



Master Timetable Builder (MTB) Cheat Sheet

Last Updated: 05/10/2010

TABLE OF CONTENTS

Time Line	3
Master Timetable Builder (MTB) Screens	4
Scheduler Main Window	4
New Session Options	5
Course Section Allocation	6
Section Details.....	8
Result	8
Action	8
Common Errors from the Scheduler	10
Teacher Unavailable	10
Room Unavailable	10
Course Unavailable.....	11
Target # of Seats Would be Exceeded	11
Modify Targets	11
Create Course Section Maintenance	14
Simulation Options	17
Sim Only Incomplete/Remove Blocking	18

This document is the property of the NC DPI and may not be copied in whole or in part without the express written permission of the NC DPI.

In compliance with federal laws, N C Public Schools administers all state-operated educational programs, employment activities and admissions without discrimination because of race, religion, national or ethnic origin, color, age, military service, disability, or gender, except where exemption is appropriate and allowed by law. Inquiries or complaints should be directed to:

Robert Logan, Associate State Superintendent
Office of Innovation and School Transformation
6301 Mail Service Center, Raleigh, NC 27699-6301
Telephone: (919) 807-3200; Fax: (919) 807-4065

Time Line

The time line is a general overview of the order of events.

1. Pre-scheduling steps:
 - Enter courses in Course Maintenance.
 - Input as many student course selections as possible (the more entered, the better the MTB will do in placing sections).
 - Decide on what the “skeleton” of the schedule should look like.
2. Start an MTB session.
 - Delete last year sessions or sessions from this year you are sure will no longer be needed. File > Delete
 - *Recommended:* When you have created a New version, make a “Base” version and input the constraints that will exist in every version. This can be accomplished by selecting the Copying a Saved Version box.

Note: Remember to Refresh the version if you make any changes back in **Course Maintenance** or other **School Details** screens.

3. Enter **Teacher** and **Room** constraints.
 - Use **Staff Maintenance** if constraints will exist in every version; use the Teacher button on the MTB Start screen to set constraints for THIS version.
4. Update **Max Sec per Period** on the **Allocate Sections** screen for ALL courses.
5. Set **Constraints** for courses.
 - Decide which courses you must “hand schedule” and courses which you will let MTB decide placement.
6. Schedule Course Sections.
 - If you are mainly hand-scheduling all of your courses, this can be done section by section.
 - If you are letting MTB decide some placements for you, schedule those courses you need to hand place, then **Schedule all Remaining**.

Navigation: MTB > More Info menu > Schedule Remaining Sections

7. Resolve Error Messages From the **Scheduler**.
8. Copy to **Course Section Maintenance**.

Navigation: MTB > File > Create Course Section Maintenance

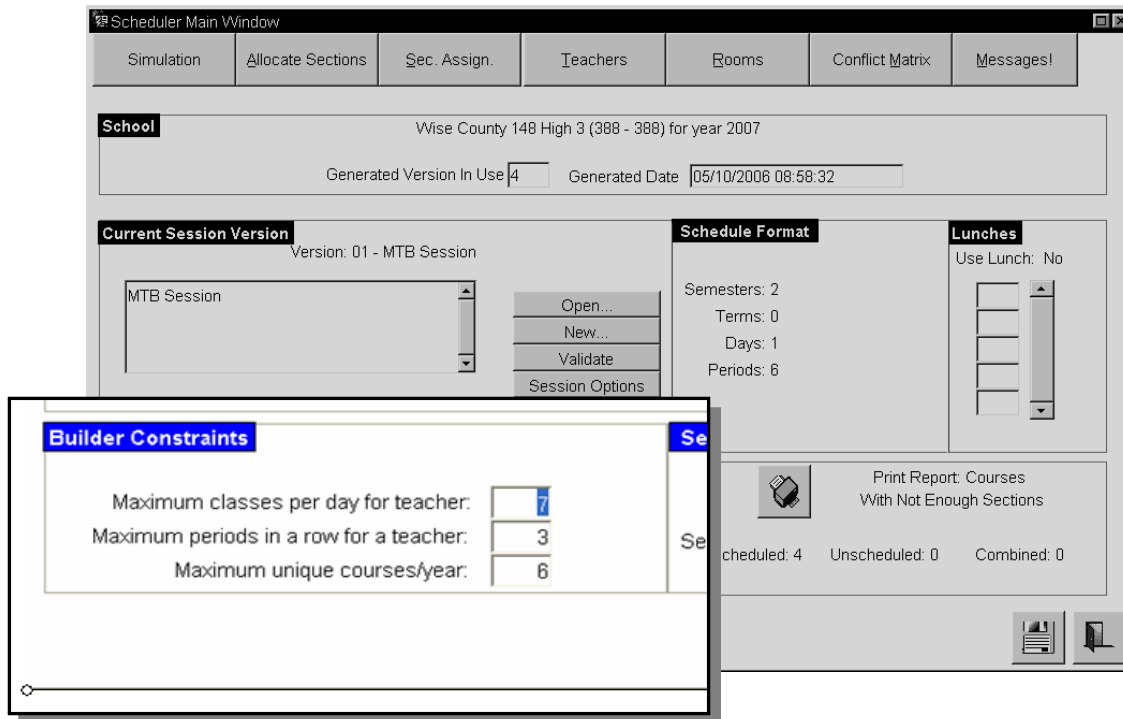
9. Simulate. School > Mass Simulation. This can be completed for all students or only selected grade levels.
10. Make changes or new versions and re-simulate until desired results achieved (85% is a very good simulation result. Remember that if a student is missing just one class, he is considered unsuccessful. Also remember that adding one section can sometimes fix dozens of students).

Note: Remember that if you have made any changes or new versions, you must re-copy to **Course Section Maintenance** BEFORE you re-simulate.

Master Timetable Builder (MTB) Screens

Scheduler Main Window

Navigation: School>Master Timetable Builder



- The **Scheduler Main Window** allows you to **Open** an existing version, create a **New** version (see options next page), and **Refresh** your information.
- **Refresh** your session whenever you have made any changes to Course Maintenance or Staff Maintenance.
- Enter session-specific **Teacher** and **Room** constraints by clicking the appropriate button at the top of the screen.

Important:

Pay close attention to the Builder Constraints area, which includes **Maximum classes per day per teacher**, **Maximum periods in a row for a teacher**, and **Maximum unique courses/year**. The MTB will return an error if you try to exceed these limits, **EVEN IF** you are “hand placing” your sections. Make sure to set these to realistic values.

Example: There were 5 sections of Advanced English this year; Smith teaches 3 and Franklin teaches 2. The number of students signed up for the course next year requires only 4 sections. When you create a session with this option, the builder will automatically create (but not “schedule”) your 4 required sections, and will divide them equally amongst the teachers. It will NOT create a 5th section automatically.

- **Copy a saved session** allows you to make an exact copy of a previous session (so you can experiment or make a copy of your “Base” version to try something different).
- **Use current school year timetable model** creates an exact replica of your schedule this year. If a course was offered last year but not this year (or vice versa), it will be ignored and no sections will be created. **IMPORTANT: If there are changes to the STDP from current year to next year, this option should not be used.**

Course Section Allocation

Navigation: School>Master Timetable Builder > Allocate Sections button

The screenshot shows the 'Course Section Allocations' window. At the top, there are radio buttons for 'All', 'Scheduled', 'Not Scheduled', 'To be Scheduled', and 'Zero Sections'. The table below lists various English courses with their respective attributes. The 'S' column contains an 'X' for the first course (10012X). Below the table, there are instructions: 'P = Parent of combined course', 'C = Child of combined course', and 'PC = Parent & Child of combined courses'. A legend indicates 'X = To be Scheduled', 'S = Scheduled', and 'U = Unschedule'. At the bottom, there are buttons for 'Unschedule All!', 'Unschedule', 'Section Detail', 'Timetable With', and 'Schedule'. A callout box points to the 'Section Detail' button with the text: 'To look at the details and sections of a particular course, click on the course, then click **Section Detail** near the bottom of the screen.'

Column	Description
S	Enter 'X' beside the course you are ready to Schedule
Course	Course name and number
Act	Actual number of students with options for this course
Sped	Number those who are special education students
Sec	Number of sections
C	If there is a C in this column, it indicates the number of sections has been calculated by the builder and no sections have been added or deleted
Max	Max number of students per section
Credit	Credit value of course

Column	Description
Grade	Grade Level
PG	Predominant Grade
DS	Default Semester
Department-Language	Art, Math, Science, etc.
Format	(Course length) Full Semester, Full Year, etc.
C	Indicates if this course is a multi-period course (number of Consecutive Periods)
M	<p>Maximum number of Sections per Period</p> <p>Important: This column indicates how many sections of a given course may be taught in the same scheduling slot. Think about it as the number of teachers you have available for a given course...if there are only 2 PE teachers, then only have 2 sections of PE can be running at the same time. This is a Hard Stop, and cannot be bypassed you even if you are hand placing sections. First go through and set this number to a realistic value for all courses. Err on the high side, but not by too much (especially if you want MTB to automatically place sections).</p>

Schedule all sections of a given course on this screen by placing an x in the **S** column and clicking the **Schedule** button. We recommend that you schedule as many sections at one time as you can to help ensure the MTB has the best information when deciding where to place sections.

Section Details

The following screen image has been separated into two parts; **Results** and **Action**.

Navigation: School > Master Timetable Builder > Allocate Sections button > choose Course > Section Detail button

Results

Action

Result

- To schedule a single section, place an **x** in the first column and click the **Schedule** button.
- Information only appears for Scheduled sections in the Result part of the screen.
- If a section fails to schedule due to a conflict of any kind, **NO** information about the section will appear here until **ALL** conflicts are resolved.

Action

Note: Click on a Section number in the grid above to select that section to work with below.

1. Input as many or as few constraints as you wish.
2. Enter a Teacher, Room, and STDP.
 - STDP is the only truly required field; a section can be scheduled with just the STDP information. Therefore, **Teachers** and **Rooms** can be left blank at this point, and teacher information can be added later in Course Section Maintenance. The MTB will not select a teacher randomly; if you have left the teacher fields blank, those sections will be assigned to the STDP, but without a teacher.
 - If you choose fill in teacher info, you can attach teachers to sections in one of two ways: assign one teacher per section, or use a "pool" of teachers if it

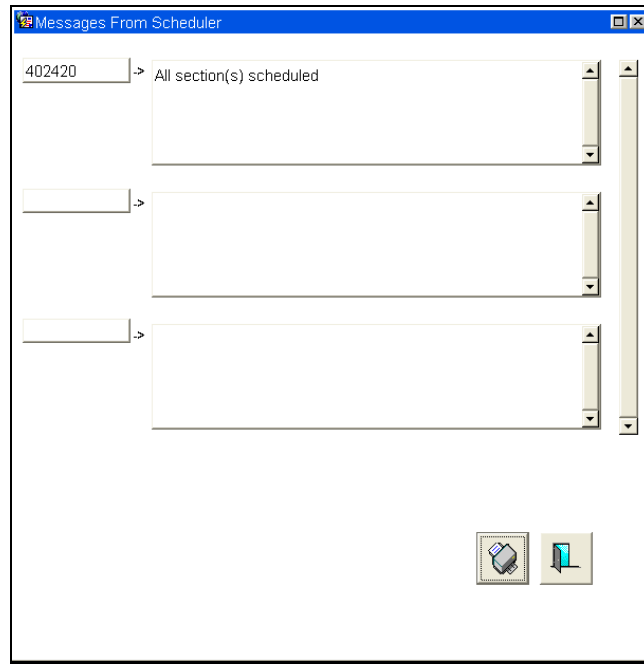
does not matter which teacher is attached to which section (MTB decides who teaches what based on other constraints). To enter the pool of teachers, highlight the first section that any teacher from the pool could teach (it does not have to be Section 1). Enter all the possible teachers in the Action section (click the **ADD** button if there are more than three teachers in your pool). Double click the asterisk button beside the teacher dropdown in the **Result** section of the screen. This will copy the pool to every section below the one you have highlighted.

- “Hand schedulers” will enter all information about the selected section.
- For schools that are letting the MTB do at least some thinking for them, enter as much or as little information as you like. When the MTB schedules your sections, it will fill in the rest of the information based on the constraints you have entered.

Note: A “Scheduled” section means that all conflicts have been resolved and the Teacher, Room, and STDP information has been locked.

Common Errors from the Scheduler

The following screen appears when one or more sections are simulated.



Teacher Unavailable

- Check **Staff Maintenance > Timetabling Options** (may have copied from last year).
- In MTB, Check Teacher Timetabling Options (**MTB > "Teachers" button**).
- Check the Builder Constraints on the Main Window.
- Double check "hand placed" sections for conflicts.
- Check that a teacher has not been permanently "attached" to a room through **Staff Maintenance > Assigned Room** field.
- Make sure the format of the course is correct (i.e. 18 week vs. 36 week).
- If all else fails, schedule the section without a teacher. Update the teacher once everything is copied to Course Section Maintenance.

Room Unavailable

- In MTB, Room Timetabling Options (**MTB > "Rooms" button**).
- Check that a teacher has not been permanently "attached" to an unavailable room through **Staff Maintenance > Assigned Room** field.

Course Unavailable

Important: Check max # of sections per period.

- Check course Format.
- Make sure you haven't accidentally made the course a multi-period course (consecutive periods in Course Maintenance).

Target # of Seats Would be Exceeded

Modify Targets

Navigation: MTB>More Info menu>Modify Targets

What is a Target?

Targets are one way the MTB balances the number of sections *horizontally* (meaning across semesters) and *vertically* (across periods). **Target # of Seats** is the number of seats that have been distributed across all scheduling slots to account for the total number of students, the total number of courses each student has signed up for, and the maximum class size you entered in Course Maintenance.

Example 1

For this example, we will work with a grade level that has 100 students in the grade level. In a perfect world, there should be 100 classroom seats available during each period for that grade level. If there are more seats available than there are students, then you are not utilizing your classrooms to their fullest potential (or your maximum class sizes have been set too high). If there are more students than seats, then some of your students will not have a class during those periods. In the window shown below, this means that the **Calculated Target** should roughly equal the **Number of Students** (no more than 10-15% difference between these two).

S	T	D	P	Calculated Target	Load %	Actual Target	Num Students	Target Used
1	1	1	1	0	100	0	0	.0000
1	1	1	2	0	100	0	0	.0000
1	1	1	3	0	100	0	0	.0000
1	1	1	4	0	100	0	0	.0000
1	1	1	5	0	100	0	0	.0000
1	1	1	6	0	100	0	0	.0000
2	1	1	1	0	100	0	0	.0000
2	1	1	2	0	100	0	0	.0000
2	1	1	3	0	100	0	0	.0000
2	1	1	4	0	100	0	0	.0000

Each time a section is placed into a certain period; some of the seats are used. If you have decided to let the MTB do some thinking for you, it may decide that, because of teacher constraints, room constraints, course constraints, etc., "X" period is the best place to put a particular section. If you have manually placed too many sections in period X, too many of those seats are already used. If the MTB places one in that period, then the "target number of seats" for that period would be exceeded.

Example 2

For this example, we will work with a school that has 100 students. The class size has been set to 20, and there are 5 sections being taught in any given period. Every child has a class and every class is full in every period.

A PE class is then added in 1st period with a class size of 20. There are now 120 "seats" in 1st period but still only 100 students.

Some students who were taking PE in 4th period are now moved to 1st period. This means that neither the 1st period PE class nor the 4th period PE class is full, and there is an imbalance in the number of students being taught in 1st period and 4th period.

While some imbalances are inevitable and there will always be conflicts that prevent a "perfect" schedule, the goal is to minimize this as much as possible. The **Target # of Seats would be exceeded** error notifies you that the imbalance exists. Please see the following sections for steps you can take to resolve the error.

Summary

- Enter as many student course selections as possible options before working in MTB.
- Set realistic class sizes.
- Compare **Actual Target** and **Number of Students**...make sure these are *roughly* equal. (**Actual Target = Calculated Target x Load Percentage**)

Steps to Address the Targets Error

- Try to determine into which period the builder is trying to put the section.
- Look at the **Target Used** column to see if you can tell if one period is overloaded, then reduce the number of seats or sections in that period.
- Make sure the **Load Percentage** is not 0.
- Reduce the Class Size for that course.
- Reduce Class Sizes generally where possible.

ONLY IF ALL ELSE FAILS

- Increase the **Actual Target** for that period (just update the field directly on-screen and save), OR
- **Make Mass Target Changes**—click the button near the bottom of the screen, and the pop-up on the right appears.
 - Select the **Increase** radio button.
 - Select the **Grade Level** and **Semester** (you can choose to update only first or second semester targets).
 - Input the **Change Percent** (change no more than 10% at a time).
 - Click the **Make Changes** button.

Mass Change Of Targets

Increase Decrease

Grade
All Grades

Semester
All

Change Percent

Cancel Make Changes

Create Course Section Maintenance

Sessions created in the Master Timetable Builder are housed separately from eSIS. Users must select their desired version and copy it from the Master Timetable Builder back to the eSIS Next Year Course Section Maintenance. This must be done before simulation of student schedules. Additionally, this step must be completed prior to YET as the Master Timetable Builder only works for Next Year.

Users may create Course Section Maintenance as many times as necessary. Each time Create Course Section Maintenance is performed, the previous version in Next Year Course Section Maintenance will be overwritten.

CAUTION: If **Create Course Section Maintenance** is not completed prior to YET, the Course Section Maintenance will be blank after YET and all sections will have to be built by hand on the Course Section Maintenance screen.

Navigation: MTB > File > Create Course Section Maintenance

1. On the MTB main screen click **Open**.

The screenshot displays the MTB main screen interface. It is divided into several sections:

- Current Session Version:** Shows 'Version: 10 - new' and a dropdown menu with 'new' selected. The 'Open...' button is highlighted with a red box. Other buttons include 'New...', 'Validate', 'Session Options', and 'Refresh...'. Below the dropdown is the text 'Refresh Last Run on: not run'.
- Schedule Format:** Displays 'Semesters: 1', 'Terms: 0', 'Days: 5', and 'Periods: 9'.
- Lunches:** Shows 'Use Lunch: No' and a vertical slider control.
- Builder Constraints:** Includes three input fields for 'Maximum classes per day for teacher:', 'Maximum periods in a row for a teacher:', and 'Maximum unique courses/year:'.
- Section Summary:** Shows a printer icon and a 'Print Report: Courses With Not Enough Sections' button. Below this, it displays 'Sections: 0', 'Scheduled: 0', 'Unscheduled: 0', and 'Combined: 0'.

At the bottom right of the interface, there are two small icons: a printer and a monitor.

2. Highlight the desired version to be copied and click **Select**.

Sessions Saved

Ver	Year	Title	Lunch	S	T	D	P	Created	Modified
10	2010	new	<input type="checkbox"/>	1	0	5	9	05/10/2010	05/10/2010
2	2010	2nd run - unscheduled	<input type="checkbox"/>	1	0	5	9	05/04/2010	05/10/2010
3	2010	3rd run - New copy of 2009	<input type="checkbox"/>	1	0	5	9	05/04/2010	05/06/2010
4	2010	New 5/4/10 copy of 2009	<input type="checkbox"/>	1	0	5	9	05/04/2010	05/04/2010
5	2010	copy 2009	<input type="checkbox"/>	1	0	5	9	05/10/2010	05/10/2010
7	2010	copy of 2009 CSM	<input type="checkbox"/>	1	0	5	9	05/06/2010	05/06/2010

Description
new

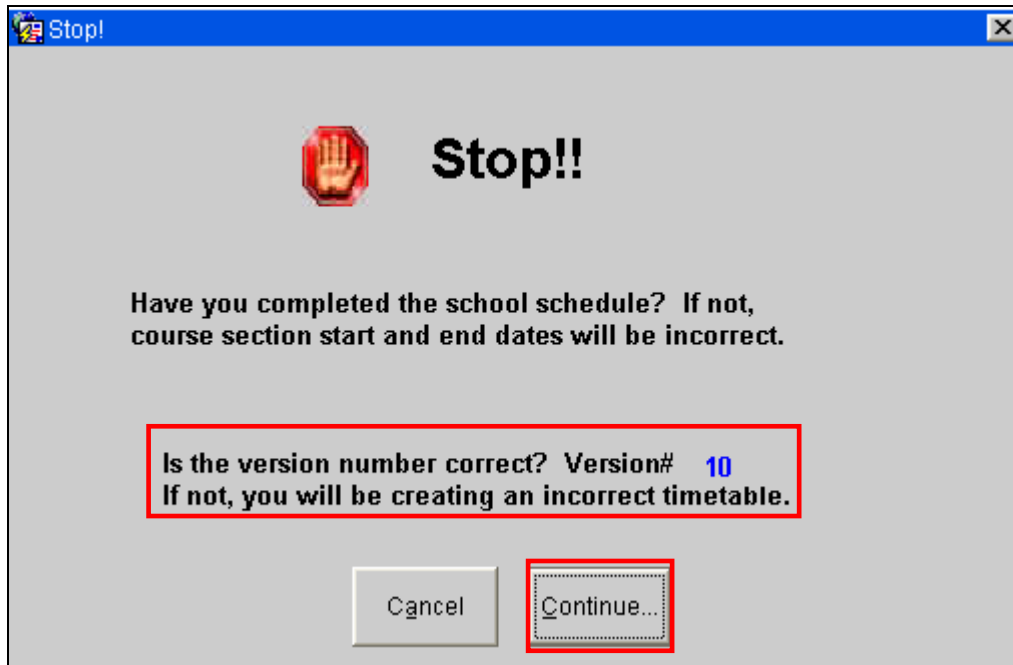
Select

Navigation: File > Create Course Section Maintenance

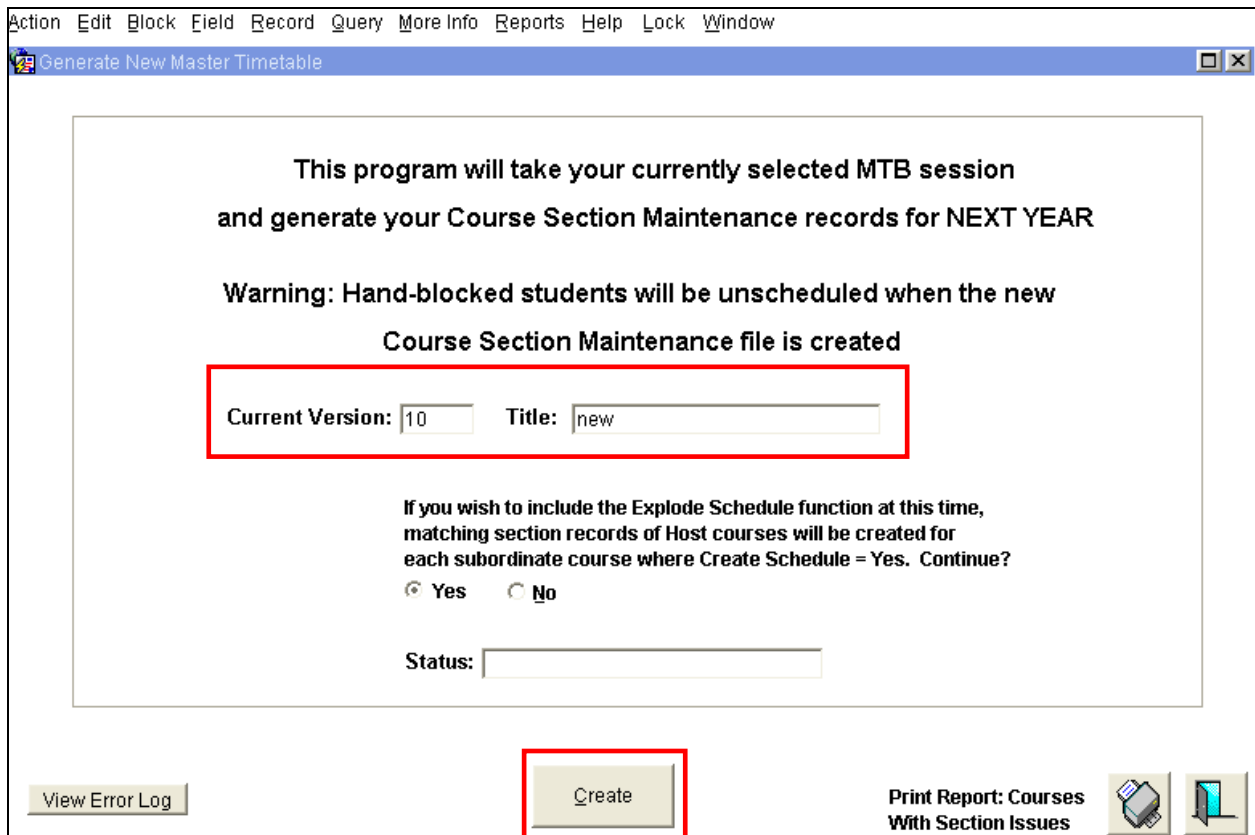
3. Click **File**.
4. Click **Create Course Section Maintenance**.

The screenshot shows the 'File' menu with the following items: New, Open, Close, Delete, Save As, **Create Course Section Maintenance**, Refresh Course Selections, Timetable Simulation..., and Exit. The main application window is titled 'WC 120 Elem 10 - Scheduling (316 - 316) for year 2010'. It includes a 'Schedule Format' panel with Semesters: 1, Terms: 0, Days: 5, and Periods: 9. A 'Lunches' panel shows 'Use Lunch: No'. A 'Section Summary' panel at the bottom shows 'Sections: 0', 'Scheduled: 0', 'Unscheduled: 0', and 'Combined: 0'. A 'Builder Constraints' panel is also visible on the left.

- Verify the correct version is displayed and click **Continue**.



- Verify correct version then click **Create**.



Simulation Options

The Simulator first orders students from hardest to simulate (i.e. lots of singleton and doubleton selections) to easiest to simulate (student selected only courses with many sections available in different time slots).

Once the Simulator knows which student to simulate, it then determines the order in which that student's *courses* will be simulated by looking at the **Required First** and **Screen Order** fields.

Navigation: MTB > Simulation button OR School > Mass Simulation

Field	Description
School Year	Double check to make sure this is correct Remember it becomes "next year" after YET
Only Grades	Enter one grade level or multiple grade levels (8 th grade = 08, 9 th grade = 09, etc.). Leave blank for ALL grade levels
Capping Required	Select YES to enforce Class Size maximums. We recommend set this to NO on the first few runs so you can more easily see which sections are overloading
Sim Only Incomplete	See: Sim Only Incomplete/Remove Blocking
Required First	If a course meets any diploma or Career Dev requirements, checking this box will force the simulator to schedule those courses first before it moves to "electives". This option

Field	Description
	gives upperclassmen the best chance to get all the courses they need to graduate.
Screen Order	If student options are entered in a particular order on the Option Sheet Entry screen, you can force the simulator to schedule in that order.
Use Alternates	Checking this box will allow students to get their Alternate selections if their main selection is unavailable. We recommend running your first couple of simulations WITHOUT using alternates, as this will allow you to more easily see where you may need to add or move sections.
Overload Percent Allowed	This field will "overload" classes this percentage above the Class Size Max.
Place Sections Randomly	Not widely used
Keep Details	This field produces a simulation report with student by student results. On Unsuccessful is recommended.

Sim Only Incomplete/Remove Blocking

Sim Only...	Remove Blocking	Result
Yes	Yes	Do not touch students with complete schedules. Remove all section assignments from remaining students and re-simulate all selections.
Yes	No	Do not touch students with complete schedules. For remaining students, only simulate unscheduled selections; leave scheduled sections as they are.
No	Yes	Simulate all students. Remove all section assignments from all students and re-simulate.
No	No	Simulate all students, but keep existing section assignments from previous runs in place.
Exclude Alternates from being considered as "Incomplete" courses (we recommend enabling this option).		