stud.-List (short)	26
Students/Cluster-List	27
Student-clashes	27
Kurs-Studenten Übersicht	28
Students-Course-Matrix	28
12 Change of school year.....	29
Transferring students	30
Transferring courses	31
III Course scheduling	32
1 Data input.....	33
Students	33

Courses	34
Course choices	35
Course clusters	35
2 Scheduling tools.....	36
Course-student overview	37
Creating parallel courses.....	37
Cancelling a course.....	38
Student-course-choice	38
Entering a course choice.....	40
Selecting an alternative course.....	42
Reserve courses.....	44
Priority	45
Course choice combinations.....	46
Studenten-Kurs-Wahlen kopieren.....	47
Course-student-choice	47
Course-student-matrix	50
Course-student-matrix functions.....	51
Course-cluster-matrix	52
Window layout.....	53
Course-cluster-matrix functions.....	55
Adding and removing courses.....	56
Create new cluster.....	56
Cluster to coupling.....	58
Fix the cluster	58
Merge similar clusters.....	59
Display student clashes.....	59
Refresh - Settings.....	59
Printing	60
Delete course assignments	61
3 Course optimisation.....	61
Parameters for optimisation	62
Totaloptimierung	64
Partial optimisation	65
Specifying subsets.....	66
Optimisation parameters	68
Partial optimisation.....	70
Toolbar functions.....	73
Partial optimisation example.....	74
Optimisation for several class levels	75
Term-related optimisation	76
Course choices/clusters in scheduling	78
IV Exam scheduling	79
1 'Exam scheduling' window	79
Assembling courses	80
Selecting time/date	82
2 'Exams' window.....	83
Functions in exams window	84
Exam scheduling and cover planning	85
Printing exams	86
V Import / export	87

1 Introduction

Many school systems offer students (pupils) the possibility of choosing at least some of their subjects in order to take individual students' interests and talents into account.

For the timetable, this means that the concept of class no longer applies in certain areas and different student groups can be put together differently for different subjects. This eclipses the importance of traditional class-based teaching where all students in a class have the same lessons at all times.

The timetable for the class as a whole thus has less significance for the individual student. When setting up timetables, more attention has to be paid to the course choices of each student, and each student consequently needs his/her own schedule.

Students timetables

The [Students timetables](#) module extends the basic functionality of Untis, making it possible to create an individual schedule for each student.

It allows you to administer [student master data](#) , convert lessons to [courses](#) for student selection, define [course choices](#) of individual students and also to enter which course should if possible take place simultaneously (course bands or [clusters](#)).

With the students timetables module, automatic [timetable optimisation](#) and timetable diagnosis take course choices into account and attempt to optimise individual [student timetables](#) .

The students timetables module is ideal for school systems that have a large measure of class-related lessons but which also offer a number of optional courses.

Course scheduling

The limitations of the functionality of the students timetables module can be seen when several similar [parallel courses](#) are held for a particular subject and a decision has to be made as to which of these parallel courses a student should take, or when the range of optional courses is so large that it must first be determined which courses should best be held concurrently because they have no shared students.

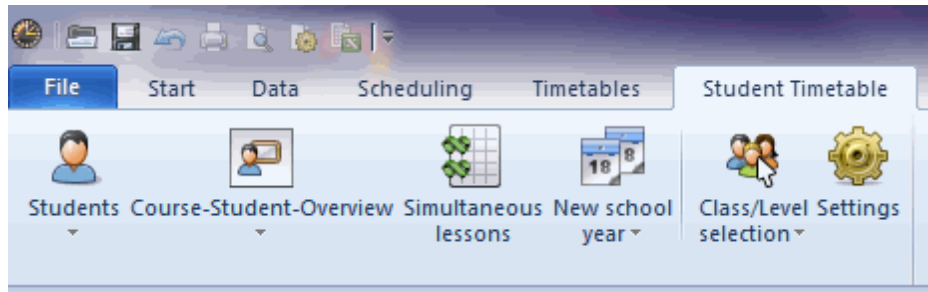
The course scheduling module is intended to help you with these advanced tasks. The two main tasks of course scheduling are to determine which courses should best be taught at the same time (creation of [course clusters](#)) and to allocate students to actual courses when a subject is offered in several [alternative courses](#) .

The course scheduling module, with the [exam scheduling](#) function, also offers the possibility of scheduling tests and coordinating the resultant changes to the timetable.

The course scheduling module is based on the students timetables module, and so the license for former includes the license for the latter.

2 Students timetables

You will find the additional functions for working with students and courses under menu item "Modules | Students timetables".



- [Course-Student-Overview](#)
- [Students](#)
- [Simultaneous lessons](#)
- [New school year](#)
- [Class/Level selection](#)

Some of these can be called from other places in the menu, such as the menu item "Students", which you will also find under master data.

2.1 Workflow for completed student timetable

1. Create (or import) appropriate [master data for each student](#) required for student timetable creation
2. Determine (or import) the lessons permitted for [course options](#)
3. Define the course options for each student in the [course-student-overview](#) (allocation of courses)
4. Define simultaneous courses in [course clusters](#) (bands)
5. Create the timetable with the help of automatic [timetable optimisation](#) or the [scheduling dialogue](#)
6. Analyse the timetable of each student with the timetable diagnosis function
7. Display and print [student timetables](#)

2.2 Student master data

You can open the input window for student master data via menu item "Master Data | Students" or via menu item "Modules | Students timetables | Students".

Name	Surname	First name	Number	Class	Male	Female
Oban	Oban		S12001	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Talisker	Talisker		S12002	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Lagavulin	Lagavulin		S12003	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Laphroaig	Laphroaig		S12004	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Scapa	Scapa		S12005	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>
GlenOrd	GlenOrd		S12006	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Students first name

S12001 Student registration number ☒ Male

12 Class of the student ☐ Female

E-Mail address

Birthdate

Classes with class group

Student

This is where you enter the details of all students who may choose courses. The meaning of many of the fields match that of corresponding fields in other Untis master data elements or are self-explanatory. If necessary, please refer to the "Untis User Manual" for information on entering data.

Warning: Assigning students to classes

Each student must be allocated to a class since a student may only choose courses allocated to that class. It is sufficient to enter the name and class of a student in order to allocate course options and create student timetables.

Optimisation codes

In addition to the general student data fields there is an additional "optimisation code" input field for course scheduling. You can use this field for [course optimisation](#) to determine which students should if possible be scheduled in the same [parallel course](#) or not scheduled in the same parallel course.

Enter the same number (0-9) for all students who are to be scheduled in the same parallel course. This allows you to retain the overall class that existed previously..

Codes A-Z have the opposite effect. Students with the same code are assigned to different courses wherever possible.

Class groups

If you use so-called class groups to organise your lessons (please also refer to chapter 'Class groups' in the 'Untis User Manual'), you can allocate, via the master date field 'Classes with class group', each student the differentiation group(s) he/she chose.

this makes it possible to create an individual [timetable](#) for each student.

Tip: Years/grades

If your school system has no (real) classes, we recommend combining a school year to form a class (e.g. YR12) or simply creating one class and assigning all your students to this class.

2.2.1 Import

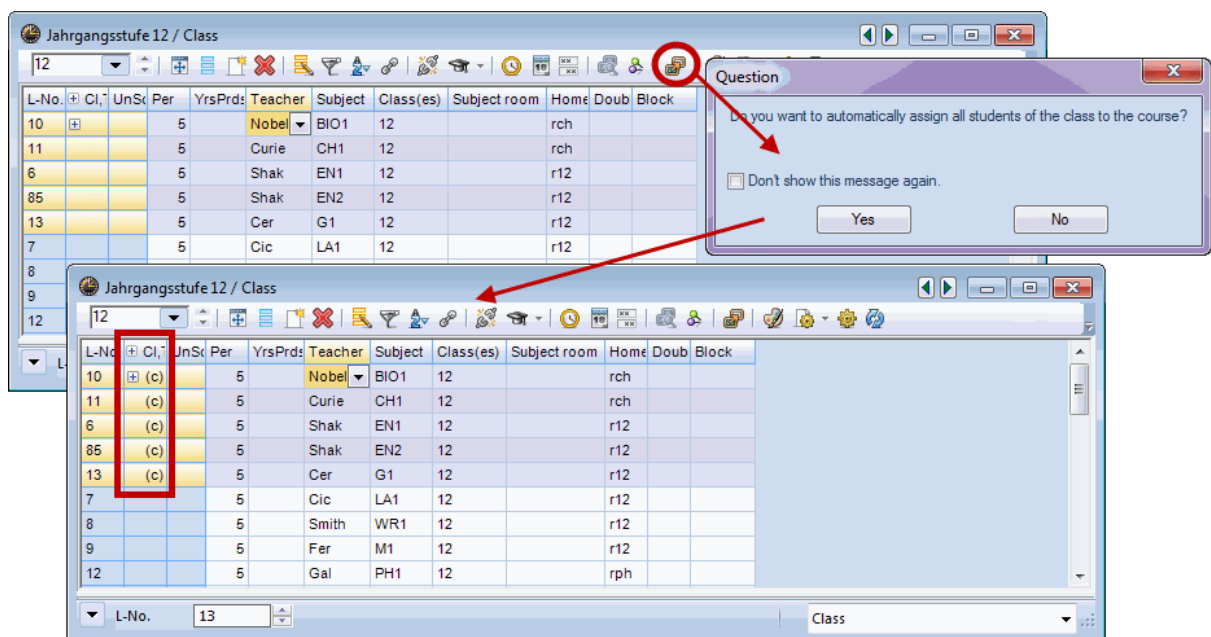
The required information on students often exists in electronic form. In such cases this data can usually be imported into Untis..

The simplest method is if there is already a special interface to the other application, but even the standard import interface (File | Import / Export | Import DIF file | Students) allows data to be easily transferred.

2.3 Specifying courses

A course is an (Untis) lesson that need not be taken by all students in the class(es) allocated, but can be chosen by individual students.

In order to convert lessons into courses, the desired lessons must be selected by highlighting them with the mouse and then clicking on the <Convert lesson(s) into course(s)> in the toolbar of a lessons view.



A (c) is displayed in the "Cl,Te" column of a lessons view to indicate that a lesson has been converted into a course.

Warning: Unique subject name

If there are several courses allowed for a class, each of these courses should be given a unique subject name in order to make them easier to identify. For this reason, the course demo file contains e.g. two lessons for year 12 with the subject names bio1 and bio2 instead of both lessons having the subject name bio.

2.3.1 No lesson couplings

We recommend that you create a separate lesson for each course and that you do not use courses to form lesson couplings. Instead of lesson couplings, you should use course clusters (bands), which are described later.

Each course should therefore be a discrete lesson. This is possible since course can be held simultaneously for the same classes if the students participating in them are different.

Note: No course without a class

Lessons without class(es) cannot be converted to courses.

Students can only choose lessons that are allowed for their class. If a lesson can be chosen by students from different classes, simply specify all these classes in the lesson.

2.4 Class/Level selection

You can use the menu option 'Modules | Student timetable | Class / Level selection' to specify which class or class level/year should be preselected when the course-student overview is opened. This is very useful when work relates to a particular class or year/level

2.5 Course-student overview

The course-student overview provides you with a summary of which [courses](#) are being taken by which [students](#) and is also used to [allocate courses](#) to students and students to courses.

The window consists of three parts:

1. On the left is the [course window](#) with a list of possible courses.
2. On the right is the [student window](#) with a list of students.
3. The [detail window](#) in the centre shows either the courses for a student (when the focus is on a student) or the students in a course (when the focus is on a course).

Note: Clipboard

The contents of the student list can be copied to the Windows clipboard by selecting the desired rows and executing the command 'Edit | Copy' (or by pressing CTRL+C).

Course-Student overview

Selected course: BIO1

Lessons: 10, BIO1

Cla.	Les.	Subj	DNo	Stud.
12	<input type="checkbox"/>	10 BIO1	1	10
13	<input type="checkbox"/>	91 BIO1	1	10
12	<input type="checkbox"/>	72 bio1	1	20
13	<input type="checkbox"/>	109 bio1	1	24
12	<input type="checkbox"/>	73 bio2	1	19
12	<input type="checkbox"/>	11 CH1	2	9
13	<input type="checkbox"/>	92 CH1	2	16
12	<input type="checkbox"/>	74 ch1	2	21
13	<input type="checkbox"/>	110 ch1	2	7
12	<input type="checkbox"/>	80 ch2	2	20
12	<input type="checkbox"/>	14 d1		18
13	<input type="checkbox"/>	95 d1		26

Students	Cla.	Altern. Courses	Surname
Bladnoch	12	BIO1	Bladnoch
Tobermory	12	BIO1	Tobermory
Glenkinchie	12	BIO1	Glenkinchie
Springbank	12	BIO1	Springbank
Glenmorangie	12	BIO1	Glenmorangie
Tomatin	12	BIO1	Tomatin
Aberfeldy	12	BIO1	Aberfeldy
GlenScotia	12	BIO1	GlenScotia
Auchentoshan	12	BIO1	Auchentoshan
Coleburn	12	BIO1	Coleburn

Cla.	Name	Surna	First	Per	Cours
12	<input type="checkbox"/>	Oban	Oban	30	10
12	<input type="checkbox"/>	Talist	Talist	31	10
12	<input type="checkbox"/>	Lagav	Lagav	30	10
12	<input type="checkbox"/>	Laphr	Laphr	33	11
12	<input type="checkbox"/>	Scapa	Scapa	31	10
12	<input type="checkbox"/>	GlenC	GlenC	33	11
12	<input type="checkbox"/>	Clyne	Clyne	30	10
12	<input type="checkbox"/>	Bladn	Bladn	33	11
12	<input type="checkbox"/>	Fetter	Fetter	30	10
12	<input type="checkbox"/>	Ardbe	Ardbe	31	10
12	<input type="checkbox"/>	Bowrr	Bowrr	33	11
12	<input type="checkbox"/>	Runnz	Runnz	31	10

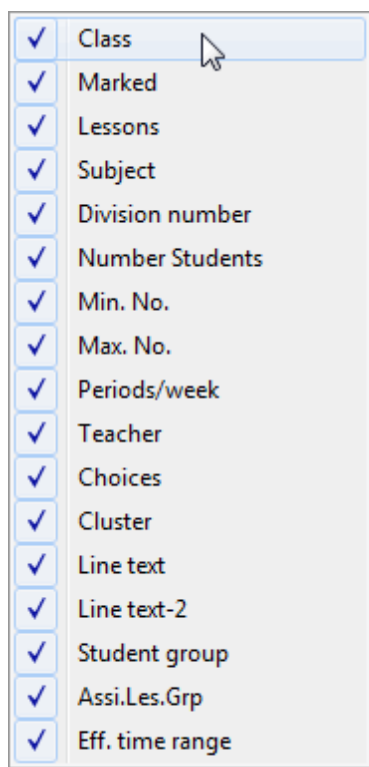
Note: Course-student-overview and course scheduling

The [course scheduling](#) module also extends the functionality of the course-student overview. Some of the following figures may differ from your system version if you use the course scheduling module. You can find a more detailed description of the extended functions of the course scheduling module in chapter 'Course scheduling' under ' [Data input](#) '.

2.5.1 Course window

The course window of the [course-student-overview](#) displays a list of all courses of the selected class or class level/year..

You can right-click with the mouse to display or hide the following columns:



'Cla.' Class(es) for which the course is held (e.g. 12)

Marking box To permanently mark a course

'Les.' Lesson number (e.g. 12 or 19)

'Subj.' Subject (e.g. *bio1* or *M1*)

'DNo.' The division number is entered under 'Lessons | Classes' and indicates lessons that are taken by different groups in the class. A student may only be assigned one lesson from a group of lessons/ courses with the same division number. For example, the mathematics courses *M1* , *m1* and *m2* for class 13 all share the division number 5 . Each student may therefore only choose one of these courses.

Note: Division numbers

If the division numbers of the classes taking part in a lesson are different, the relevant division numbers are indicated in the sequence of the classes. Otherwise a division number is indicated only once.

'Stud.' Shows the total number of students who have chosen the course (irrespective of the class or class level selected).

'Min. No.' 'Max No.' this is where you can define the minimum and maximum number of students permitted for the relevant course. This entry is important in combination with [Course optimisation](#) of the [course scheduling](#) module.

'Per' Course periods per week

'Tea.' Teacher giving this course

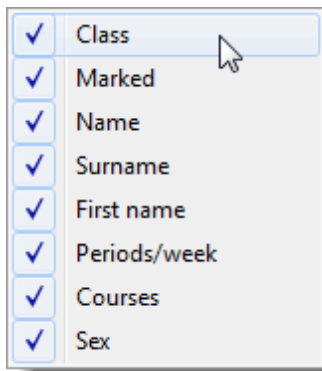
'Cluster' Shows the name of the cluster (band) that the course belongs to. Please refer to section '[Simultaneous courses \(clusters\)](#)' for more information.

When you select a course by clicking on it with the mouse, the row in question is displayed dark blue. This course is now the active course. All students of the active course will be listed in the [detail window](#) and also highlighted light blue in the student window.

2.5.2 Student window

The student window of the [course-student-overview](#) displays a list of all students of the selected class or class level/year.

The following columns can be displayed for each student:



'Cla.' Class of the student

Mark box To permanently mark a student (please also refer to '[Assignment using element marking](#)')

'Name' Student short name

'Surname' Student long name

'First name' Student first name

'Per.' Weekly periods for the student (irrespective of the class or class level/year selected)

'Courses' Number of courses chosen by the student (irrespective of the class or class level/year selected).

'Sex' Student's sex

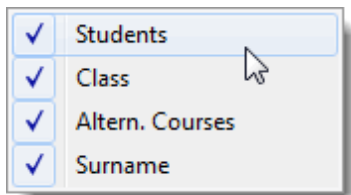
When you select a student by clicking on him/her with the mouse, the row in question is displayed dark blue. This is now the current student and all courses he/she has chosen will be displayed in the detail window and as well as in the course window highlighted in light blue.

2.5.3 Detail window

The contents of the detail window of the [course-student-overview](#) depends on whether the [course window](#) or the [student window](#) currently has the focus (i.e. in which of these two windows you last clicked the mouse).

Course window active

If the focus is on the course window, the detail window will display the students of the active course with the following columns:



'Student' Student short name

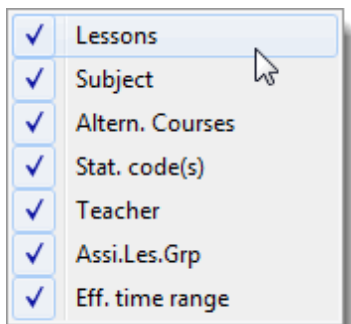
'Cla.' Class of the student

'Altern. courses' This field is displayed for information purposes only for the students timetables module and shows possible alternative courses that the student can choose. The data in this field was entered with the course scheduling module.

'Surname' Student long name

Student window active

If the focus is on the student window, the detail window will display the courses chosen by the active student with the following columns:



'Les.' Lesson number of the course

'Subj.' Subject of the course

'Altern. courses' This field is displayed for information purposes only for the students timetables module

and shows possible alternative courses that the student can choose.

'Tea.' Teacher giving this course

Student details window (magnifier)

The detail window can serve as a 'magnifier' in a similar way as other windows such as master data views, timetables or scheduling dialog.

If you click on a student in another window, the detail window will display the courses for the student concerned.

If you click on a lesson in another window, the detail window will display the students for the lesson concerned.

2.5.4 Course assignment

Specifying the course options of a student is called course assignment. You can either assign students to course of courses to students.

Note: Assignment only for own class

Please note that students can only be assigned to courses that are permitted for their class. A year 12 student can therefore not take a course that is only held for year 13.

A course can also not be assigned when a student has already chosen another course with the same division number.

Assignment can be performed in various ways:

- [by double-click](#)
- [by drag&drop](#)
- [by pressing the appropriate button](#)
- [by marking elements](#)

2.5.4.1 Assignment with double-click

The easiest way of creating (or removing) an assignment is to use the mouse double-click. First select a student and then double-click on the course that you wish to assign. You can assign further courses to the student by continuing to double-click. If a course is already assigned to the active student, the double click removed the assignment.

Note: Locking the display

You will find the <Lock display> button at the top left of the course and student windows. Clicking this button locks the window concerned. This results in the three windows always being displayed as if the locked window were the active window.

Double-clicking can be used to assign students to courses in the same way as assigning courses to students

2.5.4.2 Assignment using drag&drop

You can also establish or remove an assignment between students and courses using drag&drop.

The following options are available:

Assign one or more courses to a student

Select the desired courses in the course window and drag the selection to the desired student in the student window. When dragging the selection, up to ten courses will be displayed near the cursor.

Assign one or more students to a course

Select the desired students in the student window and drag the selection to the desired course in the course window. When dragging the selection, up to ten students will be displayed near the cursor.

Copy course assignments of a student

If you wish to copy one or more course assignments from one student to another, first select the desired student in order to display his/her assigned courses in the detail window. Now select the desired course assignments and drag them to the student to whom the courses are to be assigned.

Copy student assignments of a course

First select the desired course in order to display its assigned students in the detail window. Now select the desired student assignments and drag them to the course to which the students are to be assigned.

Remove course assignment from a student

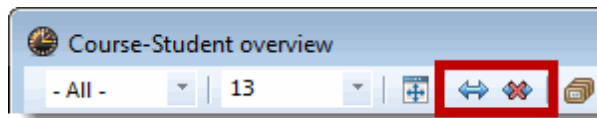
Select the desired student and then select the courses in the detail window in the centre of the screen that are to be removed. Drag the selection down to the free area below the course list in the centre section. The cursor will display a delete icon, and after the mouse button is released the corresponding course assignments will be removed.

Remove students from a course

Select the desired course and then select the students in the detail window in the centre of the screen that are to be removed. Drag the selection down to the free area below the course list in the centre section. Release the mouse button when the cursor displays the delete icon in order to remove the students from the course.

2.5.4.3 Assignment using toolbar icons

You can use assignment functions in the toolbar to assign one or more courses simultaneously or to remove the assignment.



Assignment

First select all the courses that you wish to assign to a particular student by moving the cursor over them while pressing the left mouse-button.

Now select one or more students to whom you wish to assign the selected courses and click on the <Allocate selected students/course> button.

All selected courses will be assigned to the selected students. You can of course first select the students and then the courses.

Note: Error message

An appropriate message will be displayed if a course cannot be assigned to a student. However, other courses assignments will not be affected..

Remove assignment

In the same way, you can also remove existing course assignments using the <Delete student/course assignment> button.

2.5.4.4 Assignment using element marking

These assignment functions are available via the context menu commands (right-click).

First mark all the courses that you wish to assign to a student by checking the mark box. Now select a student in the student window, open the context menu using the right mouse-button and select the command 'Link marked courses'. All marked courses will now be assigned to the selected student. You can proceed in the same way to assign students to courses.

The following marking commands are available in the context menu:

Mark students

When you have selected a course in the course window this command displays all the students (highlighted in light blue) assigned to this course with a checked marking box.

Mark courses

When you have selected a student in the student window, this command displays all the courses (highlighted in light blue) assigned to this student with a checked marking box.

Remove course markings

This command removes all course markings.

Remove student markings

This command removes all student markings.

Remove all markings

This command removes all course and student markings.

Link marked students

When you select a course and execute this command, all marked students will be assigned to the course.

Link marked courses

When you select a student and execute this command, all marked courses will be assigned to the student.

Delete course linking

When you select a course and execute this command, the assignment of all marked students to this course will be removed.

Delete student linking

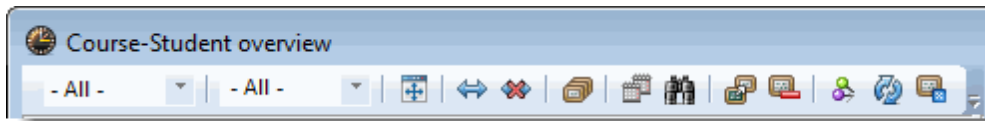
When you select a student and execute this command, the assignment of all marked courses to this student course will be removed.

Note: Context menu

Some of these commands are only available in the course window context menu or in the student window context menu.

2.5.5 Toolbar functions

The following functions can be performed from the toolbar.



Class-level selection

You can restrict the display of courses and students to a particular class level/year.

Class selection

You can restrict the display of courses and students to a particular class. A class selection quite naturally overrides a class-level (year) selection.

Adjust window size

This function adjusts window size to the width of the visible columns.

Allocate selected students/course

All selected courses are assigned to the selected students.

Delete student/course allocation

The course assignment of the selected courses to the selected students are removed.

Cancelling a course

This function is only possible with the course scheduling module and is described in chapter [Cancelling a course](#).

Create parallel courses

This function is only possible with the course scheduling module and is described in chapter [Creating parallel courses](#).

Find

Clicking on this button opens the "Find" dialogue. This is where you can enter the desired search text. Clicking on the <Find next> button causes Untis to search in the current column for the search text. If the text is found, the relevant row will be selected.

Convert lesson

This function opens the lessons window. If you have restricted the display to a certain class, it will be displayed automatically in the lessons window.

In the lessons window you can mark desired lessons by moving the cursor over them while pressing the

left mouse-button and then converting them into courses using the button < [Convert lessons\(s\) into course\(s\)](#) >.

Remove lesson

This function allows courses to be removed from the student course choice. These courses are then no longer displayed in the course lists. The function is useful when e.g. a course should be taken (again) by all students in a class and is therefore no longer available as a student course choice.

Lock this display

If this button is activated, the window will not respond in the [course-student-overview](#) when the active lesson of active student is changed in another window.

2.6 Simultaneous courses (clusters)

However, when the range of courses is so wide that the total number of periods of all courses exceeds the available number of weekly periods, or when students have a very wide freedom of choice, a decision must be reached as to which courses should be held simultaneously in order to improve the quality of the timetable.

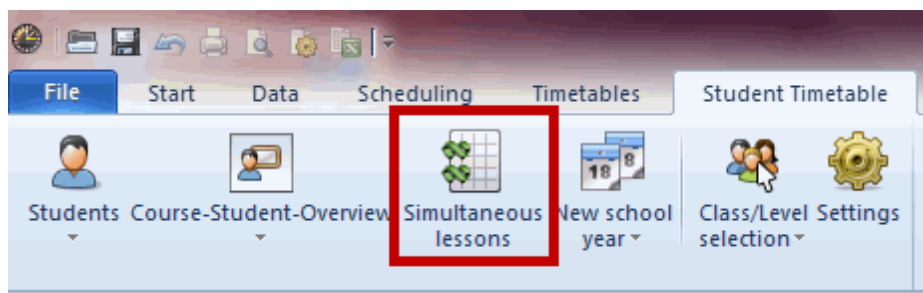
In the context of the students timetables module, you yourself must specify which courses should take place simultaneously.

Note: Course scheduling module

This is where the course scheduling module comes into its own since it performs exactly this task, determining which courses take place simultaneously. Please refer to section [Course scheduling](#).

Simultaneous lessons

You can access the input window for simultaneous groups/clusters via the menu command 'Modules | Students timetables | Simultaneous lessons'.



If you wish to create a new cluster, simply click in an empty row where you then enter the lesson numbers of the course that are to take place simultaneously.

Lesson sequences

Lesson sequences: C13_1 [Delete] Simultaneous lessons [v]

Lessons: 14 [Add] [Remove]

Display: ☒ Lesson number ☐ Subject ☐ L-No. + Subject

Name	Per	L-No.	L-No.	L-No.	L-No.	L-No.	L-No.
C13_	2	14	15	115			
C13_	2	95	96	97			
T1_1	5	6	9				

L-No.	Per	Teacher	Class	Subject
14	4	Goethe	12	d1
15	4	Bach	12	d2
115	4	Ander	12	d3

The cluster C13_1 includes e.g. lesson numbers 14, 15 and 115 that are to take place in parallel for two periods in the week.

The section at the bottom of the window displayed additional information on the lessons in the selected group.

During timetable optimisation the aforementioned lessons will be set at the sametimes. Only during the so-called swap optimisation can individual lessons be moved in order to improve student timetables.

Note: Simultaneous lessons instead of lesson couplings

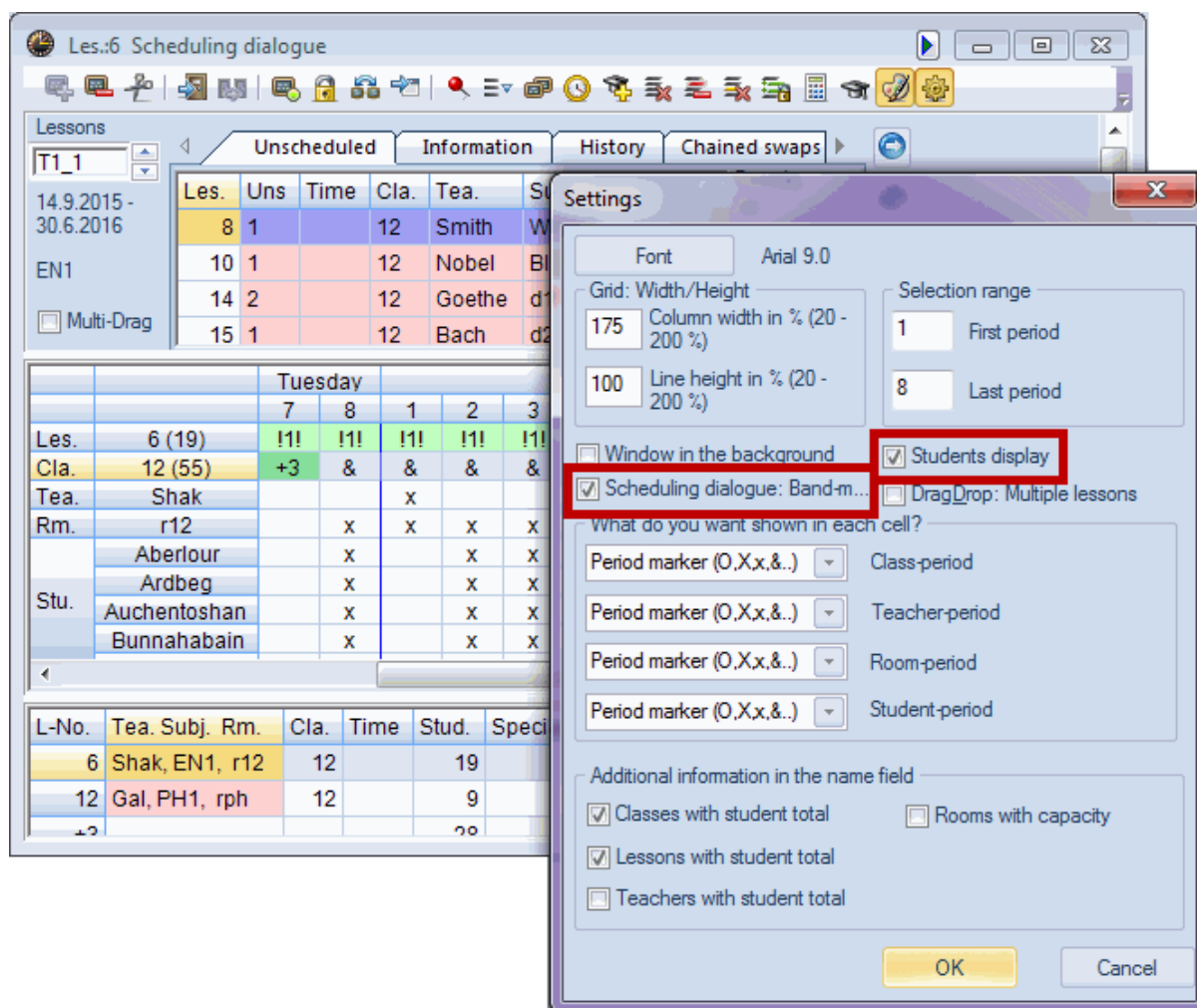
You may be tempted to enter lessons that take place simultaneously as a lesson coupling. We would advise against doing this as it can lead to problems with the unique identity of courses (e.g. with a lesson coupling in which the same subject occurs twice) and as timetable optimisation is restricted by fixed couplings.

If you already have lesson couplings that you would like to convert to clusters, you can simply mark the lesson couplings concerned (by activating the '(m)' marked code for the coupled lessons in the lessons view) and execute the command 'File | Auxiliary Functions | Coupl. to Less. Sequ.'.

2.7 Scheduling dialogue

Student choices are of course also taken into account in the scheduling dialogue. If a lesson is allowed as a student choice you will see all students taking this lesson in the scheduling dialogue.

However, you can also hide the display of students by deactivating the check box 'Students display' in the scheduling dialogue settings.



You will often see the ' & ' character in the rows of the classes indicating that lessons are held in the class for different students simultaneously .

Cluster mode

You can also edit several lessons of a cluster in the scheduling dialogue at the same time by entering the name of the cluster in the 'Active lesson' field or by activating the check box 'Scheduling dialogue: band mode' in the scheduling dialogue settings and then selecting a lesson in the cluster.

This will activate an entire cluster instead of a single lesson and will show all the lessons belonging to that cluster. If the same class occurs in several lessons, it will only be displayed once.

The scheduling functions <Schedule period> and <Delete period> have an effect on all lessons in the cluster, meaning that the entire lessons of a cluster (or in other words the cluster itself) can be scheduled or descheduled at the desired time with one action.

Note: Active cluster

When a cluster is displayed in the lesson magnifier, you can also make this cluster the active cluster by double-clicking on the cluster name.

2.8 Timetable optimisation

The students timetables module greatly enhances automatic optimisation . The following points are dealt with here:

Classes

Lessons for different students may take place in the class at the same time. If students are assigned to a particular lesson, Untis will itself determine when lessons can take place simultaneously.

Student timetables

Nearly all the points that apply to the optimisation of class timetables are also taken into account when student timetables are optimised. The required parameters (e.g. minimum/maximum lunch break, periods per day etc.) are taken from the student's class.

The weightings are also derived from those of the class. However, a student is naturally not weighted as highly as a class. The more students there are taking a lesson, the higher the relevant weightings.

Cluster conditions

The first phase of optimisation is the allocation run, when all lessons are distributed in the time grid.

The swap optimisation run that follows transposes periods based on class timetables.

Lessons contained in [cluster conditions](#) are scheduled at the same time during allocation optimisation. These conditions do not apply during swap optimisation, and lessons can be moved independent of one another.

2.9 Diagnosis

The diagnosis for students displays, on the 'Students' tab, students with clashes, non-teaching periods and lunch breaks that are too short or too long.

The screenshot shows two windows from the Untis software. The left window, titled 'Timetable diagnosis', displays a list of elements with their weights and numbers. The right window, titled 'Heidi - Heidi 13 Ti', shows a weekly timetable for the school year 14.9.2015 - 30.6.2016.

Timetable diagnosis window:

Input Data	Wtg	Num
Diagnosis	All	>= 1
Lessons		34
Class		8
Teacher		145
Room		68
Subject		3
Students		848
Non-Teaching-Periods for Students	4	670
Lunchbreak too short	4	46
Lunchbreak too long	4	126
Student clashes not allowed	*	6
Lesson sequences		
Calendar - Year Planning		

Type of diagnosis: There are timetable clashes for these elements.

Weighting: *
Number: 6

Student list:

Stu	Per	L-No	L-No-2
Heidi	Tu-8	83	114
Heidi	Fr-3	83	114
Louie	Tu-8	83	112
Louie	Fr-3	83	112
Wendy	Tu-8	83	114
Wendy	Fr-3	83	114

Heidi's Timetable (School year: 14.9.2015 - 30.6.2016):

	Mo	Tu	We	Th	Fr
1	CH1		CH1		CH1
2		CH1			d3
3		PH1	d3	PH1	ev sw
4	PH1	ku1	bio1		g1
5	bio1			ku1	
6					
7	m1				
8	g1	ev sw	PH1	bio1	m1

2.10 Timetables

When the students timetables module is used, the menu item 'Students' is also activated in the 'Timetable' menu and opens the timetable for an individual student.

Note: Timetables for students

As with timetables for other elements, you can also adapt student timetables to match your requirements and create your own timetable formats. You can find more information on this feature in the chapter 'User-defined views' in the 'Untis User Manual'.

Course-student overview as magnifier

The detail window of the course-student overview can also serve as a magnifier when displaying student timetables. Reduce the size of the course-student overview so that only the detail windows can be seen and locate it next to a student's timetable. If you now page from student to student in the timetable, you will see the course choices for the relevant student in the detail window.

The screenshot shows the Untis software interface with the 'Student Timetable' menu item highlighted in the 'Timetables' menu.

Menu Structure:

- File
- Start
- Data
- Scheduling
- Timetables
 - Students
 - Student Timetable
 - Window Group
- Student Timetable
 - Course-Student-Overview
 - Simultaneous lessons
 - New school year
 - Class/Level Settings selection

If you click on a period in the timetable, the [detail window](#) will list all the students taking this course.

The left window displays a timetable for the school year 14.9.2015 - 30.6.2016. The timetable is organized by day of the week (Mo, Tu, We, Th, Fr) and period (1-8). The right window displays a list of students for the selected course, showing columns for Les., Subj, Altern. Courses, and Tea.

Les.	Subj	Altern. Courses	Tea.
80	ch2	ch1	Mend
14	d1	d2, d3	Goethe
6	EN1	EN2	Shak
21	ek1		Colu
13	G1		Cer
23	k1	k2	Beck
17	ku1	ku2	Rub
71	m2	m1	Colu
78	sw1		Bach
116	ru1		Pas

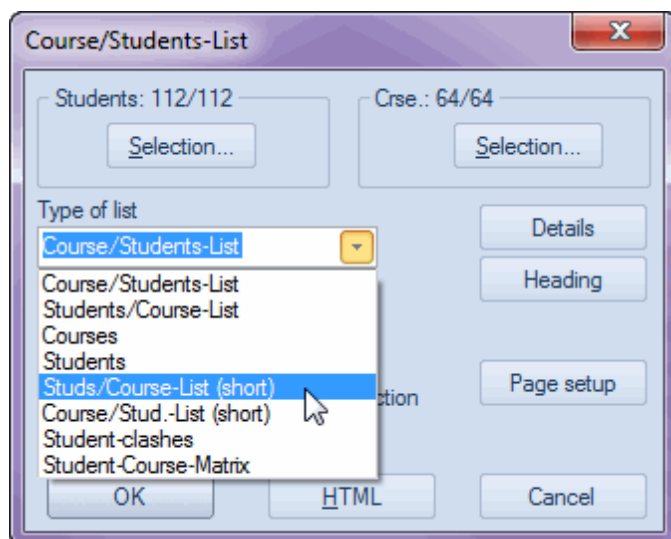
Like all other timetables, student timetables can of course be printed or output in HTML format.

2.11 Course-student lists

There are a number of lists that can be printed and to a large part also output in HTML format.

These lists are accessed direct from the [course-student overview](#) by clicking on the <Print> or <Print preview> buttons in the main toolbar.

After calling the print command, the initial print dialogue is opened where you can select the desired list type.



The following list types are available for selection:

- [Course-Students-List](#)
- [Students/Course-List:](#)
- [Courses](#)
- [Students](#)
- [Studs/Course-List \(short\)](#)
- [Course/Stud.-List \(short\)](#)
- [Students/Cluster-List](#)
- [Student-clashes](#)
- [Student/Course-Matrix](#)

The initial print dialogue allows the font and margin settings to be modified for all lists. Furthermore, printing can be limited to selected courses and students.

If courses have had to be distributed over several rows of lessons during the creation of the timetable (e.g. in order to be able to specify that 2 periods of a 5-period course have to take place in the afternoon), the subject names of these courses will be repeated in the lists.

When several courses share the same name (within a class), the "Suppress double courses in selection" option causes only one course to be selected and thus only one of these courses to be printed. This option can therefore be used to avoid courses with the same name appearing e.g. in the "Studs/Course-List (short)".

You can specify what should be printed when a teacher or student name appears in a list on the "Print-names" tab in the dialogue Report-Settings (menu item "Reports | Report Settings"). By default, the short names of these elements are printed. However, if you wish for example to print students' first and last names instead of short names in the 'Course/Students List', select "Stud. First+Full N." as the 'Print-name for students'.

2.11.1 Course/Students-List

The students taking each selected course will be printed.

EN1 LK Englisch 1 (Lesson: 6)

Name	E-Mail	Cla.
Aberlour		12
Ardbeg		12
Auchentoshan		12
Bunnahabain		12
Cragganmore		12
Dalwhinnie		12
GlenElgin		12
Glenfiddich		12
Glenlivet		12
Glenturret		12
Knockdhu		12
Laphroaig		12
Lochnagar		12
Longmorn		12
Springbank		12
Talisker		12
Tamnavulin		12
Tomintoul		12
Tullibardine		12
		19

2.11.2 Students/Course-List

This list prints the lessons for each selected student.

Please note that by default these lessons are made up of lessons from the class lessons (lessons that must be taken by all students in the class) and the student's chosen courses.

You can restrict the list to course selections only via the <Details> button..

Oban Oban 12

Crse.		Les.	Per	Tea.
M1	LK Mathematik	9	5	Fer
CH1	LK Chemie	11	5	Curie
d2	GK Deutsch 2	15	4	Bach
en1	GK Englisch 1	16	3	Car
ku2	GK Kunsterziehung	86	2	Mich
g1	GK Geschichte 1	19	2	Hero
ek1	GK Erdkunde 1	21	2	Colu
k2	GK Kath.Relig. 2	24	2	Stu
bio2	GK Biologie 2	73	3	Foss
sm1	GK Sport m:nnl 1	76	2	Ander
	Total		30	

2.11.3 Courses list

Courses list The courses list prints the courses with all the fields that are displayed in the course window of the course-student overview.

Class	Lesson	Subject	DNo	Stud.	Per	Teacher	Cluster	Cluster	Cluster	Cluster	Cluster	Cluster
12	10	BIO1	1	10	5	Nobel	T2_1	T2_1	T2_1	T2_1	T2_1	T2_1
12	11	CH1	2	9	5	Curie	T3_1	T3_1	T3_1	T3_1	T3_1	T3_1
12	6	EN1	3	19	5	Shak	T1_1	T1_1	T1_1	T1_1	T1_1	T1_1
12	13	G1	4	12	5	Cer	T2_1	T2_1	T2_1	T2_1	T2_1	T2_1
12	7	LA1		9	5	Cic	T3_1	T3_1	T3_1	T3_1	T3_1	T3_1
12	9	M1	5	15	5	Fer	T1_1	T1_1	T1_1	T1_1	T1_1	T1_1
12	12	PH1		9	5	Gal	T3_1	T3_1	T3_1	T3_1	T3_1	T3_1
12	8	WR1	6	21	5	Smith	T2_1	T2_1	T2_1	T2_1	T2_1	T2_1

2.11.4 Students list

The students list prints the students with all the fields that are displayed in the student window of the course-student overview.

Class	Name	Surname	First name	Per	Courses	Courses
12	Oban	Oban		30	10	10
12	Talisker	Talisker		31	10	10
12	Lagavulin	Lagavulin		30	10	10
12	Laphroaig	Laphroaig		33	11	11
12	Scapa	Scapa		31	10	10
12	GlenOrd	GlenOrd		33	11	11
12	Clynelish	Clynelish		30	10	10
12	Bladnoch	Bladnoch		33	11	11

2.11.5 Studs/Course-List (short)

Course choices for each selected student will be printed in a compact format.

This list prints the chosen courses for each selected student. In contrast to the students/course list, several courses are output in one row..

You can specify the maximum number of courses that can be output in one row via the <Details> button.

Name	Course options
Oban	M1 CH1 d2 en1 ku2 g1 ek1 k2 bio2 sm1
Talisker	EN1 G1 d1 ku1 ek1 k1 m2 ch2 sw1 ru1
Lagavulin	EN2 M1 d2 ku2 g1 ek1 k2 bio1 ch1 sm1
Laphroaig	EN1 G1 d1 ku1 ek1 k1 m1 bio1 ch1 inf1 sm1
Scapa	WR1 CH1 d3 en1 ku1 g2 eth1 m1 bio2 sw1
GlenOrd	LA1 WR1 d2 ku2 g1 k2 m2 ch1 sw1 en2 orc1
Clynelish	LA1 M1 d2 ku2 g1 wr1 k2 bio1 ch1 sm1
Bladnoch	M1 BIO1 d2 ku2 en1 g1 ek1 k2 ch2 sw1 ru1
Number of students	8

2.11.6 Course/Stud.-List (short)

The students taking each selected course will be printed in a compact format.

This list prints all the students taking each selected course. In contrast to the course/students list, several students are output in one row.

You can specify the maximum number of students that can be output in one row via the <Details> button.

Crse.	Students					
EN1	Aberlour	Ardbeg	Auchentoshan	Bunnahabain	Cragganmore	Dalwhinnie
	GlenElgin	Glenfiddich	Glenlivet	Glenturret	Knockdhu	Laphroaig
	Lochnagar	Longmom	Springbank	Talisker	Tamnavulin	Tomintoul
	Tullibardine					
LA1	Aberfeldy	Brackla	Clynelish	Fettercaim	Glendronach	Glenkinchie
	GlenOrd	GlenScotia	Tomintoul			
M1	Bladnoch	Bruichladdich	Caollla	Clynelish	DallasDhu	Edradour
	Fettercaim	GlenFarclas	IsleJura	Knockando	Lagavulin	Macallan
	Oban	Pulteney	Strahisla			
WR1	Aberlour	Ardbeg	Arran	Balblair	Bowmore	Brackla
	Caollla	Cardhu	Cragganmore	DallasDhu	Dalmore	Dalwhinnie
	Glendronach	Glenfiddich	Glegoyne	GlenOrd	Knockdhu	Longmom
	Scapa	Speyburn	Tamnavulin			

2.11.7 Students/Cluster-List

The students/cluster list contains the students in the rows and the [clusters](#) in the columns. The fields contain the selected courses.

Student	C13_1	C13_2	T1_1
Oban	d2	M1	ek1
Talisker	d1	EN1	ek1
Lagavul	d2	M1	ek1
Laphro	d1	EN1	ek1
Scapa	d3		d3
GlenOr	d2		orc1
Clynelis	d2	M1	wr1
Bladno	d2	M1	ek1
Fetterc	d2	M1	ek1
Ardbeg	d3	EN1	d3

2.11.8 Student-clashes

This list contains all students with course clashes.

This list has a similar structure to the students/course list (short) but only lists students with course

clashes.

A course clash occurs when two courses taken by a student are in the same [cluster](#) , i.e. when they take place at the same time

All course choices are printed for each student, with courses that clash being shown in parentheses. Information such as (M1/CH1) means that the two courses are in the same cluster.

Name	Course options
Tobermory	(EN2/BIO1) (BIO1/EN2) d2 ku2 g1 wr1
Glenmorangie	(EN2/BIO1) (BIO1/EN2) d2 ku2 g1 wr1
Deanston	(EN2/G1) (G1/EN2) (d1/EN2) ku1 wr1 eth1
Dumbarton	(EN2/G1) (G1/EN2) (d1/EN2) ku1 ek1 eth1
Speyburn	(EN2/WR1) (WR1/EN2) (d3/EN2) mu1 g2 eth1

2.11.9 Kurs-Studenten Übersicht

Die Kurs-Studenten Übersicht zeigt zu jedem Kurs den dazugehörigen Lehrer und die Anzahl der zugeordneten Studenten. Darunter finden Sie die Aufschlüsselung in männlich/weiblich.

Course	Teacher	Stu. Total	Stat. code(s)
BIO1	Nobel	10	
		3 / 7	
CH1	Curie	9	
		7 / 2	
d1	Goethe	18	
		10 / 8	
EN1	Shak	19	
		11 / 8	
G1	Cer	12	
		6 / 6	
LA1	Cic	9	
		1 / 8	
M1	Fer	15	
		10 / 5	
WR1	Smith	21	
		14 / 7	

2.11.10 Students-Course-Matrix

This list provides an overview of the selected courses of every student.

This list shows you which students take which courses. Each student and each course are contrasted in the form of a matrix. If a student takes a particular course, then a '1' will be displayed at the intersection of student and course, otherwise the cell will be empty.

			BIO1	CH1	d1	d2	EN1	en1	G1	ku1	LA1	M1	PH1	WR1
Jahrgangsstufe 12														
11	1	Bladnoch	1			1		1				1		
10	2	Clynelish				1					1	1		
10	3	Fettercairn				1					1	1		
11	4	GlenOrd				1					1			1
10	5	Lagavulin				1						1		
11	6	Laphroaig			1		1		1	1				
10	7	Oban		1		1		1				1		
10	8	Scapa		1				1		1				1
10	9	Talisker			1		1		1	1				
93	9	12:	1	2	2	6	2	3	2	3	3	5	0	2
93	9	:	1	2	2	6	2	3	2	3	3	5	0	2

2.12 Change of school year

Change of school year Untis helps with the change of school year providing its own tool that enables you to easily transfer students to the next class, allowing existing course choices to be retained wherever this makes sense.

- [Transfer students](#)
- [Transfer courses](#)

Select menu item "Modules | Students timetables | New school year" to open a window of the same name.

The window consists of 4 parts. At the top is the selection window, where you can choose the classes concerned, the centre section displays the courses of the selected classes on the left and the students

of the selected classes on the right while the section at the bottom shows details on the current course.

Note: Performing changes

Changes are not executed immediately, but are only earmarked for change. If you wish to perform the changes, you must confirm them with <OK>, or if you wish to reject them, you can click on <Cancel>.

Since all changes in the new school year window are initially only performed on copied data, you must close the window and re-open it if you wish to see the changes you have made to students or courses.

2.12.1 Transferring students

There are basically three possible things that can happen to a student at a school:

The student remains in the same class as the this year
In this case you do not need to do anything in Untis.

The student leaves school
In this case you should highlight the student and click on button <Delete lesson/student>. The student will be deleted from the master data.

The student transfers from one class to the next
Select previous year's class and the current class and click on button <Transfer lesson/student>.

Note: Several class levels/years

If you wish to perform the school year change for several class levels, always start with the highest level and work down step by step to the lowest class level.

Lessons

Subject	Les.	12 Prev.cl.	13 Class
EN1	6	12	
LA1	7	12	
WR1	8	12	
M1	9	12	
BIO1	10	12	
CH1	11	12	
PH1	12	12	
G1	13	12	
d1	14	12	
d2	15	12	

Students

Students	12 Prev.cl.	13 Class
Aberfeldy Aberfeldy	(12) -> 13	
Aberlour Aberlour	12	
Aladdin Aladdin		13
Alice Alice		13
Ardbeg Ardbeg	12	
Arielle Arielle		13
Arran Arran	(12) -> 13	
Auchentoshan Auchentoshan	(12) -> 13	
Baghira Baghira		13
Balblair Balblair	(12) -> 13	
Balu Balu		13

M1 15 Fer 9 5 12

The figure above illustrates the following situation:

All students of class 13 have left school except for student Aladdin. He will continue in class 13.

All students of class 12 will transfer to class 13 except for Aberlour and Ardbeg. Aberlour will repeat year 12 and Ardbeg will leave school.

Tip: Cursor selection

You can select several students in one go moving the cursor over them and then either delete them or transfer them.

2.12.2 Transferring courses

As with students, there are three possible ways to do this:

The course will be offered to the same class as in the previous year
In this case you do not need to do anything in Untis.

The course is transferred
In this case the course is offered for a different class and no longer for last year's class.

The course is copied.
The course is offered to the same class as last year and also to a different class.

The screenshot shows a 'New school year' dialog box with two main tables: 'Lessons' and 'Students'.

Lessons Table:

Subject	Les.	12 Prev.cl.	13 Class
inf1	81	12	
en2	82	12	
ev1	83	12	13
orc1	84	12 -> 13	
EN2	85	(12) -> 13	
ku2	86	12	
EN1	87		13
LA1	88		13
WR1	89		13
M1	90		13

Students Table:

Students	12 Prev.cl.	13 Class
Aberfeldy Aberfeldy	(12) -> 13	
Aberlour Aberlour	12	
Aladdin Aladdin		13
Alice Alice		13
Ardbeg Ardbeg	12	
Arielle Arielle		13
Arran Arran	(12) -> 13	
Auchentoshan Auchentoshan	(12) -> 13	
Baghira Baghira		13
Balblair Balblair	(12) -> 13	

At the bottom, there is a small table with the following data:

EN2	6	Shak	85	5	12
-----	---	------	----	---	----

The figure above illustrates the following situation:

Course orc1 has been copied, i.e. it is now offered to classes 12 and 13. Students who took the course last year and who have transferred will automatically be assigned to the course in class 13.

Course E2 will be transferred, i.e. it will only be held for class 13 and no longer for class 12. In this case, student assignment is kept for students who have transferred.

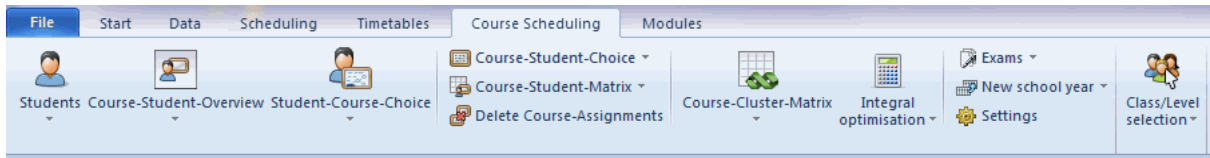
Note: The same subject name in different class levels/years

If you define the same subject name for courses in different class levels/years, course selections will be kept for students who transfer even if the course is given by a different teacher.

3 Course scheduling

The course scheduling module has all the functions of the students timetables module such as creating [students](#) and [courses](#) and [assigning courses](#) via the [course-student-overview](#) . Please read the corresponding points in section [Students timetables](#) .

You will find the course scheduling functions under menu item "Modules | Course scheduling" or in the course scheduling toolbar.



The following points relating to course scheduling are explained in detail below:

- [Data input](#)
- [Scheduling tools](#)
- [Course optimisation](#)

The functions of [exam scheduling](#) are then explained.

3.1 Data input

The most important data items for course scheduling are:

- [Students](#)
- [Courses](#)
- [Course options](#) (selected courses and alternative courses)
- [Clusters](#)

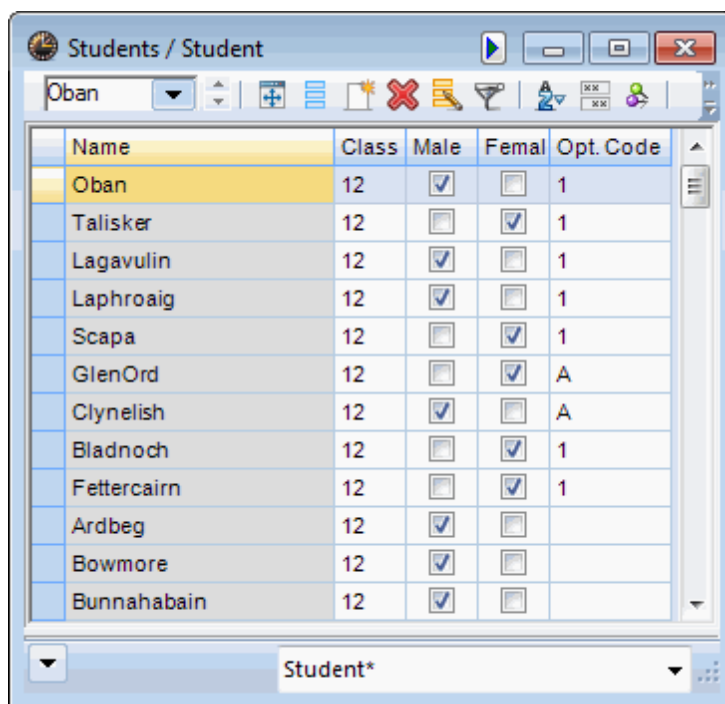
3.1.1 Students

Students General data input for students was explained in chapter ' [Student master data](#) ', section ' [Students timetables](#) '.

This section explains only those functions relating to course scheduling:

The optimisation code

In addition to the general student data fields there is an additional 'optimisation code' input field for course scheduling. You can use this field for [course optimisation](#) to determine which students should if possible be scheduled in the same [parallel course](#) or not scheduled in the same parallel course.



Name	Class	Male	Femal	Opt. Code
Oban	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
Talisker	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
Lagavulin	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
Laphroaig	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
Scapa	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
GlenOrd	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	A
Clynelish	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A
Bladnoch	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
Fettercairn	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
Ardbeg	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Bowmore	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Bunnahabain	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Enter the same number (0-9) for all students who are to be scheduled in the same parallel course. This allows you to retain the overall class that existed previously..

Codes A-Z have the opposite effect. Students with the same code are assigned to different parallel courses, wherever possible.

3.1.2 Courses

The definition and creation of courses was described in chapter ' [Specifying courses](#) ', section ' [Students timetables](#) '. Please refer to that chapter for more details.

Parallel courses, i.e. equivalent course for a certain subject such as biology should be numbered sequentially. For example, if you have three equivalent biology course you should name them *bio1* , *bio2* and *bio3* or *bio01* , *bio02* and *bio03* .

Note: Equivalent courses

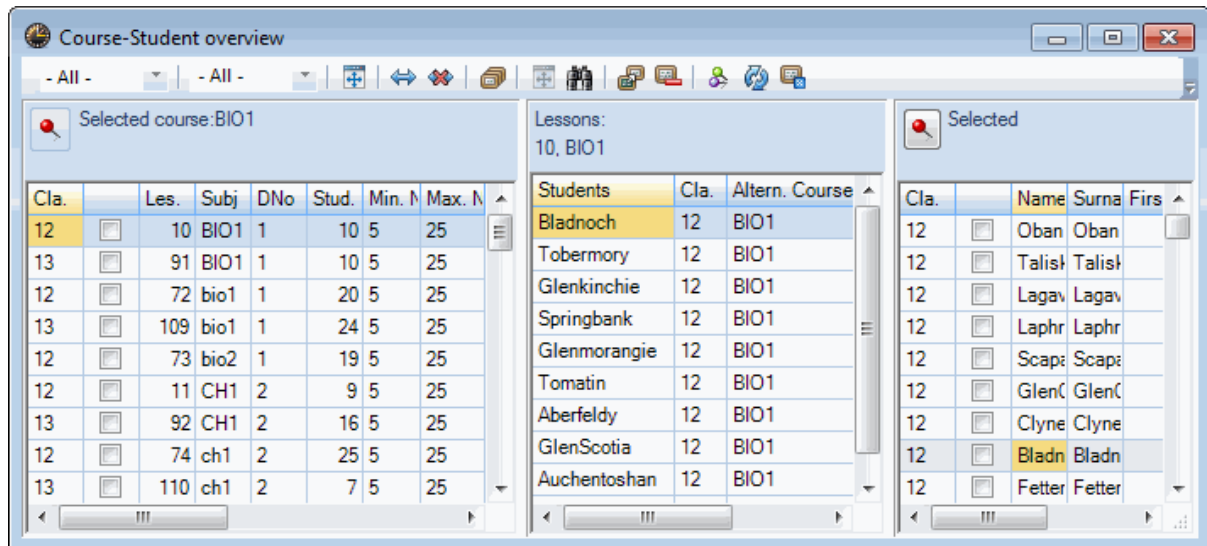
The optimisation algorithms recognise equivalent courses on the basis of their similar names (followed by a number)

You can best see possible courses in the [course-student-overview](#) .

Course-student-overview

When the course scheduling module is used, the window on the left, the course window, provides the additional column "Choices" displaying the number of course choices where the course in question occurs.

There are also the additional fields of 'Min. No.' (minimum number of student) and 'Max. No.' (maximum number of students) . During course optimisation, Untis attempts to observe the minimum and maximum number of students for courses.



If you wish to edit student numbers simply click on the relevant field and enter the desired value. Alternatively, you can enter the values direct for the lessons (on the 'Lessons' tab under 'Lessons | Classes').

3.1.3 Course choices

Without alternative courses

If only module student timetables is available, the selected courses of a student must already be determined, i.e. it is not possible to enter alternative courses since it is only possible to enter whether a certain course has been chosen or not. This procedure was described in chapter [Course-student-overview](#) in section [Students timetables](#).

With alternative courses

However, in many cases students can choose between several alternative courses, and the decision for one of these courses does not necessarily have to be made by the student or the course planner. The actual selection of a course is then not made until course optimisation.

In this case, the application must be explicitly told which courses are actually the possible alternatives for a specific course option. Chapter [student-course-choice](#) describes how course options with alternative courses can be entered.

3.1.4 Course clusters

Courses which are to be scheduled in the timetable grid at the same time are in a so-called cluster. These clusters are also sometimes called blocks, and the term bands is also often used.

Cluster = band

In the 'Students timetables module, courses taking place simultaneously are combined in Untis into [clusters](#). The clusters in course scheduling are nothing more than clusters.

The course scheduling module provides a comfortable tool for working with clusters, the [course-cluster-matrix](#).

Course-Cluster-Matrix

Only avail. periods: 76 Periods/week 3 Clashes

Class level: -All- Subject/Les. BIO1 / 10 Per (Open periods) 5 (0) Students 10

Class: -All- Cluster T1_1 5 34

Subje	Les.	Per	Open	Teach	Class	Level	Stu.	1	2	3	4	5	6	7	8	9	10
BIO1	10	5	0	Nobel	12		10										
BIO1	91	5	0	Mend	13		10										
bio1	72	3	0	Foss	12		20										
bio1	109	3	0	Foss	13		24										
bio2	73	3	0	Foss	12		19										
CH1	11	5	5	Curie	12		9										
CH1	92	5	5	Nobel	13		16										
ch1	74	3	0	Mend	12		25										
ch1	110	3	3	Curie	13		7										
ch2	80	3	0	Mend	12		16										
d1	14	4	0	Goeth	12		18										
d1	95	4	0	Gri	13		26										

Subject	Les.	Type	Name	Stat. code(s)
EN1	6	Stu.	Springbank	
EN1	6	Stu.	Auchentoshan	
M1	9	Stu.	Bladnoch	

You can see the available courses in the rows of the matrix and the existing clusters in the columns. The cells then indicate which course belongs to which cluster.

The [course-cluster-matrix](#) is described later in the section of the same name.

3.2 Scheduling tools

This section provides more details on the individual windows and functions of the course scheduling module. The following tools are available:

- [Course-student-overview](#) for the course scheduling module
- [Student-course-matrix](#)
- [Course-student-choice](#)
- [Course-student-matrix](#)

- [Course-cluster-matrix](#)

3.2.1 Course-student overview

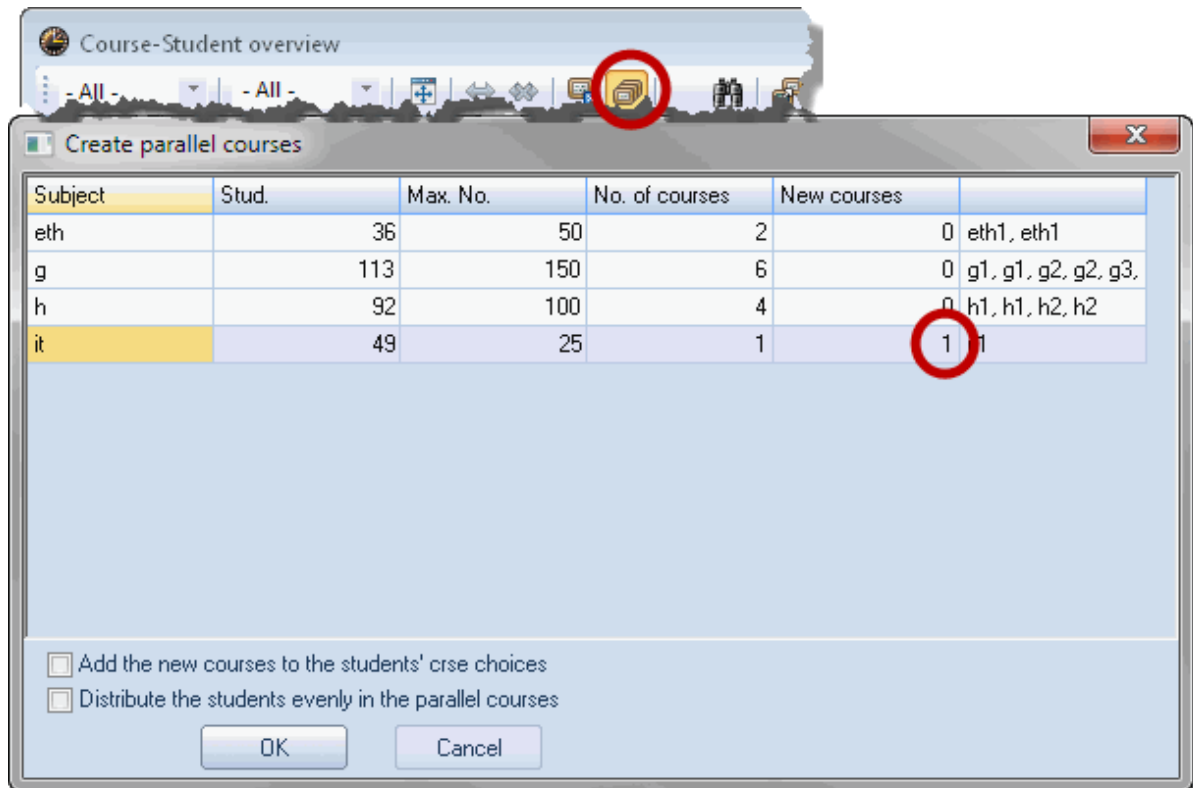
Most functions of the course-student-overview were described in the [chapter of the same name](#) in section [Students timetables](#).

The course scheduling module also offers you the option of [creating parallel courses](#) and [cancelling courses](#).

3.2.1.1 Creating parallel courses

It can of course happen that you have to offer a particular subject in the form of several parallel courses due to a large number of registrations for the course (or, more precisely, the for course subject).

Use the <Create parallel courses> button in the course-student-overview in order to create additional parallel courses. This function opens a dialogue of the same name which displays the actual number and maximum allowed number of students for all the courses you have selected and which provides a proposal in the 'New course' column for the number of parallel courses that should be created. You can of course modify this proposal as you wish.



In the above example, a proposal is made to create an additional parallel course for the subject inf. 49 students have registered for it but there are only 25 places available.

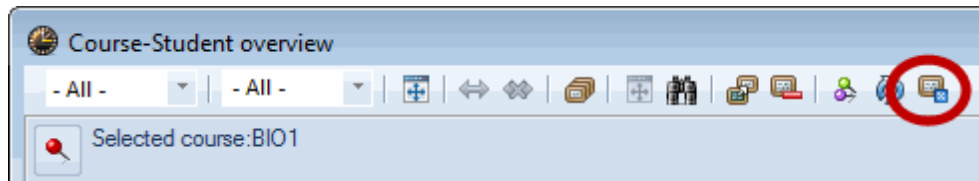
Note: Copying parallel courses to course choices

If you check the box 'Add the new courses to the students' course choices', the newly created parallel

courses will immediately be added to the corresponding student course choices.

3.2.1.2 Cancelling a course

Cancelling a course yourself you wish to cancel a course using the button <Cancellation of a course> (without deleting the entire lesson), you must first have entered one or more alternative or [reserve courses](#) in the corresponding student course choices. In this case Untis will allocate all students who would have liked to take the cancelled course the reserve course entered first.



Note: Cancelling reserve courses

If additional reserve courses have been specified you can also cancel the first reserve course, and so on.

Technically, this course will be ignored. If you wish to make this course available once more, uncheck the box on the 'Ignore' column in the lessons window.

3.2.2 Student-course-choice

The student-course-choice window is used to assign courses to a student. The main difference to the course-student choice is that alternative courses can be specified here, too.. It is not absolutely necessary to define which courses a student will actually take.

The window consists of the course choice area in the left pane, the course list in the right pane and the detail window at the bottom.

Note: Restrict to class

Use the combo box at the top left to limit the display to a particular class. The left window will then only display the students from the class, and only the courses allowed for the class will be offered for selection in the course list.

Student-Course-Choice

112 Students: Oban
 Course Choice: 10
 Class: 12
 Class level: 129298976

☐ Include all parallel courses
☐ Advance the cursor to the next line
☐ Sort courses by the subject master-list

Choi	Stat. code	Alternative Courses		
1	M1	M1		
2	CH1	CH1		
3	d2	d1	d2	d3
4	en1	en1	en2	
5	ku2	ku1	ku2	
6	g1	g1	g2	
7	ek1	ek1		
8	k2	k1	k2	
9	bio2	bio1	bio2	
10	sm1	sm1		

Sub.	Stud.	Tea.	Les.	Per	Cla.
BIO1	10	Nobel	10	5	12
EN1	19	Shak	6	5	12
EN2	6	Shak	85	5	12
G1	12	Cer	13	5	12
LA1	9	Cic	7	5	12
PH1	9	Gal	12	5	12
WR1	21	Smith	8	5	12
ch1	25	Mend	74	3	12
ch2	16	Mend	80	3	12
eth1	12	Arist	25	2	12
ev1	6	Luth	83	2	12, 13
inf1	15	New	81	2	12

Sub.	Les.	Tea.	Cla.	Per	Stud.	Clusters	Errors	Line text	Line
k1	23	Beck	12	2	25	T11_1			
ku2	86	Mich	12	2	22	T11_1	2 courses of 1 Student are in the same cluster		

Course list

The course list shows all the courses which are available for the selected student, with the student's class determining which courses are available. All courses which can actually be chosen, i.e. course without clashes, are highlighted green.

You can also sort the course list by any column in order to make course selection easier.

Course choice window

Each row of the course choice window displays one course choice of the currently active student. You can use the combo box at the top of the window to determine which student's course choices you wish to display and edit.

A course which has actually been chosen from the set of alternative courses, i.e. the course actually assigned to the student, is displayed in the 'Choice' column. You can also view possible courses in the [course-student-overview](#). The other columns contain possible alternative courses for this course choice. Unfavourable courses are highlighted red, while appropriate (favourable) courses are highlighted green. The sequence of the alternative courses is not relevant.

You can enter one or several codes of your choice for each course choice in the 'Stat.code(s)' column. These codes will be printed in the student-course-choice list and (optionally) in the course-students list and students-course list (printed from the [course-student-overview](#)). They play an important role when scheduling exams (please refer also to the chapter 'Exam scheduling' and to the notes on statistics codes in chapter 'Course-students-choice').

Course detail view

The course detail window displays additional data about the currently selected course such as teacher, weekly periods or [clusters](#) to which this course belongs. Furthermore, you will also see the courses that make the selected course a poor choice.

There are two reasons for a poor choice of course:

1. The course is in the same [cluster](#) as another course which is already assigned.
2. The course has the same [division number](#) as another course which is already assigned.

Functions

You can perform the following functions in the student-course-choice:

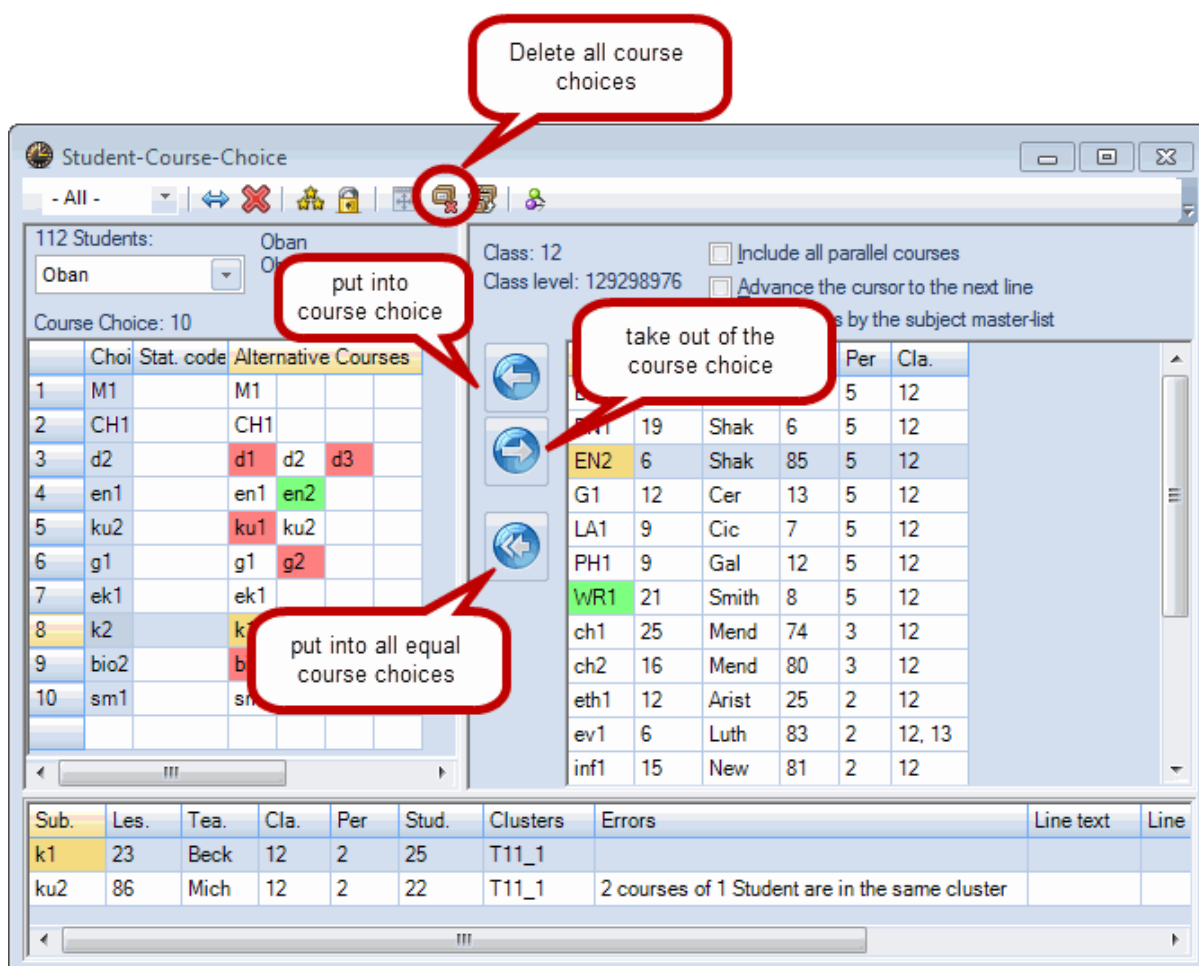
- [Assign courses and alternative courses](#)
- [Select courses from alternative courses](#)
- [Create reserve courses](#)
- [Specify priorities](#)
- [Course choice combinations](#)

3.2.2.1 Entering a course choice

You must first select a row in the course choice window in order to enter a course choice. Selecting an empty row opens a new course choice. Selecting a filled row allows you to add alternative courses.

Tip: Next row

Checking the box 'Advance the cursor to the next line' will cause the cursor to move to the next row in the course choice window after a course is chosen.



Adding a course (as an alternative course) to the course choice

You can now enter alternative courses for this choice either by double-clicking on the desired course in the course list or by selecting one or more courses using the mouse and then clicking on the blue-framed arrow pointing to the left or using drag&drop to move them to a new row in the course choice window while pressing the left mouse-button.

Note: With parallel course assignment

Checking the box 'Include all parallel courses' causes any parallel courses to be transferred to the course choice window automatically. Parallel courses, i.e. courses with the same teaching content, can be automatically recognised in Untis by the same subject name (which may only be supplemented at the end by a number).

If you wish to extend an existing course choice simply click on the corresponding row and add additional courses to the course choice.

Deleting alternative courses from the course choice

If you wish to remove alternative courses from an existing course choice use the mouse to select the courses and then either press the blue-framed arrow pointing right or use drag&drop to pull the course(s)

to the course list window. You can remove entire course choices in the same way.

Adding a course as an alternative course to all similar course choices

However, if you make the course choice for only one student and click on the blue-framed multiple arrows pointing left, the selected courses will be added not just to the current students but also to all other students who have the same course choice. Course choices are considered to be the same if they contain the same alternative courses with the same course priorities as the selected course choice.

Note:

If the view has been limited to a particular class, the new alternative courses will only be added to students in this class.

Delete all course choices

This function deletes the course choices of all students in the selected class(es).

Warning:

This function not only deletes all alternative course assignments, it also deletes all course choices. This means that no student in the selected class will have any course assigned.

3.2.2.2 Selecting an alternative course

It is generally not always necessary to choose an alternative course. Course optimisation can automatically determine the most suitable course. However, you of course have the possibility of making a course choice manually.

Assigning a course (to a student)

In order to select an alternative course, i.e. to assign an alternative course to a student, simply double-click on the desired alternative course (in the course choice window). This course will be added to the "Choice" column.

Alternatively, you can perform course assignment using the corresponding toolbar button after selecting the desired course.

	Choi	Stat. code	Alternative Courses		
1	EN1		EN1		
2	WR1		WR1		
3			d1	d2	d3
4			g1	g2	
5			k1	k2	
6			m1	m2	
7	bio1		bio1		
8	sm1		sm1		

Click, Click

	Choi	Stat. code	Alternative Courses		
1	EN1		EN1		
2	WR1		WR1		
3	d3		d1	d2	d3
4			g1	g2	
5			k1	k2	
6			m1	m2	
7	bio1		bio1		
8	sm1		sm1		

In the example above, course d3 was assigned with a double-click. The immediately results in situation that course g2 and k1 can no longer be assigned without causing a clash since they are in the same [cluster](#).

Note: Assigning unfavourable courses

You can also assign courses which are highlighted red if you confirm this by clicking <OK> in the appropriate message window.

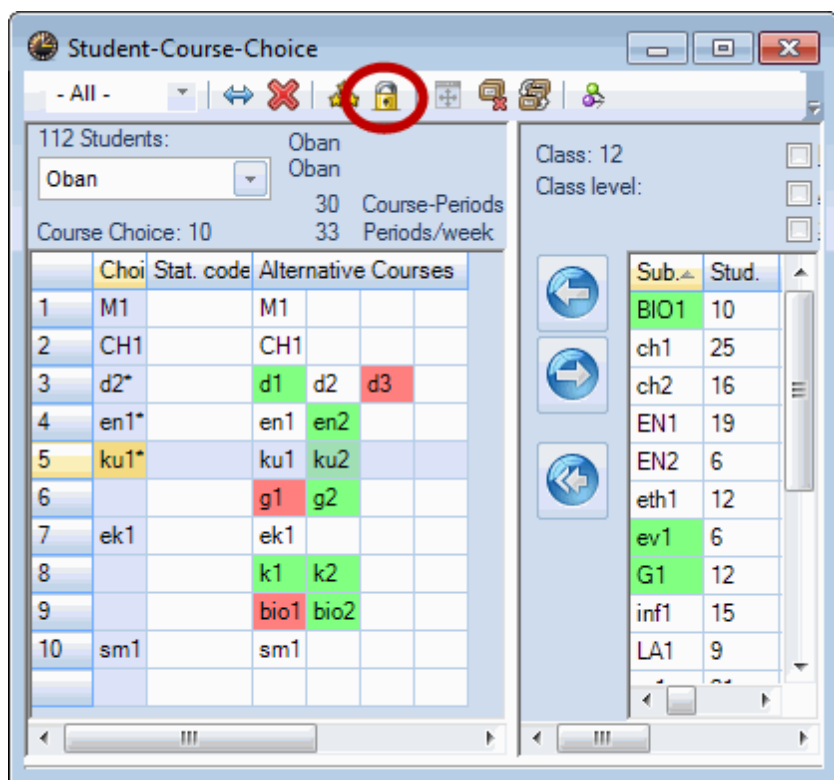
Deleting a student/course assignment

If you wish to remove a course assignment simply double-click on the chosen course in the "Choice" column or use the corresponding toolbar button.

Please note that you can only remove a course assignment if more than one alternative course has been entered in the course choice.

Fixing the course choice

A different alternative course may be assigned during course optimisation. If the course choice is to remain unchanged, you can fix it. Fixed course choices are marked with a *.



The figure above illustrates the following situation:

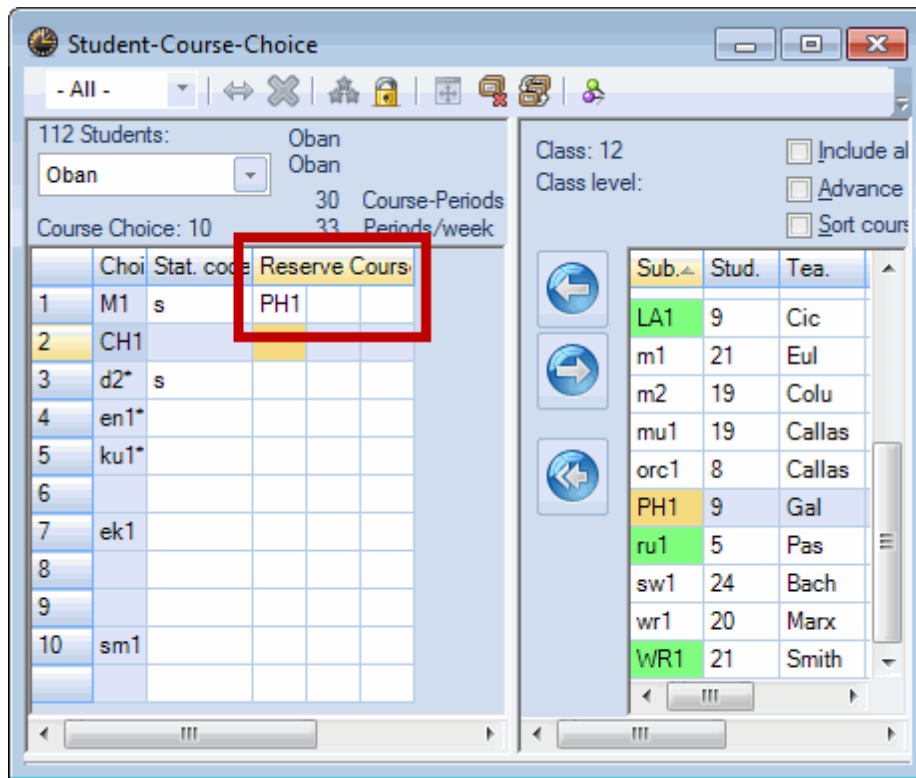
- Courses in rows 1, 2, 7 and 10 are entered automatically since there is no alternative course.
- Courses in rows 3-5 have been selected and fixed.
- For each course rows 6 and 9 there is only one clash-free option.
- A choice can be made in row 8 between k1 and k2.

3.2.2.3 Reserve courses

Students can often make an initial choice if you require them to specify one or more reserve courses for all courses (or for courses that you know from experience are likely to have a low take-up). Once this choice has been made you as timetable scheduler will see from the number of students which courses have to be [offered more frequently](#) and which courses can be cancelled.

If you wish to enter reserve courses, right-click on the column heading 'Alternative Courses' in the left section of the [student-course-choice](#) window. This will switch to the display of reserve courses, and you can enter reserve courses in the same way as entering alternative courses.

If a course for which a reserve course has been entered is now cancelled, the reserve course will automatically be assigned to the students affected.

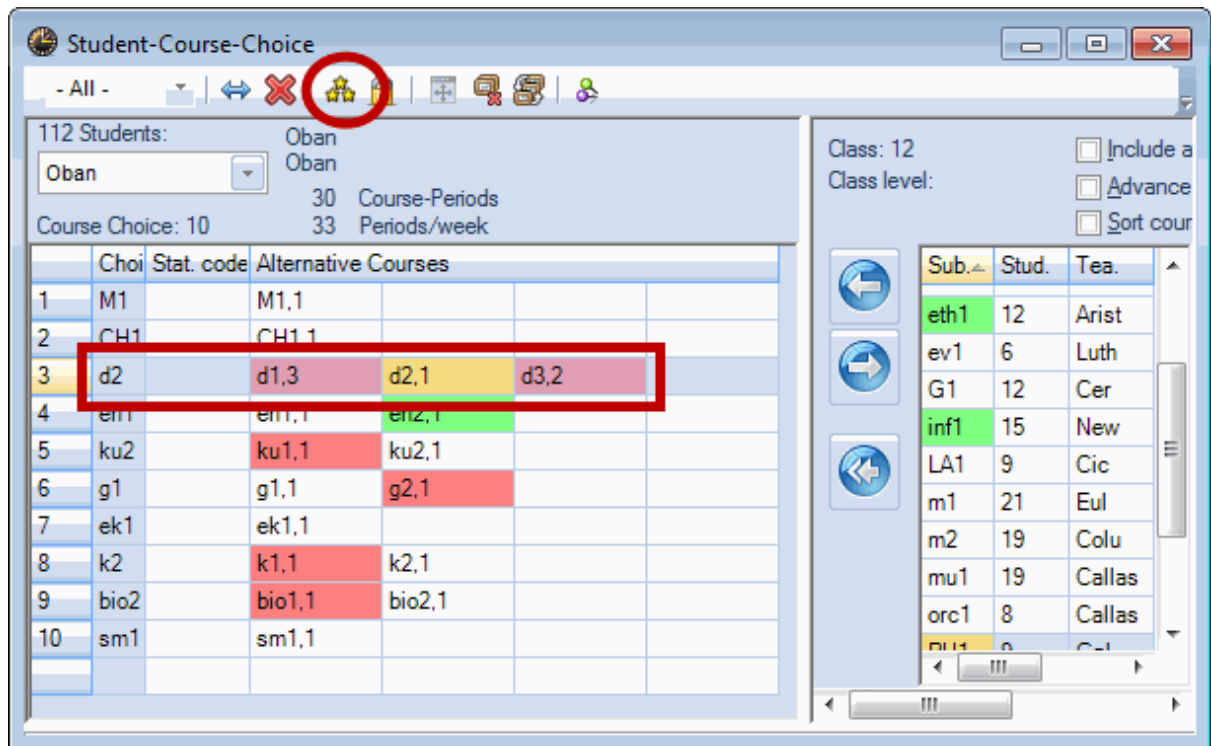


3.2.2.4 Priority

If a student has a preference for one of several alternative courses, you can manage this using the <Priority> button (function).

To change the priority of a course, select it and then click on this button. This decreases the priority of the course by 1. If, for example, the priority was originally 1, it will be changed to 2. The value is indicated after the subject name. Clicking on the <Priority (1-3)> button once more will change it to 3 and the next click would set the priority back to 1 again.

As soon as you have changed the priority of a course, the priority of all courses will be displayed behind the course names. If all courses have the same priority, no priority will be indicated.



In the above example, student *Oban* would prefer to take course *d2* while course *d1* is only considered as an alternative.

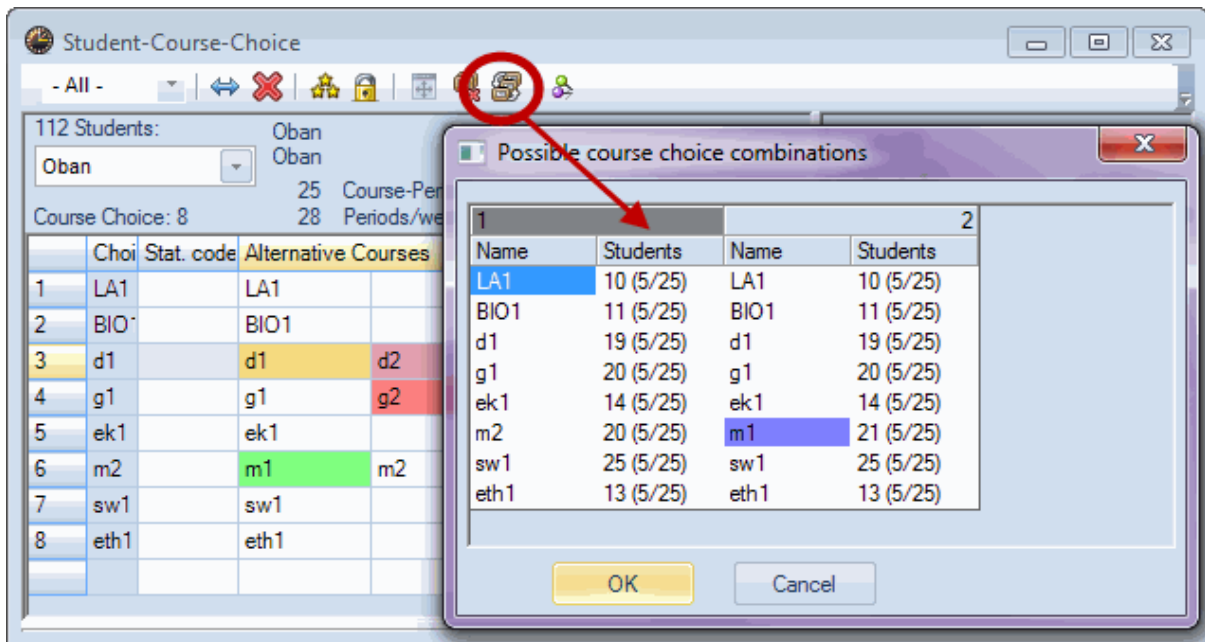
3.2.2.5 Course choice combinations

Clicking the <Course choice combinations> button opens the 'Possible course choice combinations' dialogue that displays all possible course choice combinations for the currently active student (in columns).

Any combination of course choices that does not result in a clash is possible. Changes vis-à-vis the current course choice are highlighted in colour. A field will be highlighted red if the defined number of students is exceeded.

The individual course choice combinations are sorted in such a way that the combinations listed first distribute the load more evenly over parallel courses than those listed lower down.

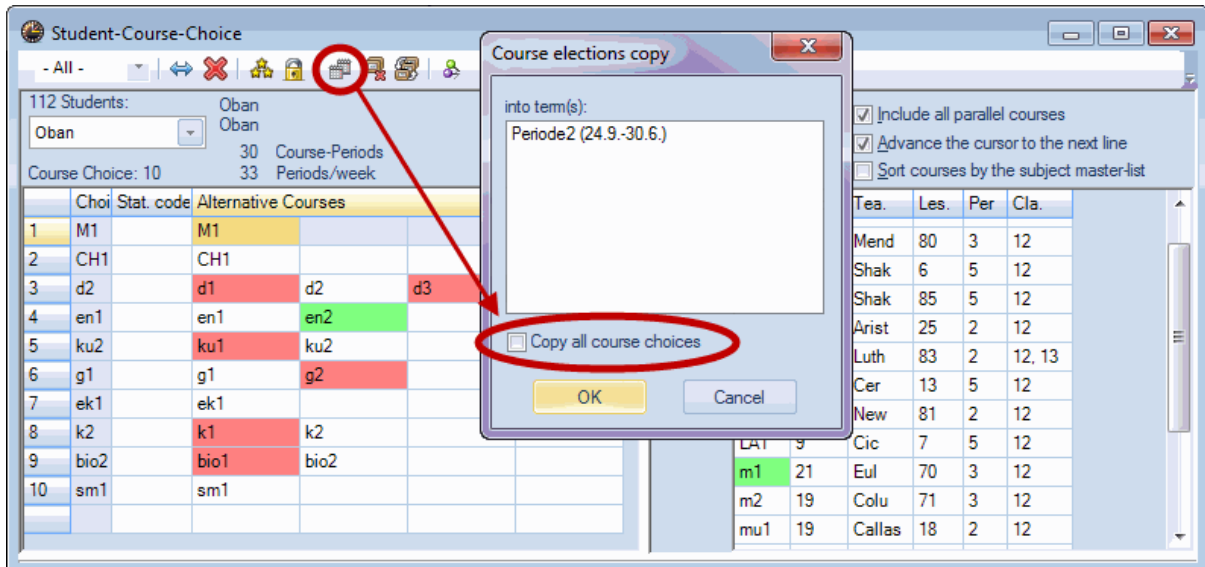
If you wish to adopt one of these alternative course choices simply click in the row in question and then on <OK>. This will assign the selected course choice combination to the student.



3.2.2.6 Studenten-Kurs-Wahlen kopieren

Über die Schaltfläche <Periodenkopie> können Sie die Kurswahlen eines Studenten in andere Perioden kopieren.

Dies kann auch für alle Studenten auf einmal durchgeführt werden. Aktivieren Sie dazu das Auswahlfeld 'Alle Kurswahlen kopieren' im Fenster 'Kurswahlen kopieren'.



3.2.3 Course-student-choice

The course-student-choice window consists of two parts: the student list in the upper section and the course details in the lower section.

Course-Student-Choice

- All - 12

Course: d1 Clusters: C13_2, T12_2

Les.: 95

Fix course choice

Stu.	Cla.	Stat. code(s)	Course		
Alice	13		d1	d2	d3
Arielle	13		d1	d2	d3
Baghira	13		d1	d2	d3
Bianca	13		d1	d2	d3
Blume	13		d1	d2	d3
Duchesse	13		d1	d2	d3
Dumbo	13		d1	d2	d3
Esmeralda	13		d1	d2	d3
Floh	13		d1	d2	d3
Geppetto	13		d1	d2	d3

Sub.	Les.	Tea.	Cla.	Per	Stud.	Clusters	Errors
d3	97	Grill	13	4	9	C13_2, T11_2	
g2	100	Asim	13	2	25	T11_2	2 cours

Students list

The student list displays those students for the currently active course who have this course in their course choices.

Note: Alternative courses

If the 'Alternative courses' box is checked, all the students of the alternative courses will also be displayed.

Course: d1		Clusters: C13_2, T12_2		
Les.: 95		Stu.: 26	<input type="checkbox"/> Alternative courses	

Stu.	Cla.	Stat. code(s)	Course		
Alice	13		d1	d2	d3
Arielle	13		d1	d2	d3
Baghira	13		d1	d2	d3

Course: d1		Clusters: C13_2, T12_2		
Les.: 95		Stu.: 26 (57)	<input checked="" type="checkbox"/> Alternative courses	

Stu.	Cla.	Stat. code(s)	Course		
Chef	13		d1	d2	d3
Seppl	13		d1	d2	d3
Brummbär	13		d1	d2	d3
Hatschi	13		d1	d2	d3
Pimpel	13		d1	d2	d3
Schlafmütz	13		d1	d2	d3
Schneewitchen	13		d1	d2	d3
Happy	13		d1	d2	d3
Dumbo	13		d1	d2	d3
Bambi	13		d1	d2	d3
Pan	13		d1	d2	d3
Hood	13		d1	d2	d3
Mogli	13		d1	d2	d3

In addition to the students' names, the window also lists their class, statistics code(s) and any alternative courses to this course choice.

Statistical codes

You can enter one or more statistical codes in the 'Stat. code(s)' column for each student. These statistical codes play an important role in the context of [exam scheduling](#).

Course detail view

The detail window displays additional data about the currently selected course such as teacher, weekly periods or clusters to which this course belongs. Furthermore, you will also see the courses that make the selected course a poor choice.

Choosing an alternative course

This function enables you to specify an [alternative course](#) of a course choice as chosen course, i.e. assign this course to the student. Just select the requested course and then click this button. You can also make a selection by double-clicking.

Fixing the course choice

You can use this function to explicitly fix the selected course of a course choice so that no change can be made to this course assignment during [course optimisation](#).

3.2.4 Course-student-matrix

The course-student-matrix, as its name suggests, provides an overview of which courses have been chosen by which students or which courses appear in the course choices of which students.

It contrasts students (columns) with courses (rows), with an entry at the intersection of the two indicating that the course appears in the student's course options.

The number in the cell indicates the number of the student's course choice. If a student's column contains several courses with the same number, this means that they are alternative courses.

An "X" at the intersection indicates that the course has been chosen by the student in question, i.e. it has been assigned to the student. These cells are also highlighted in blue.

Alternative courses are highlighted in either green or red depending on whether they are 'favourable' or 'unfavourable' for the student.

Course-Student-Matrix

Class level: **- All -** Subject/Les.: **en1 / 16** Students: **12** ☐ Only students with open course choices

Class: **- All -** Students: **Arran** ☐ Allow new subject choices

Subje	Les.	Per	Teach	Class	Level	Stu.	1	2	3	4	5	6
							Aberfeldy	Aberlour	Ardbeg	Arran	Auchentoshan	Balblair
							12	12	12	12	12	12
d3	97	4	Grill	13	13	9						
d3	115	4	Ander	12	12	12	03	03X	03X	03X	03	03X
EN1	6	5	Shak	12	12	19		01X	01X		01X	
EN1	87	5	Stan	13	13	24						
EN2	85	5	Shak	12	12	6		01	01		01	
en1	16	3	Car	12	12	12	11X			04		04X
en1	98	3	Buck	13	13	19						
en2	82	3	Buck	12	12	12	11			04X		04
ek1	21	2	Colu	12	12	14						

Clusters

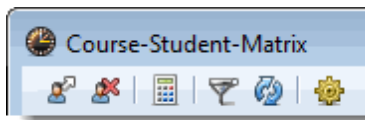
en1	16	T6_1
m2	71	T6_1 2 courses of 1 Student are in the same cluster

The course detail window at the bottom displays additional data about the currently selected course such as statistical codes or clusters to which this course belongs. Furthermore, you will also see the courses that make the selected course a poor choice.

The matrix generally displays all students and courses. However, you can use the combo boxes 'Class level' (year) and 'Class' as well as the check box 'Only students with open course choices' to restrict the display to specific students and courses.

3.2.4.1 Course-student-matrix functions

The following functions are available in this window:



Assign course

Use this button (or a double-click in the cell in question) to assign the selected alternative course to a course option or to change the current course assignment. If you activate the check box 'Allow new subject choices' in the settings for this window, you can also use this button to form new course options.

Delete assignment

In a similar manner to the previous function, you can use this button (or a double-click in the cell in question) to delete a course assignment. However, course choices cannot be deleted.

Optimisation of student allocation

You can also have courses assigned to students by automatic scheduling. Here you have the option of selecting students by year, class or individually.

This optimisation will only offer students class-free assignments, and efforts will be made to spread student numbers evenly over the courses.

Filter

Use the filter function to restrict the students displayed to those who have the currently active course in the course choice. If you activate the filter and e.g. click on the row with the course *bio2*, only the students will be displayed who have course *bio2* as an alternative course.

Refresh

This function enables you to refresh the window e.g. after changes to master data.

Settings

The settings dialogue allows you to determine whether new subject choices should be allowed (please

refer also to the 'Assign course' function for this window) and whether student names should be displayed vertically or horizontally.

3.2.5 Course-cluster-matrix

The course-cluster-matrix window displays which courses are scheduled in which clusters and also serves to manage the clusters themselves as well as to manually schedule courses in clusters.

Course-Cluster-Matrix

Only avail. periods: 76 Periods/week 3 Clashes

Class level: -All-
 Class: -All-
 Subject/Les.: BIO1 / 10 Per (Open periods): 5 (0) Students: 10
 Cluster: T1_1 5 34

Subje	Les.	Per	Open	Teach	Class	Level	Stu.	1	2	3	4	5	6	7	8	9	10
BIO1	10	5	0	Nobel	12		10										
BIO1	91	5	0	Mend	13		10										
bio1	72	3	0	Foss	12		20										
bio1	109	3	0	Foss	13		24										
bio2	73	3	0	Foss	12		19										
CH1	11	5	5	Curie	12		9										
CH1	92	5	5	Nobel	13		16										
ch1	74	3	0	Mend	12		25										
ch1	110	3	3	Curie	13		7										
ch2	80	3	0	Mend	12		16										
d1	14	4	0	Goeth	12		18										
d1	95	4	0	Gri	13		26										

Subject	Les.	Type	Name	Stat. code(s)
EN1	6	Stu.	Springbank	
EN1	6	Stu.	Auchentoshan	
M1	9	Stu.	Bladnoch	

The window contrasts clusters (columns) with courses (rows). If a course has been scheduled in a certain cluster, the cell at the intersection of a course and a cluster contains an 'X' and is highlighted either blue or red. Blue highlighting indicates that the course causes no clashes with another course in the cluster (i.e. each teacher and each student is only assigned to one course in the cluster). Red highlighting shows that this course clashes with another course in the cluster.

A white cell indicates that the course cannot or should not be scheduled in the cluster represented by this column. This is the case when all the periods of this course have already been scheduled or when scheduling would cause conflicts with other courses in the cluster.

A yellow cell indicates that assignment would lead to clashes with the cluster conditions entered (please also refer to chapter ' [Parameters for optimisation](#) ').

A green cell means that the course can be scheduled in this cluster without causing clashes.

If you select a cell the weekly periods and the number of students of the current course and the current cluster are shown at the top of the window. In addition, the total number of weekly periods of all clusters and the number of clashes (i.e. the number of students that have already chosen another course in the same cluster) are also shown.

Information on the [layout](#) and [functions](#) of this window can be found below.

3.2.5.1 Window layout

The course-cluster-matrix is divided into three sections, the form window, the course-cluster matrix and the detail window.

The screenshot shows the 'Course-Cluster-Matrix' window with three main sections:

Form view: Displays summary statistics for the selected course and cluster.

Class level:	Subject/Les.	Per (Open periods)	Students
- All -	BIO1 / 10	5 (0)	10
Class:	Cluster		
- All -	T1_1	5	34

Course-Cluster-Matrix: A grid showing the relationship between courses and clusters. The grid has 10 columns (1-10) and 10 rows (T1_1 to T5_2). Cells are colored green (no clash), yellow (clash), or blue (clash with 'X').

Subje	Les.	Per	Open	Teach	Class	Level	Stu.	1	2	3	4	5	6	7	8	9	10
BIO1	10	5	0	Nobel	12		10										
BIO1	91	5	0	Mend	13		10										
bio1	72	3	0	Foss	12		20										
bio1	109	3	0	Foss	13		24										
bio2	73	3	0	Foss	12		19										
CH1	11	5	5	Curie	12		9										
CH1	92	5	5	Nobel	13		16										
ch1	74	3	0	Mend	12		25										
ch1	110	3	3	Curie	13		7										
ch2	80	3	0	Mend	12		16										
d1	14	4	0	Goeth	12		18										

Detail view: A table showing details for selected courses.

Subject	Les.	Type	Name	Stat. code(s)
EN1	6	Stu.	Springbank	
EN1	6	Stu.	Auchentoshan	
M1	9	Stu.	Bladnoch	

Form window

The form window displays all information about the active course and the cluster that it belongs to. You can limit the matrix to a particular class level / year or class

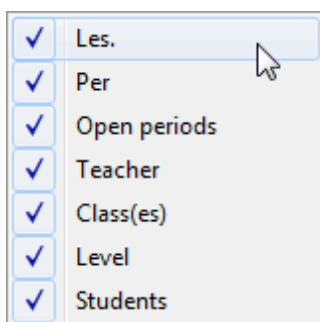
If you check box 'Only avail. periods', only those courses will now be displayed that still have open periods. Open periods are periods of a course that have not been scheduled in a cluster.

You can hide the top section of the course-cluster-matrix window if you need more room to display courses. To do this simply click on the black triangle pointing up at the top left of the window . If you wish to show the form window, click on the on the black triangle pointing down.

Course-band-matrix

Courses

For every course a field with the subject name, lesson number, the number of weekly periods and open periods, teacher, classes, class level (years) and number of students is displayed.

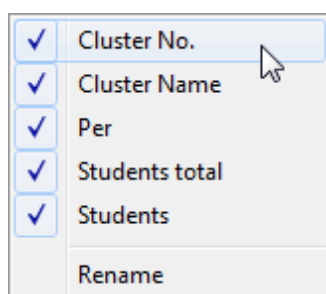


You can hide unneeded columns by right-clicking in the (grey) heading area. This opens a context menu which shows all available columns. Visible columns are checked. Clicking on a column name hides or displays the corresponding column.

Clicking on a column heading will sort the courses according to this column. The order of the columns can be rearranged by dragging them to the desired position. Likewise, you can adjust the width of the columns by dragging the column border in the heading line.

Clusters

A row is displayed for each cluster containing the number and name of the cluster, the number of periods, the total number of assigned students (=total of all students who take at least one course in this cluster) and number of students (=total of students in the currently active class level or class who take at least one course in this cluster).



You can hide unneeded columns by right-clicking in the (grey) heading area. As with the columns, a context menu is displayed which can help you to hide heading lines.

Detail window

Students causing clashes will be listed in the detail window at the bottom. The names of courses that clash will also be highlighted red. If the teacher of this course already teaches another course in this cluster, he/she will also be listed in the display of clashes and the teacher's name will also be highlighted red in the conflicting course.

								1	2	3	4	5	6	7
Name of the cluster								T1_1	T1_2	T2_1	T2_2	T3_1	T3_2	T4_1
								5	5	5	5	5	5	3
								34	43	43	40	24	11	49
Subje	Les.	Per	Open	Teach	Class	Level	Stu.	34	43	43	40	24	11	49
bio2	73	3	0	Foss	12		19							X
CH1	11	5	5	Curie	12		9							
CH1	92	5	5	Nobel	13		16							
ch1	74	3	0	Mend	12		25							X
ch1	110	3	3	Curie	13		7							

Subject	Les.	Type	Name	Stat. code(s)
M1	9	Stu.	Obar	
M1	9	Stu.	Bruichladdich	
M1	9	Stu.	Edradour	

The example above illustrates the following situation: If course BIO1 in cluster T4_1 is scheduled there will be three student clashes, namely Bladnoch, Springbank and Auchentoshan.

Note: Displaying alternatives

As an alternative to displaying clashes, you can change the settings for the detail window to display all students who have at least one course in the cluster or to display all students without a course in the cluster.

3.2.5.2 Course-cluster-matrix functions

Course-cluster-matrix functions

3.2.5.2.1 Adding and removing courses

Add course to the cluster



There are the several ways of scheduling a course in a cluster:

- Select the cell concerned and click on the <Add course to the cluster> button
- Double-click on the cell at the intersection of course and cluster
- Select the cell concerned and press the key 'X' or 'x'.

Note: Scheduling with clashes

An appropriate warning will be displayed if scheduling a course in a cluster is going to cause a clash. You can still schedule the course by confirming the message with <OK>. A course without open periods can of course not be scheduled.

If the course has fewer open periods than the cluster has periods/ week, you will be asked if you wish to split the cluster. If you confirm this, two new clusters will be created from the original cluster and will contain all the courses assigned so far. The number of periods/week in the original cluster will be reduced to the number of open periods of the course being added, and the course is also added to the cluster. The second cluster "inherits" the remaining number of weekly periods and contains only the previous courses.

Remove course from the cluster



There are the several ways of removing a course from a cluster:

- Select the cell concerned and click on the button <Remove course from the cluster>.
- Double-click on the cell at the intersection of course and cluster
- Select the cell concerned and press the or <SPACE> key.

Tip: Removing several courses

You can remove several courses from their cluster at the same time. First select the desired cells and then click on the button "Remove course from the cluster" or <Remove course from the cluster> button or press the or <SPACE> key.

3.2.5.2.2 Create new cluster

Create new cluster



If you wish to create a new cluster, simply press the 'Create new cluster' button. Untis will create an empty cluster with 0 periods. As soon as you assign a course to the cluster this number will be adjusted to the number of open periods of the course. You can also enter and change the number of weekly periods in the cluster yourself.

Note: Cluster = simultaneous sequence of lessons

Since a cluster is actually a simultaneous sequence of lessons, you will also find the new cluster in the 'Lesson sequences' window.

Delete cluster

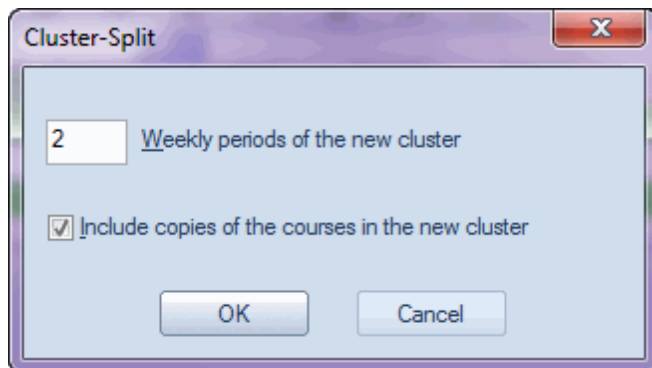


You can delete a cluster by selecting the desired cluster and then clicking on the 'Delete cluster' button.

Split cluster



Use this function to split a cluster containing several periods, for example a 3-period cluster can be split into a 2-period and 1-period cluster.



If the box 'Include copies of the course in the new cluster' is checked, the courses in the cluster will also be split, i.e. a former 3-period course would be split into a 2-period course and also a new 1-period course created with a new lesson number. This is especially important if you wish to schedule the periods of a cluster in different ways, for example the 2-period cluster only as a double period or the single period only in the afternoon.

Split cluster by year/level



Use this function to split a cluster containing courses from class levels (years) into several clusters containing courses for a single class level (year). Please refer to section '[Optimisation for several class levels \(years\)](#)' for more information on this function

3.2.5.2.3 Cluster to coupling

This function in the course-cluster-matrix allows you to convert the selected clusters to couplings. Please also refer to the application notes in section 'Course scheduling and clusters in timetable scheduling'.



Conversely, you can convert existing couplings back to courses via menu item 'File | Auxiliary Functions | Coupl. to Less.-Sequ.'.

Note: converting unscheduled lessons

At the time of the transformation, the lessons affected by this involved should not yet be scheduled in the time grid.

3.2.5.2.4 Fix the cluster

This function locks a cluster, i.e. no courses will be removed from the cluster during [course optimisation](#). However, you can allow course optimisation to add courses to a locked cluster.



Fixed (locked) clusters are indicated a * next to the cluster number and by a grey background.

								4	*5	6	*7	8
								T2_2	T3_1	T3_2	T4_1	T4_2
								5	5	5	3	3
								40	24	11	49	37
Subje	Les.	Per	Open	Teach	Class	Level	Stu.	40	24	11	49	37
bio1	72	3	0	Foss	12		20					
bio1	109	3	0	Foss	13		24					
bio2	73	3	0	Foss	12		19				X	
CH1	11	5	5	Curie	12		9					
CH1	92	5	5	Nobel	13		16					
ch1	74	3	0	Mend	12		25				X	
ch1	110	3	3	Curie	13		7					

Note: Fixed (locked) clusters

Fixed clusters will also normally remain unchanged during timetable optimisation, i.e. all courses in a fixed cluster will also be scheduled at the same time. Please also refer to the application notes in section 'Course scheduling and clusters in timetable scheduling'.

3.2.5.2.5 Merge similar clusters

This function searches for cluster assigned exactly the same courses. If such clusters are found, they are merged to form a single cluster with the same number of periods/week as the original clusters.

**3.2.5.2.6 Display student clashes**

This function shows the number of student clashes that would be caused if the course(s) were scheduled in the cluster in question. Teacher clashes are indicated by a '-' (hyphen).



You can use this function, for example, if you wish to remove a cluster with few courses and are now searching for other clusters to which you can assign these courses. You can then see at a glance which assignments would cause the fewest student clashes and consequently the fewest changes in student choices.

								1	2	3	4	5	6	7	8
								T1_1	T1_2	T2_1	T2_2	T3_1	T3_2	T4_1	T4_2
								5	5	5	5	5	5	3	3
								34	43	43	40	24	11	49	37
Subje	Les.	Per	Open	Teach	Class	Level	Stu.	34	43	43	40	24	11	49	37
BIO1	10	5	0	Nobel	12		10	3	0	0	0	7	0	8	0
BIO1	91	5	0	Mend	13		10	0	4	0	0	0	6	-	5
bio1	72	3	0	Foss	12		20	17	0	12	0	9	0	-	0
bio1	109	3	0	Foss	13		24								
bio2	73	3	0	Foss	12		19							X	

Subject	Les.	Type	Name	Stat. code(s)
EN1	87	Stu.	Klopper	
EN1	87	Stu.	Duchesse	
EN1	87	Stu.	Jaq	
EN1	87	Stu.	Schneewitchen	

3.2.5.2.7 Refresh - Settings

Refresh

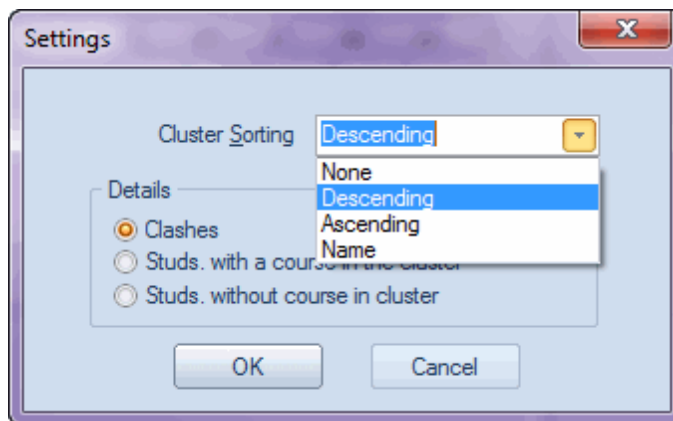


This function enables you to refresh the window e.g. after changes to master data.

Settings



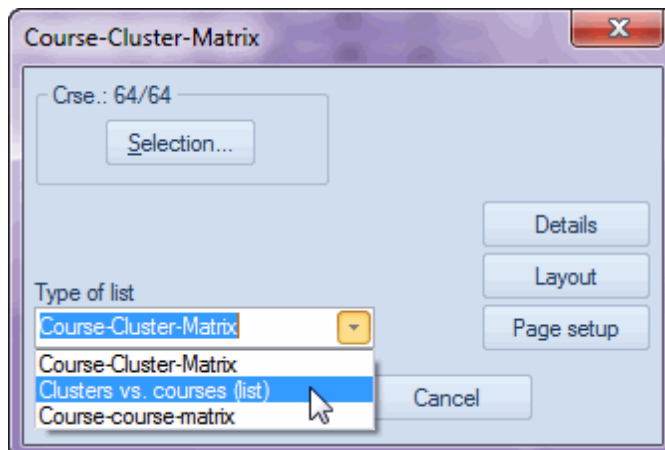
The settings dialogue allows you to determine the sort order of the clusters.



You can also determine whether all clashes of a cluster, all students with a course in the cluster or all students without a course in the cluster should be displayed in the detail window.

3.2.6 Printing

The course-cluster-matrix window provides a number of lists for you to print or display by selecting the <Print> or <Print preview> buttons from the main toolbar.



Course-cluster-matrix

The course-cluster-matrix is always printed in the form that is displayed on the screen. The same column and row headings are printed as in the screen display.

If student clashes (please refer to section 'Display student clashes') are currently displayed in cells when the print command is called, they will also be printed.

Cluster vs. courses list

This list shows the name of all courses contained in each cluster with the relevant number of students.

You can limit the output to certain courses by entering one or more statistical codes in the detail settings.

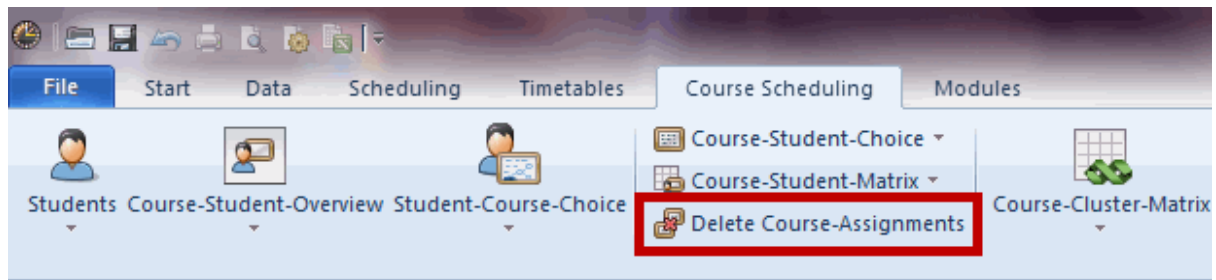
Course-course-matrix

The course-course matrix shows you how many students take two different courses at the same time. It thus indicates how many student clashes would result if the two courses were scheduled simultaneously in a cluster.

Any clashes resulting from a possible assignment of alternative courses are also shown in parentheses.

3.2.7 Delete course assignments

assignments' to delete the course assignments for all students of a class or class level/year, or of all students. The selected course is removed in the case of course choices with several alternative courses.



3.3 Course optimisation

The two main tasks of course scheduling are to define course clusters, i.e. determine which courses should best be taught at the same time, and to allocate students to actual courses when several alternative courses are specified in their course choices.

Several constraints must be taken into account:

- No teacher may teach two different courses within the same [cluster](#) .
- No student should take two different courses within the same [cluster](#) , otherwise choices must be redefined
- Clusters should be formed in such a way that as many students as possible take a course in this cluster.

- Students should be allocated to [parallel courses](#) as evenly as possible, e.g. course *bio1* should not be taken by 40 students when the parallel course, *bio2*, is only taken by 10 students. At the same time, [alternative courses](#) requested with a higher priority by students should be given preferential treatment during assignment.
- A number of user parameters must also be observed (e.g. minimum and maximum number of students per course, student optimisation codes, and cluster conditions).

The course scheduling module provides two different optimisation methods for this purpose: standard optimisation and partial optimisation (also called part optimisation).

Standard optimisation

The advantage of [standard optimisation](#) is its ease of use. After defining the constraints you only have to launch optimisation, and Untis will attempt to find a complete solution while keeping to the conditions as closely as possible.

Partial optimisation

In contrast, [partial optimisation](#) only deals with a part of the courses which have to be scheduled, but still examines the entire mathematical solution space. Partial optimisation usually yields better results than standard optimisation, but its use requires a certain level of experience from the user.

In practice, it is generally advisable to use a combination of both methods together with some manual scheduling with the aid of the [course-cluster-matrix](#).

Example

For example, taking an ethics or religious knowledge lesson may be compulsory for students of a particular class level/year may have to take one of the three English courses on offer. Your specialist knowledge of these matters must underpin your scheduling activities. In many cases manually scheduling these courses in a cluster (and then fixing the cluster) will speed up subsequent optimisation significantly and greatly improve the quality of the solutions.

3.3.1 Parameters for optimisation

There are a number of parameters that need to be observed in course scheduling that quite naturally have to be taken into consideration by course optimisation. The following section explains the requirements in more detail.

Minimum and maximum number of students

For each course you can specify the minimum and maximum number of students who should take the course.

The data can be entered either in the [course-student-overview](#) or directly in the lessons window and is described in more detail in chapter [Courses window](#) in this manual.

Student optimisation code

The student optimisation code allows you to specify which students should be scheduled in the same parallel course and who should if possible be scheduled in different parallel courses. The optimisation code is entered in the student master data window and is explained more in greater in the '[Student](#)

[master data](#) ' section of this manual.

Cluster conditions

Selecting 'Modules | Course scheduling | Cluster conditions' from the main menu opens a window of the same name where you can set restrictions on the creation of clusters during courses optimisation.

Enter conditions in the left part of the cluster conditions window. The right section of the window displays the list of possible courses that can be included in the conditions.

The details window at the bottom shows additional data on the selected course when the focus is on the course list.

Conditions that are violated by existing clusters are highlighted red. The detail window will show you the reason(s) for the clash when you click on the condition in question.

Conditions: 1, Conditioned courses: 3

Number	Max.	Not							
of	Courses	In clus	Conditioned courses						
Condit.	In clus	W. con.							
1	2		BIO1	CH1	PH1				
2		3	d1	d2	d3				
3		2	en1	en2					
4									

Class level: - All - Class: - All -

Sub.	Stud.	Tea.	Les.	Per	Cla.
en1	19	Buck	98	3	13
EN1	19	Shak	6	5	12
EN1	24	Stan	87	5	13
en2	12	Buck	82	3	12
EN2	6	Shak	85	5	12
eth1	12	Arist	25	2	12

Sub.	Stud.	Tea.	Les.	Per	Cla.	Clusters	Errors
BIO1	10	Nobel	10	5	12	T2_1	
CH1	9	Curie	11	5	12	T3_1	
PH1	9	Gal	12	5	12	T3_1	

In order to create a new condition you first have to select an empty cell in the left part of the window. Now add one or more courses to the condition (in a similar way to the ' [student-course-choice](#) ' window) either by double-clicking on the desired course(s) or by clicking on the blue-framed arrow.

You can use the other blue-framed arrow (pointing to the right) to remove courses from a rule.

The following two cluster condition options are available:

Maximum courses from one cluster

Only a certain number of courses from a group of specified courses may be scheduled in one cluster.

Cluster condition 1 in the above example: A maximum of two courses from BIO1, CH1 and PH1 may be in one cluster.

Not in cluster with specific course

No courses from a certain group may be scheduled with courses from another group.

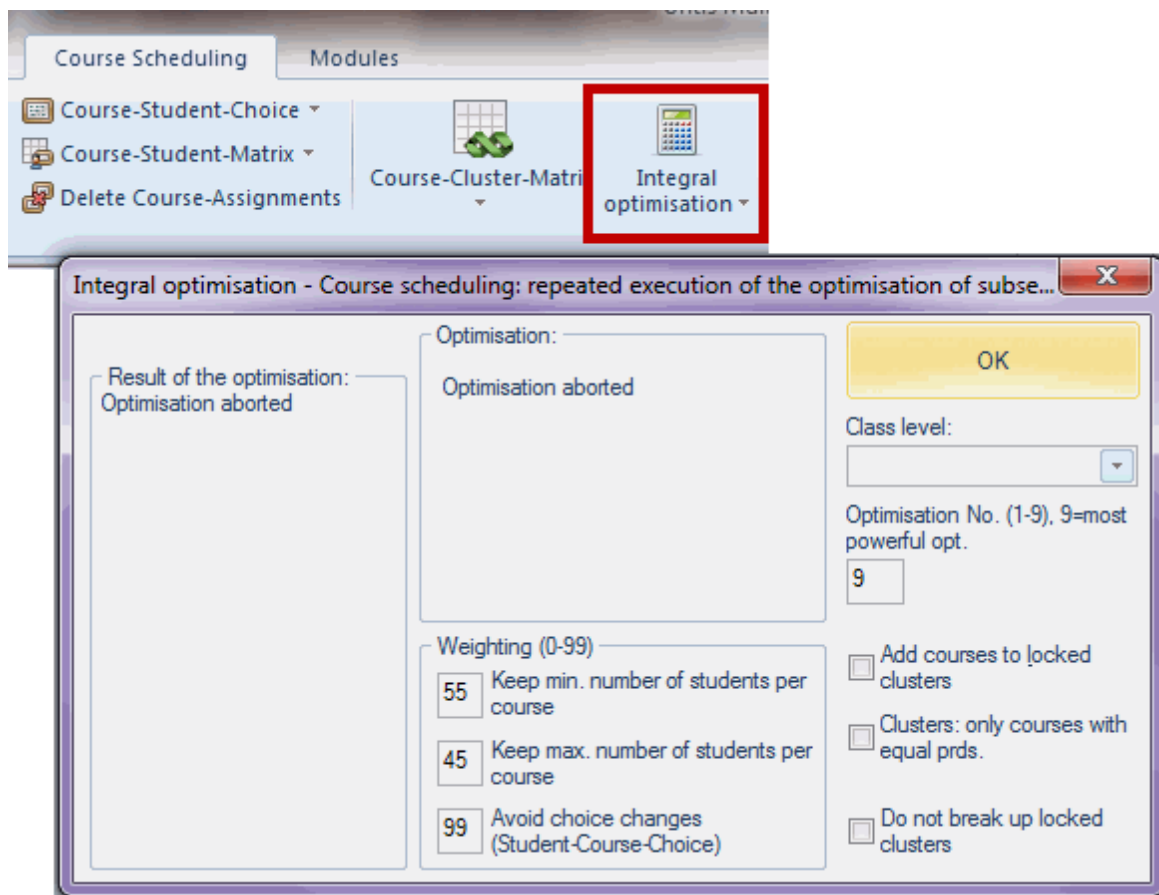
Cluster conditions 2 and 3 in the above example: The three German courses d1, d2 and d3 may not be in the same cluster, i.e. scheduled simultaneously, as English courses e1 and e2.

3.3.2 Totaloptimierung

Auf Knopfdruck werden alle Kurse in Bändern verplant und die Zuteilung der Studenten auf Alternativkurse festgelegt.

Mit der [Teil-Optimierung](#) kann man auch sehr gute Optimierungsergebnisse erzielen, es ist für den Anwender allerdings schwierig und oft umständlich, die optimalen Teilbereiche auszuwählen. Für die Totaloptimierung wurde ein Algorithmus entwickelt, der genau diese Aufgabe übernimmt, nach unterschiedlichen Kriterien Teilbereiche auswählt und damit die Teilbereichsoptimierung aufruft.

Sie können die Totaloptimierung auf der Registerkarte 'Kursplanung' über den Punkt 'Totaloptimierung' starten.



In dem Optimierungsdialog haben Sie auch noch einige zuschaltbare Optionen sowie Gewichtungseinstellungen.

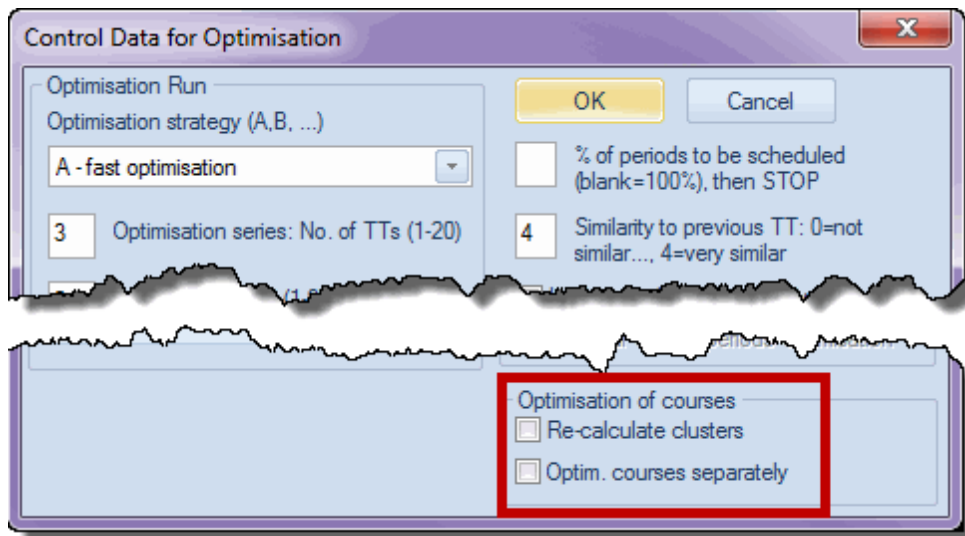
Die Totaloptimierung ist auch über den Optimierungsdialog der Stundenplanung aufrufbar. In diesem Fall wird nicht nur die Zuteilung der Kurse zu den Bändern und der Studenten zu den Alternativkursen gerechnet, sondern auch der gesamte Stundenplan. Hier werden zwei Optionen angeboten:

Bänder neu rechnen

Alle bislang angelegten Bänder werden gelöscht und von der Totaloptimierung neu berechnet. Anschließend wird die Stundenplanoptimierung aufgerufen.

Kurse getrennt optimieren

Mit diesem Haken werden zunächst sämtliche Unterrichte, die keine Kurse sind, ignoriert. Daraufhin werden die Kurse optimiert, bis keine Verbesserung mehr gefunden werden kann. Anschließend werden die restlichen Unterrichte dazu optimiert.



Berücksichtigung von Zeitwünschen

Die Totaloptimierung berücksichtigt bei der Erstellung der Bänder auch schon die Zeitwünsche. Sollte ein Unterricht beispielsweise immer am Vormittag, ein weiterer immer am Nachmittag gesperrt sein, werden diese beiden Kurse nicht in dasselbe Band gelegt. Es wird vielmehr versucht, die Bänder so zu gestalten, dass die sich darin befindlichen Kurse alle dieselben (oder zumindest ähnliche) Sperrungen aufweisen.

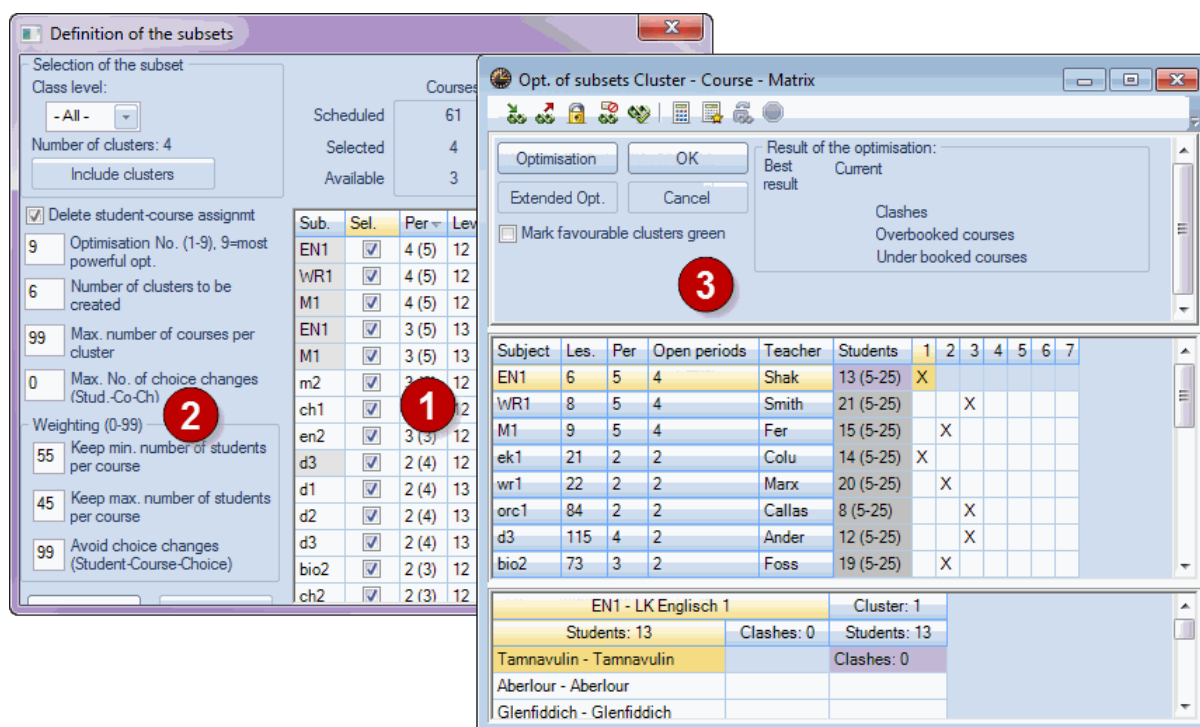
3.3.3 Partial optimisation

This type of optimisation examines a great number of solutions. Since this method takes so long, it is not usually possible to optimise all courses at the same time, and the user must select which subset of courses should be optimised.

Note: Courses with the same weekly periods

Partial optimisation ignores course periods/week, i.e. each course is scheduled in exactly one cluster without its periods/week being taken into account. It is therefore advisable to schedule courses with the same number of periods/week in the same optimisation run.

Partial optimisation is launched via menu item "Modules | Course scheduling | Partial optimisation".



Partial optimisation can be divided into three processes:

1. [Specifying subsets](#)
2. [Defining optimisation parameters](#)
3. [Optimising subsets](#)

3.3.3.1 Specifying subsets

The selection of courses that are to be scheduled simultaneously in partial optimisation is extremely important for the subsequent optimisation run. This is where you must use your experience and knowledge of your school to good effect in order to achieve a good result.

Course list

The course list displays all the courses of the currently active class level (year) that can be selected for partial optimisation. These are all the courses that still have open periods, i.e. periods that have not yet been scheduled in a cluster.

Sub.	Sel.	Per	Level	Stud.	Tea.	Les.
bio1	<input checked="" type="checkbox"/>	2 (3)	12	20	Foss	72
bio2	<input checked="" type="checkbox"/>	2 (3)	12	19	Foss	73
ch1	<input type="checkbox"/>	3 (3)	12	21	Mend	74
ch2	<input type="checkbox"/>	2 (3)	12	20	Mend	80
d1	<input checked="" type="checkbox"/>	2 (4)	13	26	Gri	95
d2	<input checked="" type="checkbox"/>	2 (4)	13	22	Sutt	96
d3	<input type="checkbox"/>	2 (4)	12	12	Ander	115
d3	<input checked="" type="checkbox"/>	2 (4)	13	9	Grill	97
ek1	<input checked="" type="checkbox"/>	2 (2)	12	14	Colu	21
en1	<input type="checkbox"/>	2 (3)	12	12	Car	16
EN1	<input checked="" type="checkbox"/>	4 (5)	12	13	Shak	6
EN1	<input checked="" type="checkbox"/>	3 (5)	13	24	Stan	87
en2	<input type="checkbox"/>	3 (3)	12	12	Buck	82
eth1	<input checked="" type="checkbox"/>	2 (2)	13	24	Sen	106
g1	<input checked="" type="checkbox"/>	2 (2)	13	25	Hero	101
k1	<input type="checkbox"/>	2 (2)	12	25	Beck	23
ku2	<input checked="" type="checkbox"/>	2 (2)	12	22	Mich	86
m1	<input type="checkbox"/>	2 (3)	12	20	Eul	70
M1	<input checked="" type="checkbox"/>	4 (5)	12	15	Fer	9

The "Per" column indicates the periods/week of the course and, in parentheses, the periods/week that have not yet been scheduled. The "Stud." indicates how many students have already been assigned to the course. The 'Level' column contains the class levels (years) for which each course is offered.

You can select courses for partial optimisation by checking the box in 'Sel.' column.

Note: No restriction

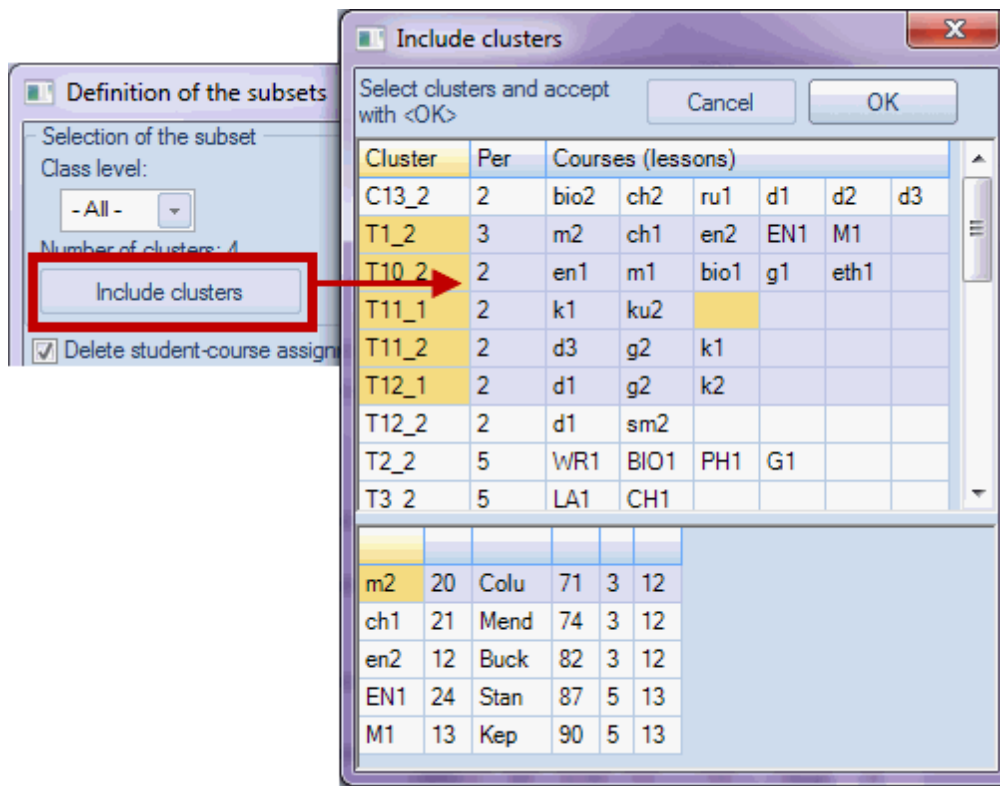
There is currently no restriction on the number of courses in partial optimisation. However, if a subset is selected that is too large, optimisation can take a very long time. You must also take care that your optimisation parameters do not contradict each other when selecting courses.

If, for example, a student has four course choices in a subset, but you wish to form a maximum of three clusters, it will as a matter of principle not be possible to achieve a result. In this case the error message 'Student has too many courses in subset' will be displayed.

Partial optimisation must of course always include all the courses that can be chosen as alternatives in a course choice. If e.g. student *Oban* can choose either course *ar1* or *ar2*, both courses must be included in the subset for partial optimisation.

Include clusters

Existing clusters are usually ignored in partial optimisation. However, it is possible to include existing clusters as the starting point for creating new clusters.



Clicking the button <Include clusters> displays a dialogue with list of available clusters. Here you can select the desired clusters and then include them in partial optimisation by clicking on <OK>.

3.3.3.2 Optimisation parameters

In addition to [selecting courses](#), you have the following options for defining optimisation parameters.

Delete student/course assignment

Checking this box means that any existing [student course choices](#) will be disregarded during the optimisation

Optimisation no.

The optimisation number determines the depth of the search for solutions. The larger the number, the more combinations Untis will search in order to find a solution. Valid entries are 1 to 9. No combinations will be skipped if you select 9.

Number of clusters to be created

Use this field to specify the maximum number of [clusters](#) that are to be formed. Optimisation will then look for a solution where all courses in the [subset](#) are scheduled in these clusters.

Note: Minimum number of clusters

You need at least as many clusters as the maximum number of course choices of each student if you wish to avoid student clashes. If, for example, a student has defined 12 different course choices, you will need at least 12 clusters.

Max. number of courses per cluster

You can use this parameter to limit the number of courses that are to be scheduled in one cluster.

Max. number of choice changes (Stud.-Co-Ch)

It is usually the goal to find solutions where no student takes two courses in the same cluster since such a solution forces the student to choose other courses, i.e. to change his/her course choice.

However, if it is not possible to find a solution without student clashes, you can also search for solutions that cause students to change their course choices. Enter the maximum number of student course choice changes allowed.

Weighting parameters

Weighting parameters are used to define to what degree some of the conditions should be taken into account during optimisation. In addition to a weighting value for observing the minimum and maximum number of students per course, there is also a weighting value for the importance of avoiding student clashes.

Once you are satisfied with the course choices, click on <Continue> in order to start actual [optimisation](#).

Note: Plausibility check

The entries are now tested for their plausibility and a corresponding message will be displayed if problems are encountered. Some of these messages allow you to decide whether you wish to continue with these entries or whether you wish to alter the parameters.

3.3.3.3 Partial optimisation

If no entries are likely to hinder optimisation, the corresponding subset optimisation window will open make [make or prohibit course-cluster assignments](#) and where you can start the actual optimisation run.

In the right section of the top window area - the status display - data about the solutions that have been found is displayed during and after optimisation. After optimisation the <OK> button serves to save the result of optimisation or any manual entries. Clicking the <Cancel> button discards the results found so far and takes you back to the 'Definition of the subsets' dialogue.

Opt. of subsets Cluster - Course - Matrix

Optimisation OK
Extended Opt. Cancel

Result of the optimisation:
Best result
Current
Clashes
Overbooked courses
Under booked courses

☐ Mark favourable clusters green

Subject	Les.	Per	Open periods	Teacher	Students	1	2	3	4	5	6	7
vr1	8	5	4	Strim	21 (5-25)				X			
M1	9	5	4	Fer	15 (5-25)	X						
ek1	21	2	2	Colu	14 (5-25)			/	/	/	X	
wr1	22	2	2	Marx	20 (5-25)						X	
orc1	84	2	2	Callas	8 (5-25)							X
d3	115	4	2	Ander	12 (5-25)			/	/	/	/	X
bio2	73	3	2	Foss	19 (5-25)	X						
ch2	80	3	2	Mend	20 (5-25)	X						
ru1	116	3	2	Pas	5 (5-25)			X				
d1	95	4	2	Gri	26 (5-29)		X					
d2	96	4	2	Sutt	22 (5-25)			X				
d3	97	4	2	Grill	9 (5-25)		/	/		X		
m2	71	3	3	Colu	20 (5-25)		/	/		X		
ch1	74	3	3	Mend	21 (5-25)						X	
en2	82	3	3	Buck	12 (5-25)	X						
EN1	87	5	3	Stan	24 (5-25)	X						
M1	90	5	3	Kep	13 (5-25)	X						
en1	16	3	2	Car	12 (5-25)				X			

d3 - GK Deutsch 3	Cluster: 2
Students: 12	Clashes: 0
Students: 41	
Caollia - Caollia	Clashes: 0
Aberlour - Aberlour	

The middle part of the window contains a simplified cluster-course-matrix with the courses of the subset and the clusters to be filled by partial optimisation. The 'Students' column displays the number of students attending the relevant course as well as the minimum and maximum number of students entered for this course (in parentheses). Red indicates that the maximum number of students has been exceeded and green that the minimum number has not been reached.

The students of the selected course are listed individually and details about possible clashes are given in the bottom section of the window. You can see the number of students as well as details about eventual clashes for the selected cluster.

If you have added clusters to the subset, the courses of the clusters which already have been entered

are in the middle section (marked with an 'X') and are also locked. This ensures that existing cluster definitions are retained.

You can also manually assign courses to certain clusters and lock clusters for certain courses. In addition, you are provided with information on how well the selected would fit in with a particular cluster.

How long optimisation takes mostly depends on the following factors:

- Number of [courses](#) and [clusters](#)
- The structure of students' [course choices](#)
- Locked and blocked courses/clusters (increases the length of time considerably)
- [Optimisation type](#) (fast or extended)
- [Optimisation no.](#)

You can start with simple optimisation for the initial optimisation run. If no solution is found, try extended optimisation.

All possible combinations of clusters are generally tested. The algorithm tries to recognise identical solutions in order to save time and to forego the needless examination of combinations :

A solution is equal if clusters are only swapped (e.g. cluster 1 instead of 3).

Parallel courses (e.g. *E1* , *E2* , *E3*) are seen as equal if they are always selected together in every student choice..

Note: Blocked, locked courses/clusters

If you lock clusters or exclude courses from certain clusters, different clusters and courses are no longer equal and therefore the number of combinations which has to be examined can be drastically increased (a hundredfold or even more).

The number of student clashes as well as the number of the over- and underbooked courses are shown for the best and for the last solution. The [course-cluster-matrix](#) shows the interim results of cluster allocation.

You can examine the best solutions after optimisation. Select the solution you are interested in from the list-box The number of clashes as well as the number of overbooked and underbooked courses are indicated in parentheses next to number of the solution.

Note: Unrealistic numbers

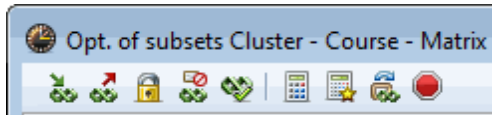
If the minimum and maximum numbers of students for a course are not realistic (based on their course choices), Untis calculates the optimum number of students for the course in question, and the number of over- or booked courses is determined on the basis of this number. This can result in differences to the display in the course-cluster-matrix.

If, for example, a course can be taken by at least 5 and at most 25 students (according to the entry in the course-students-overview), but only 3 students have chosen this course as an alternative, then these 3 students are the most that can be assigned to the course after optimisation. This course would then be marked as underbooked in the course-cluster-matrix whereas it would not be counted as

underbooked in the solution display.

3.3.3.3.1 Toolbar functions

You can control optimisation with the following toolbar functions:



Add course to the cluster

This function allows you to add a course to a cluster. To do this, select the course and the desired cluster and click on the 'Add course to the cluster' button. You can alternatively add a course to a cluster with a simple double-click.

Note: Locking a course

You have to lock this course if this course-cluster-assignment is to be observed during a subsequent optimisation run.

Remove course from the cluster

If you wish to remove a course from a cluster, select the course and the desired cluster and click on the 'Remove course from the cluster' button. You can alternatively remove a course from a cluster with a simple double-click.

Fix course in cluster

If you wish a particular course to be scheduled in a certain cluster in all cases, add this course to the desired then lock it by using the 'Fix course in cluster' button. A locked course is marked with a *.

Exclude course from cluster

If you wish to avoid a course being scheduled in a certain cluster, select course and cluster and click on the 'Exclude course from cluster' button. Optimisation will not now place this course in the cluster marked with the block.

The block is represented in the cell with a forward slash '/'.

Favourable clusters green

This function highlights all those clusters to which each course could be added in green. Restrictions such as [cluster conditions](#) are taken into consideration during the check.

Alternatively, you can also check the box 'Mark favourable clusters green'. This will highlight the favourable clusters for the selected course when you click in the corresponding row.

Optimisation / Extended Opt.

You can choose between one of the two variants for optimisation. In principle both variants are based on the same algorithm. The first one is faster because some combinations are considered to be equal and are therefore not re-examined.

In contrast to fast optimisation, extended optimisation also takes into account that

- Two parallel courses can be scheduled in the same cluster
- Parallel courses are considered equal if teachers are already assigned to them.

Skip combinations

Optimisation will automatically skip combinations if a solution has not been found after a specific time. This function enables you to skip functions manually in order to speed up optimisation.

Cancel optimisation

Clicking this button terminates the optimisation run. Solutions found so far are saved.

3.3.3.3.2 Partial optimisation example

We now wish to demonstrate the practical application of partial optimisation.

First remove all existing [course assignments](#) , delete all existing [clusters](#) and then launch [partial optimisation](#) .

Since there are no clusters, all course weekly periods are still to be scheduled, and the course list therefore contains all the courses of our school.

In the first step we are going to schedule all the courses with 5 periods/week. Start by sorting the [course list](#) according to the number of periods by clicking on the "Per" column heading. Then hold the left mouse-button move the cursor across all the 5-period courses. Now press <SPACE> or click in the 'Sel.' column to mark the courses.

We will first try to manage with three clusters, and so we enter a '3' in the field 'Number of clusters to be created'.

Click on the <Continue> button to proceed to the next step. No problems are encountered and no warnings are displayed, and so the ' [Opt. of subsets](#) ' window is displayed. We do not wish to set any constraints/parameters so we can launch optimisation immediately by pressing the < [Optimisation](#) > .

Untis finds a solution without clashes almost immediately and displays the message 'Optimisation completed - Solution found'. Confirm this with<\>OK>. You can see how courses have been scheduled in clusters in the [course-cluster-matrix](#) .

Now press <OK> in the "Opt. of subsets" window and confirm the save cluster prompt with <YES>. The 'Definition of the subsets' window will be redisplayed.

In the next step, we are going to schedule all courses with 3 periods/week and see whether we will be able to manage with just 2 clusters. Mark all the 3-period courses, enter 2 in the "Number of clusters to be created" field and then press <Continue>. A message is displayed informing us that student *Talisker* has too many courses in our selected subset, i.e. 3, but we only allow the creation of 2 clusters. We could now press <Cancel> and change our input, but we would first like to know whether there are any other students with too many courses before we decide on a new number of clusters. The next message

window lists a whole number of students with too many courses. We now press <Cancel> and enter 3 as the desired number of clusters to be created. Clicking on <Continue> and confirming the message with <OK> takes us to the optimisation dialogue.

Start optimisation again, and almost instantly there is a solution. Click on <OK> to once more save the clusters.

In the next step we are going to schedule the 4-period clusters together with the 2-period clusters. Please mark all the relevant courses with and test if 4 clusters are sufficient. After clicking on <Continue> we see the message that one student has 6 courses in the subset. We therefore increase the number of clusters to 6 and reach the optimisation dialogue without any further messages.

After optimisation is launched, a solution is quickly found but Untis is not completely satisfied with it and continues the calculation. After a certain time a solution is found that does not violate any boundary conditions, and the message 'Optimisation completed, solution found' is displayed. We save the clusters once more and now see that only the two remaining weekly periods of the German courses have not been scheduled.

We could now have partial optimisation schedule the remaining German lessons in a new cluster. However, we decide on scheduling using [standard optimisation](#) since these remaining course periods can perhaps be added to existing clusters. The clusters from the partial optimisation are already fixed meaning that they can no longer be modified, and we can call standard optimisation immediately. In the standard optimisation dialogue we check the box ' [Add courses to locked clusters](#) ' and launch optimisation.

As you can see, standard optimisation does not succeed in scheduling the remaining German periods in existing clusters. We nevertheless obtain a significantly improved result compared to the previous standard optimisation with a total of 38 cluster periods.

If you invest knowledge of the course structure at your own school in defining subsets, partial optimisation will generally reward your effort with results that are far better than those of standard optimisation.

3.3.4 Optimisation for several class levels

Optimisation for several class levels (years) If you have to schedule courses for several class levels (years), you can either run optimisation for all the levels at once or you can optimise one level at a time. Which procedure delivers the better results depends on the structure of your course choices.

If you have only a few or no cross-level courses, it will be better to optimise every class level separately. Otherwise it is advisable to schedule all course together in one go.

Split cluster by year/level



If it is found after [course optimisation](#) that there are mainly courses from different class levels in one cluster, it is often advisable for the subsequent timetable optimisation to split the cluster using the function <Split cluster by class level> in the [course-cluster-matrix](#). This will in many cases allow you to break unnecessary links between lessons which place additional restrictions on timetable optimisation.

Class levels in standard optimisation

If you wish to schedule courses of different class levels separately, proceed as follows with [standard optimisation](#) :

Launch optimisation, selecting the most difficult level in the class level field. Untis will now optimise all the courses and course choices of the students of the selected level. In addition, the course choices of the students at other levels which contain courses of the selected level are taken into account.

After optimisation, lock (fix) the clusters that have been created and launch optimisation for the next class level. Repeat these steps until all class levels have been optimised.

Class levels in partial optimisation

Partial optimisation is far more flexible with regard to scheduling courses at different school levels because you can explicitly select the courses that are to be optimised.

Three possibilities are outlined briefly here.

1. First create clusters for cross-level courses. Then add courses of the individual levels to these clusters. To this end, include existing clusters in each optimisation run.
2. As a first step, optimise all courses of the first level and all cross-level courses. Then schedule the next class level, including the clusters that have already been created.
3. You can also proceed in a much more differentiated way. For example, optimise all 5-period courses for all class levels together. The clusters for the other courses can then be created for each class level separately.

3.3.5 Term-related optimisation

The multiple terms timetable module allows you to create different timetables for different parts of the year.

This makes it possible to offer your students a completely different range of courses in the first semester from those in the second semester and to create separate timetables for each semester.

Year's planning in terms

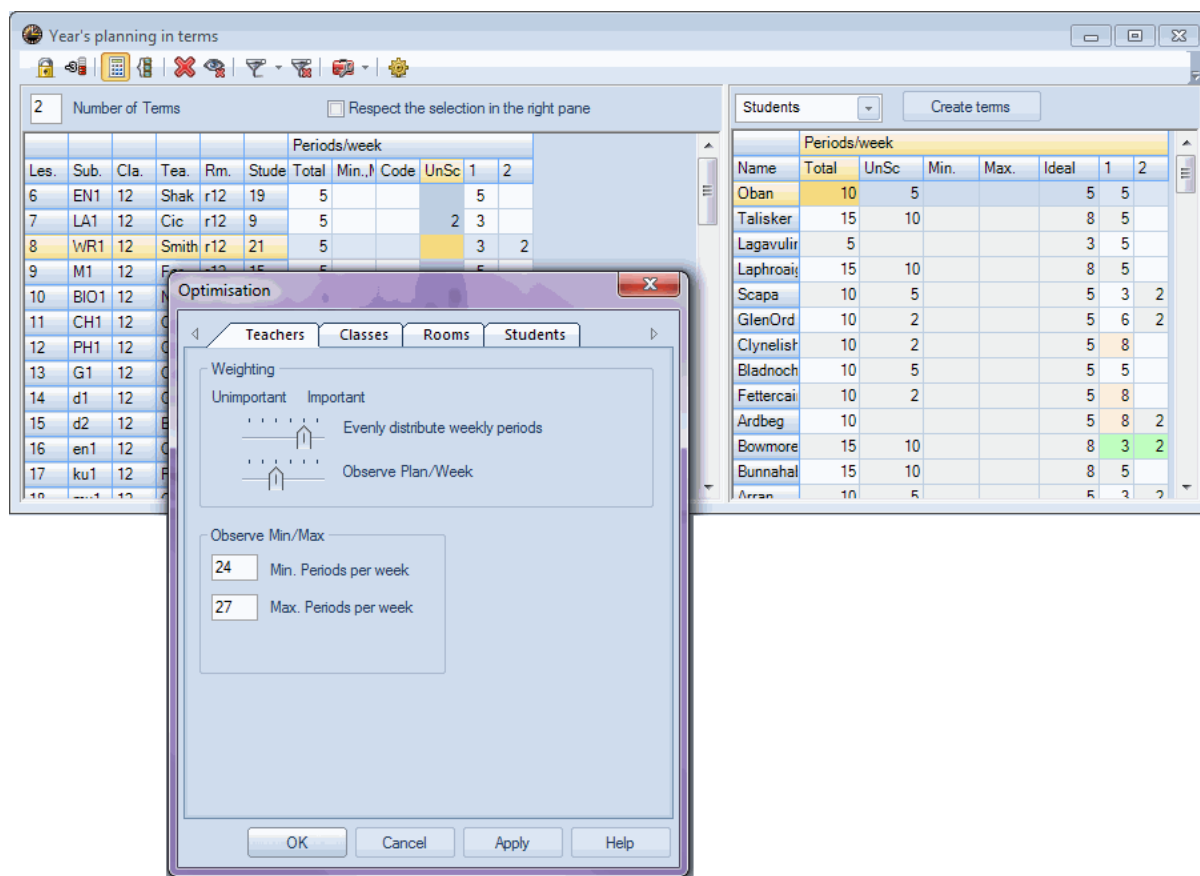
An important tool for scheduling and dividing up a school year is the 'Year's planning in terms' option. This enables you to very simply distribute lessons over the individual terms, i.e. as required by our example, to assign courses either to the first or to the second semester. You will find a detailed description of the window in the manual 'Modules' in chapter 'Year's planning in terms'.

Term planning for the year, when combined with the course scheduling module, attempts to ensure during the optimisation of course assignments that each student has a balanced workload across all terms and that alternative courses are evenly utilised.

Own weighting options take account of course distribution at student level.

Note: Fixed course assignments

In order not to lose optimised course assignments after terms have been created the corresponding course choices are automatically locked when the terms are created



You have two options after courses have been distributed over terms.

Termwise optimisation of clusters

Perform standard optimisation before creating terms making sure to check the 'Termwise optimisation of clusters' box in the initial standard optimisation dialogue window. This will prevent courses that do not take place together in any term from being scheduled in the same cluster.

Optimise terms separately

Use the <Create terms> button to create both terms before creating the clusters, and then optimise each of these terms separately by performing course optimisation in one term and then in the other.

Note: Course with 0 weekly periods

Courses are assigned 0 periods/week in terms where they are not planned. This allows you to retain an overview of all student course choices within a term.

These course assignments have already been optimised previously in the 'Year's planning in terms' window. As mentioned above, certain course choices that should not be modified during further processing have now been locked and will therefore not be touched by course optimisation. However, if you wish to change a course assignment in spite of its being locked, you must first remove the lock on the course choice before being able to assign the desired course.. Please always bear in mind that such a change is only performed in the current term, but may have to be taken into account in other terms and may therefore have an effect there, too (e.g. on the total number of weekly periods of the student in that term).

Note: Copy term

We strongly advise against making any changes to course choices after terms have been created. If this cannot be avoided, you can use the <Copy to other terms> button in the student-course-choice window to copy the course choice for the current term very easily to any other terms.

3.3.6 Course choices/clusters in scheduling

Course scheduling and timetable optimisationAt the end of the course planning process, all student course choices should have been determined there should be a number of clusters with courses that can be scheduled at the same time. It is now important to place the courses and clusters in the timetable, i.e. to schedule them. This task is part of timetable optimisation.

Please ensure that no contradictory entries are made for the courses of a cluster, e.g. one course is to be given in double periods and another one in single periods. This type of input can impair the results of optimisation.

Note: Cluster conditions

are one way of preventing such results. To this end, define one cluster condition with the single-period courses and another with double-period courses and specify that course from the one condition may not be scheduled with course from the other condition in the same cluster.

There are basically two different methods for timetable optimisation.

Clusters may be broken up

If course assignment to clusters may be modified, timetable optimisation can begin immediately. For timetable optimisation, a cluster is nothing other than a group of simultaneous courses. All courses in a simultaneous group are scheduled by placement optimisation at one position in the timetable. However, swap optimisation may still move individual courses.

Clusters must be retained

If clusters need to be retained at all costs you can convert all or selected clusters to couplings in the course-cluster matrix. This ensures that all course in a cluster really are scheduled at the same positions in the timetable.



Note: Couplings to simultaneous groups

You can access the reverse function via 'File | Auxiliary functions | Couple. to Less.-Sequ.'

Warning: Fixed (locked) clusters

If you fix clusters, all courses in the clusters concerned will be fixed. This means that these course cannot be moved during swap optimisation. This represents a significant restriction on optimisation.

4 Exam scheduling

Exams (tests) are held in the course of the school year. These are one-off events on fixed dates. Specifying an exam date has direct consequences for normal lessons, which should if possible continue without interruption. If students take most lessons together since they are included in fixed classes, lessons taking place at the time of the exam will simply be cancelled since all students in the class will normally have to take the exam.

However, if students have elective courses, the scheduler will need exact information about

- for which courses an exam is being held (exam courses),
- which students are taking part in the exam,
- which courses are taking place in parallel to the exam (here quite naturally only those courses are relevant where at least one student is taking part in the exam) and
- how many students remain from the courses affected by the exam.

This is where exam scheduling comes into play since it supplies this very information to the scheduler. The core of exam scheduling is the '[Exam scheduling](#)' window, which helps you when putting together courses for which an exam can be held, together with the '[Exams](#)' window, which provides you with the relevant information on all exams.

4.1 'Exam scheduling' window

The exam scheduling window can be called either from the menu via 'Modules | Course scheduling | Exam scheduling' or via the button of this name in the 'Course scheduling' toolbar.

Subject	Total	d1	d2	d3	g1	eth1	BIO1	G1
Teacher		Goethe	Bach	Ander	Hero	Sen	Nobel	Cer
Class(es)		12	12	12	13	13	12	12
Exam	112	18	25	12	25	24	10	12
Remaining	0	0	0	0	0	0	0	0
Total	112	18	25	12	25	24	10	12
Clashes	112	18	25	12	25	24	10	12

Students	Cla.	Subject	Les.
Ardbeg	12	EN1	6
Aberlour	12	EN1	6
Dalwhinnie	12	EN1	6
Glenfiddich	12	EN1	6

Period	Total	Exam	Remaining
Mo-1	63	63	0
Mo-2	71	71	0
Mo-3	86	86	0
Mo-4	93	93	0
Mo-5	80	80	0
Mo-6	44	44	0
Mo-7	37	37	0
Mo-8	67	67	0
Tu-1	15	15	0
Tu-2	47	47	0
Tu-3	76	76	0
Tu-4	85	85	0
Tu-5	67	67	0
Tu-6	50	50	0
Tu-7	21	21	0
Tu-8	101	101	0
We-1	51	51	0
We-2	86	86	0
We-3	112	112	0

The window serves to schedule an exam, i.e. it helps you with the following:

- [Assembling courses](#) for which exams can be held at the same time.
- [Selecting a time and date](#) when the planned exam is to take place.

It provides an overview of the students concerned, the exact number of students and any possible student clashes for all courses involved in the exam.

Note: Print course-course matrix

You can output a course-course matrix using the <Print> or <Print preview> button in the main toolbar. This matrix shows the number of students taking two different courses, indicating how many clashes would be generated if an exam were scheduled for these two courses at the same time.

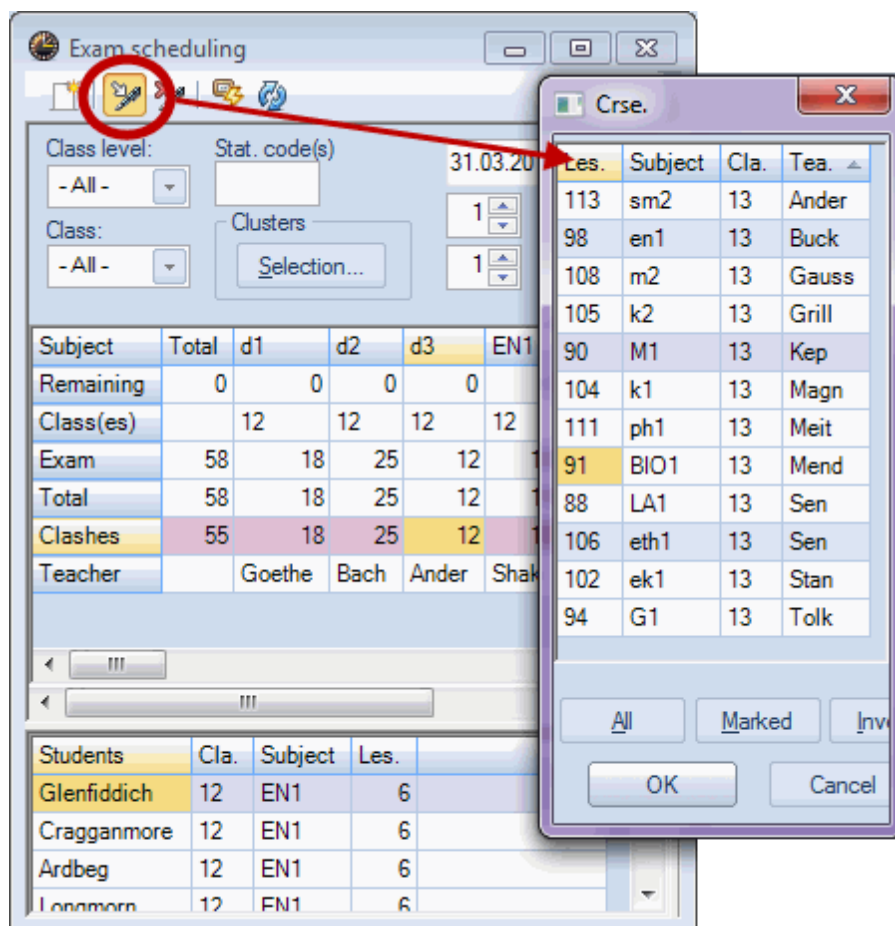
4.1.1 Assembling courses

Copying courses

If you wish to add courses to an exam, click on the <Add course to exam> button, select one or more courses and confirm with <OK>. This will copy the selected courses to the exam and you will see the following information in each row:

- Exam: how many students from each of the exam courses will be taking the exam.
- Balance: how many students from each of the exam courses will not be taking the exam.
- Total: how many students take this course in total.

- Clashes: how many student clashes will occur in each of these courses. Details about clashes are displayed in the lower window section.



Note: Adding individual courses

If you add course to an exam one by one, i.e. if you repeat the process described above, only those courses will be displayed for selection that are not going to cause a student clash with the exam courses already chosen. This makes it very easy to put together courses for which exams can be written simultaneously.

Since clusters should always be free of clashes, there is an alternative way of adding all courses of a cluster to an exam using the <Selection> button (under 'Clusters'). Simply click on the <Add course to exam> button again if you wish to add more course to the exam.

Removing courses

You can remove courses from the exam by selecting one or more columns with an exam and then clicking on the <Remove course> button.

New exam

If you wish to clear the window in order to schedule a new exam and delete the previous entries you can use the <Start scheduling> button.

Not all students

If not all students of courses involved in an exam are to take the exam, you must tell Untis which students (in which course) are to take the exam..

For this purpose you can use the course choice statistical code, which can be entered in the ' [Student-course-choice](#) 'or' [Course-student-choice](#) ' windows. There you should enter a statistical code (e.g. 'w' for written) for all course choices where an exam will take place for the relevant student.

You can now use the 'Stat. code(s)' field in the 'Exam scheduling' window to indicate which students will be taking part in the exam by entering the appropriate statistical code. This means that only those students will be taken into account for whom the corresponding statistical code is defined in their course choices. You can leave the field empty if all students of the exam courses are to take the exam.

Warning: Single-letter statistical code

You can of course define more than one statistical code in a course selection. Please note that the statistical codes may only consist of one letter.

4.1.2 Selecting time/date

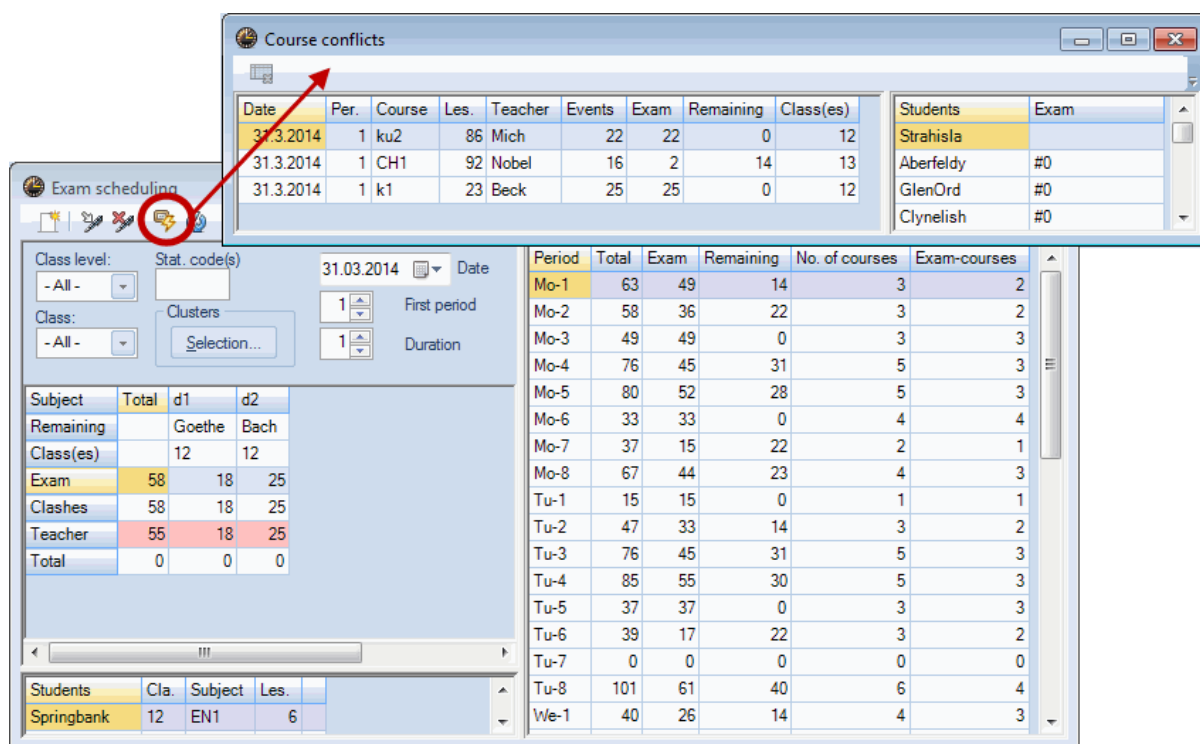
After [course specification](#) a suitable time and date must be found for the exam. To this end, specify a date when the exam should take place the week (in the date field) and enter the duration of the exam in the duration field.

The right window pane will display the data relevant for the exam for each period in the selected week.

- Total: number of students taking a course in this period.
- Exam: number of students taking the scheduled exam and who attend a course in this period.
- Balance: number of students not taking the scheduled exam but who attend a course in this period.
- No. of courses: number of courses taking place in this period.
- Exam courses: number of courses taking place in this period and for which an exam is taking place.

Note: Only courses involved

This information only relates to those courses that are also taken by at least one of the students participating in the planned exam. Other courses are, after all, not affected by the exam.



Conflicting courses

If you wish to see more detailed information on a period, select the desired period and click on the 'Conflicting courses' button to open a window of the same name. This will display which courses and which students are affected by the exam.

Tip: At least one exam course

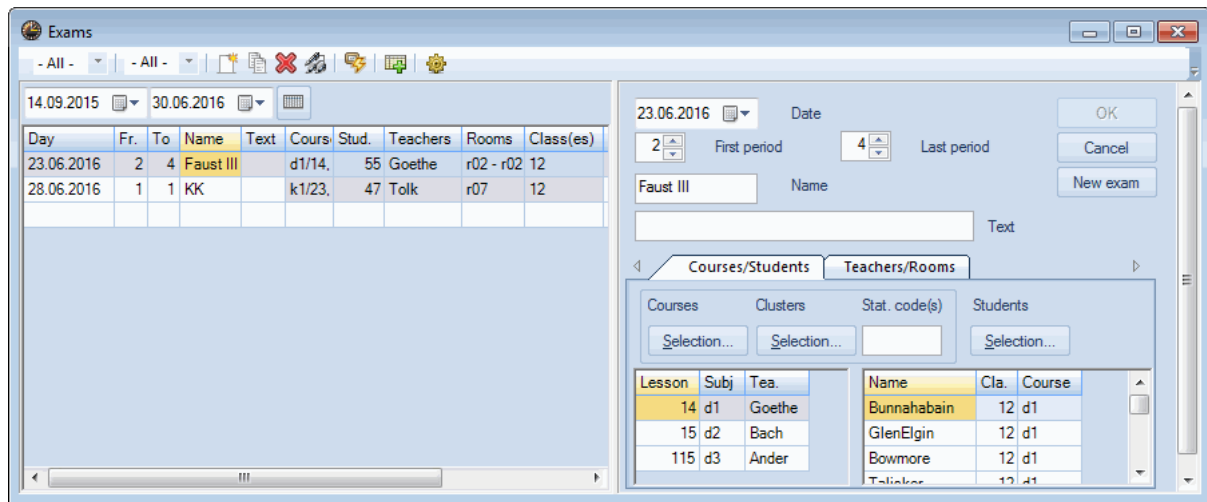
Exams are usually held when affected exam courses (or at least some of them) take place since this involves no timetable changes for the students and they will automatically have the time available. Furthermore, (at least) one teacher and a room are certain to be available for the exam.

Once you have found a suitable time and date you can create the exam with the data displayed using the <Transfer Exam> button and then edit the information in the 'Exams' window.

4.2 'Exams' window

The 'Exams' window can be called either from the menu via 'Modules | Course scheduling | Exams' or using the button of this name in the 'Course scheduling' toolbar.

You can specify courses and times/dates for exams via the 'Exam scheduling' window. However, if you already know when an exam is to take place in which course, you can create exams in the 'Exams' window direct.



The 'Exams' window is divided into two parts. The exam list in the left window pane displays the exams that have been defined while the exam dialogue in the right pane serves to display and enter data for the exam selected on the left.

Courses

As in the exam scheduling window, you can select either individual courses or all courses in a cluster.

Students

When you specify an exam for a course, all students in the course will be entered for the exam.

You can also add individual students (who perhaps are not in the course) to the exam using the <Selection...> button under 'Students'.

If, on the other hand, there are students who are not to take the exam, you can simply select them and remove them from the exam with .

Teachers/Rooms

In contrast to the 'Exams scheduling' window, you can also assign teachers and rooms to an exam in the 'Exams' window. You can see here whether a teacher teaches in one of the courses assigned to the exam and whether a teacher or room is already booked for a lesson at the time in question.

Input from the selection dialogue also works for several selected rows, meaning that the same teacher or room can be entered in several periods at the same time.

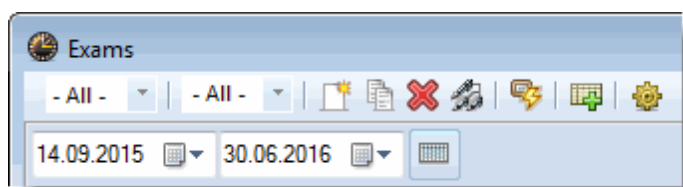
Note: Several elements

You can press <CTRL> and highlight several elements for assignment to an exam.

4.2.1 Functions in exams window

Use the combo boxes for class level and class in the toolbar to restrict the display and input to a particular class level (year) or class. For example, selecting a class results in only those exams being displayed taken by at least one student in the class.

Only courses and students of this class will be listed in the course and student selection dialogues.



Display whole school year

The two date fields below the toolbar can be used to restrict the display of exams to a particular range of time. Only those exams will be listed that fall within the specified time range. You can use the <Display whole school year> to switch to a complete list of exams for the entire school year.

New exam

Click on the button when you wish to enter a new exam. Alternatively, you can simple select the empty row in the exam list.

Copy exam

Use this function to copy an entire exam (including participating students, teachers and rooms).

Delete exam

Select the desired exams and then click on this button to delete one or more exams.

Divide exam

You can use this function to generate n exams with one course each from an exam with n different courses. This makes it possible, for example, to transfer all the courses of a cluster to an exam (without clashes), to divide the exam finally to have each exam take place in a different room or in a different period.

Conflicting courses

Use this button to open the ' [Course conflicts](#) ' window displaying all courses being held simultaneously with the courses in this exam and taken by at least one of the students participating in the exam.

Generate special duties

This function generates [special duties](#) for the selected courses. It can only be used in combination with the cover planning module.

Settings

The setting function allows you to specify how many exams a student may take in any one week. If this limit is exceeded when you enter an exam, a warning will be displayed and the student will be listed in the right window pane highlighted in light blue.

4.2.2 Exam scheduling and cover planning

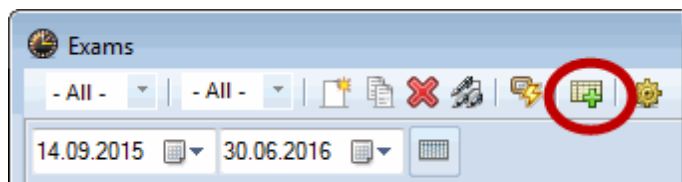
If you have licensed the cover planning module, data from exam scheduling can flow directly into the current timetable. Exams are accepted there as special duties, and courses with few remaining students result in cancellations.

Generating special duties

Select the exams that you wish to transfer to the current timetable by clicking on the <Generate special

duties> button. After confirmation that the special duties should be transferred they will appear as substitutions in cover planning with substitution type 'Exam'.

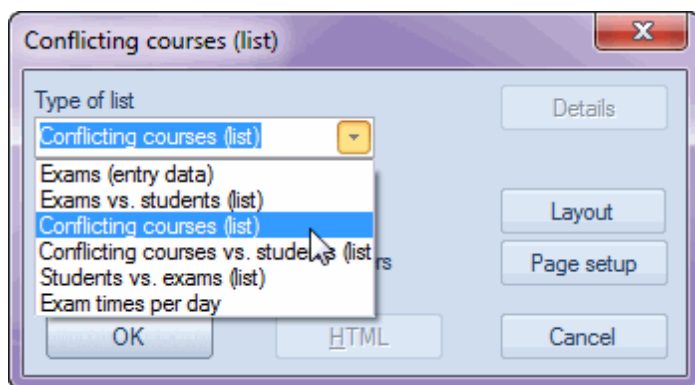
Generate cancellations



You can cancel courses with only a few remaining students in the 'Course conflicts' window using the <Generate cancellations> button. The course will be cancelled with regard to cover planning and the row will be highlighted red to indicate the cancellation. A cancellation of this type can be reversed in cover planning.

4.2.3 Printing exams

The 'Exams' window provides a number of lists for you to print or display by selecting the <Print> or <Print preview> buttons from the main toolbar.



Exams entry data

This list type outputs all exams for the currently active time range in a summary list.

Exams/students list

This list type outputs each exam with all participating students on a separate page.

Conflicting courses list

Select this list type to generate a list of all courses that clash with the currently selected exam.

Conflicting courses/students list

This list outputs each conflicting course on a separate page listing all students participating in the exam.

Students/exams list

Select this list type to output a summary of each student with his/her exams.

As is usual with Untis, you can also make detail settings for these lists. For example, you can use the 'Print courses with lesson-numbers' check box to specify whether just the course name or also the associated lesson number should be output.

This list outputs each conflicting course on a separate page listing all students participating in the exam.

Students vs. exams (list)

Select this list type to output a summary of each student with his/her exams.

5 Import / export

Untis provides a number of interfaces which you can use to easily exchange student data, course data and exam scheduling data with other applications.

Import / Export course data

If the course scheduler and the timetable scheduler are different people and more or less independent of each other and wishing to work with two separate Untis files, this function can be used to transfer course data to the timetable file.

You will find the appropriate menu item 'Import/Export course data' under 'File | Import/Export'.

The export command writes the following course data to a file.

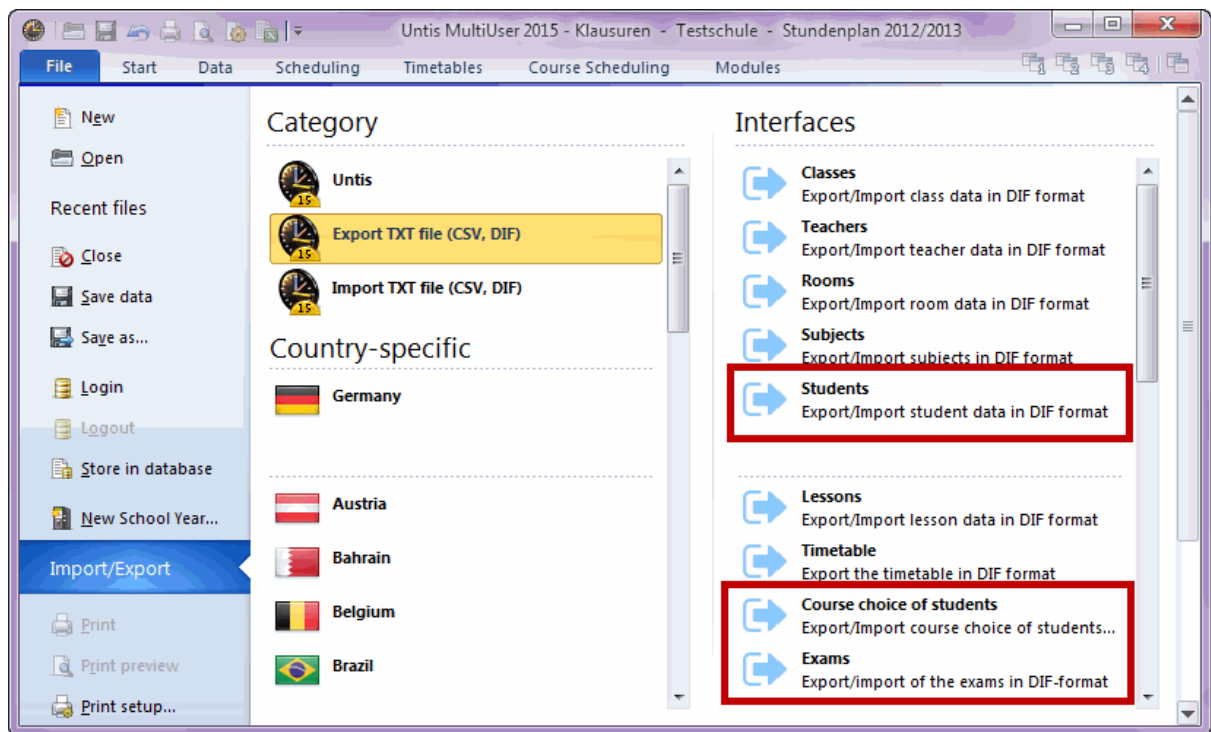
- Subjects (name and long name)
- Courses (underlying lesson)
- Student master data
- Student course choices
- Clusters
- Cluster conditions

The course file can be imported with the import command, with the lessons being created as additional entries. When importing data you can thus specify that lessons should not be imported. Lessons/courses are then identified by the lesson number. The lesson numbers may not be modified in this case in order to ensure that data can be successfully transferred.

Import / export of DIF files

You can import and also export the following data records as DIF files (Data Interchange Format).

- Student master data ('GPU010.TXT')
- Course choices ('GPU015.TXT')
- Exam data ('GPU017.TXT')



You will find an exact description of the file structure if you move the cursor to the appropriate menu item and press <F1>.

Index

- A -

Assignment using drag&drop 14
 Assignment using toolbar icons 15
 Assignment with double-click 14

- C -

Cancelling a course 38
 Change of school year 29
 Class/Level selection 9
 Clipboard 9
 Cluster mode 20
 Cluster to coupling 58
 course 8
 Course assignment 14
 Course choice combinations 46
 Course choices/clusters in scheduling 78
 Course optimisation 61
 Course scheduling 32
 course window 10
 Course-cluster-matrix 52
 Course-student lists 23
 Course-student overview 9
 Course-student-choice 47
 Course-student-matrix 50
 cover planning module 85
 Create new cluster 56
 Creating parallel courses 37

- D -

Data input 33
 Delete cluster 56
 Delete course assignments 61
 detail window 13
 Diagnosis 21
 Display student clashes 59

- E -

Entering a course choice 40

Exam scheduling 79
 Exam scheduling and cover planning 85
 'Exams' window 83

- F -

Fix the cluster 58
 form window 53

- G -

Generating special duties 85

- I -

Import 8, 87
 Import / export 87

- M -

Marking box 10
 Max. number of choice changes (Stud.-Co-Ch) 68
 Merge similar clusters 59
 multiple terms timetable 76

- N -

No lesson couplings 9

- O -

optimisation 21
 optimisation code 33
 Optimisation for several class levels 75
 Optimisation parameters 68

- P -

parallel course 33
 Parameters for optimisation 62
 Partial optimisation 65, 70
 Plausibility check 68
 Printing 60
 Printing exams 86
 Priority 45

- R -

Reserve courses 44

- S -

Scheduling dialogue 20
Selecting an alternative course 42
Simultaneous courses (clusters) 18
Specifying courses 8
Split cluster 56
Split cluster by year/level 56
statistics code 47
Student master data 6
student window 12
Student-course-choice 38
Students 33
Students timetables 5

- T -

Term-related optimisation 76
timetable optimisation 21, 78
Toolbar functions 17
Totaloptimierung 64
Transferring courses 31
Transferring students 30

- W -

Weighting parameters 68
Window layout 53