

Course Scheduling Policy Workgroup

Report to the Provost and Executive Vice Chancellor

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Background

UCR's Provost and Executive Vice Chancellor has purview over the campus-wide scheduling policy for general assignment classrooms. The Registrar is responsible for implementing the policy with help from faculty and departmental staff. The course scheduling policy was changed in spring 2016 in response to increasing pressure for limited classroom space. At the time, classroom utilization rates for general assignment (GA) classrooms were above 100% in many room sizes, and all were over 89% utilization.¹ Since 2016, utilization rates across all room sizes have continued to increase.

The main purpose of the 2016 scheduling policy change was to manage excess demand for "prime" hours and for two-day meeting patterns.² To this end, departments were limited to requesting no more than 40% of their primary activities on a Tuesday-Thursday meeting pattern.³ A similar requirement already was in place for requests during prime hours, but the policy change also redefined prime hours to better reflect peak demand. Moreover a provision was introduced for departments that did not comply with these requirements: such departments would not be included in the first round of scheduling and thus would receive lower priority for all of their scheduling requests.

These policy changes led to changes in scheduling requests from departments, which notably created new scheduling conflicts between courses. Courses that historically had settled into non-conflicting meeting patterns suddenly found themselves offered during the same time slots, impairing student progress towards degree and giving rise to new course scheduling challenges. The policy changes also raised new objections from faculty who were both concerned about student welfare and also disliked having to teach in a less desirable meeting pattern. A group of department chairs in CNAS requested that the campus take another look at its scheduling policy, with an emphasis on addressing student needs, improving communication between the Registrar and departments, coordinating scheduling across programs, addressing perceived inequities across departments, and other refinements.

In response, the Provost's office appointed a course scheduling workgroup in winter 2017 to reexamine the scheduling policy. Recognizing that the 2016 changes primarily focused on room utilization and resource efficiency without considering other relevant concerns, the workgroup was given a broader charge:

1. Develop recommendations to modify/improve the existing course scheduling policy, in particular to facilitate student progress toward degree
2. Consider changing class start times to top/bottom of the hour to align with administrative meeting schedules
3. Identify additional scheduling issues in need of attention in the longer-term, and recommend next steps.

Methodology

Given this charge, the workgroup decided to undertake a complete rethinking of the scheduling policy rather than make adjustments to the existing policy. We met regularly and followed principles of "design

¹ Utilization expectation is set by UCOP at 35 hours/week.

² Prime hours currently include activities that start at 9:00 a.m. or later, but before 3:00 p.m.

³ A primary activity is the unit-bearing activity of a course. All courses have one primary activity. A secondary activity is the non-unit-bearing activity of a course. A course may have one, many, or no secondary activities.

thinking” to deconstruct the scheduling process, identify challenges, develop goals for a new policy, and prototype a variety of solutions.⁴ As an approach emerged, variations on a theme were explored, and the most promising model went through feasibility testing.

Phase 1: Investigation

In spring 2017, the workgroup surveyed UCR students and faculty with a wide range of questions related to course scheduling, class taking (or offering) preferences, and more. Overall, 2105 students and 353 faculty completed the surveys. Summaries are available on the Provost’s “ongoing projects” website (<https://provost.ucr.edu/searches/private/projects.html>) and are attached here as Appendix 1 and 2.

Observations from the student survey include:

- Two-day per week meeting patterns are preferred most, with MW and TR patterns receiving 57% of first place votes (and 69% of first and second place votes). MWF received 40% of first place votes (and 25% first and second place votes).
- Most preferred meeting times largely coincide with prime hours (i.e. 9:00am to 3:00pm).
- Respondents greatly prefer schedules with courses that cluster around a certain time of day (78%) rather than being distributed throughout the day (15%).
- 77% of respondents report that a course scheduling conflict has negatively impacted their progress towards degree.
- 88% of respondents felt it would be at least “very helpful” if classes were scheduled annually rather than quarterly to facilitate longer-term planning.
- About 40% of respondents are employed each quarter. Undergraduates work an average of 17 hours each week, with seniors working an average of 19 hours. 40% of respondents also report facing frequent (nearly every quarter) scheduling conflicts between classes and other important obligations such as work or family responsibilities.

Observations from the faculty survey include:

- Two-day per week meeting patterns are preferred most, with MW and TR patterns receiving 73% of first place votes (and 76% of first and second place votes). MWF received 19% of first place votes (and 14% of first and second place votes).
- Many faculty also expressed a preference for one-day per week (3 hour) meeting blocks, and some others expressed a desire for four-day per week (50 minute) meeting blocks.
- Most preferred meeting times largely coincide with prime hours (i.e. 9:00am to 3:00pm).
- 55% of respondents were at least “somewhat satisfied” or better with their assigned meeting patterns. 32% of respondents were at least “somewhat dissatisfied” or worse with their assigned meeting patterns.
- There is a consensus for improving communication throughout the course scheduling process.
- Switching between two-day and three-day per week meeting patterns, especially at the last minute, is frustrating.

After surveying students and faculty, the workgroup spent a significant amount of time with department schedulers and the Registrar’s office staff to understand the course scheduling process in detail. We

⁴ See J. Liedtka and T. Ogilvie, 2011. Designing for growth: a design thinking tool kit for managers. Columbia University Publishing.

used “process mapping” to visualize the scheduling process, understand pain points, and think through possible remedies. Intermediate and final products for this effort are shown in Appendix 3 and 4, respectively.

Key lessons learned from this effort include:

- Scheduling is a nearly year-round effort. During times of peak workload in the larger colleges, it can require the full attention of 2-3 people for 3-4 weeks straight.
- Department scheduling staff maintain “ghost schedules” and other important offline documents to help with the process--documents that risk being lost due to staff turnover and that would be more helpful if made available to others online.
- The requirement to comply with prime hour and two-day meeting pattern limits is problematic, and not only because it requires some faculty to teach at less desirable times. Achieving compliance often requires chairs to make commitments to faculty that they cannot keep due to the unpredictability of the automated central scheduling system. Also, compliance is assessed at the call deadline, but eventually all classes must be scheduled--this eventually can tip some departments out of compliance and creates the temptation to game the system by holding out.
- The main drivers for classroom assignment are proximity to the department and historical enrollment. The benefit of using historical enrollment is to promote high seat utilization, but one downside is that it can cause newer classes (often taught by newer faculty) to have lower scheduling priority. These two main drivers also seem to be insufficiently student-focused.
- We currently do not have a technological solution for avoiding course conflicts--rather just institutional memory.
- Learning community sections receive scheduling priority but have greatly increased in number, creating additional stress on the system.
- Departments feel they lack sufficient control over scheduling, and perceive the overall scheduling process to be unfair and insufficiently respectful of departmental preferences.
- Scheduling staff are frustrated because they are put in the impossible situation of having to deliver bad news to faculty without being able to precisely explain the reasons for it; because faculty push back when the explanations inevitably fall short; because their labor-intensive efforts to schedule departmentally-controlled space are often upended by the vagaries of the automated central scheduling system for GA classrooms; because there are always last minute changes that disrupt and upset faculty and students; because patience wears thin and they must deal with the fallout; and because they have to run this gauntlet three times each year. One particularly frantic step in the process is referred to by some staff as the “hunger games.”

Phase 2: Ideation

With all of this as background, the workgroup adopted the following design question to guide our exploration of possible solutions:

How might we better coordinate the scheduling and delivery of our curriculum in order to:

- *Prioritize student success and timely progress to degree*
- *Address faculty preferences equitably*
- *Increase predictability for students and faculty*
- *Reduce staff workload and stress*
- *Increase flexibility and control at the department level*
- *Promote transparency and cross-college coordination*

Workgroup activities during this phase ranged from brainstorming responses to trigger questions, to examining how other institutions currently schedule classes. Brainstorming efforts were unfettered and wide-ranging, including imagining extreme approaches such as having students self-identify course time preferences and then reverse-engineering a schedule based on a best-fit of those demands, or giving all classrooms to departments and abandoning the general assignment approach. While these approaches are untenable given current constraints, they did help to surface ideas that found their way into our final proposal. They also revealed a core policy need beyond plugging classes into a matrix: namely, there needs to be an understanding that the scheduling policy is a living process and needs to be capable of adapting and adjusting as the campus continues to grow and change. Rather than “set it and forget it,” a standing advisory committee can help the policy stay current with changing campus needs. Appendix 5 summarizes the trigger questions used for brainstorming, the main ideas that emerged, and ways those ideas could be translated into practice.

When we looked to other campuses for more practical guidance, we learned, for example, that UCLA has experimented with annual rather than quarterly scheduling; several other UC campuses have a greater variety of standard meeting patterns than we do, and they commonly use prime hour limits similar to ours; Oregon State allocates large blocks of time to individual departments, and successfully vested a high level of decision-making authority in the Registrar’s office; the University of Michigan is changing class start times from 10 minutes after the hour to on-the-hour; and all campuses we investigated schedule classes into the evening hours. Appendix 6 includes a comparison of scheduling elements across UC campuses as well as a summary of observations from some non-UC campuses.

Phase 3: Prototyping and Testing

In summer 2017, the workgroup began iterating through several versions of a “prototype” scheduling policy designed to be responsive to the criteria embodied in the design question. By fall 2017, we generally felt that we had converged to a workable policy proposal (presented in the next section).

However, we recognized that part of the frustration borne of the last scheduling policy change was due to inadequate testing. We therefore worked with the Registrar’s office to develop a test environment in Banner to undertake a rebuild of the fall 2017 schedule under the prototype policy.⁵ Our main concern was whether or not UCR’s scheduling optimization software could achieve sufficiently high rates of room placement and seat utilization under the proposed policy, which includes a more complex menu of inter-dependent meeting patterns and fewer constraints on departmental requests (specifically, no limit on two-day meeting pattern requests which originally was conceived to facilitate the mechanics of building the schedule). This test required a coordinated effort from the Associate/Divisional Deans for Student Affairs in the undergraduate colleges/schools, the Registrar’s office, ITS, and departmental scheduling staff from across the campus, for which we are extremely grateful. Faculty who taught in fall 2017 were polled for their meeting pattern preferences under the proposed policy, and courses were scheduled based on the expressed demand. We had participation from all but three departments, for which we substituted hypothetical requests to simulate a full load.

The results from the test were very encouraging. Less than 5% of scheduling requests were not placed by the optimization software (normally these are placed later, manually, but this was beyond the scope of our test). Seat utilization rates also were high: above 80%. Moreover, we were able to give more

⁵ Fall is historically our busiest term and thus the best candidate for testing.

faculty the meeting patterns they want. For example, 56% of scheduled classes were in 90-minute meeting patterns, compared to only 35% for the actual fall 2017 schedule (likely due in large part to current policy that limits Tuesday-Thursday requests to 40%). Appendix 7 provides a more detailed summary of the test results. Overall, the test strongly suggests that the proposed policy will work in practice.

Our feasibility testing also considered final exam scheduling. Both the current policy and the proposed policy require 24 non-conflicting exam slots to accommodate all standard meeting patterns between 7:00am and 10:00pm (Appendix 8 shows a sample exam schedule for the proposed policy). In addition, the campus is currently committed to providing four “reserved” slots for special cases: one for all foreign languages, one for the University Writing Program, one for Biology 5, and one for Chemistry 1. Therefore 28 separate exam slots are needed to guarantee no conflicts. However, the campus currently schedules only 24 3-hour exam slots over 6 days following the last day of classes, and has been reluctant to extend exams either later into the evenings or into a seventh day. Therefore, some students inevitably experience exam conflicts under the current policy, and will continue to do so under the new policy.

Policy Recommendations

The proposed scheduling policy has nine key recommendations. Each is presented here along with a brief explanation. For reference, the current scheduling policy is provided in Appendix 9.

1. **Clock time.** Classes start on the hour and half hour.

Explanation: Aligns UCR class schedules with administrative schedules, event schedules, employment schedules, and widely used scheduling conventions off-campus. Eliminates confusion about whether a meeting that is scheduled to begin at X:00 actually starts at X:00 or at X:10. Allows faculty and students 10 minutes of passing time to administrative meetings, rather than no time. Generally improves coordination both within and off campus. This recommendation could be implemented sooner than others, if desired.

2. **Course Scheduling Committee (CSC).** The CSC is appointed by and reports to the Provost. The CSC membership includes the Associate Provost, the Registrar, the Associate/Divisional Dean for Student Affairs from each of the undergraduate colleges/schools, and faculty and staff representatives. The CSC works with the Registrar to implement the campus scheduling policy and makes recommendations to the Provost on all aspects of course scheduling, including priority scheduling, departmentally controlled classroom space, final exam scheduling, special agreements with departments that claim unique scheduling needs, and changes to the campus scheduling policy.

Explanation: Course scheduling should be responsive to evolving campus needs, and should be informed by broad input from stakeholders. This fosters communication and transparency, and provides a forum for inequities to be discussed and addressed. The Provost should develop a detailed charge for the CSC to refine its purview and help to focus its work. Among its first tasks, the CSC should undertake a review of existing special agreements and final exam scheduling. Ongoing coordination between the CSC and the Registrar’s office will be essential.

3. **Prime time.** Prime hours (9 a.m.-3 p.m.) and allocations (up to 50% of all primary activities and up to 60% of all secondary activities) remain unchanged from current policy but are reviewed

regularly by the CSC. An activity counts against a department's prime allocation if (1) it starts within the prime interval (9:00am – 2:59pm) and (2) it is not listed on the CSC's 1st-level priority list. As with the current policy, departmental compliance with these allocations is measured at the "Call" deadline. If a department is not in compliance at this time, it will not be included in the scheduling process until it comes into compliance.

Explanation: Survey results show there will continue to be excess demand for these times. Although our scheduling software is sufficiently robust that we can avoid imposing limits on two-day meeting pattern requests, there remains a need for a mechanism to address excess demand during prime hours. Departmental allocations are currently used by UCR and other campuses, they are arguably an equitable approach, and they distribute the workload more broadly rather than concentrating it on limited Registrar's office staff. Departmental scheduling staff also know more about departmental scheduling needs than does the Registrar's office.

4. **Meeting patterns.** The standard meeting patterns for primary activities are shown in Appendix 10. Each scheduling requests for a primary activity should use a standard meeting pattern unless the CSC has approved a request for an alternative pattern (see below: approved exceptions), otherwise the activity will receive lowest scheduling priority among primary activities (see below: non-approved exceptions).

Explanation: Compared to the current policy, there is a much greater variety of standard meeting patterns and many more two-day per week meeting patterns to meet demand expressed by both students and faculty, while still allowing for maximum utilization (no unscheduled time blocks) between 8am and 8pm. Early morning and late evening patterns are likely to have lower utilization, but nonetheless are available if needed. Standard patterns also include single-day three-hour blocks (e.g. for film courses), three-day per week patterns, and four-day per week patterns (e.g. for language courses). The larger number of two-day patterns (along with no limit on departmental requests for two-day patterns) also increases contact time due to fewer passing periods during the day, and greatly reduces the likelihood that a faculty member will have to involuntarily switch a course from a two-day to a three-day pattern. More two-day patterns also can help facilitate the efficient scheduling of hybrid-online courses that may desire only one 80 minute meeting per week: two such courses could fill a standard two-day meeting pattern without negatively impacting utilization.

5. **Priority scheduling.**
 - a. 1st priority (scaffolding): Primary activities determined by the CSC and Provost to be of significant importance for student progress to degree across multiple majors receive 1st-level priority, along with their associated secondary activities. These courses are scheduled by the CSC in standard meeting patterns and rarely change meeting patterns from one year to the next.⁶ 1st-level priority courses do not count against individual departmental prime time allocations due to the university service nature of these courses, and because departments have relatively less control over when these courses are scheduled. The CSC regularly reviews the list of courses with 1st-level priority, and their meeting patterns, and recommends changes. Secondary activities associated with these courses also have 1st-level scheduling priority.

⁶ Appendix 11 shows the scaffolded courses that were used in our feasibility testing, and a description of how the list of courses was developed.

Explanation: Originally suggested by department chairs in CNAS, “scaffolding” creates a foundational framework of courses that are important across majors and thus to the university as a whole. These courses are scheduled first and deliberately arranged to avoid conflicts, thus placing an emphasis on student needs and progress to degree. This minimizes conflicts that would impact large numbers of students, and/or that could neither be foreseen nor resolved by a single department. It also allows for longer-term planning and greater predictability. Listed courses do not necessarily meet during prime time, but if a large number of them do, the common departmental prime time allocation may need to be reduced below 50%. Learning communities associated with “scaffolded” courses also receive 1st-level priority scheduling. The CSC also may recommend that a set of courses be treated as a block for scheduling purposes and given 1st-level priority. Each course in such a block also must follow a standard meeting pattern.

- b. 2nd priority (approved exceptions). Primary activities with approval from the CSC and Provost to use non-standard meeting patterns receive 2nd-level priority to promote higher overall utilization rates and to accommodate unusual and unavoidable circumstances. Such exceptions are rare and require strong justification. 2nd-level priority courses scheduled during prime hours count against individual departmental prime time allocations. The CSC regularly reviews the list of courses with 2nd-level priority, and their meeting patterns, and recommends changes.

Explanation: The current policy gives lower priority to non-standard meeting pattern requests. This policy change recognizes that some exceptions are necessary and should not be penalized in scheduling priority because they don’t fit the standard mold. Coordinating exceptions also helps ensure efficient space utilization by bundling them together under this higher priority. Hybrid-online courses could be on the 2nd-level priority list. For approved non-standard meeting patterns that span across prime and non-prime hours, the CSC will determine whether the activity counts against departmental prime time allocations.

- c. 3rd priority (standard). Most primary activities receive 3rd-level priority. Departmental requests for these activities must follow standard meeting patterns. Prior to this step, the grid of 1st-level and 2nd-level priority activities is shared with college enrollment managers to reduce the number of infeasible scheduling requests.

Explanation: Standard priority is similar to current policy. Most of these activities are scheduled using the Registrar’s optimization software. Faculty time and location preferences are expressed through departmental requests, while the optimization step aims for high rates of room placement and seat utilization. Advanced notification of the 1st and 2nd-level priority scheduling results enables department staff to make well-informed scheduling requests for standard priority courses.

- d. 4th priority (non-approved exceptions). Primary activity requests for non-standard meeting patterns that were not approved, and that were not re-submitted as standard requests, are scheduled into remaining rooms and meeting patterns. A 4th-level priority course counts against a department’s prime time allocation if any of its meeting times starts during prime hours.

Explanation: Outstanding requests for non-standard meeting patterns are fit into rooms and times that remain available. This does not include requests from departments that were not in compliance with prime hour allocations at the time of the “Call.” As is the current policy, each department must be in compliance before it will be included in the scheduling process.

- e. 5th priority (secondary activities). All secondary activities not previously scheduled. These activities should align with standard meeting times to the greatest extent possible to promote coordination with primary activities and improve overall utilization.

Explanation: Most secondary activities receive the lowest priority in order to adequately prioritize primary activities. Because most secondary activities are 50 minutes in length, they should be scheduled on the hour.

6. **Room holds.** A department may keep a classroom assigned to an activity in “hold” status for up to two weeks prior to the first day of instruction. At that time, if an activity has not been placed into “active” status, the room will be released back to the Registrar. The Registrar will then work with departmental scheduling staff to reassign heavily impacted activities to larger rooms, and to address other outstanding scheduling needs.

Explanation: Departments currently may “hold” rooms past the start of classes, leading to underutilization. Often these holds occur during prime hours, yet are never filled. The proposed policy requires unutilized space to return to the Registrar’s pool for assignment prior to the start of classes. To avoid creating a cascade of conflicts, activities should be moved only within existing meeting patterns (i.e. rooms may be reassigned but meeting patterns should remain unchanged), unless another preferred solution can be identified with minimum disruption to other activities.

7. **Annual scheduling.** Initially, departments should develop, disseminate, and attempt to adhere to an annual (or possibly biennial) list of course offerings. Course scheduling will continue to be done quarterly to allow for more flexibility and last-minute adjustments as the proposed policy is brought online. As the proposed policy becomes more routine, the CSC should re-evaluate annual scheduling.

Explanation: “Course offerings” refers to a departmental plan to offer courses in particular terms. “Course scheduling” refers to how the offered courses are scheduled into rooms and meeting patterns. Currently, course offerings often are published on a quarterly basis, so it is possible to plan ahead only for the next quarter. Our survey found that students would appreciate knowing anticipated course offerings over a longer time horizon for better planning around other activities (e.g. employment, study abroad, etc.). Additionally, UCR is adopting related planning tools (such as EduNav, a degree planning tool) that would benefit from having a longer-term view of anticipated course offerings. Although the workgroup sees merit in annual scheduling, we feel it is best to take up this issue again later for the reasons stated above.

8. **Guidelines and expectations.** These should be developed by the CSC to help department chairs address challenging issues at the department level rather than relying exclusively on the department scheduler or appealing to the Registrar’s office or the CSC. Among these, the central

role of the chair in helping to resolve conflicts should be clarified, rather than relying on unilateral engagement between faculty and scheduling staff.

Explanation: We found that a variety of faculty and staff frustrations derive from the lack of clear expectations and workflows. The CSC should develop, publish, and communicate clear guidelines related to course scheduling that will help department chairs better manage the process and create greater efficiency through coordinated workflow. The process mapping exercise undertaken by the workgroup provides a good starting point for this effort. Guidelines also might be developed for how departments can manage and mitigate scheduling conflicts between graduate courses and undergraduate discussion sections (i.e. for teaching assistants).

9. **Transparency and coordination.** Information related to the scheduling process (for both centrally and departmentally controlled space) should be migrated to an open online system with secure login to promote greater transparency, host important policy documents, and realize the benefits of information sharing.

Explanation: A secure online system is not a replacement for other modes of communication, but nonetheless establishes a good foundation for transparency, communication, and efficient workflow. In addition to scheduling staff, the system should be accessible by all faculty.

Endorsement

The members of the Course Scheduling Policy Workgroup unanimously endorse this report.

Appendix 1 - Course Scheduling Student Survey Summary
Office of the Provost
June 26, 2017

Overview

To better understand the student experience at UCR as it relates to course scheduling, all UCR students (undergraduate & graduate) were asked to complete a variable-length survey. Of 2,467 participants, 2,015 completed the survey. By virtue of how the student list is generated, 305 responses indicated they were freshmen who did not take classes in the '16-'17 academic cycle, meaning they are incoming freshmen, and their answers are also excluded. The remaining 1,710 answers are summarized below.

Population Composition

Responses were fairly even across the UG population: 24% first-year, 19% sophomore, 27% juniors, and 19% seniors. There were 45 (2.6%) masters student responses and 132 (7.7%) doctoral students. Of the total population, 16% (281) were transfer students. Of 415 freshmen, 39% (163) said they were in a first year learning community, 57% (235) said they were not, and 4% (17) were unsure. 110 students were a member of the honors program. For college division: 53% (902) were in CHASS, 26% (443) in CNAS, 14% (237) in BCOE, 6% (107) in SOB, 1% in GSOE, and 4 from the School of Public Policy. There were no SOM responses.

When asked, "Did you take classes at UCR during the 2016-17 academic year?" only 60 students said they had not. The largest group was doctoral students (29), though juniors also said no at an elevated rate with 24 no responses. The average distance from campus was 11.53 miles. The distribution followed a fairly standard power law distribution, with 752 of 1,390 (54%) living within 5 miles or less.

Work Responsibility

Roughly 750 total students worked each term (708 F, 723 W, 774 S), about 40% of participants. Juniors and Seniors represent a majority of those working, though the number of working freshmen grows the most, term over term. The average number of hours worked, for those that worked, hovered around 15hrs/wk, though seniors worked, on average, almost 20hrs/wk. The average number of hours for masters and doctoral students was 26.

Class Patterns & Preferences

A MWF pattern was the largest first place preference with 658 responses prioritizing it. However, when looking at top two choices, MWF received 838 votes, MW received 993, and TR received 1,297. WF was the most disliked class pattern for days of the week. MWF also received effectively the second most dislikes, with 478 people placing it as their last choice, compared to 141 and 99 for MW and TR, respectively. Although this question allowed 'other' as an answer, no clear trend emerged, although some suggested having fewer days for longer blocks of time (3 hour lectures once a week), several also mentioned a MTWR schedule as ideal.

Students clearly prefer courses be offered back-to-back, with 78% saying clustered is best, 15% saying distributed is best, and 7% showing no preference.

Student desires for start and end times follows a nearly perfect bell curve, the largest preference for classes that begin between 10:00 and 3:00. 7:00 AM and 9:00 PM were the most disliked, though more students disliked 8:00 PM than disliked 8:00 AM.

The class meeting times and days are important to students, with 84% saying it's "very important" or "extremely" important", and only 3% saying it's slightly or not at all important. Fortunately, this seems largely justified based on other considerations. When we ask students to explain why class meeting times factor into their course selection, those who said class times were extremely important or very important largely said it was because they had other constraints on their time such as work or family obligations. When saying "moderately" or "slightly" important, it was primarily because of preference. Again, we offered students an "other" option and three themes dominated: a student's own understanding of their performance based on the time of day, other obligations requiring them be free at certain times of day, and the impact of commuting.

Scheduling Conflicts

Only 7% of participants indicated they'd never had a conflict between classes that they wanted or needed to take, and other important obligations. 75% of students indicated it happened sometimes (about once a year) or frequently (nearly every quarter). When examining the subset of students that indicated they had worked in the prior academic year, those numbers go up about 5% and 'Never' virtually disappears (<4%). The percentages are relatively consistent across undergraduate class level, though seniors do express an elevated rate of "frequently".

When there was a conflict between classes and other obligations (1,310), 404 students (31%) said academic advisors helped resolve the conflict. 152 (12%) indicated the professor in charge of the class helped in some way. The majority of 'other' responses indicated that the conflict was never resolved, or that someone off-campus, such as an employer, helped resolve the conflict.

Only 8% indicated they'd never had a conflict involving courses required for their major. 35% said it had happened only once, with 54% saying it had happened more than once. When asked who resolved the issue, Academic advisor or professor again dominate, though many of the students say they were unable to resolve the conflict or it was resolved by someone off campus. A decent subset also said they did not seek out help or were rebuffed when doing so.

70% of students said seat availability impacted their progress to degree, 70% said course availability impacted progress to degree, and 77% said course scheduling ("a course was offered and seats were available but the meeting times were problematic for you") impacted their progress to degree.

Future-related questions

When asked about late-night courses, safety concerns around lighting and security dominated concerns. 87% of respondents said an annual schedule of courses would be extremely or very helpful, with only 12 students saying it would be not at all helpful.

Appendix 2 - Course Scheduling Faculty Survey Summary
Office of the Provost
June 26, 2017

Overview

To better understand the faculty experience at UCR as it relates to course scheduling and course planning, UCR faculty were asked to complete a variable-length survey. Of 372 responses, 353 individuals completed the survey. Their answers are summarized below.

Population

The majority of responses came from assistant, associate, or full professors (76%), though lecturers and LSOEs were also represented. The majority represented CHASS (49%), then CNAS (30%), BCOE (10%), and the rest the professional schools. A significant portion (39%) have been at UCR 5 years or less. Many have also been here 20 years or longer (24%). Over half (53%) live 10 miles or closer to campus (39% are 5 miles or closer).

Classroom Experience

Participants were asked to provide information about the frequency and type of classes they had throughout the year. For instance, they were asked to mark that they had 1 class of >300 students and 3 classes of 30-75 students. Some responses indicate a misunderstanding, for instance, marking that they taught 150 classes of <30 students. Because of the difficulty of correctly dividing the proper division of such responses, 10 such responses were excluded.

55 respondents (16%) taught >300 seat classes, 72 (21%) taught 150-300 seat classes, 108 (32%) taught 75-150 seat classes, 158 (46%) taught 30-75 seat classes, and 220 (64%) taught in <30 seat classes. In total, 1135 sections were represented, the majority of which were <30 seat classes (477, 42%), and then 310 (27%) were 30-75 seats, 171 (15%) were 75-150, 99 (9%) were 150-300 seats, and 78 (7%) >300.

Class Patterns & Preferences

Tuesday-Thursday and Monday-Wednesday patterns were clear preferences. Unlike the undergraduate poll, where there was no clear preference for 'other' in the comments, faculty expressed a large preference for once-a-week classes for 3 hours. A handful also expressed a desire for a MTWR 50 minute schedule (most of whom were from foreign languages). Meeting time preference also followed the expected prime/non-prime desired hours, with a significant drop at the noon and one o'clock hour.

Only a small number of faculty were extremely dissatisfied with their meeting days/times assigned to their courses (9%), 23% were somewhat dissatisfied. Most were either somewhat satisfied or extremely satisfied (29% and 26%, respectively). There was a higher frustration level with classroom assignments, with 13% extremely dissatisfied and 31% somewhat dissatisfied, and only 16% extremely satisfied.

About 1/3 of faculty said they had conflicts with family obligations, while a number highlighted that they had no conflicts in the comments. Campus-based research, off-campus research, and conflicts with service and committee work also stood out.

When asked if they had to change their pedagogy because of the classroom, 20% of participants said they had to change once, and 24% said they had to change more than once.

Approaches to Improvement

Faculty identified the two most helpful steps to improve course scheduling as: 1) Improve communication throughout the course scheduling process (248); 2) Create a mechanism to request specific types of classroom technologies (220).

When individuals included a response in the 'other' category, some mismatches became apparent. For instance, one faculty member warns: "Stop making course enrollments so large. It's very hard to assign papers if you have to grade 50 or more at a time, let alone 65 or 90. Class sizes are eroding the quality of education," whereas another begs for a, "mechanism to request class size! I keep getting capped for classes that could be larger."

From the overall comments, a few trends emerged. First, there is a lot of frustration amongst faculty around the perception that professors far from campus receive unfair privileging when it comes to course scheduling. "In effect there is a penalty for living closer to campus and a benefit in course scheduling for living farther away." Unsurprisingly, others disagreed: "If one is driving 70 miles to teach one class, one should not be forced to teach 3 days a week."

Second, family concerns played an important role for many in deciding when they were able to teach. Extending classes into the evening would, in many participant's opinion, require extending childcare later into the day.

Third, faculty emphasized the impact of the unknown on their ability to effectively teach. This concern expressed in many ways. First, too many find out very late their class length. Having to switch between 80 minute lectures and 50 minute lectures can be incredibly troublesome. Second, some even find out which subject they're teaching very late. Third, academic technology has been unreliable. While other surveys have captured this frustration, it resurfaced here as well. Fourth, elements like the holiday schedule can adversely impact some schedules. For instance, spring will always have two Monday holidays, which can impact the number of days available for instruction.

Moving Forward

Classroom environment continues to be a frustration for faculty. When combined with very last-minute classroom information, frustration skyrockets.

However, there are clearly places where interests diverge in ways a one-size-fits-all solution will poorly accommodate--especially when compared to undergraduate preferences, as well.

Registrar

Term Roll
Roll over prior calendar

Send ^{key} call to ^{actions} ^{included} academic units
data in banner

E.M.

Remove notes from courses related to (learning communities) manually

NAS runs the call preemptively. W/ excel does compliance first time

term roll data pull go to academic year schedule just list of classes - nothing

could insert or not changing courses things out of inventory until fully approved by entire

Courses based on dept info

Start shadow schedule for all units

put courses into compliance w/out chair input (some)

for cross-courses - decide prim secondary - enter twice the same time Banner
ROSS - college courses to avoid conflict sequences

START

Dept. Chair

Year long teaching sched.

Shadow Schedule in Google Sheets



FOC

Faculty Senate Course Approval can input inventory

Faculty Desires

Advance guidance from units projecting enrollment

~~50 days~~
Take pending courses into account (ghost sched)

30 Days

Priority manual pre-scheduling
Campus agreement
Learn it
SOPA
evad Sem
- through

Coordinate with PC to Banner to live

manually compile enrollment history data to prioritize big lectures

department not in compliance go back to back line

Review report to see input errors compliance

for cross-listed courses - decide primary/secondary + enter twice at the same time. infra time Banner

notify reg. of pending courses
real problems & waiting

specific rooms/reqs get emailed to scheduling

CROSS-college convos to avoid conflicts sequences

Call dead have full schedule times/rooms in Banner class size

If you use your own space - you get it.



Advance guidance from units projecting enrollment

30 Days

Priority
mahred
pre-s
camp
agree
learn
SOPA
and so
bright

manua
compile
inven
history
data to
prioritize
big lectures

LCA
Special
exemption
course

Coordinate
w/ CAC to
move Banner
data to
25 live

departments
Not in
compliance
go
back on
time

Review
reports
to see if
input
errors
compliance
...
unit briefing

Non-standard
Prime Schedules

Send non-
compliance
Report
to EM

Compliance is
Whole dept.
Send
e-mail to
dept

Send
respon
to get
correct
low

have
classes

Moves
Classes

Worst part
for EMs -
feedback
from faculty

initial
schedule
of large
lectures
pre-
optimizer

Send non-compliance Report to EM

Count in prime
Specific room requests Scheduled.
allergies/late Watkins, ment 1000 etc... rics

Run schedule optimizer
bulk of depts (-1 not comp.)
unit bearing activities
65-75 in no w land no room held for most of sch cycle. last 11

break ties for requests
hunts new courses

Send special prefs.

Compliance is whole dept.
Send e-mail to dept

Send responses to get correct compliance issues
EM can't
Promises

stops mattering after call deadline
gray area
you can name the system

"Must have x classes"

might only get 50% even if in comp.
constant loop
If one is out of comp. the whole dept. is left out
HUGE penalty

Moves classes

Difficulty contacting faculty to get classes
compliance undergrad loses to grad classes consistently

Be nicer!
Depts/faculty are holding out and getting what they want.

Possibly change to smaller size

Run
schedule
optimizer
bulk of
depts
1 not comp.

Just
GA or
DP +
Size
3 location prefs
ranked

63 + u.
run report
attempt
manual sched.
mostly works

ALL MANUAL
Start
sending
optional
times

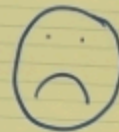
Locations
availability
grid
↓ email
around
12 Sept.
2009

unit
bearing
activities
only for
63 & below
one for large
63 & above

65-75
in no man's
land -
no rooms
held for
most of sched.
cycle. 1st...

notify
dept.

receive grid
this step is
highly competitive
b/c it's first
come first
serve



~~all~~
some
units
don't send
this back
to faculty -
make quicker
decisions

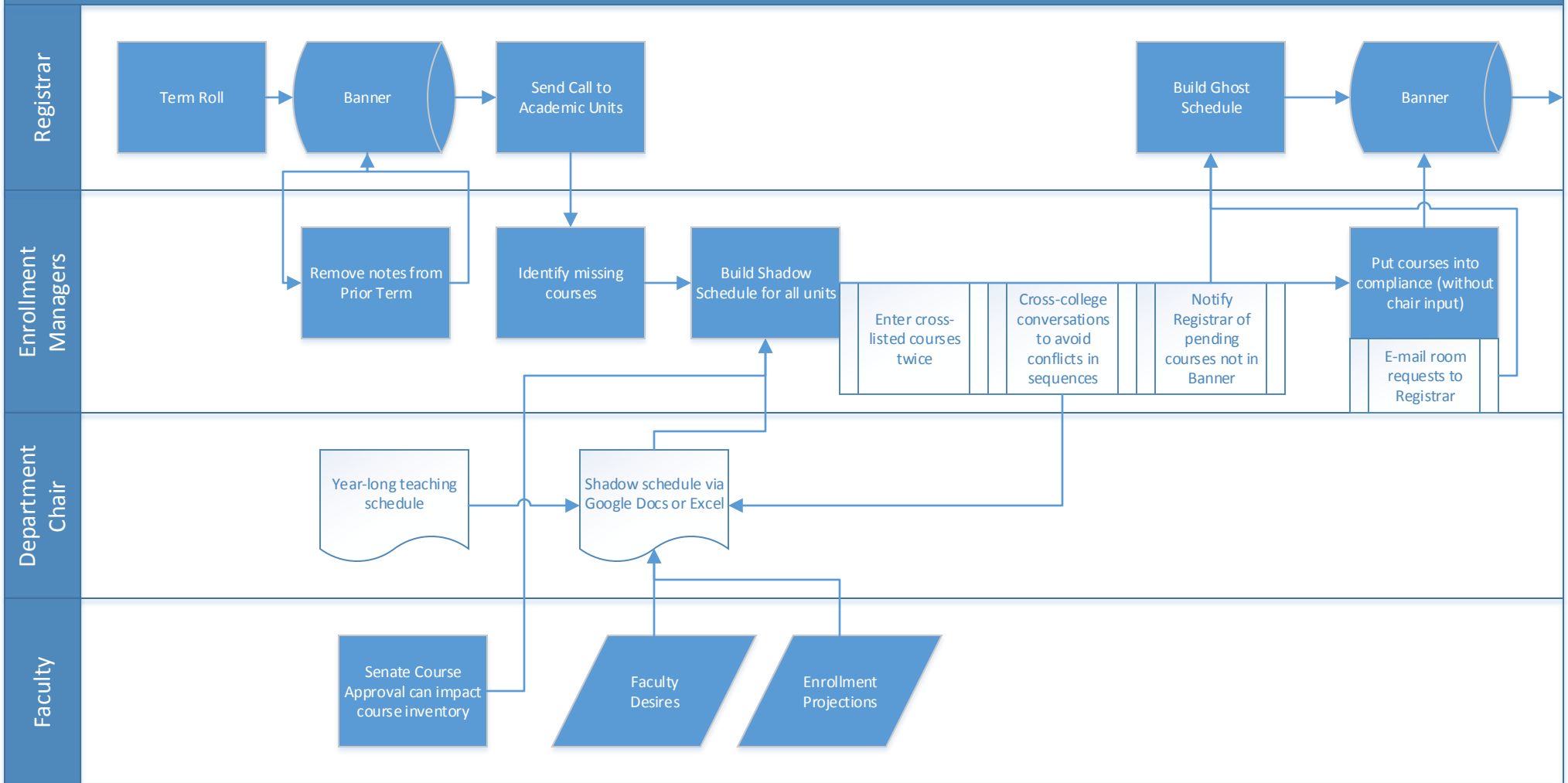
give faculty
10 min. to
make decisions
(suboptimal
curricular
decisions)

Possibly
change
to
smaller
size

depts
can respond
w/ range
of options
depends on
faculty

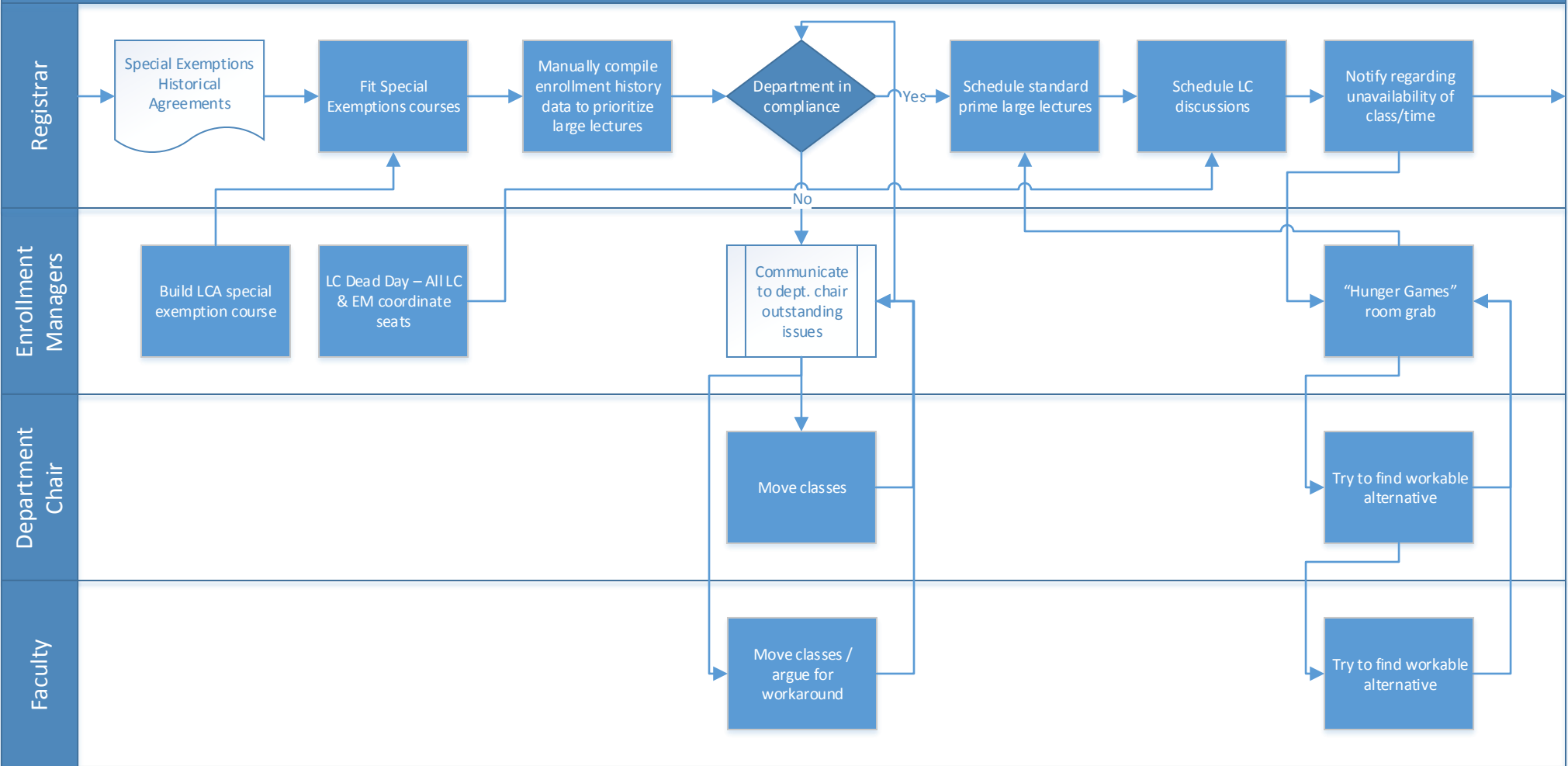
Appendix 4 - Class Schedule Process

Days 0-30



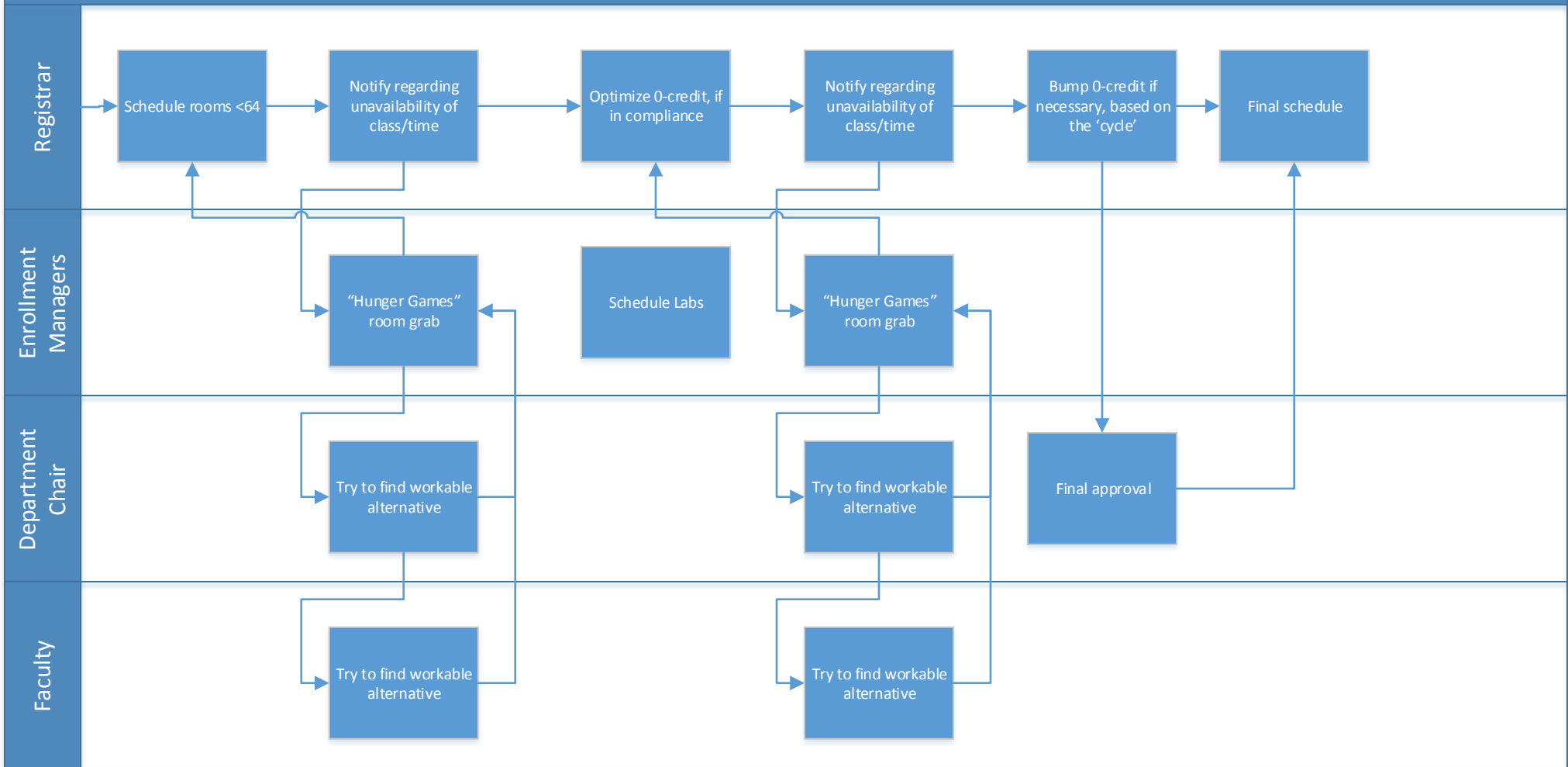
Appendix 4 - Class Schedule Process

Days 30-60



Appendix 4 - Class Schedule Process

Days 60+



**Appendix 5:
Summary of Brainstorming Responses to Trigger Questions**

<i>What would a scheduling policy look like if its sole purpose were to promote student academic success and timely degree completion?</i>	
<i>Ideas</i>	<i>Translations</i>
Greater frequency and variety of course offerings, especially of required/impacted courses, including hybrid and online.	Allow for a greater variety of standard meeting patterns; don't penalize non-traditional modes of delivery.
Annual rather than quarterly scheduling.	Annual scheduling.
Scheduling that is responsive to the needs of each student cohort as they progress through the curriculum.	Priority scheduling and fixed meeting times and rooms for critical classes.
Emphasis on scheduling conflict avoidance.	Priority scheduling and fixed meeting times for critical classes.
Faculty preferences are de-emphasized.	Faculty work through their chairs rather than appealing directly to scheduling staff.
<i>What would a scheduling policy look like if its sole purpose were to achieve an equitable distribution of class meeting times/locations for faculty?</i>	
<i>Ideas</i>	<i>Translations</i>
Accommodate demands of research, service and other obligations.	Create more two-day meeting patterns; create a greater variety of standard meeting patterns.
Prioritize faculty preferences, whether for pedagogical reasons or otherwise.	Do away with limits on prime time and Tuesday/Thursday requests; faculty work directly with scheduling staff.
Ensure everyone "wins" at some point.	Institute regular rotation of meeting times and rooms; institute a reward system for accepting undesirable times/rooms (e.g. future scheduling priority).
Make all scheduling requests and decisions transparent.	Online system accessible by all faculty and staff.
Strengthen the role of the department chair.	Strengthen the role of the department chair; provide a framework for department level scheduling policies.
<i>How do other organizations/businesses provide predictability for their stakeholders? (e.g. employees, customers, investors)</i>	
<i>Ideas</i>	<i>Translations</i>
Pursue gradual change.	Pursue gradual change; launch changes after thorough testing and vetting.
Study and assess likely impacts in advance.	Study and assess likely impacts in advance.
Clear, repeated, advance communication about change and anticipated impacts.	Clear, repeated, advance communication about change and anticipated impacts.
Build and maintain trust.	Transparency and clear communication; online system accessible by all faculty and staff.
Involve stakeholders in the change process.	Establish a standing committee with broad representation.

Data-driven decision-making.	Standing committee charge.
Facilitate feedback and make adjustments as needed.	Establish a standing committee with broad representation.
<i>If enrollment management staff could unilaterally change the current scheduling process to make it better for themselves, what would they do?</i>	
<i>Ideas</i>	<i>Translations</i>
Full autonomy over scheduling.	Reduced emphasis on individual faculty preferences, reduced departmental control of space.
Create more time to work through room options without losing them to other schedulers.	Change rules of “hunger games” phase.
Annual scheduling (or longer).	Annual scheduling.
Fix meeting times/rooms and move faculty among classes.	Fix meeting times/rooms for critical classes.
Full transparency of the master schedule to facilitate requests.	Online system accessible by all faculty and staff.
Strict adherence to policy (no exceptions)	Limited exceptions.
Good communication with department chairs.	Good communication with department chairs.
Improved software, including ability to reliably predict future seat demand.	EduNav (ongoing implementation).
Broader definition of a “standard course”.	Allow for a greater variety of standard meeting patterns; don’t penalize non-traditional modes of delivery.
<i>What would a scheduling policy look like if its sole purpose were to maximize flexibility and control at the department level?</i>	
<i>Ideas</i>	<i>Translations</i>
Allocate all space and control to individual departments.	Reduce restrictions on departmental requests; maintain entirely separate scheduling for GA and departmental space.
Transparent view of other departments’ needs.	Online system accessible by all faculty and staff.
Effective cross-department coordination.	Online system accessible by all faculty and staff.
<i>If we wanted to keep the current scheduling policy, how could we improve it only by changing how information is shared?</i>	
<i>Ideas</i>	<i>Translations</i>
All scheduling data available in real-time to everyone.	Online system accessible by all faculty and staff.
Chairs keep faculty better-informed about upcoming and ongoing scheduling steps.	Emulate “The Call”.
Reduce reliance on email.	Online system accessible by all faculty and staff.
Make resources available in advance to help departments avoid non-compliance.	Staff training.
Greater reliance on staff-to-staff communication to resolve issues, rather than staff-to-chair.	Staff training.

Appendix 6a - UC Scheduling Comparison

	UCB	UCD	UCI	UCLA	UCM	UCR	UCSB
Standard Time Blocks (hours per week)							
Tu/Th (3 hours)	Y	Y	Y	Y	Y	Y	Y
MWF (3 hours)	Y	Y	Y	Y	Y	Y	Y
MW (3 hours)	Y	Y (4 hours)	Y	Y	Y	N	Y
WF (3 hours)	Y	N	Y	Y	Y	N	Y
MF (3 hours)	Y	N	Y	Y	Y	N	Y
1-2 hours on 1 day	Y	Y	Y	Y	Y	N	Y
3 hours on 1 day	Y	N	Y	Y	Y	N	Y
4 hours in 4 days		Y			Y	N	
4 hours on 1 day		N			Y	N	
Maximum %age Scheduled during Prime-time	70%	75% generally (70% for enrmt. > 150)	?	60%	?	60%	60%

NOTES

Scheduling priorities tended to be the same across the board: standard time patterns are scheduled first then non-standard, primary sections are scheduled before secondary sections, larger classes before smaller, etc. Biggest variation was in approve “standard” time blocks or patterns.

At UCB, non-standard patterns must be scheduled in department controlled space.

UCB, UCM ... have broad variety of standard time patterns at designated times. UCLA and UCI have designated hours for non-standard course patterns. These designated non-standard course patterns receive same priority as standard course patterns.

At UCLA 20% of classes must be scheduled on Friday.

Appendix 6b - Overview of Non-UC Scheduling Policies & Practices

Goals and purpose

Most campuses have a strong sense of the goals and purpose of the course scheduling policy. For example, UT Austin emphasizes this point twice: “Departments must balance fulfilling undergraduate and graduate teaching needs and ensuring full participation of all faculty members in our teaching mission,” and later, “Course scheduling should be done with student needs in mind. Faculty convenience can be considered but should not be the driving force in determining the time, frequency and capacity of classes.”

Responsibility

Responsibility for scheduling varies. At all campuses, the department chair bears ultimate responsibility for assignments. Some campuses seem to have custom software that gives significant assignment control to enrollment managers. ASU and Stanford both seem to give such control to enrollment managers, even allowing them to see global ‘heat maps’ to better find times that might work for classes:



However, this work is related merely to meeting patterns, not room assignments. Room assignments are only possible in a few cases: expected enrollment of over 100 students and in cases of instructor disability need.

Rigidity

Campuses vary on levels of rigidity. For instance, Oregon State University has a very flexible 2-hour block and scheduling within that block is open to a wide range of both duration and day-of-week patterns. However, crossing those boundaries is very difficult.

Iowa State University has a standard 1-hour MWF, 90-minute TR pattern, but the ‘only’ consequence of breaking that pattern is being subject to lower priority room selection (much like UCR now).

Stanford has a very flexible meeting pattern grid, and moving outside that grid is very difficult, requiring substantive justification and an analysis of student impact:

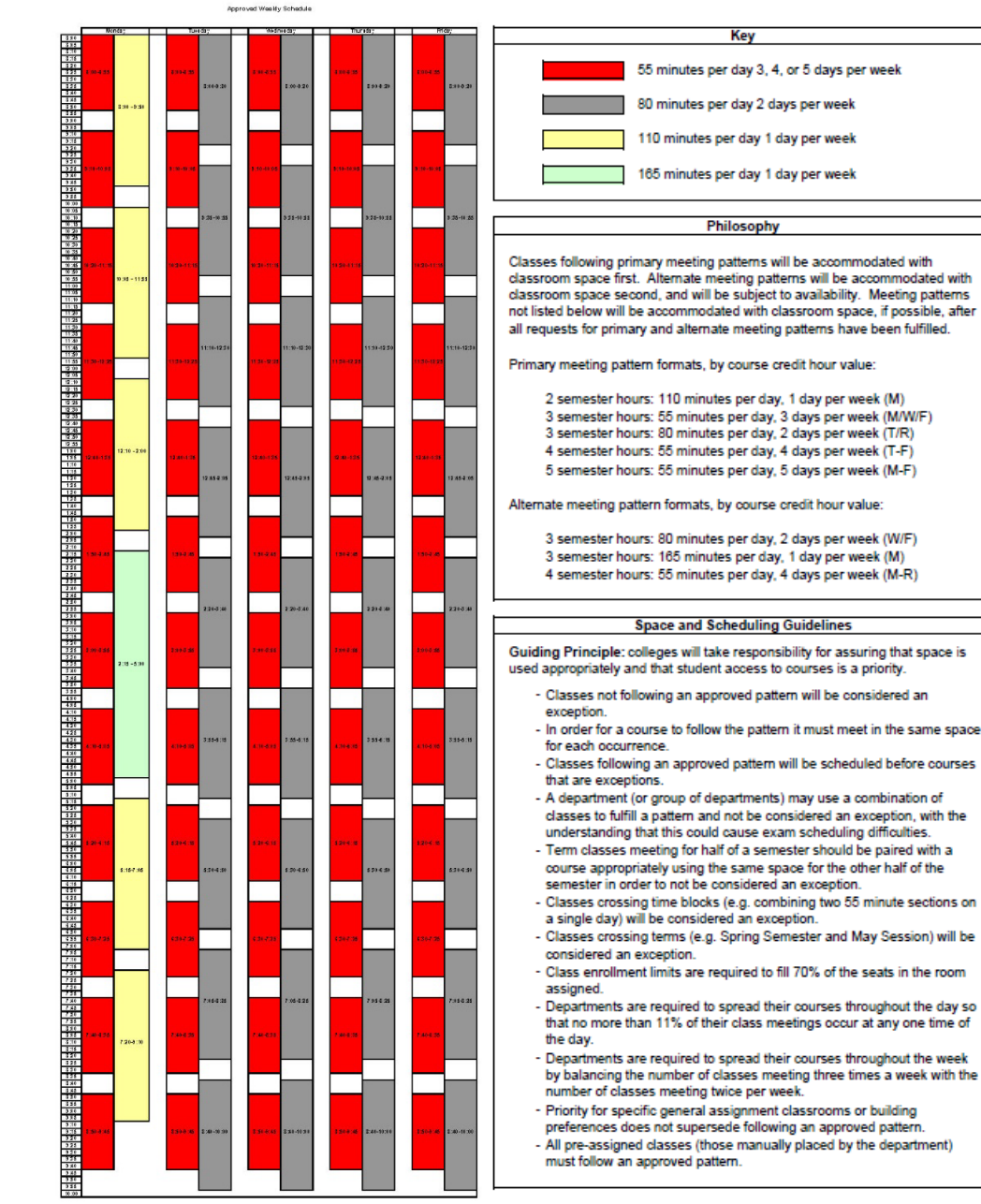
“Requests for exceptions must be made in writing to the joint C-USP/C-GS Subcommittee on Class Scheduling Patterns and, if approved, will be scheduled only after all other courses have been assigned a classroom. Instructor preference is not considered to be a valid basis for an exception. Any request for an exception must have the approval of the department or program chair.

“Requests for exceptions should include a rationale for why the class or classes cannot fit the regular meeting patterns as well as an assessment of student impact resulting from the exception.”

Meeting Patterns

Many campuses seem to have adopted fixed meeting patterns. Some are simple: Oregon State University only requires that class begin aligned with the 2 hour block: when it ends is flexible based on meeting patterns. However, this seems to be possible because of an abundance of instructional space available currently. Below are two examples of meeting patterns, one from Ohio State University and the other from Stanford University.

Ohio State University



Stanford University

Monday	Tuesday	Wednesday	Thursday	Friday
8:30*	8:30*	8:30*	8:30*	8:30*
9:20	9:20	9:20	9:20	9:20
9:30	9:30	9:30	9:30	9:30
10:20	10:20	10:20	10:20	10:20
Monday	Tuesday	Wednesday	Thursday	Friday
10:30	10:30	10:30	10:30	10:30
11:20	11:20	11:20	11:20	11:20
11:30	11:50	11:30	11:50	11:30
12:20	12:00**	12:20	12:00**	12:20
12:30		12:30		12:30
1:20	1:20	1:20	1:20	1:20
Monday	Tuesday	Wednesday	Thursday	Friday
1:30	1:30	1:30	1:30	1:30
2:20		2:20		2:20
2:30	2:50	2:30	2:50	2:30
		2:50		2:50
3:20	3:00	3:20	3:00	3:20
3:30		3:30		3:30
4:20	4:20	4:20	4:20	4:20
Monday	Tuesday	Wednesday	Thursday	Friday
4:30	4:30	4:30	4:30	4:30
5:20		5:20		5:20
5:30	5:50	5:30	5:50	5:30
		5:50		5:50
6:20	6:00	6:20	6:00	6:20
6:30		6:30		6:30
7:20	7:20	7:20	7:20	7:20
Monday	Tuesday	Wednesday	Thursday	Friday
7:30	7:30	7:30	7:30	7:30
8:20		8:20		8:20
	8:50		8:50	
8:50		8:50		8:50

Blocks

The calendar has been broken into 50 (orange) and 80 (green) minute blocks. 10 minutes has been left between classes for travel time.

To reduce conflicts, all classes start at a standard time as represented on the grid. Classes may end early (e.g., a 75-minute class) but they cannot start early or late.

Blocks may be combined to create lengthier classes, typically 2- or 3-hour classes, provided that the standard start time is maintained.

Start Times

Most classes start on the half hour, except as necessary for the TTh 80 minute patterns and the MWF afternoon 80-minute pattern.

Mornings

Generally, 50 minute blocks on MWF and 80 minute blocks on TTh, except for 50 minute blocks on TTh to accommodate five-day foreign language classes and labs.

*The 8:30 block MTWTF is typically available for five-day foreign language classes, and labs and discussions where students have other options for enrollment.

Afternoons

50 minute blocks on MWF and 80 minute blocks on MTWThF.

**The 80 minute block on TTh beginning at 12:00 may be extended to a 2-hour block starting at 11:30.

Duration of Schedule

None of the schools I looked at seemed to have a year-long pattern. For instance, Iowa State explicitly says, "Each semester is a fresh start; general university classrooms are not carried forward from year to year."

Communication

While obviously difficult to assess internal communication externally, Stanford seems to have the [clearest timeline for classroom scheduling](#). While it's very similar in nature to the UCR timeline used, in part, as an input to the process mapping, it seems to include other elements we 'discovered' in that phase of design. For instance, they include deadlines that would need senate approval, such as changing the number of units for a course.

Other Observations

No other campuses seem to be doing a class scaffolding. Most campuses seem to start classes on the hour.

Software

R25 is still incredibly popular (Iowa State, Oregon State, University of Kansas, and others use this). Even places where there are custom tools, event planning seems to be done via 25Live. ASU seems to do much if not all of their scheduling inside PeopleSoft.

Appendix 7 - Prototype Scheduling Model Testing Results

Prepared by Jeff Williams, Scheduling Analyst

February 2, 2018

Purpose:

The purpose of this testing scenario was to establish the viability of implementing a proposed set of prototype meeting patterns within the context of UCR's current scheduling system (25Live and Series25 Optimizer).

Method:

Academic departments were asked to create a hypothetical Fall course schedule for sections requesting general assignment classrooms, based on data available from the Fall 2017 quarter. Confirmations were received from 69 departments or departmental divisions. Of those responses, 4 departments (CMDDB, ENTX, MCS, NEM) did not participate in creating a model schedule. To account for these departments, their schedule created for Fall 2017 has been used in this test.

The data set utilized for testing this model schedule was derived by capturing **a)** all sections that were scheduled into a general assignment classroom in Fall 2017 regardless of room attribute preference code and **b)** all sections bearing a room attribute preference code for a general assignment classroom for the Prototype Term. These two sets of sections were merged and duplicate sections were removed. This data was cleaned, imported into 25Live, and processed by the Optimizer in a variety of permutations.

Cross-listed courses are counted only once per cross-list group, regardless of the number of cross-listed partners. The Optimizer counts each partner during a run, resulting in different counts of total sections between data sets.

Sections with multiple meeting patterns are counted once for total section counts and each meeting pattern is considered separately for meeting pattern counts. The Optimizer treats each meeting pattern as an individual section occurrence, resulting in different counts of total sections between the data sets.

Data & Results

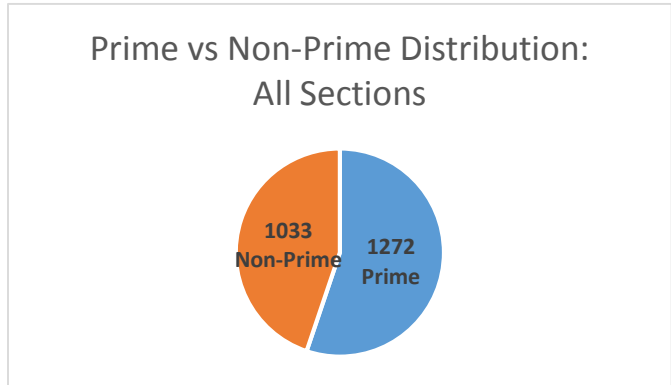
Section Counts:

Section Totals:		
Total Sections	2296	<i>*does not include secondary cross-listed partners or multiple meeting patterns</i>
Total PACT (% of total)	1049	45.69%
Total SACT (% of total)	1247	54.31%

Section Distribution:

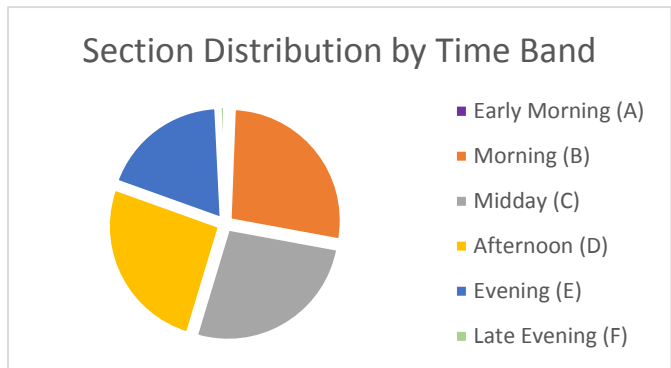
Prime Time vs Non-Prime Time

Prime Time (% of total)	1272	55.18%
PACT (% of Prime Time)	597	46.93%
SACT (% of Prime Time)	675	53.07%
Non-Prime Time (% of total)	1033	44.82%
PACT (% of Non-Prime Time)	459	44.43%
SACT (% of Non-Prime Time)	574	55.57%



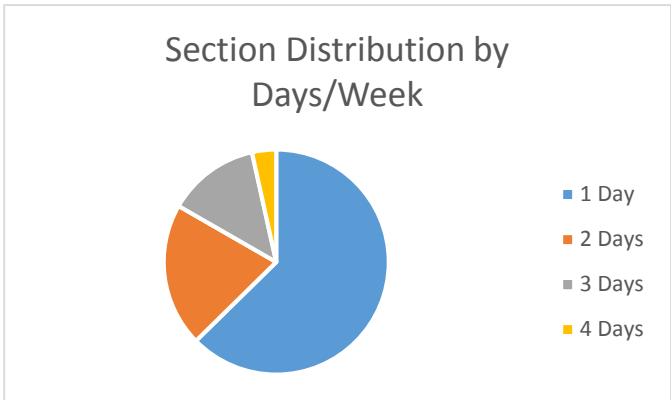
By Time Band

Early Morning (A)	14	0.61%
Morning (B)	629	27.29%
Midday (C)	617	26.77%
Afternoon (D)	595	25.81%
Evening (E)	432	18.74%
Late Evening (F)	18	0.78%



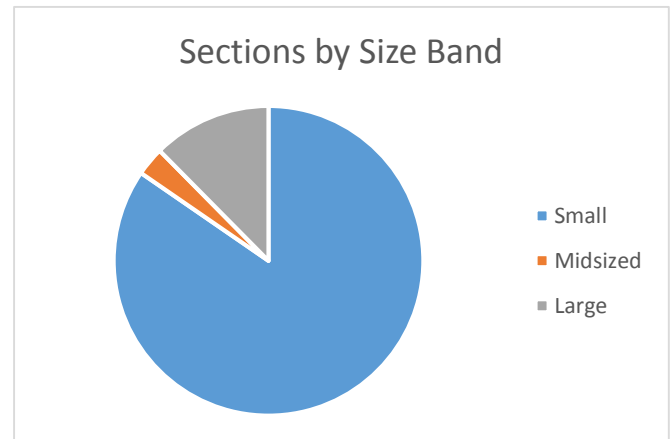
By Days per Week

1 Day	1444	62.65%
PACT (% of 1 Day)	218	15.10%
SACT (% of 1 Day)	1226	84.90%
2 Days	476	20.65%
PACT (% of 2 Day)	453	95.17%
SACT (% of 2 Day)	23	4.83%
3 Days	305	13.23%
4 Days	80	3.47%



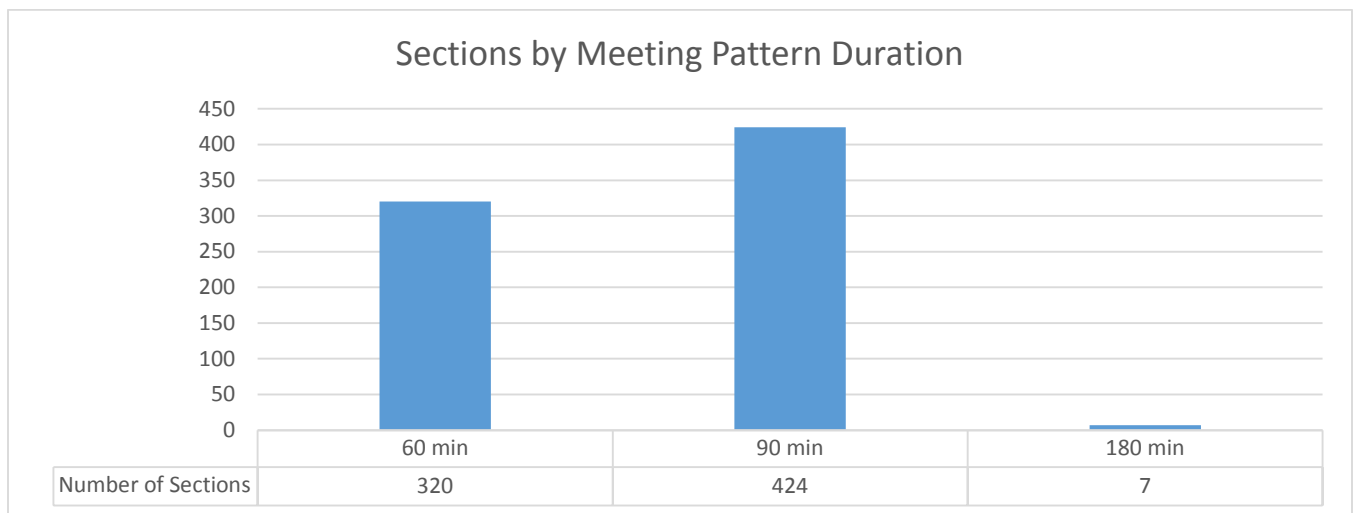
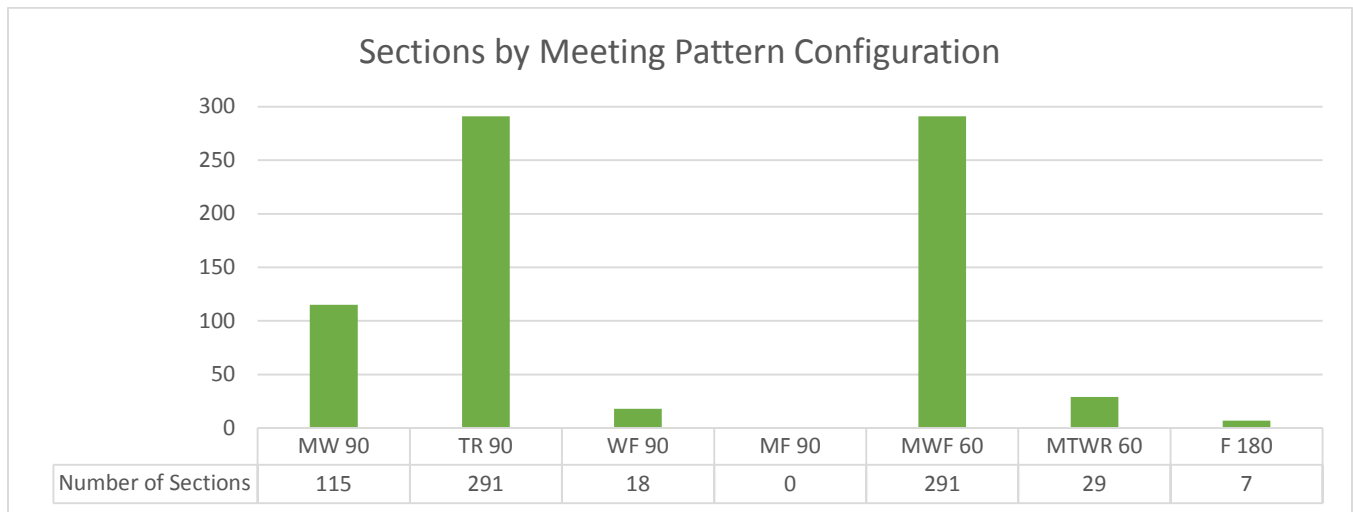
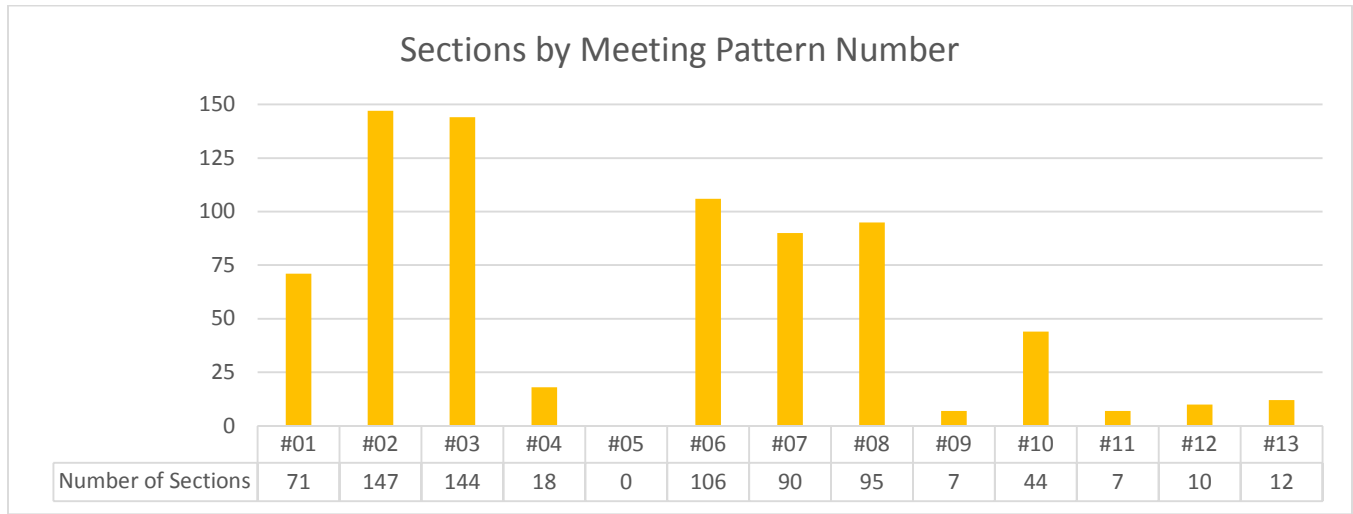
By Size Band

Small	1950	84.60%
PACT (% of Small)	705	36.15%
SACT (% of Small)	1245	63.85%
Midsized	69	2.99%
PACT (% of Midsized)	69	100.00%
SACT (% of Midsized)	0	0.00%
Large	286	12.41%
PACT (% of Large)	282	98.60%
SACT (% of Large)	4	1.40%

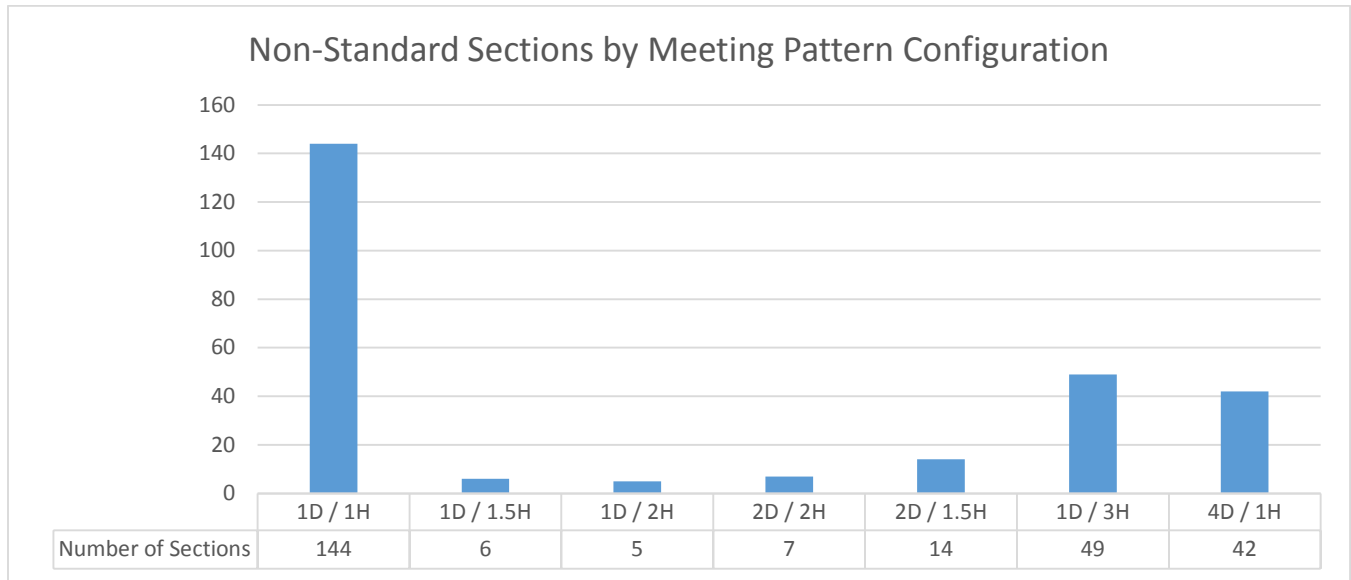


Section Distribution by Meeting Pattern:

**A full breakdown for each individual meeting pattern is available in the excel file with the testing data*



Non-Standard Meeting Patterns:



Optimizer Runs:

**A full data set is available in the included excel file.*

Name	Included Sections	Min. Utilization	Act. Utilization	Total Sections	Placed	%	Unplaced	%
Run #1	PACT & SACT Standard MP	67%	84.61%	2136	2050	95.97%	86	4.03%
Run #2	PACT & SACT Standard MP	50%	81.05%	2136	2099	98.27%	37	1.73%
Run #3	PACT Standard MP	50%	82.00%	811	774	95.44%	37	4.56%
Run #4	PACT & SACT Any MP	50%	79.68%	2470	2380	96.36%	90	3.64%

University Village classrooms were not utilized in these Optimizer runs as they are scheduled on a different standard meeting pattern matrix from on-campus classrooms. Sections with UV meeting patterns were not considered in runs #1-3. For run #4, it is likely that some of the large unplaced course sections could be scheduled in UV classrooms.

Conclusions:

Based on the results of the Optimizer runs above, there is a high level of confidence in the system’s ability to process the increased number of standard meeting patterns presented. According to the software vendor, CollegeNet, the Optimizer is programmed to place the highest number of sections at the highest utilization rate (max enrollment / room capacity) possible. The results of this test support that claim.

It is important to note that the prototype term was based on a previously built term in which alternative meeting patterns and maximum enrollments had been adjusted in order to fully schedule courses. The placement rates of the Optimizer in this test are likely higher than would be seen in a production term, depending on how closely departments matched their prototype schedule to their actual requests.

Additional Recommendations:

A) For the purposes of data auditing and consistency in communication, meeting pattern numbers should be utilized identically in each time band. For example, pattern #1 should always be the earliest MW 90-minute pattern, pattern #6 should always be the earliest MWF 60-minute pattern.

B) To further validate the results of this test, the Optimizer should be run through the same permutations utilized here when the next set of production data is available for Fall 2018 to provide a more realistic sense of possible placement rates. Any adjustment in placement rates in a production rather than a testing scenario would not invalidate the results of this test, however, as the system has demonstrated its ability to successfully process the increased number of meeting patterns.

C) A further study of the non-standard meeting patterns present in the term may be of value to establish whether there are any areas of modification needed in the prototype meeting patterns to address campus scheduling requests. The 1-day/3-hour and 4-day/1-hour requests are of most interest. The data is available for this study, but as it was not the focus of this test, is only presented in cursory form here.

Definitions:

Primary Activity (PACT): The unit-bearing section of a course. Each course has a single primary activity.

Secondary Activity (SACT): The non-unit-bearing section(s) of a course with group contact hours. Each course may have multiple secondary activities or none.

Multiple Meeting Patterns (MMP): A section has multiple meeting patterns if it meets at different times on different days. A section meeting at the same time on different days does not have multiple meeting patterns. It is the presence of different times that creates the multiple patterns. A course section employing the #5 meeting pattern has multiple meeting patterns.

Cross-listed Course: Courses approved as equivalent that are taught concurrently at the same time in the same location by the same instructor to a single population of students consisting of the total enrollment in all cross-listed partners.

Primary Cross-listed Partner: The section in a cross-listed group belonging to the department administering the group of equivalent courses. This is generally the department providing the instructor.

Secondary Cross-listed Partner: All partners of a cross-list group other than the primary cross-listed partner.

Appendix 8 – Prototype Final Exam Matrix

Includes only primary activities for standard meeting patterns

	8:00 – 11:00 AM	11:30 AM – 2:30 PM	3:00 – 6:00 PM	7:00 – 10:00 PM
SAT DEC 8	MWF 7:00 – 7:50	MWF 8:00 – 8:50 PM MW 8:00 – 9:20 PM	MWF 9:00 – 9:50 PM	TR 8:00 – 9:20 PM
MON DEC 10	MWF 8:00 – 8:50 MW 8:00 – 9:20	MWF 11:00 – 11:50 MW 11:00 – 12:20	MWF 2:00 – 2:50 MW 2:00 – 3:20	MWF 5:00 – 5:50 MW 5:00 – 6:20
TUE DEC 11	MWF 9:00 – 9:50 MW 9:30 – 10:50 WF 9:30 – 10:50	MWF 12:00 – 12:50 MW 12:30 – 1:50 WF 12:30 – 1:50	MWF 3:00 – 3:50 MW 3:30 – 4:50 WF 3:30 – 4:50	MWF 6:00 – 6:50 MW 6:30 – 7:50 WF 6:30 – 7:50
WED DEC 12	MWF 10:00 – 10:50 F 8:00 – 10:50	MWF 1:00 – 1:50 F 11:00 – 1:50	MWF 4:00 – 4:50 F 2:00 – 4:50	MWF 7:00 – 7:50 F 5:00 – 7:50
THURS DEC 13	TR 8:00 – 9:20	TR 11:00 – 12:20	TR 2:00 – 3:20	TR 5:00 – 6:20
FRI DEC 14	TR 9:30 – 10:50	TR 12:30 – 1:50	TR 3:30 – 4:50	TR 6:30 – 7:50

June 2016

Scheduling Process Guidelines for General Assignment Rooms

Prime Time = Starts after 9:00 a.m. and before 3:00 p.m.

Non-Prime Time = Starts before 9:00 a.m. or after 3:00 p.m.

Standard Teaching Pattern = Tuesday/Thursday or Monday/Wednesday/Friday

Non-Standard Teaching Pattern = A teaching schedule that does not match the above patterns (i.e. single day instruction, Monday/Wednesday, etc.)

- A. Departments are limited to requesting no more than 50% of their lectures/seminars and no more than 60% of the lab/discussions during prime time hours. Classes meeting on one day only and for more than normal duration (e.g., 3 hour seminars) should be scheduled in non-prime time to ensure maximum space utilization for all. (Exceptions may be necessary. See Item D below.)
- B. Departments are limited to requesting no more than 40% of their lectures/seminars on a Tuesday/Thursday teaching pattern (standard and non-standard patterns combined). (Exceptions may be necessary. See Item D below.)
- C. Sections offered in prime hours must conform to established time blocks (standard teaching pattern). Established time blocks are fifty-minute classes beginning ten minutes after the hour in the Monday, Wednesday, and Friday (MWF) pattern, and eighty-minute classes beginning ten minutes after the hour or half hour (i.e., 8:10 a.m., 9:40 a.m., 11:10 a.m., 12:40 p.m., 2:10 p.m., 3:40 p.m., 5:10 p.m.) on Tuesday and Thursday (TR). The one exception to this rule is the scheduling of sections in one-hour time blocks on Tuesday or Thursday for discussions. Sections requiring non-standard teaching patterns are restricted to the non-prime hours.
- D. To minimize interdepartmental conflicts and to develop a schedule based on sound educational principles and promote time-to-degree, the following guidelines will prevail:
 - a. Items A – C above will be monitored at the time of department schedule submission (Call Deadline). If a department is out of compliance or misses the deadline, the department will be notified to adjust the request(s) as appropriate. This will not delay the scheduling of classroom spaces so a department that has the initial submission returned may receive room considerations after the first run of the room optimizer algorithm (Scheduler 25).
 - b. During the prime times, in order to improve space utilization, the use of general assignment rooms will require a course history with a minimum

enrollment of four for graduate courses, eight for upper-division courses, and twelve for lower-division courses.

- c. In the event of conflicts, priority will be given to the course that demonstrates the highest seat utilization based on current projections and end of third week enrollment figures for the last three terms the course was taught (not including the current quarter or summer session). Special consideration may be given when departments submit substantial information identifying significant anticipated enrollment increases beyond those of the general campus.
 - d. Assignment of teaching duties is completed by the Chair of the Department; the assignment of teaching days, times, and rooms is not guaranteed and is driven in concert with the classroom utilization standards, time-to-degree requirements and overarching academic scheduling rules outlined above. Faculty requests will be taken into consideration, but are not guaranteed, unless the faculty member has a documented disability that must be accommodated or a unique technical/logistical need exists that is not available in all classroom spaces.
 - e. Rooms may be reassigned if it is found that utilization standards need to be addressed due to actual enrollments not meeting or exceeding the expected enrollments (an example of exceeding expected enrollment includes courses with waitlists where the current constraint for meeting the true demand is classroom space only). The Registrar's Office will provide courtesy notification to the departments of changes prior to the first day of instruction. After the first day of instruction, any room changes will be discussed with the department prior to making the formal change.
- E. Departments should work within their college structure related to large schedule or room changes to ensure alignment with time-to-graduation and curriculum conflicts.
- F. The Registrar's Office will maintain a wait list for departments that would like to offer courses during prime time or on a Tuesday/Thursday meeting pattern in excess of the above percentages. These requests will be satisfied when possible on the basis of room availability, optimal utilization, and in the order that the Schedule of Classes copy is received in the Registrar's Office.
- G. As an additional enrollment management tool, all undergraduate courses will have a waitlist assigned. The waitlist will have the max number of allowable waitlist seats. While waitlist will be assigned it is up to the department and/or colleges to utilize them to project potential demand as appropriate.

Appendix 10 - Proposed Standard Meeting Patterns

		Monday	Tuesday	Wednesday	Thursday	Friday	
		Early morning (A)					
	7:00 AM						
	7:10 AM						
	7:20 AM	A1 / A2	A2	A1 / A2	A2	A1 / A2	
	7:30 AM						
	7:40 AM						
	7:50 AM	Morning (B)					
	8:00 AM						
	8:10 AM						
	8:20 AM	B6 / B11	B11	B6 / B11	B11	B6	
	8:30 AM		B1		B1	B2	
	8:40 AM		B2		B2	B5	
	8:50 AM						
Prime Time	9:00 AM						
	9:10 AM						
	9:20 AM	B7 / B12	B12	B7 / B12	B12	B7	
	9:30 AM						
	9:40 AM						
	9:50 AM						
	10:00 AM		B5 / B10		B4 / B10		B4
	10:10 AM						
	10:20 AM	B8 / B13	B13	B8 / B13	B13	B8	
	10:30 AM						
	10:40 AM						
	10:50 AM	Midday (C)					
	11:00 AM						
	11:10 AM						
	11:20 AM	C6 / C11	C11	C6 / C11	C11	C6	
	11:30 AM		C1		C1	C2	C5
	11:40 AM		C2		C2		
	11:50 AM						
	12:00 PM						
	12:10 PM						
12:20 PM	C7 / C12	C12	C7 / C12	C12	C7	C9	
12:30 PM							
12:40 PM							
12:50 PM							
1:00 PM		C5 / C10		C4 / C10		C4	
1:10 PM							
1:20 PM	C8 / C13	C13	C8 / C13	C13	C8		
1:30 PM							
1:40 PM							
1:50 PM	Afternoon (D)						
2:00 PM							
2:10 PM							
2:20 PM	D6 / D11	D11	D6 / D11	D11	D6	D5	
2:30 PM		D1		D1	D2		
2:40 PM		D2		D2			
2:50 PM							
3:00 PM							
3:10 PM							
3:20 PM	D7 / D12	D12	D7 / D12	D12	D7	D9	
3:30 PM							
3:40 PM							
3:50 PM							
4:00 PM		D5 / D10		D4 / D10		D4	
4:10 PM							
4:20 PM	D8 / D13	D13	D8 / D13	D13	D8		
4:30 PM							
4:40 PM							
4:50 PM	Evening (E)						
5:00 PM							
5:10 PM							
5:20 PM	E6 / E11	E11	E6 / E11	E11	E6	E5	
5:30 PM		E1		E1	E2		
5:40 PM		E2		E2			
5:50 PM							
6:00 PM							
6:10 PM							

6:20 PM	E7 / E12		E12		E7 / E12		E12		E7		E9
6:30 PM											
6:40 PM											
6:50 PM											
7:00 PM		E5 / E10		E3		E4 / E10		E3		E4	
7:10 PM											
7:20 PM	E8 / E13		E13		E8 / E13		E13		E8		
7:30 PM											
7:40 PM											
7:50 PM	Late evening (F)										
8:00 PM											
8:10 PM											
8:20 PM	F3 / F5		F5		F3 / F5		F5		F3 / F5		
8:30 PM		F1		F2		F1		F2			
8:40 PM											
8:50 PM											
9:00 PM											
9:10 PM											
9:20 PM	F4 / F6		F6		F4 / F6		F6		F4 / F6		
9:30 PM											
9:40 PM											
9:50 PM											

Notes:

Standard meeting patterns for primary activities are shown in blue, yellow and green.

Some time slots have multiple labels (e.g. B6 / B11). This means the particular time slot could be part of multiple meeting patterns. Typically the first label is likely to be the more common pattern used. For example, B6 meets 3x MWF for 50 mins, whereas B11 meets 4x MTWR for 50 minutes. Most of the secondary patterns (e.g. B11) become relevant when a three hour block is used on a Friday (e.g. B9).

Meeting patterns are self-contained in six lettered blocks (A through F). Maintaining the integrity of the blocks by avoiding non-standard patterns that overlap multiple blocks helps improve utilization and reduce conflicts for students. Also note that, a given classroom can be used exclusively on, say, the 50 minute pattern in block B and the 80 minute pattern in block C without sacrificing utilization. Schedulers should aim to "pack" the schedule this way.

To the extent possible, courses meeting for 50 minutes multiple times per week should be targeted near the beginning and end of each block (e.g. B6 and B8) to minimize conflicts with other meeting patterns. Courses meeting for 50 minutes, once each week (e.g. discussion sections) should be targeted in the middle of each block (e.g. B7).

Early morning and late evening patterns are included for completeness but likely will be the least utilized patterns.

Classes that start at 8:00am are NOT in prime time (including the B5 meeting pattern). All other block B classes are in prime time.

Classes that start at 2:00pm are in prime time (including the D5 meeting pattern). All other block D classes are NOT in prime time.

Appendix 11 - Scaffolding Methodology: Scheduling 1st Priority Courses for Feasibility Testing

To conduct a realistic test of the proposed policy, it was necessary to develop a list of 1st-level priority courses for the scaffolding step of the fall 2017 schedule rebuild. The purpose of the scaffolding step is to coordinate the scheduling of a short list of critical courses to minimize conflicts and promote timely progress towards degree for a large number of UCR undergraduates. The Associate/Divisional Deans of Student Affairs for the undergraduate colleges met several times during 2017 to develop the list. All lower division gateway and service courses, and a smaller number of upper division courses, were considered initially as candidates. The Registrar provided a pivot table with enrollment statistics and student demographics for each course over the past three years to help inform course selection. Three criteria were then developed and used to determine the scaffolding list:

1. Proportion of freshmen enrolled (>50%)
2. Variety of major types enrolled (>10)
3. Total enrollment in course (>250)

After the list of courses was determined, the Associate/Divisional Deans then scheduled each section in an appropriate room while avoiding conflicts with other courses on the list. The final matrix of courses along with their time and room assignments is provided in this appendix.

It is worth noting that this particular scaffolding matrix was created to facilitate *testing* of the proposed policy and is not intended to be a *feature* of the policy. Under the proposed policy, the Course Scheduling Committee (CSC) would be charged with developing, reviewing, and recommending changes to the actual scaffolding matrices (one for each term) on an ongoing basis. These matrices are not intended to be fixed in perpetuity, but instead should evolve slowly and deliberately as popular major trends change, new majors and courses come online, and new instructional pedagogies come into effect (e.g. hybrid delivery). It is anticipated that many courses used for freshman learning communities would qualify for the scaffolding lists, but learning communities are neither necessary nor sufficient for listing.

Prototype Scaffolding Room Matrix for 201740 - Build 1

Pattern	Days/Times	SPR 1102	CHUNG 138	OLMH 1208	BRNHL A125	UV THE8	HWNSS 1501	WAT 1000	MSE 116	PHY 2000	MSE 104	INTN 1020	LFSC 1500	BRNHL B118	UV THE10	UV THE9	UNLH 1000
B01	MW 8-9:20a	100	105	110	130	135	138	170	284	288	293	300	303	329	334	416	570
B02	TR 9-9:20a		CS 010	BIOL 005A	MATH 005		MATH 007A	MATH 007B	MATH 009A	PHYS 040A	ANTH 002	SOC 002S		POSC 010			CHEM 001W
B03	MW 9:30-10:50a		CS 010		MATH 009C		MATH 009B		BIOL 005A		MATH 004	MATH 007A					GEO 009
B03	TR 9:30-10:50a				MATH 009B		MATH 007B	SOC 002F	ENSC 001		ANTH 005						HIST 015
C01	MW 11a-12:20p		CS 010		MATH 007A				CHEM 001A		BIOL 005C	HIST 020W				BUS 010	ETST 001
C02	TR 11a-12:20p							PHIL 030E	CS 008	PHYS 040C	BIOL 005C		MATH 006B			POSC 020	HIST 010
C10	MW 12:30-1:50p		CS 010				MATH 006A		SOC 010	MATH 007A	MATH 007A	CHEM 001A			HIST 020	BUS 010	ECON 003
C03	TR 12:30-1:50p						MATH 007A	PSYC 049	CS 008	PHYS 040A	MATH 005	MATH 009B	MCS 001		POSC 015		BIOL 005B
D01	MW 2-3:20p		CS 010		MATH 009A		MATH 009B	MATH 006A	BIOL 005C	CHEM 001A	POSC 005W	GSST 001S		CHEM 001C	ETST 002	PHIL 001	ANTH 001
D02	TR 2-3:20p							MATH 009B	CS 008	CHEM 001A	MATH 022			MATH 009A			ECON 002
D10	MW 3:30-4:50p			MATH 009B			MATH 006A			CHEM 001C	BIOL 005B	PSYC 049	MATH 005				PSYC 002
D03	TR 3:30-4:50p			MATH 009B	MATH 007A		MATH 007B		ETST 003	PHYS 040C	EE 001A		BIOL 030				SOC 001
																	PSYC 001

Notes:

- The time frame was expanded out of Prime hours to accommodate all necessary sections in UNLH 1000.

- Sections were generally kept as close to their current days, time, and rooms as possible, except:

- a) when the original time was outside the 8am-5pm window considered, or
- b) the class conflicted with another section already on the matrix, or
- c) a class time shift caused two sections of the same course to occur at the same time, or
- d) when additional time options were needed for conflicting courses.

- Sections in UV THE9 & 10 have not had their meeting patterns shifted to account for offset time for the Village

- 99 sections, representing the large lectures on the courses list, were scheduled in this sample.

- This matrix is a first sample draft and proof-of-concept. Room utilization and overall scheduling has not been optimized in any way except to avoid or provide alternatives to known conflicts.