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).

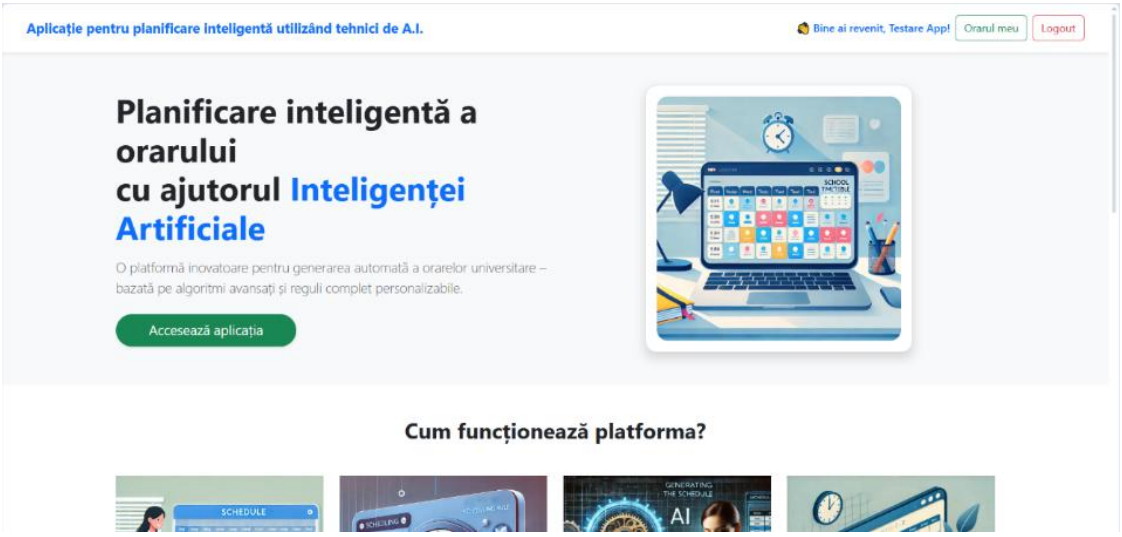

Figure 1 – Accessing the application and user login

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).

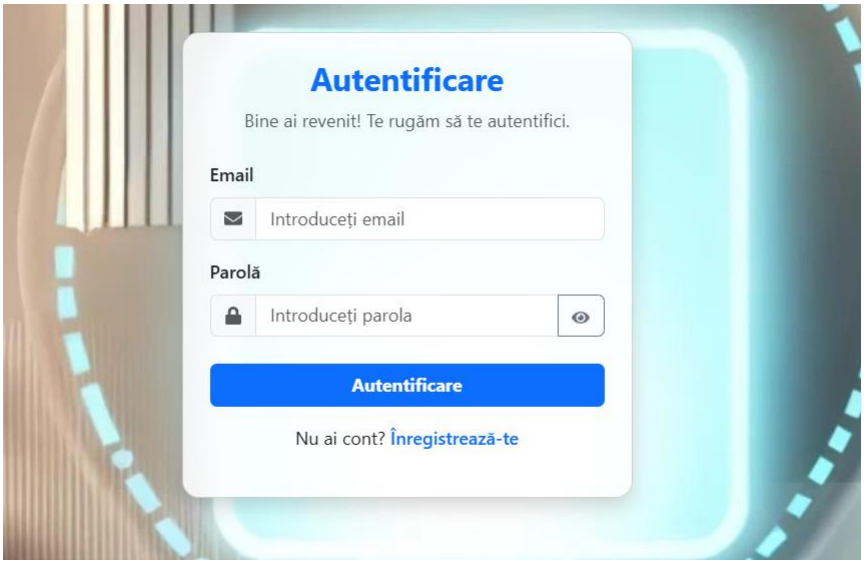

Figure 2 – Login

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).

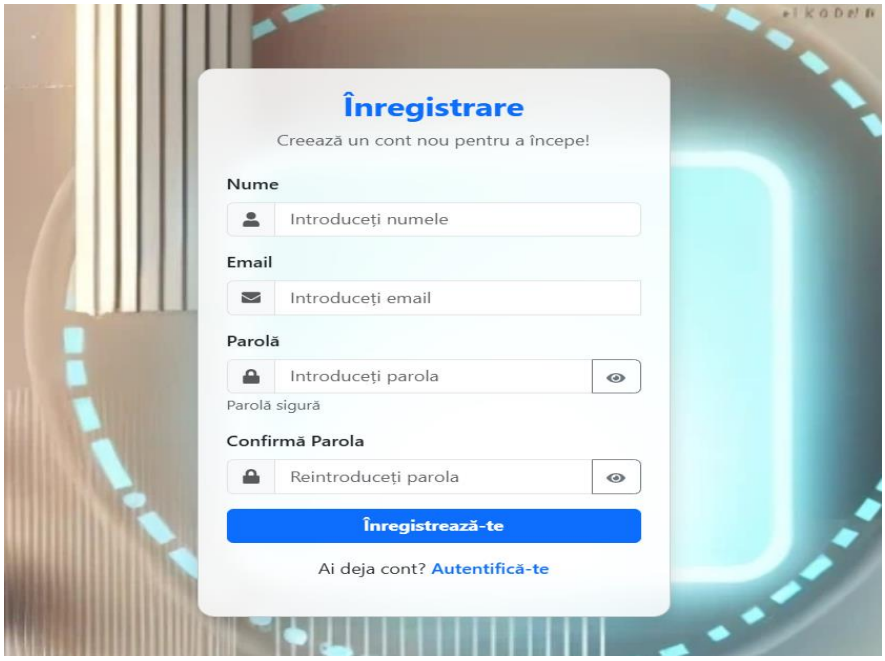

Figure 3 – Registration

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).

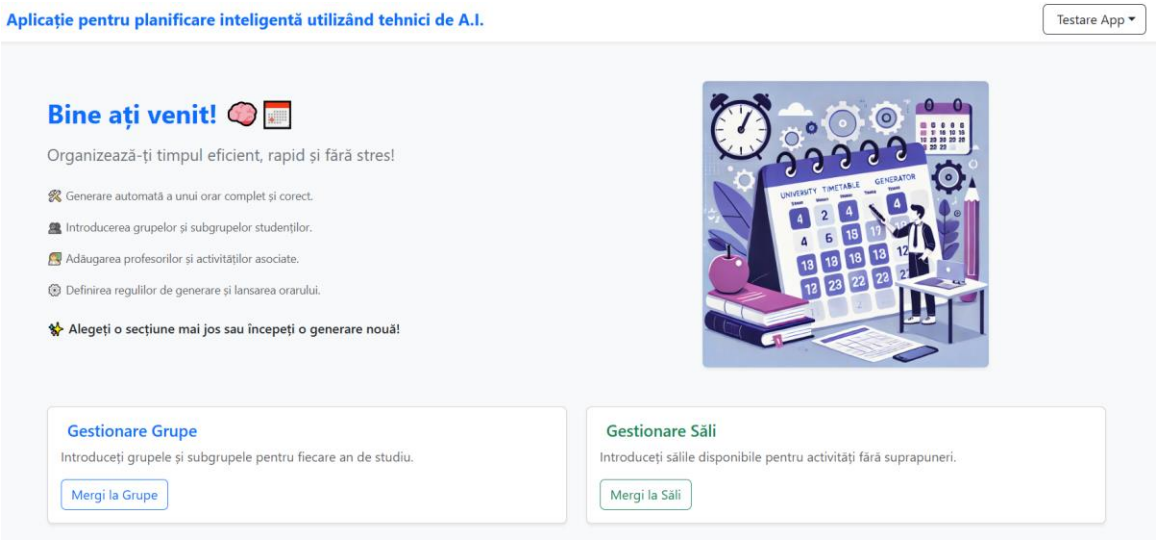

Figure 6 – Application dashboard

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).

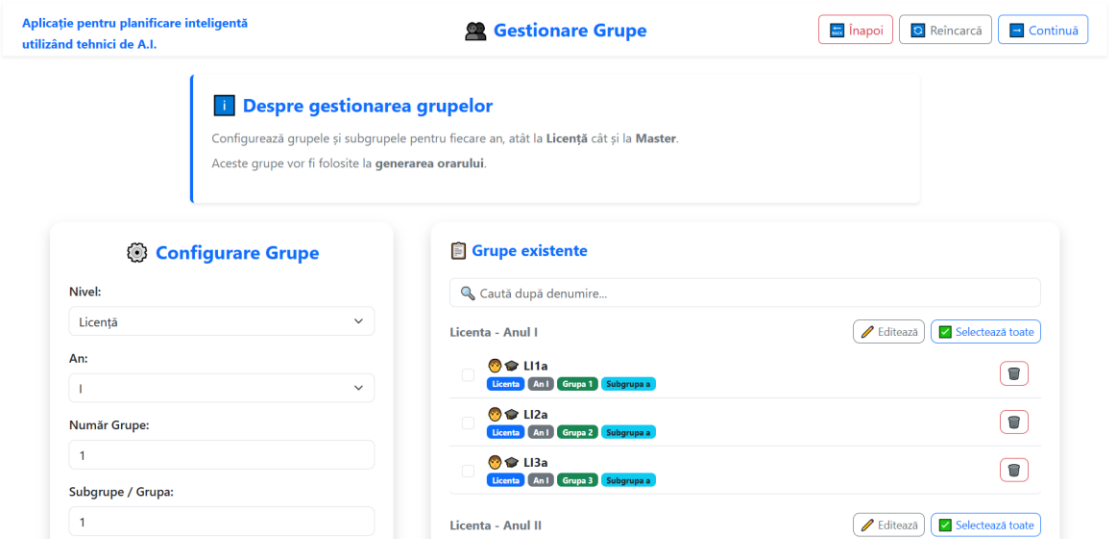

Figure 8 – Group management interface

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.

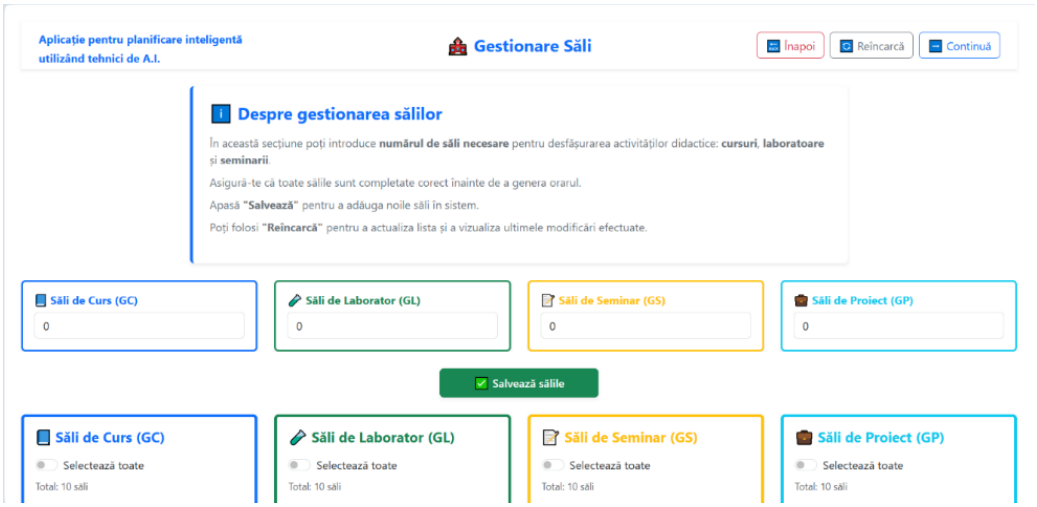

Figure 9 – Room management interface

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).

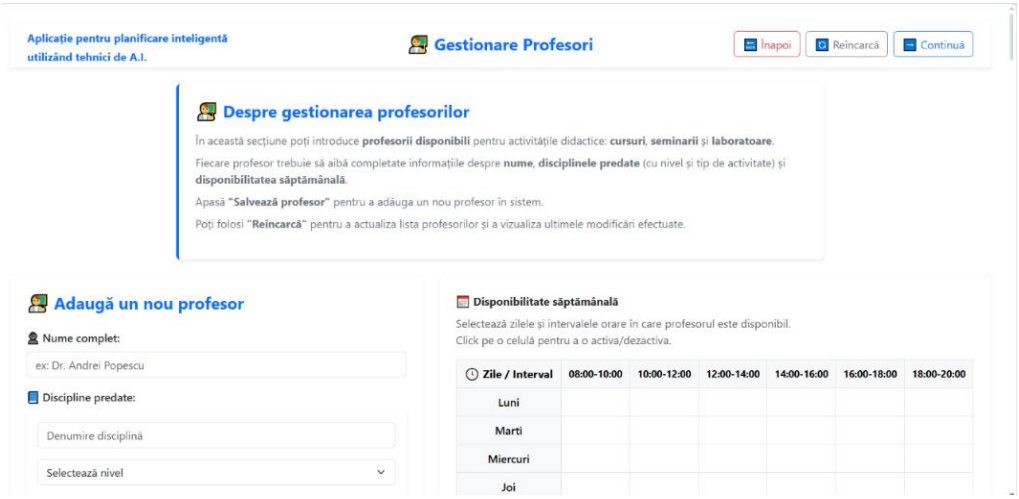

Figure 10 – Teacher management

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).

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

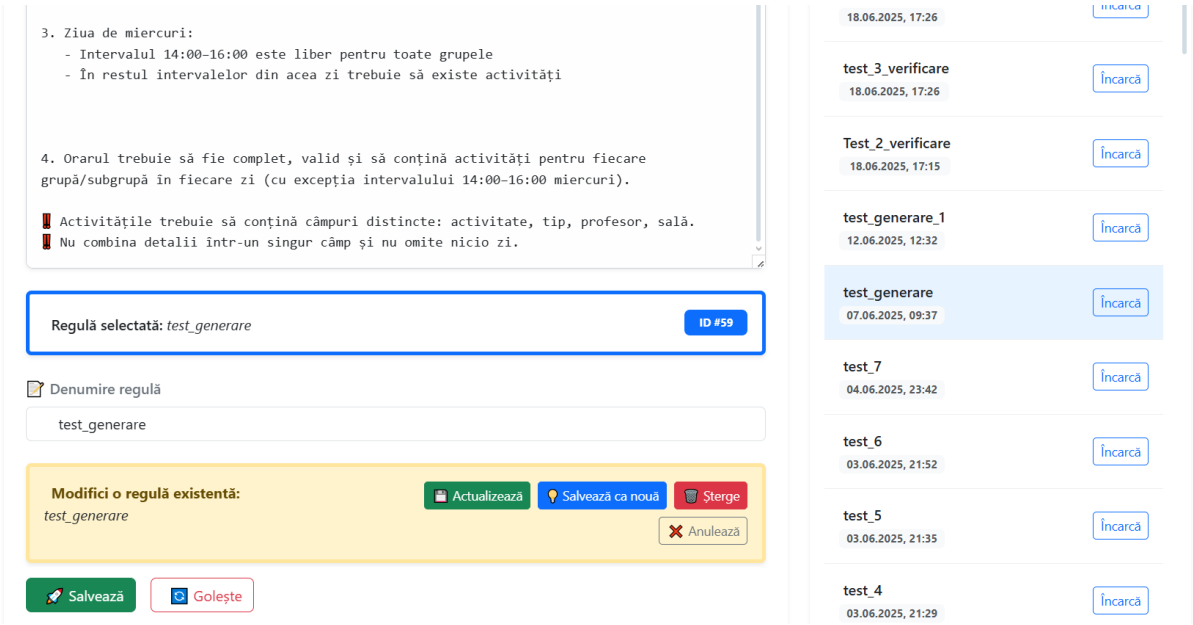

Figure 12 – Editing generation rules

Step 7 – Generating the Timetable

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

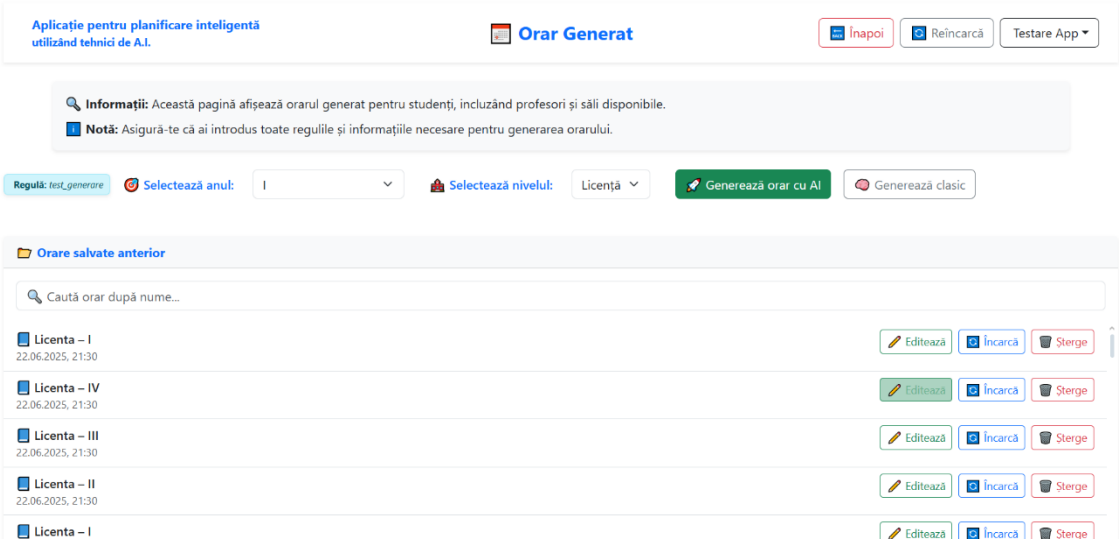

Figure 13– Generating the timetable

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

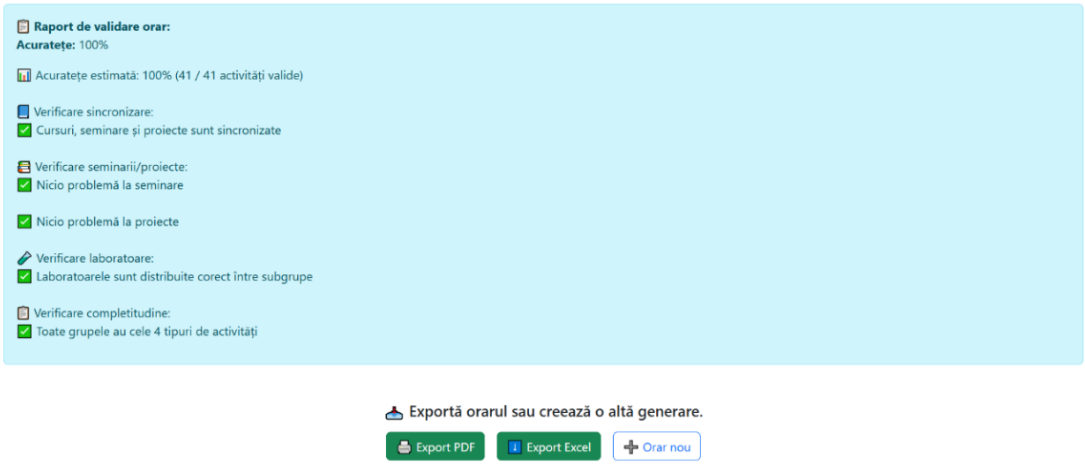

Figure 14 – Timetable validation report

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)

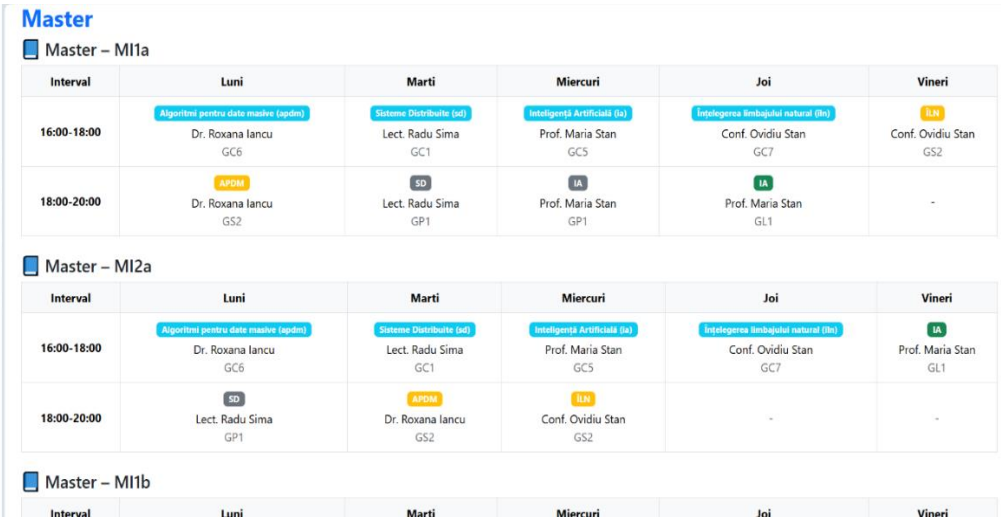

Figure 15 – Visual timetable

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)
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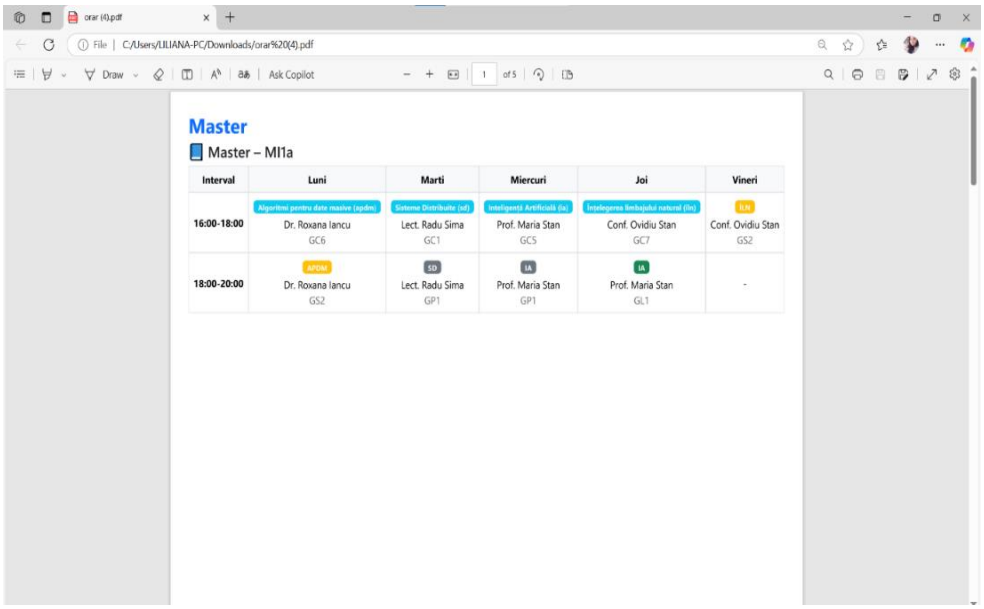

Figure 16 – Timetable export in PDF format

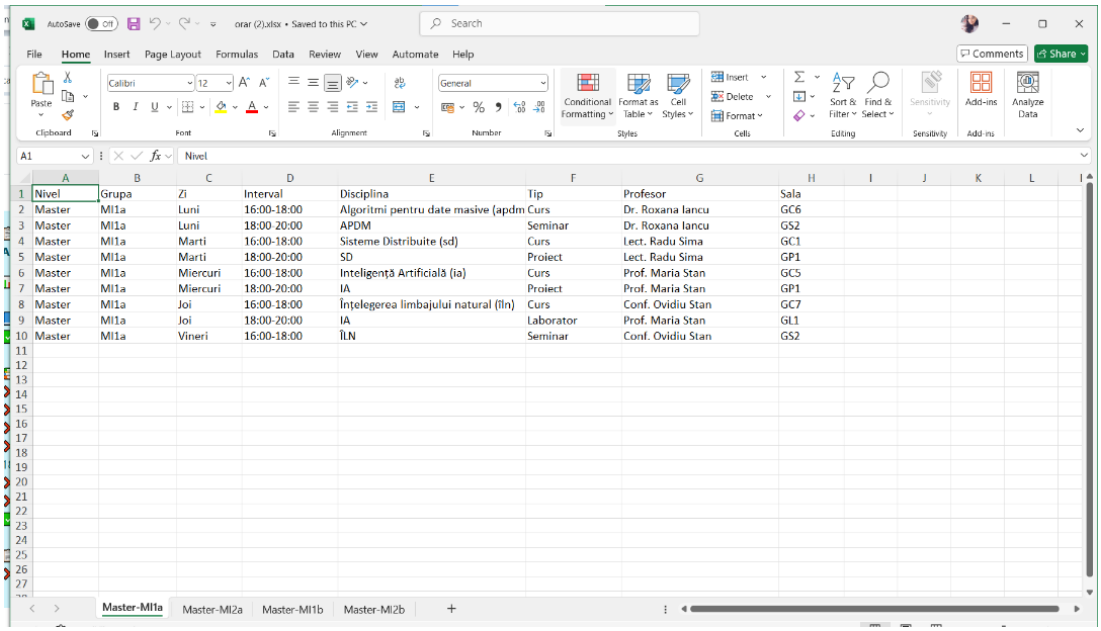

Figure 17 – Timetable export in Excel format

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)