

5-Day Schedule Evaluation Rubric (scores 0–10 per criterion)

No..	Criterion	Why it matters (description)	Weight	0-10 scoring rubric
1	Hard Constraint: Teacher double-bookings	A teacher must never be scheduled in >1 place at the same day+period. Violations break the timetable.	20	<ul style="list-style-type: none"> <li>10 = 0 conflicts</li> <li>7 = 1–2 minor conflicts resolved with no student disruption</li> <li>4 = 3–5 conflicts;</li> <li>0 = <math>\geq 6</math> unresolved conflicts. (If any unresolved conflict exists <math>\rightarrow</math> score <math>\leq 4</math>.)</li> </ul>
2	Hard Constraint: Class/section clash	A given class/section cannot have more than one subject in the same slot. Fundamental feasibility.	18	<ul style="list-style-type: none"> <li>10 = zero clashes</li> <li>6 = 1 clash found (and resolved by swapping to Activity)</li> <li>0 = <math>\geq 2</math> unresolved clashes.</li> </ul>
3	Subject frequency fulfillment	Each subject must meet its required sessions/week (from spreadsheet).	15	<ul style="list-style-type: none"> <li>10 = all subjects meet exact required weekly sessions for every section</li> <li>7 = <math>\leq 5\%</math> total deviation; 4 = <math>\leq 15\%</math> deviation</li> <li>0 = <math>&gt; 15\%</math> deviation. (Count missing + surplus as deviation.)</li> </ul>
4	Lunch & Homeroom respected	Homeroom in period 1 and Lunch (no classes) in period 5 must be enforced.	8	<ul style="list-style-type: none"> <li>10 = homeroom present every day and lunch empty for all sections</li> <li>5 = occasional misplacement in <math>\leq 1</math> section/day</li> <li>0 = repeated violations.</li> </ul>
5	Room / LAB constraints honored	When a subject requires a lab or special room (LAB, GYM, MUSIC), those sessions must be assigned there.	8	<ul style="list-style-type: none"> <li>10 = all lab-required sessions scheduled in allowed rooms</li> <li>6 = <math>\leq 10\%</math> lab sessions misplaced but resolvable</li> <li>0 = <math>&gt; 25\%</math> misplaced.</li> </ul>
6	Teacher load balance	Teachers' daily load and total weekly periods should	7	<ul style="list-style-type: none"> <li>10 = all teacher daily loads within</li> </ul>

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	& working hours	be reasonable (no single day overloaded).		<p>agreed limits and weekly loads within <math>\pm 10\%</math> of expected</p> <ul style="list-style-type: none"> <li>• 7 = minor unevenness (some days +2 periods)</li> <li>• 3 = many +3+ deviations; 0 = frequent overloads or &gt;1 teacher working two remote concurrent slots.</li> </ul>
7	Max-per-day / MAX2DAY rules	Subjects constrained to X periods/day (e.g., MAX2DAY) must respect that.	6	<ul style="list-style-type: none"> <li>• 10 = all MAX2DAY (or similar) constraints satisfied</li> <li>• 5 = 1–2 violations</li> <li>• 0 = multiple violations.</li> </ul>
8	TEAM or multi-teacher session integrity	Sessions labeled TEAM (or multi-teacher) are scheduled concurrently in same slot and preserve all teacher roles.	5	<ul style="list-style-type: none"> <li>• 10 = TEAM sessions present and all assigned teachers available</li> <li>• 6 = TEAM scheduled but one teacher absent (needs swap)</li> <li>• 0 = TEAM requirements ignored.</li> </ul>
9	No excessive subject clustering	Avoid more than 2 consecutive periods of the same subject for the same section (keeps variety/focus).	5	<ul style="list-style-type: none"> <li>• 10 = zero occurrences of 3+ repeats</li> <li>• 7 = 1 occurrence across all sections/week</li> <li>• 3 = 2–3 occurrences; 0 = <math>\geq 4</math> occurrences.</li> </ul>
10	Spread of core subjects across week	Core subjects (Thai, Math, English, Science) should be reasonably spread (not all concentrated same day).	4	<ul style="list-style-type: none"> <li>• 10 = none of the core subjects exceeds 50% of its weekly sessions on a single day</li> <li>• 6 = 1 core subject with 60–70% on one day</li> <li>• 0 = any core subject concentrated &gt;70% on one day.</li> </ul>
11	Special class slots respected	Any subject with a required fixed slot (“Special Class Slot” in file) appears there.	4	<ul style="list-style-type: none"> <li>• 10 = all special-slot constraints satisfied</li> </ul>

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				<ul style="list-style-type: none"> <li>5 = 1–2 minor misses</li> <li>0 = repeated misses.</li> </ul>
12	Minimal use of filler (Activity/Study)	Activity/Study used only to fill unavoidable gaps, not as substitute for required sessions.	3	<ul style="list-style-type: none"> <li>10 = Activity slots <math>\leq</math> available slack (<math>\leq 5\%</math> of teaching slots)</li> <li>6 = 5–12% filler</li> <li>0 = <math>&gt;12\%</math> filler replacing required sessions.</li> </ul>

#### Implementation / automated-check suggestions

- Hard constraints (1 & 2): binary checks that must pass before accepting schedule. If any detected, mark overall score as failing threshold (e.g., overall  $< 50$ ) until fixed.
- Subject frequency (3): compute for each (section, subject):  $\text{abs}(\text{required} - \text{scheduled})$ ; aggregate as percent deviation.
- Room/LAB (5): require a mapping of subject  $\rightarrow$  allowed room types. Flag any assignment outside the allowed set.
- Teacher load (6): compute each teacher's per-day counts and weekly total; define hard thresholds (e.g., max 6 teaching periods/day; max 30/week — customize).
- MAX2DAY / TEAM / special slots (7,8,11): parse constraint tags from spreadsheet; treat as rule checks.
- Clustering & spread (9,10): compute runs of same-subject per day per section and distribution of core subjects across weekdays.

#### How to convert to an automated numeric check

- For each criterion, implement a function that returns a score 0–10 based on the rubric thresholds above.
- Multiply each criterion score by its weight; sum and divide by 100  $\rightarrow$  overall score.
- Fail-fast: if either criterion 1 or 2 scores  $< 5$ , mark schedule as invalid and prioritize fixes.

#### Example PASS / FAIL thresholds (policy)

- Good: overall  $\geq 8.0$  and no hard-constraint failures (criteria 1 & 2 = 10).
- Acceptable: overall 6.0–7.9 and hard constraints satisfied (1 & 2  $\geq 9$ ).
- Needs work: overall 4.0–5.9 or any hard constraint = 5–8.
- Unusable: overall  $< 4$  or any hard constraint  $< 5$ .