

## Application Usage Guide

This section presents the concrete way of using the web application for automatic timetable scheduling, based on artificial intelligence techniques. The purpose of the application is to provide a complete, modern, and easy-to-use solution for academic and administrative staff involved in planning teaching activities.

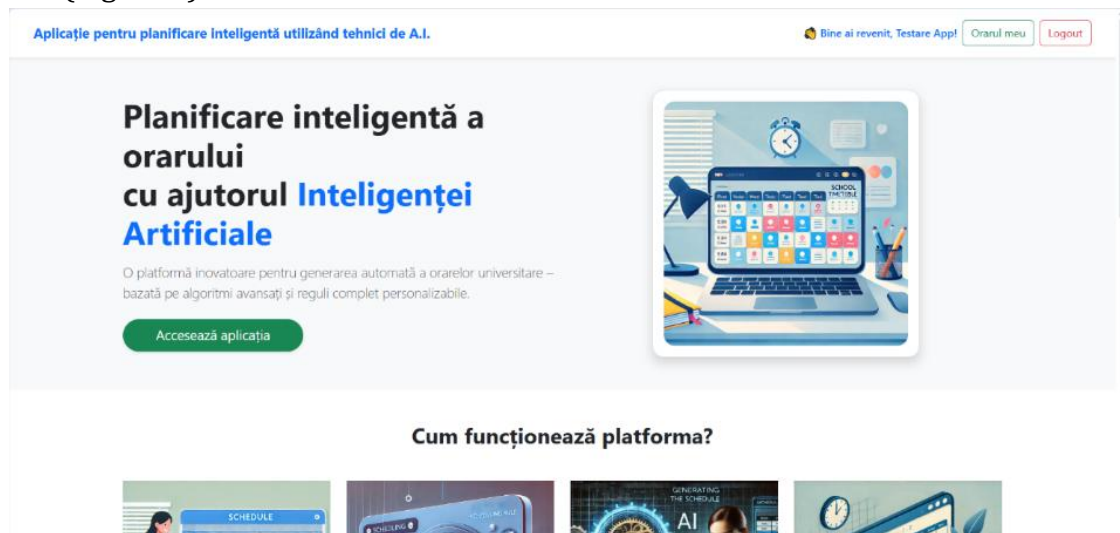
The platform has been designed to guide the user step-by-step, from logging in and entering data about teaching staff, rooms, and groups, to defining generation rules and obtaining a valid, coherent timetable that can be exported in PDF or Excel format.

The guide is accompanied by screenshots of the application interface to facilitate correct understanding and usage of each feature.

Through this guide, application users will be able to understand and fully leverage the platform's potential without requiring advanced technical knowledge.

### Step 1 – Accessing the Application and User Login

When opening the web application, the user is greeted by a modern interface that presents the purpose of the platform: automatic timetable scheduling using Artificial Intelligence (Figure 1).



**Figure 1** – Accessing the application and user login

In the top right corner of the interface are the login and registration options. Access to the application's functionalities is allowed only to authenticated users.

### Login

If the user already has an account, they will click the "Login" button, being redirected to a dedicated page where they enter their email address and password (Figure 2).

The login form is titled "Autentificare" in blue. Below the title is the text "Bine ai revenit! Te rugăm să te autentifici." in gray. There are two input fields: "Email" with an envelope icon and "Parolă" with a lock icon. Both fields have placeholder text "Introduceți email" and "Introduceți parola" respectively. The password field has a toggle icon (an eye) to the right. Below the fields is a blue button labeled "Autentificare". At the bottom, there is a link "Nu ai cont? [Înregistrează-te](#)" in blue.

**Figure 2 – Login**

After a successful login, the user is directed to the home page, from where they can begin the steps towards timetable automation.

### **Registration**

If the user does not yet have an account, they can access the "Register" option, which redirects them to the account creation form. Here, they must fill in: Full Name, Email Address, Password, and Password Confirmation (Figure 3).

The registration form is titled "Înregistrare" in blue. Below the title is the text "Creează un cont nou pentru a începe!" in gray. There are four input fields: "Nume" with a person icon, "Email" with an envelope icon, "Parolă" with a lock icon, and "Confirmă Parola" with a lock icon. The "Parolă" and "Confirmă Parola" fields have toggle icons (an eye) to the right. Below the "Parolă" field is the text "Parolă sigură". Below the "Confirmă Parola" field is the text "Reintroduceți parola". There is a blue button labeled "Înregistrează-te". At the bottom, there is a link "Ai deja cont? [Autentifică-te](#)" in blue.

**Figure 3 – Registration**

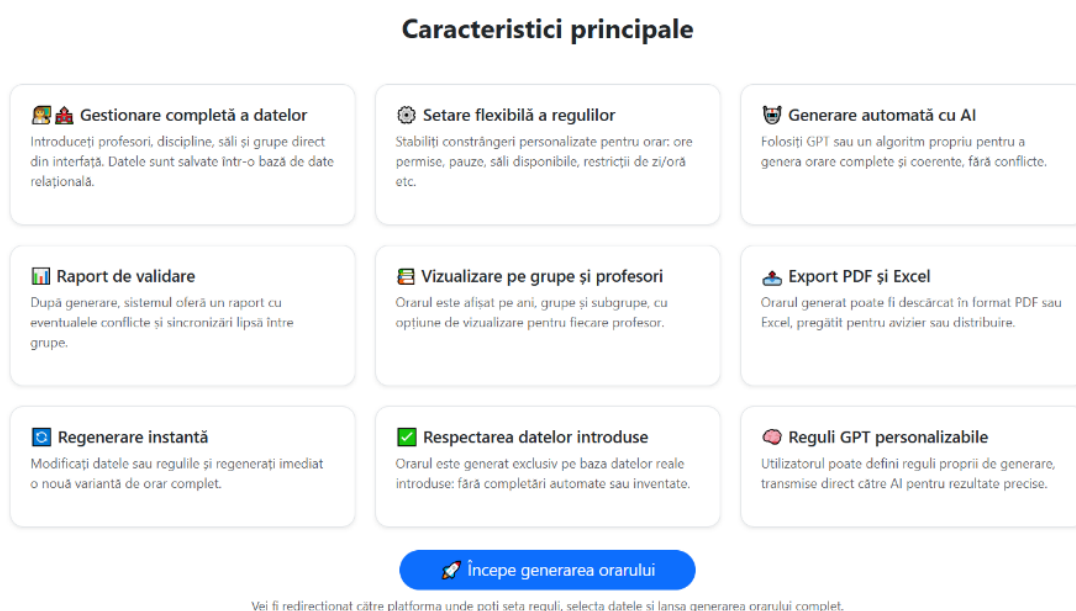
After registering, the user is automatically logged in and can access the full application interface.

The main page also offers a brief overview of the necessary steps and the application's functionalities (Figure 4).




**Figure 4 – Application functionalities**

Once logged in, the user can start planning the timetable by clicking the 🚀 "Start timetable generation" button. This redirects them to the full platform – the dashboard – where they enter data and configure rules (Figure 5).



**Figure 5 – Application features**

## Step 2 – Dashboard: Choosing the Configuration Section

After clicking  "Start timetable generation", the user is redirected to the main page (Dashboard). This provides a clear and structured presentation of the steps required for timetable planning (Figure 6).

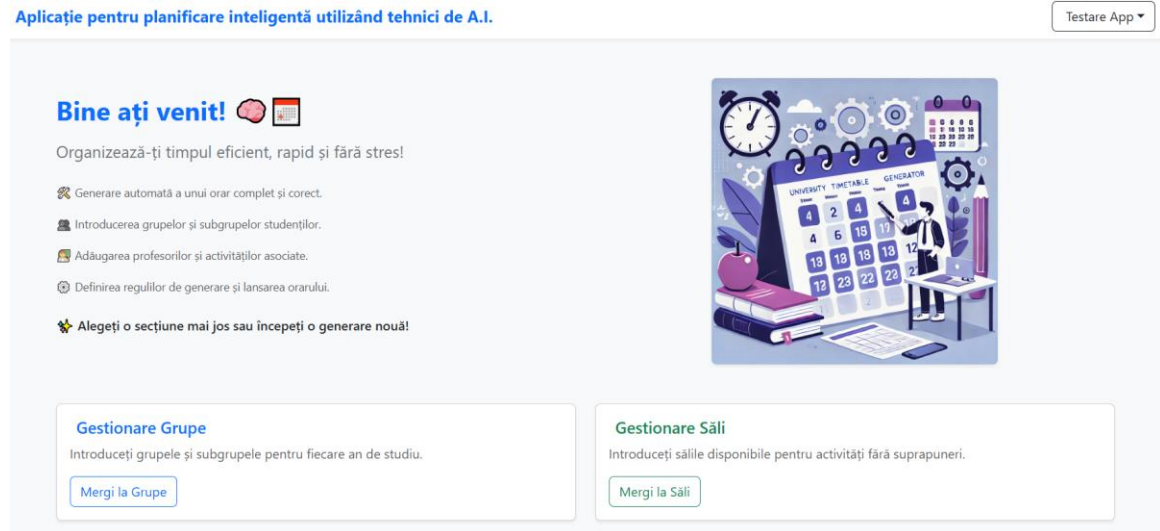


Figure 6 – Application dashboard

The user can select one of the 4 main sections (Figure 7):

- **Groups** – Add groups and subgroups
- **Rooms** – Enter available rooms
- **Teachers** – Add teachers, subjects, and activities
- **Rules** – Define custom rules

Below the informative cards, there is a visual checker indicating whether all the required sections have been completed.

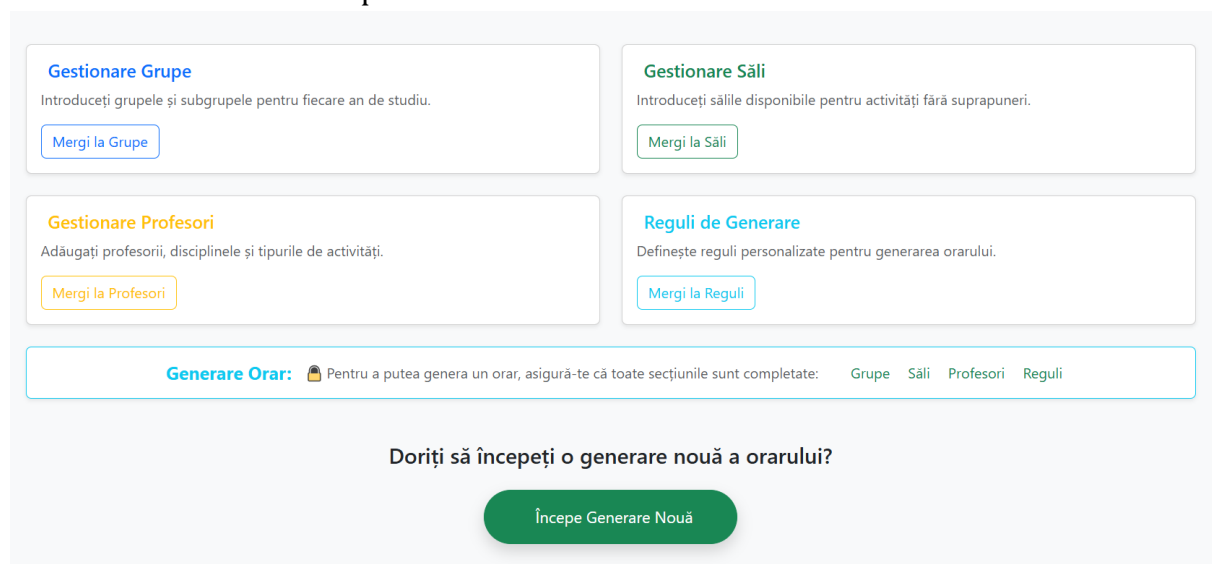


Figure 7 – Complete configuration validation

When all sections are completed, the "Start New Generation" button is activated, launching the actual timetable generation process.

### Step 3 – Managing Groups and Subgroups

At this stage, the user enters the groups and subgroups required for timetable planning. These are structured by level of study (Bachelor/Master) and study years (Figure 8).

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**Gestionare Grupe**

[Înapoi](#) [Reincarcă](#) [Continuă](#)

**Despre gestionarea grupelor**  
Configurează grupele și subgrupele pentru fiecare an, atât la **Licență** cât și la **Master**.  
Aceste grupe vor fi folosite la **generarea orarului**.

**Configurare Grupe**

Nivel:  
Licență

An:  
I

Număr Grupe:  
1

Subgrupe / Grupa:  
1

**Grupe existente**

Caută după denumire...

Licența - Anul I

[Editează](#) [Selectează toate](#)

☐ LI1a  
Licența An I Grupa 1 Subgrupa x

☐ LI2a  
Licența An I Grupa 2 Subgrupa x

☐ LI3a  
Licența An I Grupa 3 Subgrupa x

Licența - Anul II

[Editează](#) [Selectează toate](#)

**Figure 8 – Group management interface**

#### Available functionalities:

- Selecting the level: Bachelor or Master
- Choosing the year (I, II, III, IV)
- Entering the number of groups and subgroups
- Automatic name generation (e.g., LI1a, LI2b)
- Quick search by group name
- Manual editing (adding individually, e.g., "2b")
- Selective or bulk deletion

All generated groups will later be used to assign activities in the timetable. After completing this section, the user can click "→ Continue" to proceed to room management.

### Step 4 – Managing Rooms

At this stage, the available rooms for teaching activities are entered (Figure 9). The application accepts 4 types of rooms, each identified by a distinct prefix:

- **GC** – Lecture Rooms
- **GL** – Laboratory Rooms
- **GS** – Seminar Rooms
- **GP** – Project Rooms

### Functionalities:

- Enter the number of rooms for each type
- Automatic code generation (e.g., GC1, GL2)
- View generated rooms grouped by category
- Multiple or individual selection
- Delete selected rooms
- Reload the list from the database

After entering all the necessary rooms, the user must click "Save rooms". Afterwards, they can continue to the teacher configuration stage.

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**Despre gestionarea sălilor**  
În această secțiune poți introduce numărul de săli necesare pentru desfășurarea activităților didactice: cursuri, laboratoare și seminarii.  
Asigură-te că toate sălile sunt completate corect înainte de a genera orarul.  
Apasă "Salvează" pentru a adăuga noile săli în sistem.  
Poți folosi "Reincarcă" pentru a actualiza lista și a vizualiza ultimele modificări efectuate.

**Săli de Curs (GC)**  
0

**Săli de Laborator (GL)**  
0

**Săli de Seminar (GS)**  
0

**Săli de Proiect (GP)**  
0

**Salvează sălile**

**Săli de Curs (GC)**  
☐ Selectează toate  
Total: 10 săli

**Săli de Laborator (GL)**  
☐ Selectează toate  
Total: 10 săli

**Săli de Seminar (GS)**  
☐ Selectează toate  
Total: 10 săli

**Săli de Proiect (GP)**  
☐ Selectează toate  
Total: 10 săli

Figure 9 – Room management interface

### Step 5 – Managing Teachers

This section allows adding teachers available for lectures, seminars, and laboratories. It is essential that all required information is completed for each teacher to ensure correct timetable planning (Figure 10).

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**Despre gestionarea profesorilor**  
În această secțiune poți introduce profesorii disponibili pentru activitățile didactice: cursuri, seminarii și laboratoare.  
Fiecare profesor trebuie să aibă completate informațiile despre nume, disciplinele predate (cu nivel și tip de activitate) și disponibilitatea săptămânală.  
Apasă "Salvează profesor" pentru a adăuga un nou profesor în sistem.  
Poți folosi "Reincarcă" pentru a actualiza lista profesorilor și a vizualiza ultimele modificări efectuate.

**Adaugă un nou profesor**

**Nume complet:**  
ex: Dr. Andrei Popescu

**Discipline predate:**  
Denumire disciplină  
Selectează nivel

**Disponibilitate săptămânală**  
Selectează zilele și intervalele orare în care profesorul este disponibil.  
Click pe o celulă pentru a o activa/dezactiva.





Zile / Interval	08:00-10:00	10:00-12:00	12:00-14:00	14:00-16:00	16:00-18:00	18:00-20:00
Luni						
Marti						
Miercuri						
Joi						

Figure 10 – Teacher management

**For each teacher, complete:**

1. **Full name** – e.g., Dr. Andrei Popescu
2. **Subjects taught** – Add a subject (e.g., "Java Programming") and select:
  - Level: Bachelor or Master
  - Type: Lecture, Seminar, Project, or Laboratory
  - You can add multiple subjects for the same teacher
3. **Weekly availability:**
  - A time grid is displayed: days (Monday–Friday) and intervals (08:00–20:00)
  - Select grid cells to mark hours when the teacher is available
  - Active cells are colored; inactive ones remain white

**Available functionalities:**

-  **Reload** – Updates the existing teacher list from the database
-  **Save teacher** – Adds the teacher with all recorded data
-  **Back** – Returns to the previous step (Room Management)
-  **Continue** – Proceeds to the next step (e.g., rule configuration or timetable generation)

**Step 6 – Setting Generation Rules**

In this section, the user defines the rules governing timetable planning for all Bachelor and Master groups and subgroups (Figure 11).

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utilizând tehnici de A.I.

Setare Reguli

Înapoi

Reincarcă

Continuă

 **Despre setarea regulilor**

În această secțiune poți introduce **regulile care guvernează generarea orarului** pentru toate grupele și subgrupele din învățământul de **Licență** și **Masterat**.

Regulile trebuie să includă informații clare despre **structura activităților** (curs, seminar, laborator), **intervalele orare permise, restricții de săli** și **programul zilnic** pentru fiecare nivel.

După completare, apasă "**Salvează și continuă**" pentru a înregistra regulile în baza de date și a trece la generarea orarului.

Poți folosi "**Reincarcă**" pentru a reseta pagina în cazul în care dorești să reincepi editarea regulilor de la zero.

Mai întâi trebuie să **creezi** sau să **selectezi o regulă** pentru a continua.

Nespecificată

REGULI STRICTE PENTRU GENERAREA ORARULUI

 Reguli de generare

Reguli salvate recent

test\_generare\_2\_1

25.06.2025, 16:26

Încarcă

**Figure 11** – Setting generation rules



### Required fields (Figure 12):

- **Activity structure** – Define how lectures (per year), seminars/projects (per group), and laboratories (per subgroup) are distributed
- **Time intervals** – Define allowed schedules for each day:
  - Bachelor: 08:00–20:00
  - Master: 16:00–20:00
- **Special restrictions:**
  - Wednesday 14:00–16:00 must be free for all
  - Maximum two 2-hour breaks/day allowed
- **Timetable validity** – There must be activities for every group/subgroup each day (except for Wednesday's break)

### Actions:

- Name the rule in the "Rule name" field
- Save as a new rule, update an existing rule, or delete
- Rules are saved in the database and can be reused

3. Ziua de miercuri:

- Intervalul 14:00-16:00 este liber pentru toate grupele
- În restul intervalelor din acea zi trebuie să existe activități

4. Orarul trebuie să fie complet, valid și să conțină activități pentru fiecare grupă/subgrupă în fiecare zi (cu excepția intervalului 14:00-16:00 miercuri).

Activitățile trebuie să conțină câmpuri distincte: activitate, tip, profesor, sală.  
Nu combina detalii într-un singur câmp și nu omite nicio zi.

Regulă selectată: *test\_generare* ID #59

Denumire regulă

*test\_generare*

Modifici o regulă existentă:

*test\_generare*

Actualizează Salvează ca nouă Șterge Anulează

Salvează Golește

18.06.2025, 17:26	Încarcă
test_3_verificare 18.06.2025, 17:26	Încarcă
Test_2_verificare 18.06.2025, 17:15	Încarcă
test_generare_1 12.06.2025, 12:32	Încarcă
test_generare 07.06.2025, 09:37	Încarcă
test_7 04.06.2025, 23:42	Încarcă
test_6 03.06.2025, 21:52	Încarcă
test_5 03.06.2025, 21:35	Încarcă
test_4 03.06.2025, 21:29	Încarcă

Figure 12 – Editing generation rules



## Step 7 – Generating the Timetable

After entering all data (teachers, rooms, groups, and rules), the timetable planning process can begin (Figure 13).

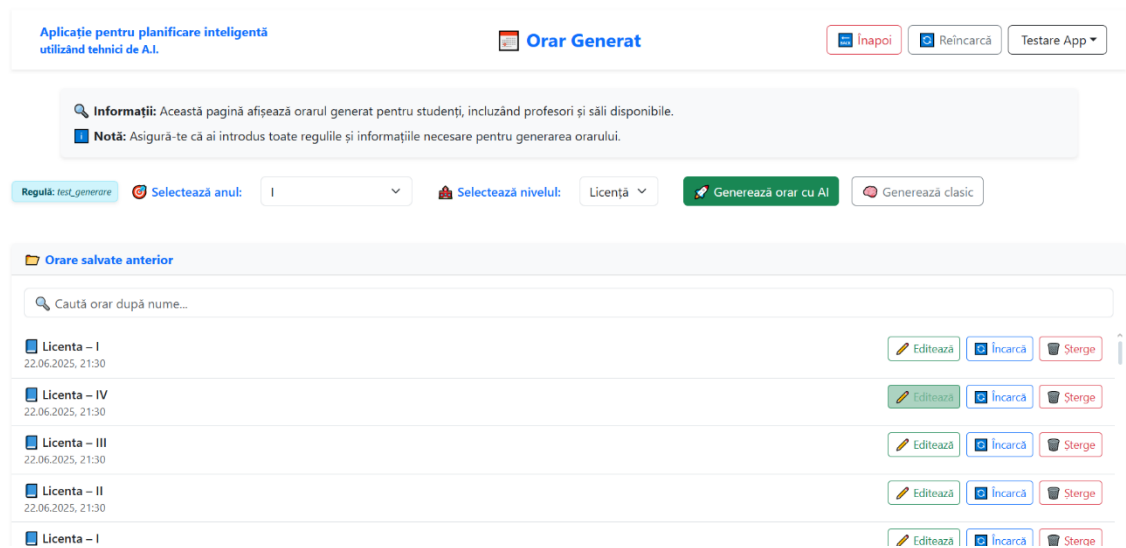


Figure 13– Generating the timetable

### Execution steps:

1. Choose the study year for which you want to generate the timetable
2. Choose the study level (Bachelor or Master)
3. Click the green **"Generate timetable with AI"** button for automatic planning using the intelligent model
4. Alternatively, use **"Generate classic"** for the traditional algorithmic method

### Additional options:

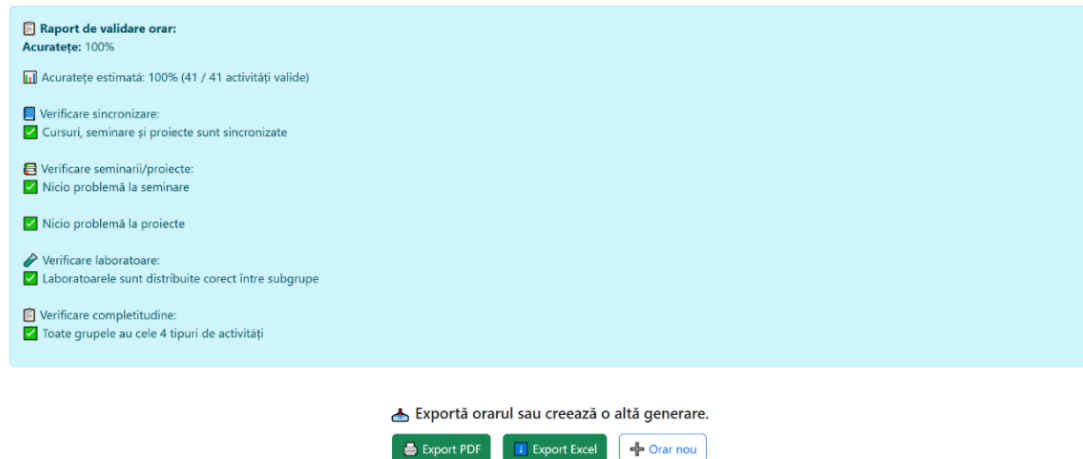
- Edit, load, or delete previously generated timetables
- View the complete history of saved timetables for each year

## Step 8 – Displaying and Validating the Generated Timetable

After clicking **"Generate timetable with AI"**, the application automatically displays the resulting timetable along with a complete validation report.

### Displayed details:

1. **Timetable validation report** (blue section) (Figure 14):
  - Generation accuracy: estimated percentage (e.g., 100%)
  - Synchronization checks:
    - Lectures – verified for no overlaps
    - Seminars and projects – aligned per group
    - Laboratories – correctly distributed per subgroup
    - Completeness – all groups have their corresponding activities



**Figure 14 – Timetable validation report**

2. **Visually displayed timetable** includes (Figure 15):
  - Structured by years, groups, and subgroups (e.g., Master – MI1a, MI2a)
  - For each day (Monday–Friday) and each time slot (e.g., 16:00–18:00)
  - Full subject name + acronym (e.g., Databases (BD))
  - Teacher’s name (e.g., Dr. Roxana Iancu)
  - Room where the activity takes place (e.g., GC6)

**Master**

**Master – MI1a**

Interval	Luni	Marti	Miercuri	Joi	Vineri
16:00-18:00	Algoritmi pentru date masive (apdm) Dr. Roxana Iancu GC6	Sisteme Distribuite (sd) Lect. Radu Sima GC1	Inteligenta Artificiala (ia) Prof. Maria Stan GC5	Inteligenta Simbolical natural (in) Conf. Ovidiu Stan GC7	IA Conf. Ovidiu Stan GS2
18:00-20:00	APDM Dr. Roxana Iancu GS2	SD Lect. Radu Sima GP1	IA Prof. Maria Stan GP1	IA Prof. Maria Stan GL1	-




**Master – MI2a**

Interval	Luni	Marti	Miercuri	Joi	Vineri
16:00-18:00	Algoritmi pentru date masive (apdm) Dr. Roxana Iancu GC6	Sisteme Distribuite (sd) Lect. Radu Sima GC1	Inteligenta Artificiala (ia) Prof. Maria Stan GC5	Inteligenta Simbolical natural (in) Conf. Ovidiu Stan GC7	IA Prof. Maria Stan GL1
18:00-20:00	SD Lect. Radu Sima GP1	APDM Dr. Roxana Iancu GS2	IA Conf. Ovidiu Stan GS2	-	-

**Master – MI1b**

Interval	Luni	Marti	Miercuri	Joi	Vineri
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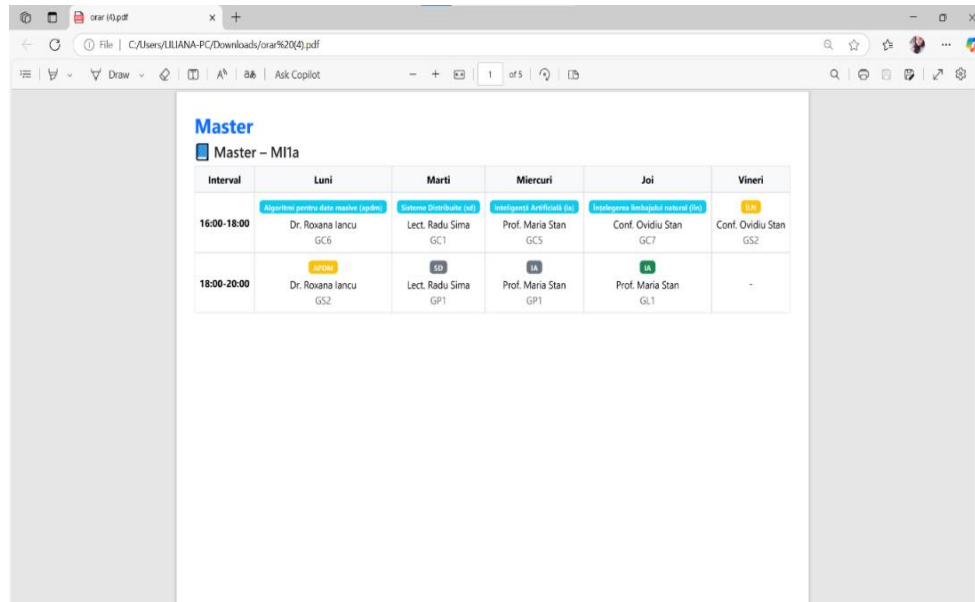
**Figure 15 – Visual timetable**

3. **Timetable export options:**
  -  Export PDF
  -  Export Excel
  -  Button for new generation

## Exporting the Generated Timetable (Excel and PDF)

After successfully generating and validating the timetable, the application allows export in two formats:

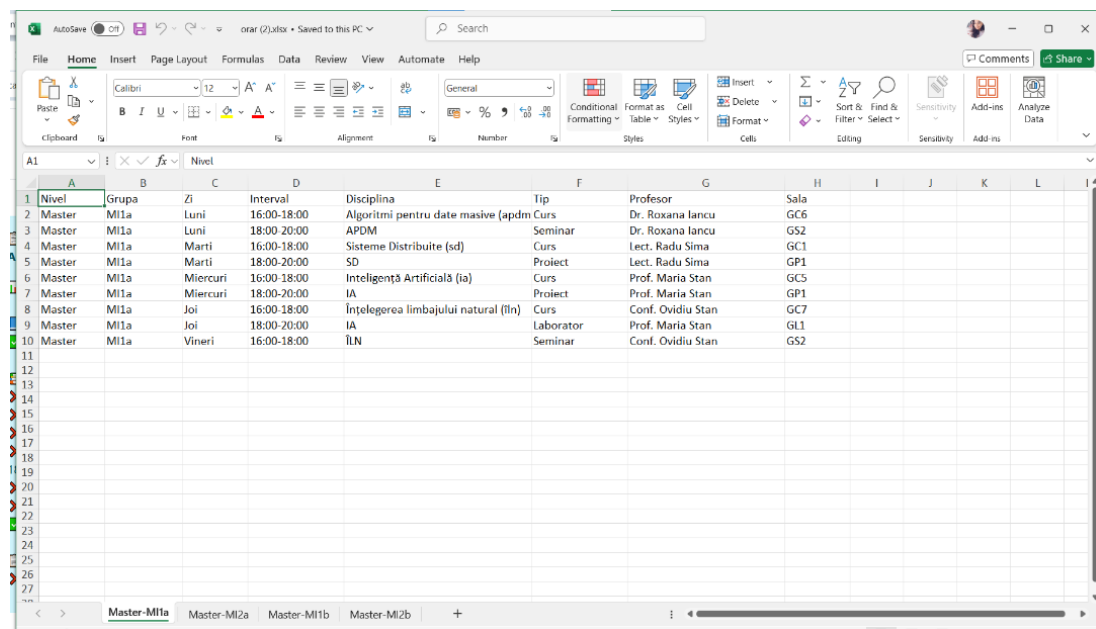
- **Export PDF** – Creates a file with the timetable in a printable, tabular, and color-coded format per group (Figure 16)
- **Export Excel** – Creates a spreadsheet file with all detailed activities: day, time, subject, type, teacher, and room (Figure 17)



The screenshot shows a PDF document titled 'Master - MI1a'. It displays a timetable with columns for days of the week (Luni, Marti, Miercuri, Joi, Vineri) and rows for time intervals (16:00-18:00, 18:00-20:00). The timetable is color-coded by activity type: 'Algoritmi pentru date masive (apdm)' in blue, 'Sisteme Distribuite (sd)' in orange, 'Inteligenta Artificiala (ia)' in green, and 'Intelegerea limbajului natural (lin)' in yellow.

Interval	Luni	Marti	Miercuri	Joi	Vineri
16:00-18:00	Algoritmi pentru date masive (apdm) Dr. Roxana Iancu GC6	Sisteme Distribuite (sd) Lect. Radu Sima GC1	Inteligenta Artificiala (ia) Prof. Maria Stan GC5	Intelegerea limbajului natural (lin) Conf. Ovidiu Stan GC7	Conf. Ovidiu Stan GS2
18:00-20:00	Algoritmi pentru date masive (apdm) Dr. Roxana Iancu GS2	Sisteme Distribuite (sd) Lect. Radu Sima GP1	Inteligenta Artificiala (ia) Prof. Maria Stan GP1	Intelegerea limbajului natural (lin) Prof. Maria Stan GL1	-

Figure 16 – Timetable export in PDF format



The screenshot shows an Excel spreadsheet with columns for 'Nivel', 'Grupa', 'Zi', 'Interval', 'Disciplina', 'Tip', 'Profesor', and 'Sala'. The data is organized into rows for each activity, showing the day, time, subject, type, teacher, and room.

Nivel	Grupa	Zi	Interval	Disciplina	Tip	Profesor	Sala
Master	MI1a	Luni	16:00-18:00	Algoritmi pentru date masive (apdm)	Curs	Dr. Roxana Iancu	GC6
Master	MI1a	Marti	16:00-18:00	Sisteme Distribuite (sd)	Seminar	Dr. Roxana Iancu	GS2
Master	MI1a	Marti	16:00-18:00	Sisteme Distribuite (sd)	Curs	Lect. Radu Sima	GC1
Master	MI1a	Marti	18:00-20:00	SD	Proiect	Lect. Radu Sima	GP1
Master	MI1a	Miercuri	16:00-18:00	Inteligenta Artificiala (ia)	Curs	Prof. Maria Stan	GC5
Master	MI1a	Miercuri	18:00-20:00	IA	Proiect	Prof. Maria Stan	GP1
Master	MI1a	Joi	16:00-18:00	Intelegerea limbajului natural (lin)	Curs	Conf. Ovidiu Stan	GC7
Master	MI1a	Joi	18:00-20:00	IA	Laborator	Prof. Maria Stan	GL1
Master	MI1a	Vineri	16:00-18:00	ILN	Seminar	Conf. Ovidiu Stan	GS2

Figure 17 – Timetable export in Excel format

After successful timetable generation and validation, the user can:

- Return to any application section (Groups, Rooms, Teachers, Rules) to modify or update entered data
- Save generated timetables for later review
- Generate new timetables using the same rules or a different set of rules
- Export the timetable in professional formats suitable for printing or digital distribution

This flexibility allows the user to test multiple scenarios, improve academic planning, and quickly obtain an optimal version of the timetable adapted to the institution's needs.

#### **Final Recommendations for Users:**

- Ensure that all entered data (teachers, rooms, groups, rules) is correct and complete before timetable planning
- For best results, set clear and realistic rules considering resource availability
- Use the rule-saving option to quickly regenerate a similar timetable in the future
- After generation, check the validation report
- Test multiple timetable variants if you have alternative scenarios (e.g., different subject distributions or new teachers)