User Manual

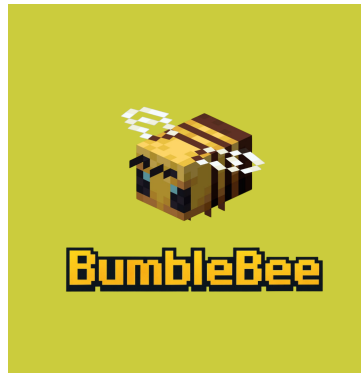## Automated Time Table Scheduling for IIIT Dharwad

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Date: October 2025

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1   Overview

The **Automated Time Table Scheduling System** for IIIT Dharwad is designed to generate academic timetables automatically for different departments using input data in CSV format. It eliminates manual scheduling conflicts and ensures balanced allocation of lecture halls, laboratories, and faculty across all courses.

Key Features

- Automatic generation of student timetables in Excel format.

- Consolidated faculty-wise timetable generation.

- Handles electives, labs, and semester halves.

- Avoids slot and faculty conflicts through algorithmic scheduling.

- Color-coded output for easy visualization.

- Highlights unscheduled courses (if any) for manual correction.

2   Installation

Prerequisites

- Python 3.9 or above

- pip package manager

- Recommended IDE: VS Code or PyCharm

Installing Required Libraries

```
pip install pandas openpyxl
```

Cloning the Repository

```
git clone https://github.com/raskinverma/AUTOMATED-TIME-TABLE-
    ↪ SCHEDULING-FOR-IIIT-DHARWAD.git
cd AUTOMATED-TIME-TABLE-SCHEDULING-FOR-IIIT-DHARWAD
```

Folder Structure

```
AUTOMATED-TIME-TABLE-SCHEDULING-FOR-IIIT-DHARWAD/
|
+-- data/
|    +-- CSE_courses-A.csv
|    +-- CSE_courses-B.csv
|    +-- DSAI_courses.csv
|    +-- Faculty.csv
|    +-- rooms.csv
|    +-- timeslots.csv
|
+-- timetable_automation/
|    +-- __init__.py
|    +-- main.py
|
+-- tests/
+-- docs/
|    +-- BumbleBee_DPR.pdf
|
+-- README.md
```

3 Usage Scenarios

Adding New Departments or Data Files

To include a new department's course file in the timetable generation process, simply add
it to the `departments` dictionary in `main.py` as shown below.

```
if __name__ == "__main__":
    departments = {
        "CSE-A": "data/CSE_courses-A.csv",
        "CSE-B": "data/CSE_courses-B.csv",
        "DSAI": "data/DSAI_courses.csv",
        # Add new departments here, e.g.
        # "ECE": "data/ECE_courses.csv",
    }
```

This setup ensures that whenever a new department file (e.g., `ECE_courses.csv`) is added
to the `data/` folder and referenced in the `departments` dictionary, its timetable will
automatically be generated.

Running the Scheduler

```
python -m timetable_automation.main
```

This will:

- Read data from the `data/` folder.

- Generate departmental timetables:

  - `CSE-A_timetable.xlsx`

  - `CSE-B_timetable.xlsx`

  - `DSAI_timetable.xlsx`

- Create a consolidated `faculty_timetable.xlsx`.

- List unscheduled courses in separate Excel files.

Terminal Output Example

```
Generating student timetable for CSE-A...
Saved timetable to sheet 'First_Half'
Saved timetable to sheet 'Second_Half'
Some courses couldn't be scheduled. See 'CSE-
   ↪ A_unscheduled_courses.xlsx' for details.
All done. Student timetables and combined faculty timetable
   ↪ generated.
```

4   Sample Input Files

timeslots.csv

Start_Time	End_Time
07:30	09:00
09:00	10:30
10:45	12:15
14:00	15:30
15:45	17:15

rooms.csv

Room_ID	Type
LH101	Classroom
LH102	Classroom
LAB201	Lab

CSE_courses-A.csv

Course_Code	Course_Title	Faculty	L-T-P-S-C	Semester_Half	Elective
CS101	DSA	Dr. Sharma	3-0-2-0-4	1	0
CS102	CN	Dr. Patel	3-1-0-0-4	1	0
ELEC1	ML	Dr. Reddy	3-0-2-0-4	2	1

5   FAQ

Q1. Why do I get 'ModuleNotFoundError: No module named 'timetable_automation''?

Ensure you run the program from the root folder:

```
python -m timetable_automation.main
```

Q2. What if some courses are not scheduled?

Unscheduled courses appear in `<dept>_unscheduled_courses.xlsx`. You can adjust `MAX_ATTEMPTS` in `main.py`.

Q3. How to add a new department?

Add a CSV file in `data/` and include it in:

```
departments = {
    "CSE-A": "data/CSE_courses-A.csv",
    "NEW-DEPT": "data/NEW_courses.csv"
}
```

Q4. How to modify excluded slots (like lunch)?

Edit in the Scheduler class:

```
self.excluded_slots = ["07:30-09:00", "10:30-10:45", "13:15-14:00
    ↪ "]
```

Q5. How are labs scheduled?

Labs are scheduled once per day:

```
labs_scheduled[day] = True
```

Q6. Can colors be customized?

Yes, edit the `palette` list in:

```
format_student_timetable_with_legend()
_generate_faculty_workbook()
```

6   Future Enhancements

- Web-based interface for uploading data and downloading timetables.

- Conflict visualization using heatmaps.

- Integration with Google Calendar.

- Auto-emailing of timetables to faculty.