Schedulify
Time-Table Generator

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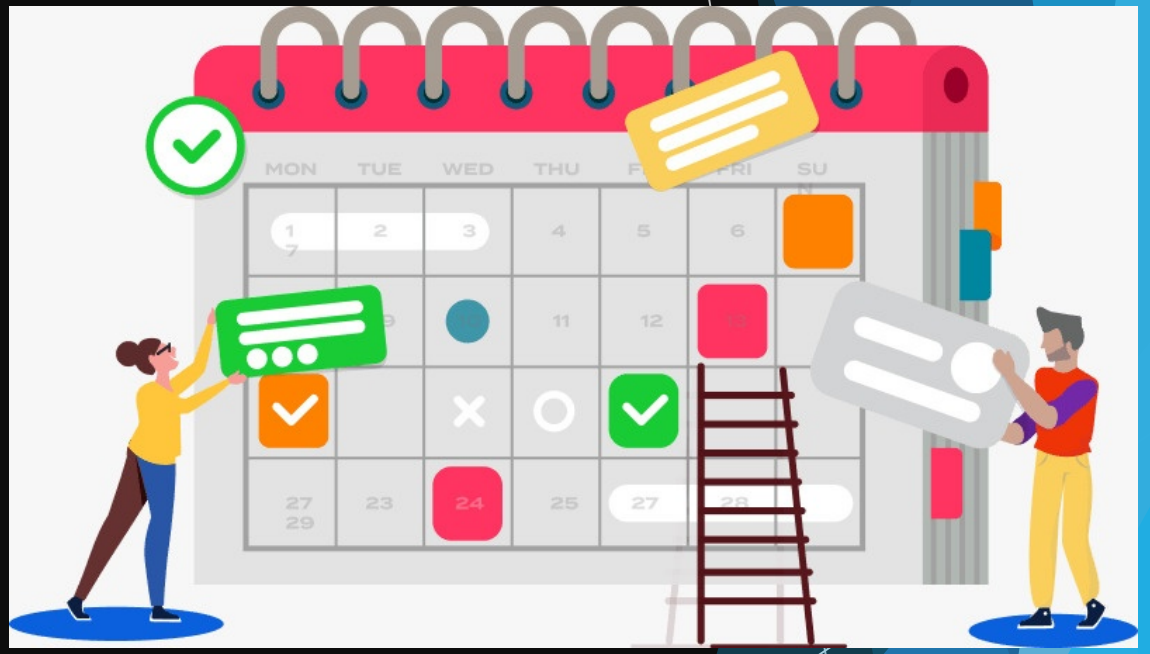
Introduction

The Context

- As academic requirements expanded, scheduling became increasingly constrained.
- Labs, teacher preferences, availability, and workload limits all had to be satisfied simultaneously.
- Manual methods couldn’t consistently manage these interacting constraints.

What is Schedulify?

This system generates automatic academic timetables. It respects teacher preferences, balances workloads, and correctly schedules classes—while remaining flexible enough to adapt to custom institutional constraints.



Main Features

- Data Control
- Conflict-Free Scheduling
- Lab & Lecture Handling
- Preference Awareness

Problem Statement

Inefficiency & Error
Manual scheduling is tedious and prone to human error, often resulting in overlapping classes and logistical bottlenecks.

Neglect of Preferences
Traditional methods frequently ignore teacher preferences, leading to suboptimal subject assignments and faculty dissatisfaction.

Scalability Issues
As institutions grow, the complexity of scheduling explodes, making manual or semi-automated spreadsheets insufficient.

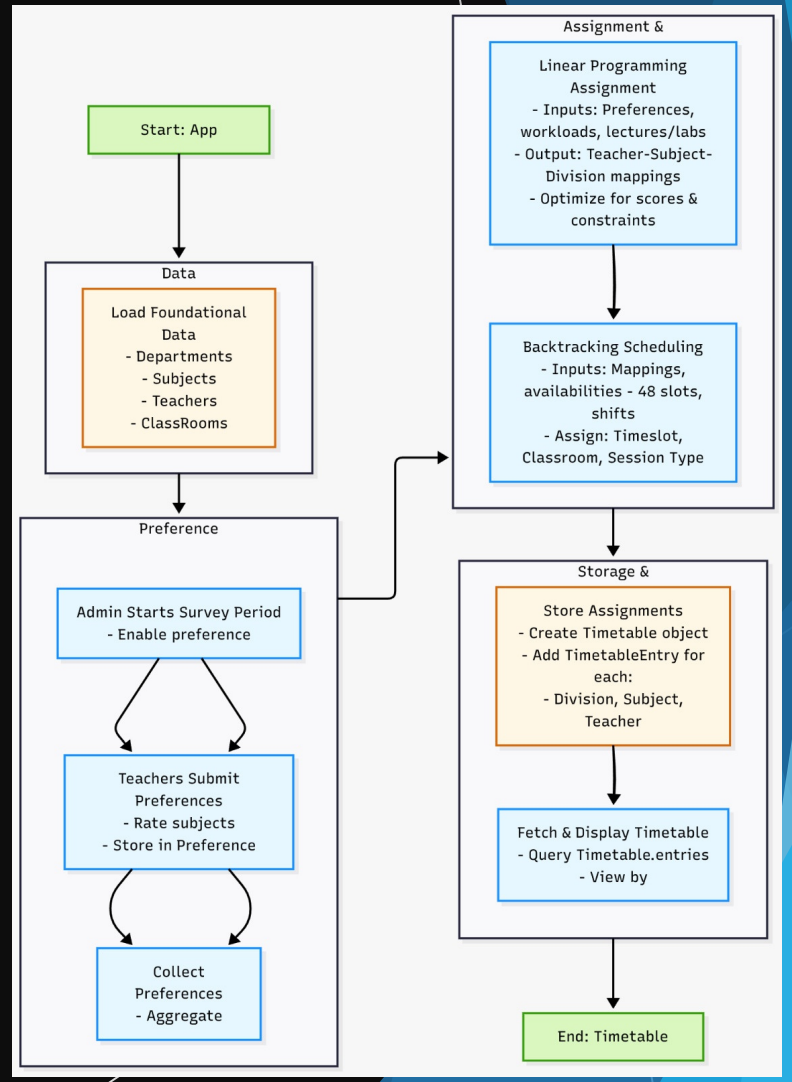
Flowchart of the System

1. Data & Preferences: Admin inputs foundational data; Teachers submit weighted subject preferences.

2. Linear Programming (LP): The engine calculates optimal Teacher-Subject mappings based on satisfaction scores.

3. Backtracking (CSP) The system assigns Time Slots and Classrooms, ensuring no hard constraint violations.

4. Output Final timetable is generated and stored in PostgreSQL for viewing.



Implementation Details

Tech Stack

Backend: Python, Django REST Framework

Frontend: HTML, CSS, JavaScript, Bootstrap

Database: SQLite

Deployment: Cloud Hosting

Core Algorithms

Linear Programming (LP): Used via the PuLP library to solve the "Assignment Problem" (Who teaches What) by maximizing preference scores.

Constraint Satisfaction (CSP): A backtracking algorithm that solves the "Scheduling Problem" (When and Where), handling hard constraints like room availability.

Generation Process

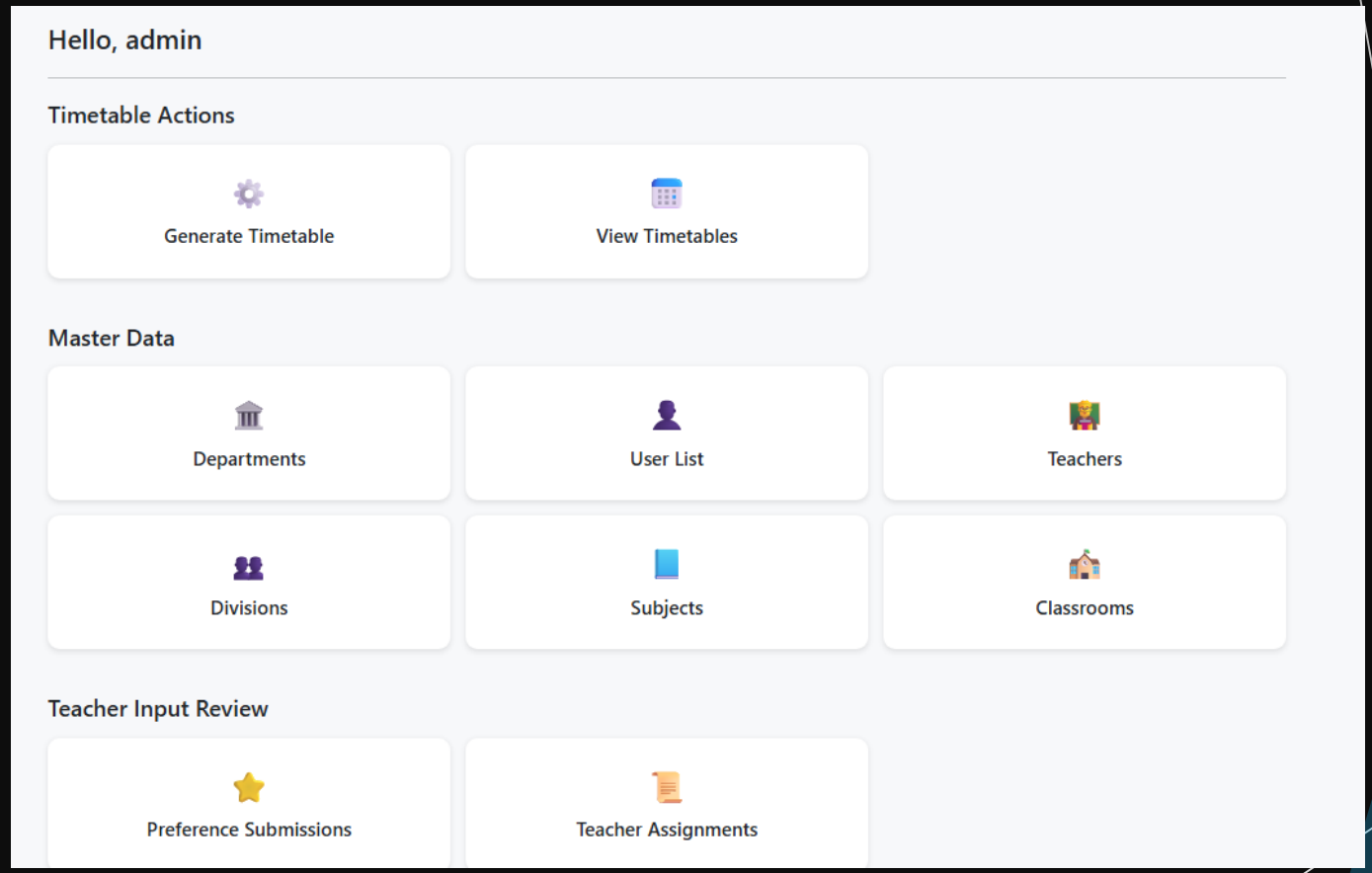
Admin configures classrooms and subjects; Teachers log in securely.

Faculty rank their preferred subjects. Admin sets constraints.

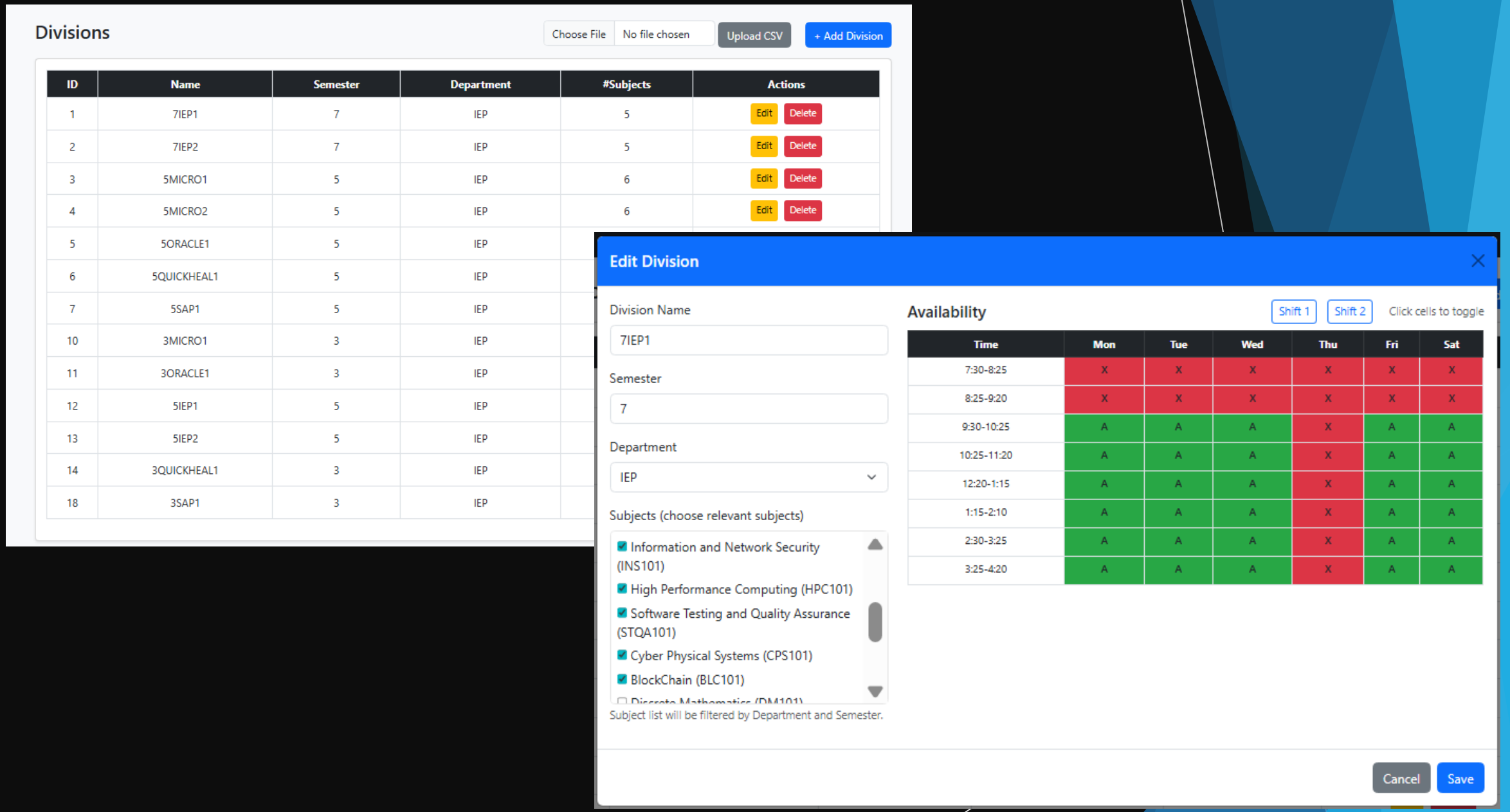
System runs LP and CSP algorithms to generate the schedule.

Final timetable is displayed on dashboard and exported to PDF/Excel.

Screenshots of Implemented Work



Admin Dashboard


Divisions
Choose File
No file chosen
Upload CSV
+ Add Division
ID
Name
Semester
Department
#Subjects
Actions
1 7IEP1 7 IEP 5 Edit Delete
2 7IEP2 7 IEP 5 Edit Delete
3 5MICRO1 5 IEP 6 Edit Delete
4 5MICRO2 5 IEP 6 Edit Delete
5 5ORACLE1 5 IEP
6 5QUICKHEAL1 5 IEP
7 5SAP1 5 IEP
10 3MICRO1 3 IEP
11 3ORACLE1 3 IEP
12 5IEP1 5 IEP
13 5IEP2 5 IEP
14 3QUICKHEAL1 3 IEP
18 3SAP1 3 IEP
Edit Division
Division Name
7IEP1
Semester
7
Department
IEP
Subjects (choose relevant subjects)
Information and Network Security (INS101)
High Performance Computing (HPC101)
Software Testing and Quality Assurance (STQA101)
Cyber Physical Systems (CPS101)
BlockChain (BLC101)
Subject list will be filtered by Department and Semester.
Availability
Shift 1
Shift 2
Click cells to toggle
Time Mon Tue Wed Thu Fri Sat
7:30-8:25 X X X X X X
8:25-9:20 X X X X X X
9:30-10:25 A A A X A A
10:25-11:20 A A A X A A
12:20-1:15 A A A X A A
1:15-2:10 A A A X A A
2:30-3:25 A A A X A A
3:25-4:20 A A A X A A
Cancel
Save

← Back Teacher Preferences Logout

Teachers List

ID	Name	Staff ID	Department	Top 3 Preferences	Last Updated	Actions
1	Vikash	Viki101	IEP	Digital Logic Design (6) Theory of Computation (5) Software Engineering (5)	16 Nov 2025, 07:41 pm	View All
2	Chndrashekhar	Chndra101	IEP	Cyber Physical Systems (10) Software Engineering (9) BlockChain (8)	16 Nov 2025, 05:08 pm	View All
5	Akruti	Akruti101	IEP	BlockChain (10) Information and Network Security (9) Cyber Physical Systems (8)	16 Nov 2025, 05:08 pm	View All
7	E Kanyappan	Kanya101	IEP	Theory of Computation (10) High Performance Computing (9) Cyber Physical Systems (7)	16 Nov 2025, 05:08 pm	View All
8	Sudhendu Prince	Prince101	IEP	Software Engineering (10) BlockChain (9) Theory of Computation (8)	16 Nov 2025, 05:08 pm	View All
9	Anusha Marada	Anusha101	IEP	BlockChain (10) Cyber Physical Systems (9) High Performance Computing (8)	16 Nov 2025, 05:08 pm	View All

← Back Generate Timetable Logout

Timeout (seconds): 60

Generate Timetable

Time elapsed: 0s

Database Summary

Departments	Teachers	Subjects	Classrooms	Divisions
4	**19**	**16**	**10**	**13**

Departments

Name	# Teachers	# Subjects
IEP	9	9
ASH	4	2
ByteXL	4	3
CDC	2	2

Subjects

Name	# Teachers	# Divisions
Theory of Computation	8	7
Software Engineering	8	7
Information and Network Security	7	2
High Performance Computing	7	2

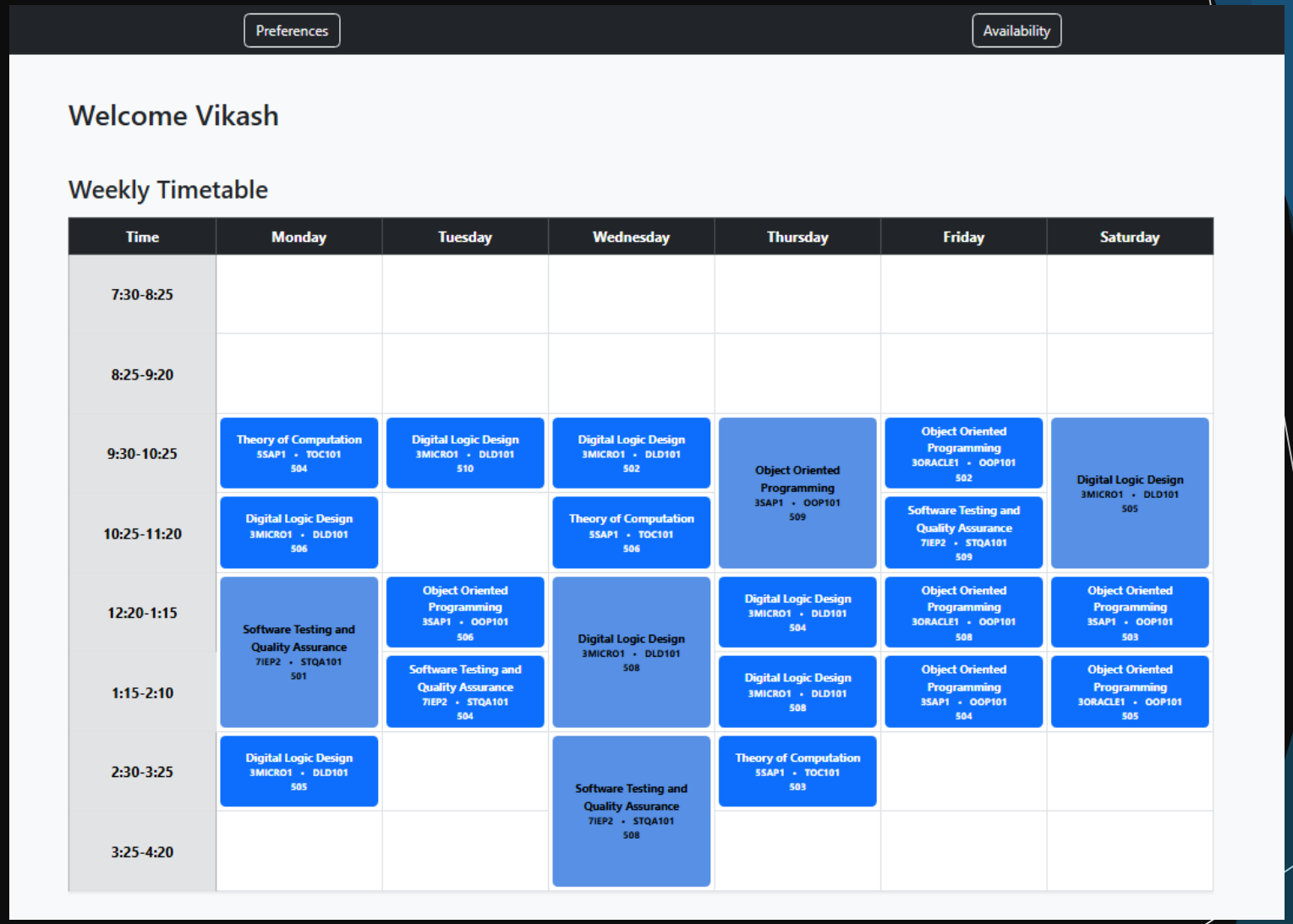
← Back Teacher Satisfaction Logout

Select Timetable

Timetable 66

Overall Satisfaction: 88.1%

Teacher	Staff ID	Department	Used Workload	Max Workload	Satisfaction	Subjects & Divisions
E Kanyappan	Kanya101	IEP	18	18	100.0%	Theory of Computation → 5IEP2, 5IEP1, 5SAP1, 5ORACLE1, 5MICRO2, 5Q
Priya Singh	PS101	IEP	15	18	90.0%	Object Oriented Programming → 3MICRO1, 3QUICKHEAL1, 3ORACLE1
Abhirup Sinha	Abhirup101	IEP	18	18	87.5%	High Performance Computing → 7IEP1, 7IEP2 Theory of Computation BlockChain → 7IEP1
Trainer 1	Trainer101	ByteXL	28	30	100.0%	Design and Analysis of Algorithms → 5SAP1, 5ORACLE1, 5IEP1, 5MICRO2
Trainer 4	Trainer401	ByteXL	18	30	100.0%	Data Structures in Python → 3MICRO1, 3QUICKHEAL1, 3ORACLE1
Vikash	Viki101	IEP	10	18	55.0%	Digital Logic Design → 3MICRO1 Object Oriented Programming → 3S
Rohan Sharma	RS101	CDC	4	18	100.0%	Professional Communication → 3MICRO1, 3SAP1, 3QUICKHEAL1, 3ORAC



Faculty Portal

Weekly Availability

Time	Mon	Tue	Wed	Thu	Fri	Sat
7:30-8:25	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
8:25-9:20	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
9:30-10:25	Available	Available	Available	Available	Available	Available
10:25-11:20	Available	Available	Available	Available	Available	Available
12:20-1:15	Available	Available	Available	Avail		
1:15-2:10	Available	Available	Available	Avail		
2:30-3:25	Available	Available	Available	Avail		
3:25-4:20	Available	Available	Available	Avail		

Save Availability

Subject Preferences

Rate each subject from **1 to 10**. Minimum total required: 45

Subject	Code	Score
Theory of Computation	TOC101	5
Software Engineering	SE101	5
Information and Network Security	INS101	5
High Performance Computing	HPC101	5
Software Testing and Quality Assurance	STQA101	5
Cyber Physical Systems	CPS101	5
BlockChain	BLC101	4
Object Oriented Programming	OOP101	5
Digital Logic Design	DLD101	6

All scores must be integers 1–10.

Submit Preferences

Conclusion

Project Success

Schedulify successfully addresses the limitations of manual timetabling. By integrating teacher preferences with rigorous constraint checking, the system delivers:

- 100% Conflict-Free Schedules
- Equitable Workload Distribution
- Significant Reduction in Administrative Time
- Higher Faculty Satisfaction

Future Work

Mobile Application

Developing a native app for iOS and Android to provide push notifications and easier access for faculty on the go.

Resource Allocation

Integrating advanced constraints for physical resources, such as specific laboratory equipment and room capacity planning.

SIS Integration

Direct integration with Student Information Systems to pull real-time student enrollment data for better optimization.

References

[1] Carter, E. R. (2025)
"Optimizing university timetabling with machine learning and constraint satisfaction." *Computers & Operations Research*.

[2] Davison, M., et al. (2024)
"Modelling and solving the university course timetabling problem with hybrid teaching considerations." *Journal of Scheduling*.

[3] Sutar, S. R., & Bichkar, R. S. (2025)
"An application of genetic algorithms for university course timetabling problems." *Proceedings of ICCI*.

[4] Schulze, M. A. (1998)
"Linear Programming for Optimization." *Perceptive Scientific Instruments*.

Thank You!