Instructional Space & Scheduling Review Study



Utilization Analysis Report

University of Maryland Baltimore County

January 9, 2019

Educational Consulting Services Corp. | www.ecs.on.ca

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Document Highlights

This report sets out the results of the first step in the analysis work for the Instructional Space & Scheduling Review Study – an assessment of current utilization of instructional space at the UMBC main campus.

The Study is using a collaborative process involving a wide range of key stakeholders to collect information and review findings and planning directions. The goal is to develop and frame strategies that the University and its stakeholders can consider to strengthen scheduling and space management in support of teaching and learning excellence, developing quality schedules for students and faculty, and achieving good utilization and equitable access to the valuable instructional space resource.

Section 2 – Methodology and Peak Week

The utilization analysis of instructional spaces presented in this report uses Office of the Registrar data records for centrally controlled and departmentally controlled classrooms and teaching laboratories for Summer 2017, Fall 2017, Winter 2018 and Spring 2018 semesters. Activity levels in all weeks of the four semesters were assessed to identify peak weeks for the detailed analysis.

Section 3 – Classroom Inventory Overview

A review of classroom area per seat allocation shows that the amount of space allocated per seat and by furniture type is generally aligned with the guidelines recommended by ECS.

Section 4 – Classroom Utilization

An analysis of classroom utilization provides a profile of the rates and patterns of use of both centrally and departmentally scheduled rooms. **Results indicate unused capacity within the classroom pool across the scheduling week**.

Specific results include:

- Highest use in Fall semester (2017 data). Based on a 45-hour scheduling window (8am – 5pm, Monday – Friday), rates of use:

Centrally Scheduled Classroom Daytime Utilization Rate:	56%	82 rooms
Locally Scheduled Classroom Daytime Utilization Rate:	33%	45 rooms
Overall Average	48%	127 rooms

- For reference, ECS recommends that an institution consider adding to its classroom inventory, or to certain segments of its inventory, when approaching a utilization rate of 80%.
- Large capacity rooms have the highest rates of utilization with almost all 100+ seat room categories showing daytime utilization rates of between 70% and 78% (Fall 2017 + Spring 2018). In this respect, the upcoming addition of four large classrooms in the Interdisciplinary Life Sciences Building is timely.
- Time-of-day graphics show the proportion of classrooms in use out of the total rooms available across each hour of the day (7AM – 10PM) and each day of the week:
  - overall pattern is typical of a large institution with high activity between 10AM and 4PM
  - high rates of scheduled use seen through late afternoon and early evening is more unusual
  - low utilization on Fridays is clearly visible in the graphics, particularly after noon
  - Monday, Wednesday, Friday mid-day common hour clearly visible in the graphics
  - highest number of classrooms in use at one time is 102 of 127 rooms (80%) in Spring 2018
    - centrally controlled room use peaks at 77 of 82 (94%) rooms in use at single time
    - locally-controlled room use peaks at 26 of 45 (58%) rooms in use at one time
- Analyses are shown to illustrate time of day use by college/school and undergraduate/graduate course events
- A review of seat utilization shows a high proportion (66%) of activity scheduled for which classroom capacity exceeds class section size. The analysis describes an 'optimal classroom pool' as the number of rooms and capacity complement required to support actual scheduled activity in Fall 2017 and Spring 2018 using a utilization target of 80%. Comparison of the optimal pool to the existing complement of rooms shows a notional surplus of classrooms, and latent capacity in unused seats which will be increased by the addition of the new Interdisciplinary Life Sciences Building.

Section 5 – Laboratory Utilization

An analysis of teaching laboratory utilization describes daytime utilization of laboratories, studios and workshops organized by lab category for both Fall 2017 and Spring 2018 semesters.

Concluding Comments

The Utilization Analysis indicates latent capacity in UMBC's main campus classroom pool both in terms of room utilization and seat utilization. This finding contrasts with the scheduling pressures and challenges described to ECS during the stakeholder consultations to date and point to the importance of the work ahead to address scheduling practices and improve the process and outcomes.

Introduction

Instructional Space & Scheduling Review Study

The University of Maryland, Baltimore County (UMBC) has commissioned an Instructional Space & Scheduling Review Study to review current practices, policies and outcomes regarding the use and scheduling of instructional space at the main campus. Goals are to identify issues and opportunities, and frame strategies that the University can consider to strengthen scheduling and space management in support of teaching and learning excellence, developing quality schedules for students and faculty, and achieving good utilization and equitable access to the valuable instructional space resource.

UMBC retained Educational Consulting Services Corp. (ECS) to undertake the study. ECS provides specialized facilities planning services to higher education institutions to develop buildings, campuses, policies and planning tools that foster quality teaching, learning, research and student life.

To ensure Study findings and recommendations reflect the needs and priorities of the UMBC community, stakeholders will be consulted at all stages of the work. Meetings are being held in April and May 2018 with a broad array of stakeholders to gather information, views and perspectives on scheduling, use and allocation practices and issues around instructional space. A questionnaire was distributed in May 2018 to collect facts and opinions on the development of schedules by academic departments and the quality, quantity and types of existing instructional spaces. Draft and final reports will be presented for discussion and feedback to the Steering Committee, Advisory Group, and representatives of each College as well as UAA, DPS and the Schools.

Utilization Analysis Report

This report outlines the results of the first step in the analysis work, an assessment of current rates of utilization of instructional space at the UMBC main campus – classrooms and teaching laboratories. The analysis is based on data records downloaded from 25Live® / Peoplesoft® databases overseen by the Scheduling group in the Office of the University Registrar. The analysis covers utilization of both centrally controlled and departmentally controlled instructional rooms.

Note that for departmentally controlled rooms, the analysis does not include room bookings not included in the central records – departmental uses such as thesis defenses, faculty-student meetings, departmental events, etc.

Methodology Used for Assessing Space Requirements at UMBC

What follows describes the framework used by ECS to assess classroom utilization at UMBC.

Scheduling Window

UMBC schedules daytime classes from 8:00 AM to 5:00 PM Monday to Friday for a daytime scheduling window of 45 hours, and from 5:00 PM to 10:00 PM in the evening Monday to Thursday for an evening scheduling window of 20 hours. Combining daytime and evening scheduling windows results in a weekly scheduling window of 65 hours. These are typical daytime, evening, and weekly scheduling windows for a University serving a large urban centre.

Note that UMBC has 3 common hours per week – Mondays, Wednesdays and Fridays from 12 pm to 1 pm.

The utilization analysis that follows considers daytime utilization only.

Utilization Percentage

The 45-hour-per-week scheduling window is used as the common denominator in the calculation of room utilization percentages, such as the two simplified examples shown here:

- $\frac{\text{1 room scheduled 45 hours during the week}}{\text{1 room x 45-hour-a-week utilization window}} = \frac{45}{45} =$ 100 % room utilization

- $\frac{\text{2 rooms scheduled 60 hours during the week}}{\text{2 rooms x 45-hour-a-week utilization window}} = \frac{60}{90} =$ 67% room utilization

Utilization Targets

Classrooms & General Computer Laboratories

ECS recommends to its university clients that classrooms and computer laboratories be used, on average, 80% of the 45-hour weekly daytime scheduling window described above, or 36 hours a week. The target of 80% is the threshold of utilization beyond which an institution should consider adding classrooms to its inventory even though it is possible to schedule above the target of 80% if required. Rates lower than 80% indicate that the classroom pool has latent capacity to absorb higher levels of enrolment and/or the repurposing of some classrooms for other high priority uses.

When using the target of 80% (or any value deemed appropriate by the University) it is important to look at both the entire inventory of classrooms and at individual segments of the inventory being evaluated. For example, a university may post an overall 80% utilization rate for all its classrooms, a figure that does not account for the fact that rooms of certain capacities (typically large ones) or in certain buildings (typically newer) are in high demand and overbooked, while rooms of other capacities (typically small ones) or other buildings (typically older) are underused. In view of this, the utilization rates shown this report calculate averages by room capacity range (rooms with 1 to 8 seats, 9 to 16 seats …. 61 to 80 seats, etc.).

Methodology Used for Assessing Specialized Laboratories, Studios & Workshops Requirements

ECS recommends to its university clients that specialized laboratories, studios and workshops be used, on average, 60% of the 45-hour weekly scheduling window described above, or 27 hours a week. The target of 60% is the threshold of utilization beyond which an institution should consider additional inventory even though it is possible to schedule above the target of 60% if required. Instructional laboratories, studios and workshops generally cannot be used at the same rate of utilization as classrooms as they require a greater amount of preparation time, student independent work time, maintenance time, etc. The specialized nature of laboratories, studios and workshops also precludes common conclusions on how they are used 'on average'. Certain programs may require certain types of teaching facilities only a few hours per week or per semester for program delivery and such a facility must be provided regardless of utilization rate. Specialized laboratories, studios and workshops are grouped by type in the utilization analysis.

High utilization for all instructional spaces leaves little flexibility for scheduling changes, the scheduling of ad hoc events and for access to the rooms in daytime for student independent work, maintenance and cleaning. The quality of student schedules might also be affected in terms of distribution of classes across the week, the length of gaps between classes each day, and late changes to schedules once the semester is under way.

Peak Weekly Utilization

The utilization of UMBC classrooms and teaching laboratories (including studios and workshops) has been measured based on peak weekly activity during all semesters. Peak utilization weeks were identified by tabulating the number of scheduled hours of utilization for each week of each semester considering regularly-recurring activity.

The results of the peak utilization analysis are presented in the tables below. Peak room utilization weeks are denoted in **red** in each table.

The utilization analysis presented here does not consider either the week of *Thanksgiving* or *Spring Week*, because scheduling demand and room utilization at those times are atypical.

Summer 2017 Peak Utilization

2017-05-29	2017-06-05	2017-06-12	2017-06-19	2017-06-26	2017-07-03	2017-07-10	2017-07-17	2017-07-24	2017-07-31	2017-08-07	2017-08-14
978.0	978.0	978.0	978.0	858.5	858.5	639.5	639.5	354.5	354.5	272.5	272.5

Fall 2017 Peak Utilization

2017-08-28	2017-09-04	2017-09-11	2017-09-18	2017-09-25	2017-10-02	2017-10-09	2017-10-16	2017-10-23	2017-10-30	2017-11-06	2017-11-13	2017-11-20	2017-11-27	2017-12-04	2017-12-11
3,724.0	3,724.0	3,724.0	3,724.0	3,724.0	3,724.0	3,724.0	3,724.0	3,600.0	3,600.0	3,600.0	3,600.0	3,600.0	3,600.0	3,600.0	3,600.0

*Thanksgiving week

Winter 2018 Peak Utilization

2018-01-01	2018-01-08	2018-01-15	2018-01-22
396.0	396.0	396.0	396.0

Spring 2018 Peak Utilization

2018-01-29	2018-02-05	2018-02-12	2018-02-19	2018-02-26	2018-03-05	2018-03-12	2018-03-19	2018-03-26	2018-04-02	2018-04-09	2018-04-16	2018-04-23	2018-04-30	2018-05-07	2018-05-14
3,593.0	3,593.0	3,593.0	3,593.0	3,593.0	3,593.0	3,593.0	3,447.0	3,460.0	3,460.0	3,460.0	3,460.0	3,460.0	3,460.0	3,460.0	3,460.0

*Spring break

Julianne Simpson comment: for context consider this..

for 127 classrooms @ 45 hours per week, 5,715 total hours available each week. 80% utilization equals 4,572 hours

these numbers include teaching labortories

Classroom Inventory Overview

This section presents an analysis of area allocations for the UMBC classroom inventory considered in the utilization study. The analysis is based on inventory data provided to ECS by the University including details for classrooms that will be added to the pool following the completion of the Interdisciplinary Life Sciences Building slated for completion in Fall 2019 (12 classrooms).

Scheduling Authority

Decisions and the authority to schedule classrooms resides with either the University's scheduling team – Central Authority – or in academic units such as faculties or departments – Local Authority. The following tables present a summary of classroom inventory by scheduling authority.

Scheduling Authority	
Central	Scheduling authority resides with the Registrar's Office responsible for scheduling a pool of classrooms across faculties and departments
Local	Scheduling authority resides in discrete academic units responsible for scheduling a set of dedicated classrooms provided to them by the University

Classroom Inventory – Centrally-Scheduled – Existing & Future

Status	Capacity Range	Number of Rooms	Seating Capacity	Seating Capacity %	Area NASF	Area NASF %	Area per Seat NASF
Existing	1-8 Seats	-	-	-	-	-	-
	9-16 Seats	1	15	0%	378	0%	25.2
	17-24 Seats	7	154	2%	3,786	3%	24.6
	25-32 Seats	13	377	5%	9,353	7%	24.8
	33-40 Seats	22	852	12%	13,721	10%	16.1
	41-48 Seats	6	281	4%	6,092	5%	21.7
	49-60 Seats	12	645	9%	12,485	9%	19.4
	61-80 Seats	10	661	9%	10,786	8%	16.3
	81-100 Seats	-	-	-	-	-	-
	101-120 Seats	1	120	2%	1,863	1%	15.5
	121-140 Seats	4	518	7%	7,226	5%	13.9
	141-160 Seats	-	-	-	-	-	-
	161-180 Seats	-	-	-	-	-	-
	181-220 Seats	3	586	8%	7,051	5%	12.0
	221-300 Seats	2	547	8%	6,357	5%	11.6
	300+ Seats	1	349	5%	3,811	3%	10.9
Existing Total		82	5,105	71%	82,908	62%	16.2
Future	17-24 Seats	4	96	1%	2,443	2%	25.4
	41-48 Seats	4	192	3%	4,865	4%	25.3
	81-100 Seats	4	364	5%	9,175	7%	25.2
Future Total		12	652	9%	16,483	12%	25.3
Grand Total		94	5,757	80%	99,391	74%	17.3

Classroom Inventory – Locally-Scheduled – Existing & Future

Status	Capacity Range	Number of Rooms	Seating Capacity	Seating Capacity %	Area NASF	Area NASF %	Area per Seat NASF
Existing	1-8 Seats	-	-	-	-	-	-
	9-16 Seats	3	45	1%	1,676	1%	37.2
	17-24 Seats	17	353	5%	8,675	6%	24.6
	25-32 Seats	14	406	6%	10,143	8%	25.0
	33-40 Seats	4	155	2%	3,406	3%	22.0
	41-48 Seats	-	-	-	-	-	-
	49-60 Seats	3	150	2%	4,014	3%	26.8
	61-80 Seats	3	224	3%	3,792	3%	16.9
	81-100 Seats	1	93	1%	3,043	2%	32.7
	101-120 Seats	-	-	-	-	-	-
	121-140 Seats	-	-	-	-	-	-
	141-160 Seats	-	-	-	-	-	-
	161-180 Seats	-	-	-	-	-	-
	181-220 Seats	-	-	-	-	-	-
	221-300 Seats	-	-	-	-	-	-
	300+ Seats	-	-	-	-	-	-
Existing Total		45	1,426	20%	34,748	26%	24.4
Grand Total		45	1,426	20%	34,748	26%	24.4

Classroom Inventory – Total – Existing & Future

Status	Capacity Range	Total Number of Rooms	Total Seating Capacity	Total Seating Capacity %	Total Area NASF	Total Area NASF %	Total Area per Seat NASF
Existing	1-8 Seats	-	-	-	-	-	-
	9-16 Seats	4	60	1%	2,053	2%	34.2
	17-24 Seats	24	507	7%	12,461	9%	24.6
	25-32 Seats	27	783	11%	19,496	15%	24.9
	33-40 Seats	26	1,007	14%	17,127	13%	17.0
	41-48 Seats	6	281	4%	6,092	5%	21.7
	49-60 Seats	15	795	11%	16,499	12%	20.8
	61-80 Seats	13	885	12%	14,578	11%	16.5
	81-100 Seats	1	93	1%	3,043	2%	32.7
	101-120 Seats	1	120	2%	1,863	1%	15.5
	121-140 Seats	4	518	7%	7,226	5%	13.9
	181-220 Seats	3	586	8%	7,051	5%	12.0
	221-300 Seats	2	547	8%	6,357	5%	11.6
	300+ Seats	1	349	5%	3,811	3%	10.9
Existing Total		127	6,531	91%	117,656	88%	18.0
Future	17-24 Seats	4	96	1%	2,443	2%	25.4
	41-48 Seats	4	192	3%	4,865	4%	25.3
	81-100 Seats	4	364	5%	9,175	7%	25.2
Future Total		12	652	9%	16,483	12%	25.3
Grand Total		139	7,183	100%	134,139	100%	18.7

Seating Type Analysis

Recommended Station Allocations Based on Classroom Furniture Type

The following table presents station allocations based on type of furniture recommended by ECS. The room types are described and illustrated in the table to the right.

In most cases, square footage allocations vary according to both the furniture type and room capacity. For example, a 30-station classroom with *loose tables and chairs* requires 24 square feet per station. A 30-station classroom with *fixed tables and seating* requires 18 square feet per station. UMBC is encouraged to consult and use these allocations during future space planning initiatives.

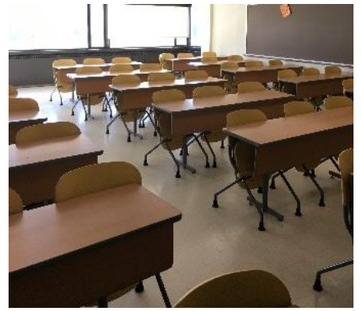
Recommended Classroom Station Area Allocation Table

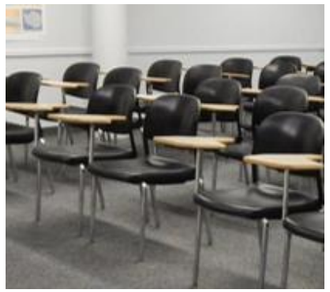
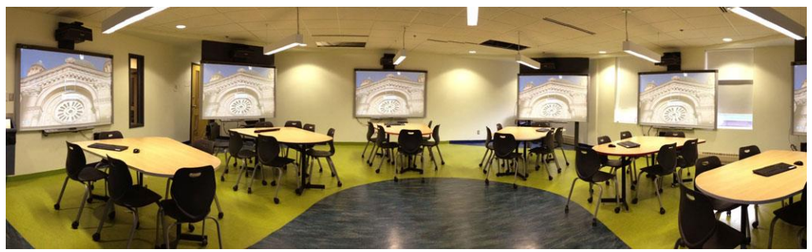
Type of Furniture	Loose Tables & Chairs	Fixed Tables & Seating	Theater Seat w/ Tablet Arms	Loose Chairs w/ Tablet Arms	Active Learning Classroom
Suitability as per Classroom Layout Designations	Classroom Layout (Exam / Traditional / Presentation) Discussion / Seminar Space	Classroom Layout (Exam / Traditional / Presentation)	Classroom Layout (Exam / Traditional / Presentation)	Classroom Layout (Exam / Traditional / Presentation) Discussion / Seminar Space	Active Learning Space Collaborative Technology Learning Space Adaptable / Flexible Learning Space
	SF per Seat or Station	SF per Seat or Station	SF per Seat or Station	SF per Seat or Station	SF per Seat or Station
up to 5 seats	28				
6 to 10 seats	27				
11 to 15 seats	26				
16 to 20 seats	26			17	36
21 to 25 seats	25			17	36
26 to 30 seats	24	18		17	33
31 to 35 seats	24	18		17	30
36 to 40 seats	23	17		16	30
41 to 50 seats	22	17		16	30
51 to 60 seats	20	17		16	30
61 to 70 seats	19	17		15	25
71 to 80 seats	18	16		15	25
81 to 90 seats		16		15	
91 to 100 seats		16			
100 +		16	12		

not recommended

Standard Classroom Types

The table below describes and illustrates the types of classrooms listed in the Recommended Station Allocation.

Loose Tables and Chairs	▪ Typical configuration: rows of tables / desks ▪ One or two seats per table ▪ Can be reconfigured in other layouts, assuming effort and time ▪ Power to each table possible with daisy-chain wiring to wall outlet	
Fixed Tables and Seating	▪ Fixed or "quasi-fixed" tables ▪ Can have seats that swing outward from table ▪ Hardwired power outlet at each seat possible	
Theatre Seating with Tablet Arms	▪ Auditorium seating with small to large working surfaces ▪ Hardwired power outlet at each seat possible	

Loose Chairs with Tablet Arms	▪ Easily movable chair with small to medium working surfaces ▪ Can be difficult to keep the room orderly	
Active Learning Classroom	▪ Fixed group worktables with fixed capacity at each worktable ▪ Room orientation and sightlines: · towards instructor and presentation area at the front of the room · centre of the room used for 360° teaching ▪ IT-intensive / multiple displays on room perimeter	 

Comparison of UMBC Classroom Station Allocations to Recommended Standards

The following table shows how well UMBC's classroom inventory matches the recommended standards by presenting UMBC classroom inventory by room type and room capacity range showing seat and area totals and square feet/seat allocations in comparison to recommended square feet/seat standards. the results indicate that existing station allocations are generally aligned with the standards.

UMBC Classroom Station Allocations and Comparison to Recommended Standards

		A	B	C	D	E = C/A	F
Type of Furniture	Room Capacity	Number of Seats	Number of Seats %	Area SF	Area SF %	SF per Seat/Station	SF per Seat/Station Recommendation Allocation
Existing							
Loose Tables & Chairs	11-15 Seats	29	0%	1,034	1%	36	26
	16-20 Seats	245	3%	6,272	5%	26	26
	21-25 Seats	235	3%	5,437	4%	23	25
	26-30 Seats	322	4%	8,925	7%	28	24
	31-35 Seats	35	0%	766	1%	22	24
	36-40 Seats	80	1%	1,695	1%	21	23
	41-50 Seats	98	1%	2,170	2%	22	22
	51-60 Seats	55	1%	1,221	1%	22	20
	61-70 Seats	252	4%	3,758	3%	15	19
	71-80 Seats	72	1%	2,008	1%	28	18
Sub-Total		*1,423*	*20%*	*33,287*	*25%*	-	-
Fixed Tables & Seating	11-15 Seats	15	0%	478	0%	32	n/a
	21-25 Seats	24	0%	598	0%	25	n/a
	36-40 Seats	40	1%	871	1%	22	17
	41-50 Seats	143	2%	3,058	2%	21	17
	51-60 Seats	220	3%	4,451	3%	20	17
	71-80 Seats	144	2%	2,632	2%	18	16
Sub-Total		*586*	*8%*	*12,088*	*9%*	-	-
Theater Seat w/ Tablet Arms	100+ Seats	2,120	30%	26,307	20%	12	12
Sub-Total		*2,120*	*30%*	*26,307*	*20%*	-	-
Loose Chairs w/ Tablet Arms	21-25 Seats	144	2%	3,385	3%	24	17
	26-30 Seats	240	3%	5,494	4%	23	17
	31-35 Seats	96	1%	2,386	2%	25	17
	36-40 Seats	812	11%	12,606	9%	16	16
	41-50 Seats	244	3%	4,232	3%	17	16
	51-60 Seats	120	2%	2,339	2%	19	16
	61-70 Seats	265	4%	4,396	3%	17	15
	71-80 Seats	152	2%	1,784	1%	12	15
	91-100 Seats	93	1%	3,043	2%	33	n/a
Sub-Total		*2,166*	*30%*	*39,666*	*30%*	-	-
Active Learning Classroom	36-40 Seats	40	1%	1,188	1%	30	30
	41-50 Seats	196	3%	5,120	4%	26	30
Sub-Total		*236*	*3%*	*6,308*	*5%*	-	-
Existing Total		**6,531**	**91%**	**117,656**	**88%**	**-**	**-**
Future							
Loose Tables & Chairs	21-25 Seats	96	1%	2,443	2%	25	25
Sub-Total		*96*	*1%*	*2,443*	*2%*	-	-
Active Learning Classroom	41-50 Seats	192	3%	4,865	4%	25	30
	81-90 Seats	180	3%	4,591	3%	26	n/a
	91-100 Seats	184	3%	4,584	3%	25	n/a
Sub-Total		*556*	*8%*	*14,040*	*10%*	-	-
Future Total		**652**	**9%**	**16,483**	**12%**	**-**	**-**
Grand Total		7,183	100%	134,139	100%	-	-

Classroom Utilization

Based on scheduling and inventory records, there are 127 classrooms available for scheduling at UMBC. Of these, 82 are scheduled by the Registrar and 45 are scheduled by departments. A detailed list of all classrooms identified in the analysis is presented in Section 6.

Daytime Utilization Summary by Campus

The following four tables present a detailed summary of how the UMBC classroom inventory was used at the main campus during daytime hours in peak weeks in all semesters. Each table considers:

- Whether rooms are scheduled centrally (Registrar) or locally (departments) (column A);
- The room capacity range (column B);
- Number of rooms in inventory at each capacity range (column C);
- The total number of hours regularly scheduled in the rooms on a weekly basis (column D);
- The average daytime weekly utilization (column E) expressed as a percentage of the total time these classrooms are available in daytime during the week, i.e. 45 hours

Daytime Classroom Utilization Summary by Room Capacity
Summer 2017 Week of May 29, 2017

	A	B	C	D = C / (B x 45)
Scheduling Authority	Room Capacity Range	Number of Rooms	Daytime Hours per Week	Daytime Utilization
Central	1-8 Seats	-	-	-
	9-16 Seats	2	-	-
	17-24 Seats	6	45.0	17%
	25-32 Seats	13	156.5	27%
	33-40 Seats	22	94.5	10%
	41-48 Seats	6	31.5	12%
	49-60 Seats	12	131.5	24%
	61-80 Seats	10	143.0	32%
	81-100 Seats			-
	101-120 Seats	1	3.5	8%
	121-140 Seats	4	26.0	14%
	141-180 Seats			-
	181-220 Seats	3	22.0	16%
	221-300 Seats	2	2.0	2%
	300+ Seats	1	-	-
Central Total		82	655.5	18%
Local	1-8 Seats	-	-	-
	9-16 Seats	3	27.0	20%
	17-24 Seats	17	74.0	10%
	25-32 Seats	12	0.5	0%
	33-40 Seats	5	-	-
	41-48 Seats	1	-	-
	49-60 Seats	3	11.5	9%
	61-80 Seats	3	16.0	12%
	81-100 Seats	1	9.0	20%
Local Total		45	138.0	7%
Grand Total		127	793.5	14%

Daytime Classroom Utilization Summary by Room Capacity
Fall 2017 Week of August 28, 2017

	A	B	C	D = C / (B x 45)
Scheduling Authority	Room Capacity Range	Number of Rooms	Daytime Hours per Week	Daytime Utilization
Central	1-8 Seats	-	-	-
	9-16 Seats	2	24.0	27%
	17-24 Seats	6	109.5	41%
	25-32 Seats	13	299.0	51%
	33-40 Seats	22	553.5	56%
	41-48 Seats	6	128.0	47%
	49-60 Seats	12	327.5	61%
	61-80 Seats	10	267.5	59%
	81-100 Seats		-	-
	101-120 Seats	1	34.0	76%
	121-140 Seats	4	133.0	74%
	141-180 Seats		-	-
	181-220 Seats	3	96.0	71%
	221-300 Seats	2	65.0	72%
	300+ Seats	1	31.5	70%
Central Total		82	2,068.5	56%
Local	1-8 Seats	-	-	-
	9-16 Seats	3	33.0	24%
	17-24 Seats	17	215.5	28%
	25-32 Seats	12	197.0	36%
	33-40 Seats	5	67.0	30%
	41-48 Seats	1	-	-
	49-60 Seats	3	56.5	42%
	61-80 Seats	3	65.0	48%
	81-100 Seats	1	31.0	69%
Local Total		45	665.0	33%
Grand Total		127	2,733.5	48%

Daytime Classroom Utilization Summary by Room Capacity
Winter 2018 Week of January 1, 2018

	A	B	C	D = C / (B x 45)
Scheduling Authority	Room Capacity Range	Number of Rooms	Daytime Hours per Week	Daytime Utilization
Central	1-8 Seats	-	-	-
	9-16 Seats	2	-	-
	17-24 Seats	6	-	-
	25-32 Seats	13	62.0	11%
	33-40 Seats	22	79.5	8%
	41-48 Seats	6	38.5	14%
	49-60 Seats	12	55.5	10%
	61-80 Seats	10	57.5	13%
	81-100 Seats		-	-
	101-120 Seats	1	-	-
	121-140 Seats	4	17.5	10%
	141-180 Seats		-	-
	181-220 Seats	3	7.0	5%
	221-300 Seats	2	-	-
	300+ Seats	1	-	-
Central Total		82	317.5	9%
Local	1-8 Seats	-	-	-
	9-16 Seats	3	20.0	15%
	17-24 Seats	17	27.0	4%
	25-32 Seats	12	10.5	2%
	33-40 Seats	5	-	-
	41-48 Seats	1	-	-
	49-60 Seats	3	-	-
	61-80 Seats	3	-	-
	81-100 Seats	1	-	-
Local Total		45	57.5	3%
Grand Total		127	375.0	7%

Daytime Classroom Utilization Summary by Room Capacity
Spring 2018 Week of January 29, 2018

	A	B	C	D = C / (B x 45)
Scheduling Authority	Room Capacity Range	Number of Rooms	Daytime Hours per Week	Daytime Utilization
Central	1-8 Seats	-	-	-
	9-16 Seats	2	12.0	13%
	17-24 Seats	6	129.5	48%
	25-32 Seats	13	281.5	48%
	33-40 Seats	22	542.0	55%
	41-48 Seats	6	150.0	56%
	49-60 Seats	12	316.5	59%
	61-80 Seats	10	262.0	58%
	81-100 Seats		-	-
	101-120 Seats	1	35.0	78%
	121-140 Seats	4	119.5	66%
	141-180 Seats		-	-
	181-220 Seats	3	104.0	77%
	221-300 Seats	2	64.0	71%
	300+ Seats	1	32.0	71%
Central Total		82	2,048.0	56%
Local	1-8 Seats	-	-	-
	9-16 Seats	3	53.0	39%
	17-24 Seats	17	198.5	26%
	25-32 Seats	12	188.5	35%
	33-40 Seats	5	42.5	19%
	41-48 Seats	1		0%
	49-60 Seats	3	60.5	45%
	61-80 Seats	3	49.0	36%
	81-100 Seats	1	27.5	61%
Local Total		45	619.5	31%
Grand Total		127	2,667.5	47%

Conference Rooms

The following table shows the number of instructional hours scheduled in designated conference rooms in the Fall and Spring semesters. Based on the utilization rates presented on the previous pages, there is room in the existing classroom pool to absorb these hours.

Semester	Number of Hours
Fall	60.0
Spring	43.0

Time-of-Day Analysis

The following tables provide a graphic representation of how the UMBC classroom pool was scheduled during a typical week from 7:00 AM to 10:00 PM, Monday to Friday, in Fall 2017 and Spring 2018. The X-axis represents the time of day in half-hour increments with each day of the week indicated by colour. The Y-axis represents the number of classrooms in use for each time-of-day interval based on the total number of rooms available to be scheduled.

Four tables are presented for each semester at the Main Campus:

- All scheduled classrooms (127 rooms)

- Centrally-scheduled classrooms (82 rooms)
- Locally-scheduled classrooms (45 rooms)

- Small classrooms with 1-32 seats (53 rooms)
- Medium classrooms with 33-80 seats (62 rooms)
- Large classrooms with 80+ seats (12 rooms)

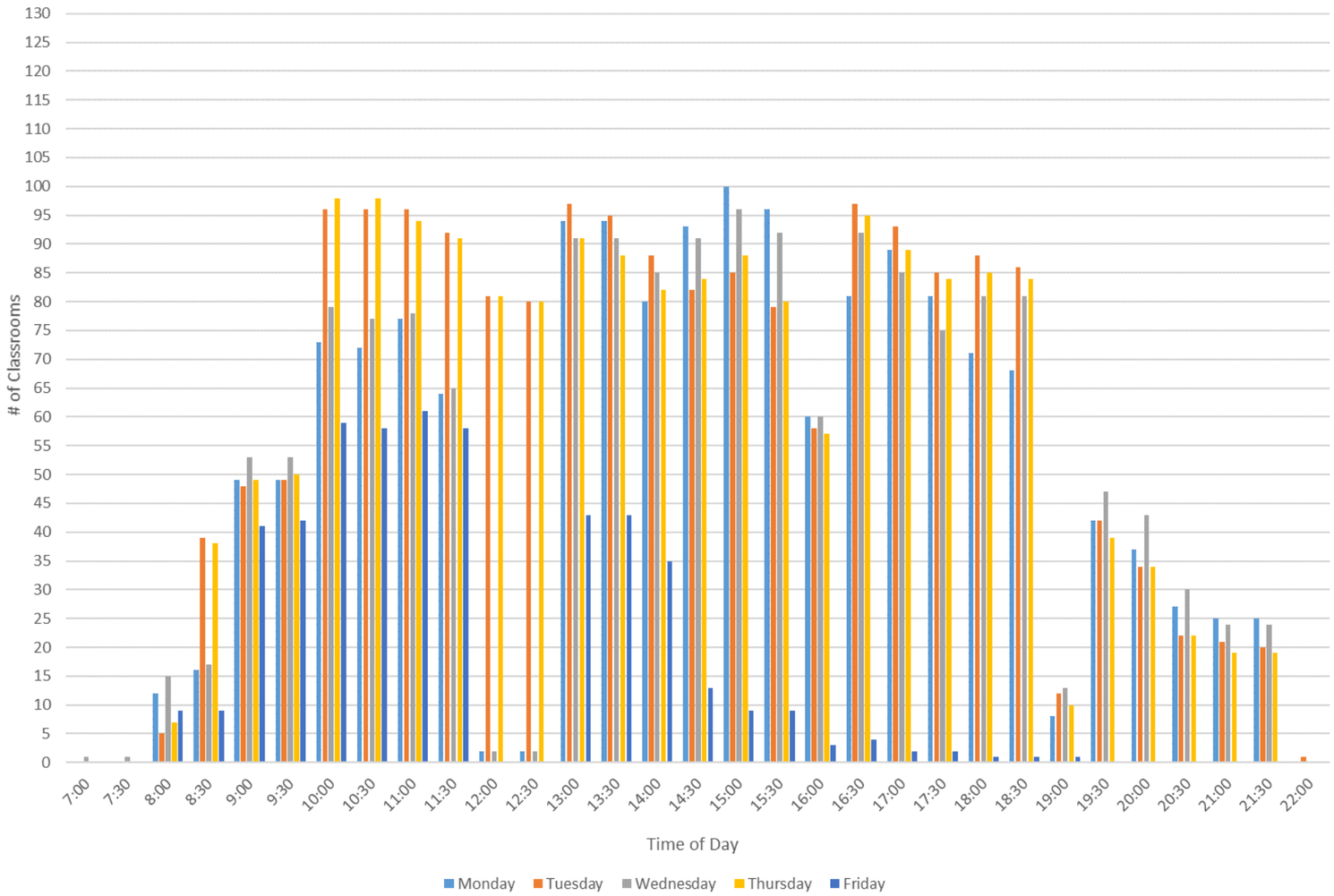
Overall patterns of utilization are typical of a large institution in that the scheduling peaks occur between 10:00 AM and 4:00 PM and utilization is lower during evenings and on Fridays. However, UMBC is unusual in that its scheduling peaks continue through the late afternoon/early evening, hours that are frequently under-scheduled at other institutions. The common hour from 12:00 PM to 1:00 PM on Mondays, Wednesdays, and Fridays is clearly visible in all tables.

The peak number of classrooms scheduled is 100 in Fall and 102 in Spring for a utilization of 79-80%. This means there are at least 25 classrooms sitting empty at any one time during the week. There is also a stark difference in the level of scheduling between centrally- and locally-controlled rooms: scheduling peaks in centrally-controlled rooms at 77 of 82 classrooms (94%) and 26 of 45 classrooms (58%) in locally-controlled rooms.

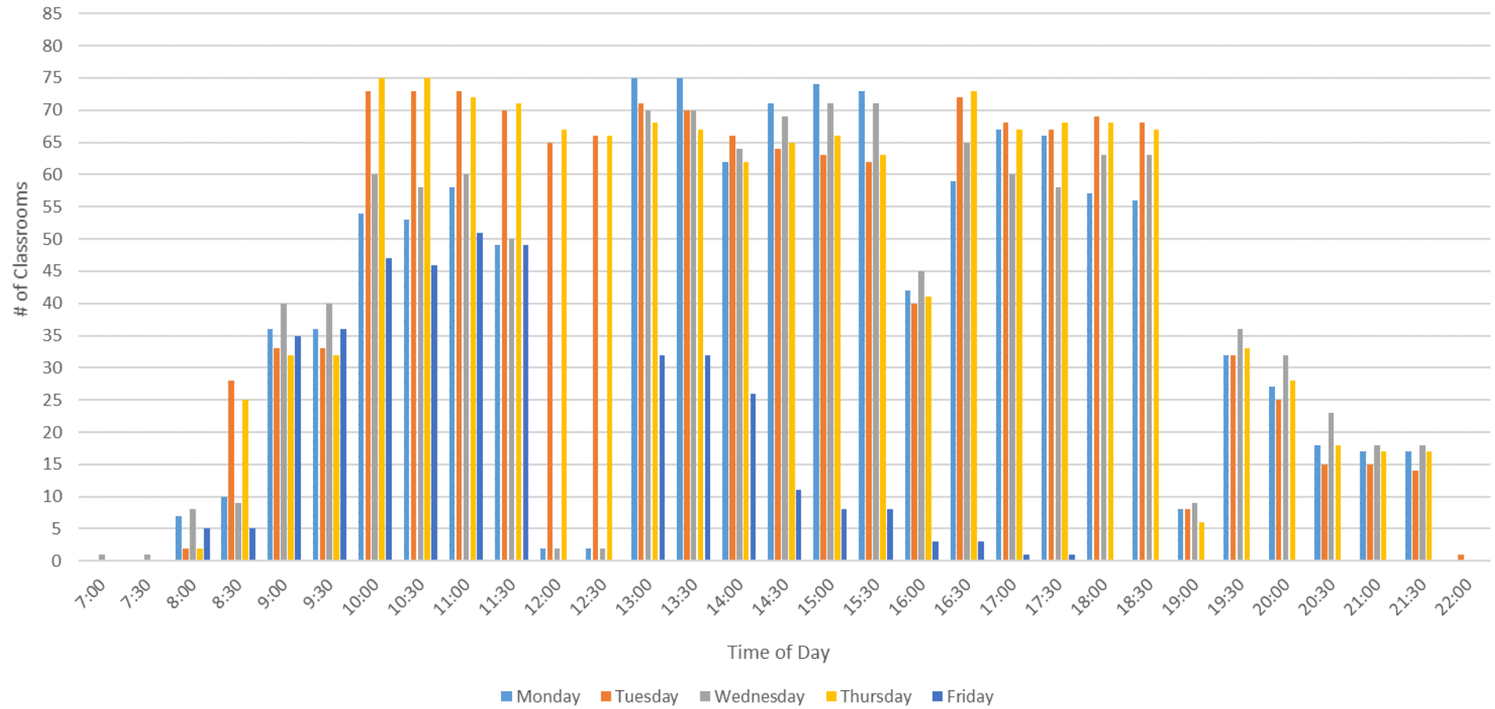
The table below shows the peak and average uses of small, medium, and large classrooms. Peak utilization is low for small rooms and high for medium and large rooms. On average, 38% of small classrooms, 53% of medium classrooms, and 75% of large classrooms were scheduled during the daytime scheduling window (8:00 AM to 5:00 PM). High peak and average scheduling rates imply a strong demand for large classrooms.

	A	B	C = B / A	D	E = D / A
		Peak		Average	
	Total # of Rooms	# of Rooms	Percentage (%)	# of Rooms	Percentage (%)
Small	53	36	68%	20	38%
Medium	62	56	90%	33	53%
Large	12	12	100%	9	75%

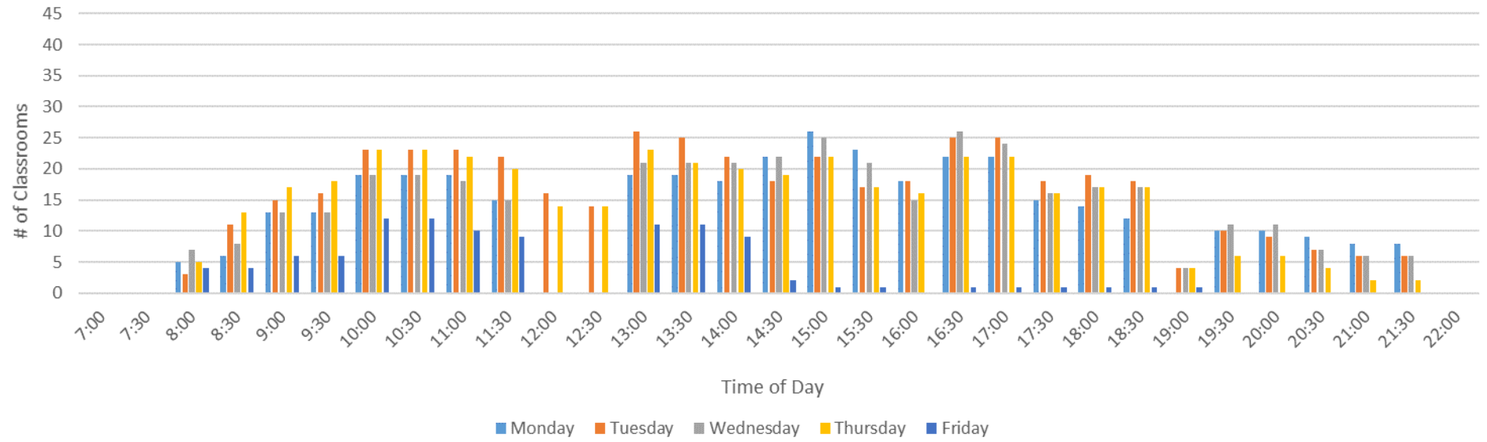
Fall – All Classrooms (127 Rooms)



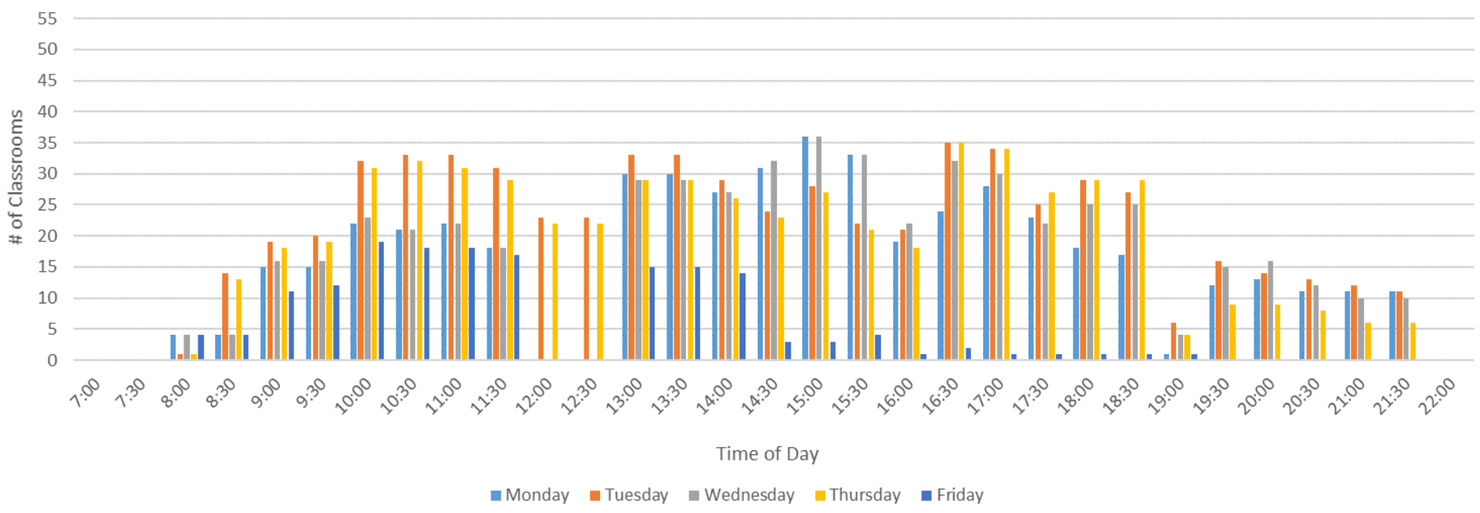
Fall – Centrally-Scheduled Classrooms (82 Rooms)



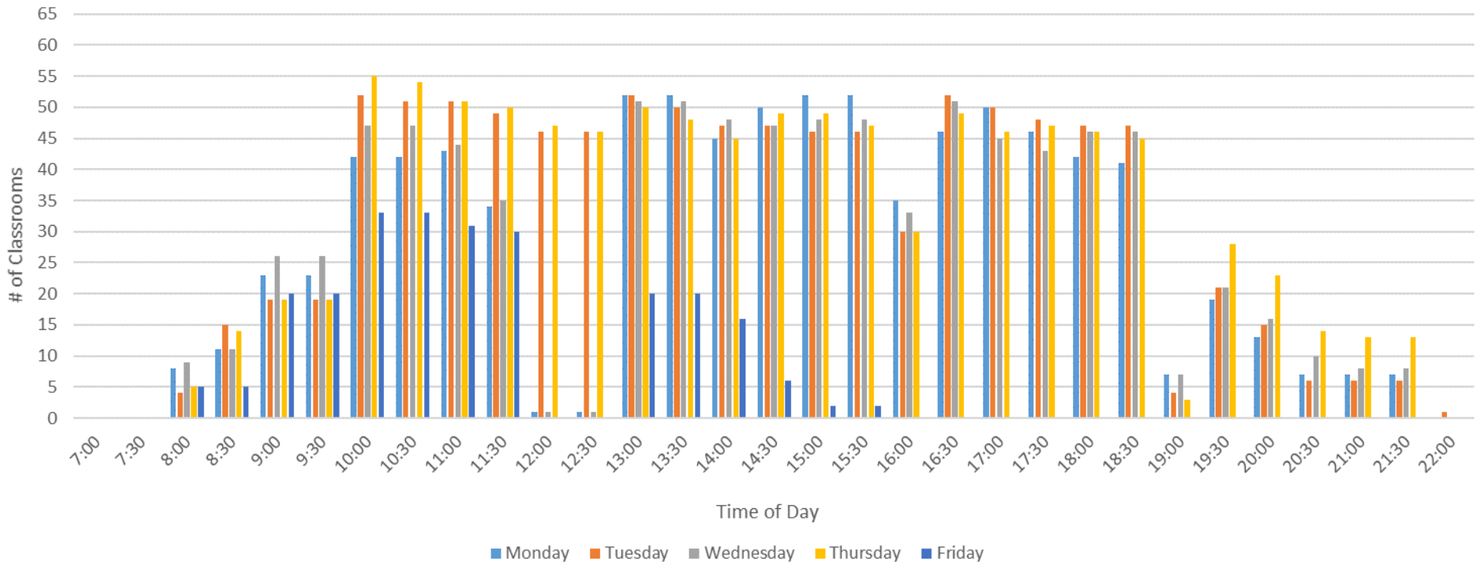
Fall – Locally-Scheduled Classrooms (45 Rooms)



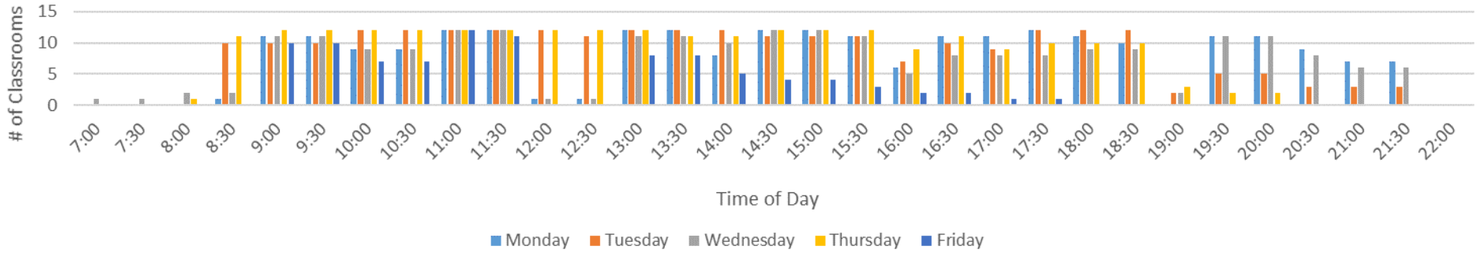
Fall – Small Classrooms: 1-32 Seats (53 Rooms)



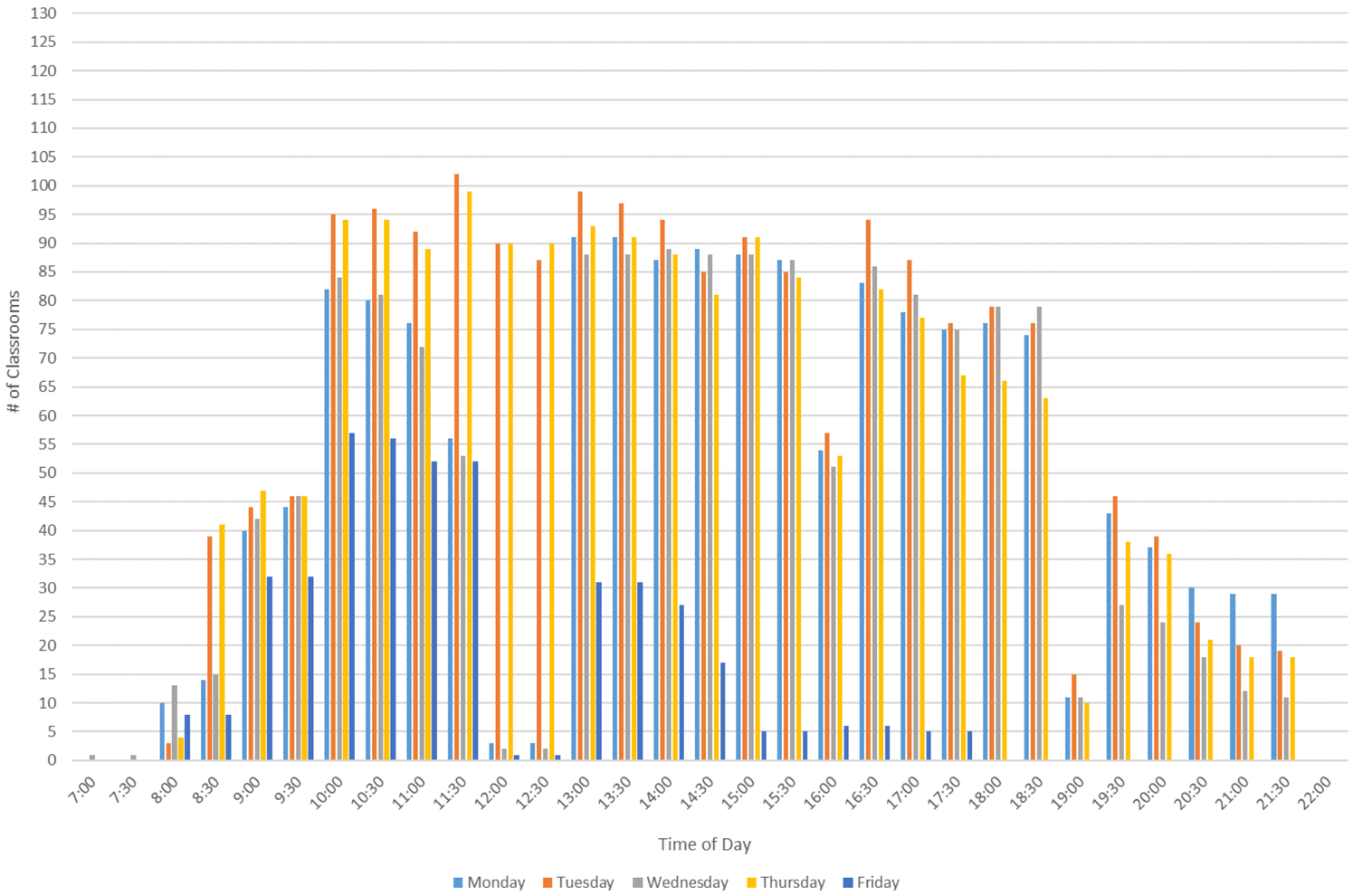
Fall – Medium Classrooms: 33-80 Seats (62 Rooms)



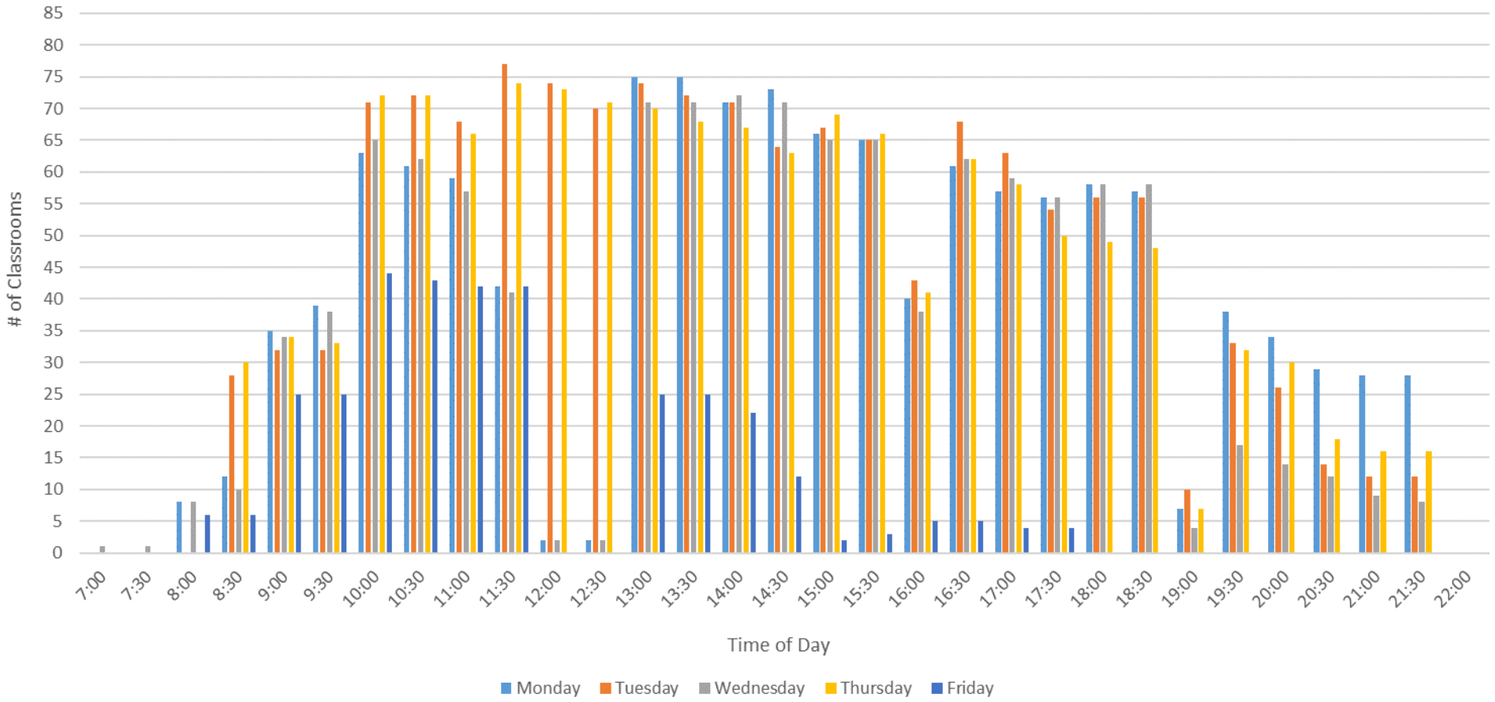
Fall – Large Classrooms: 80+ Seats (12 Rooms)



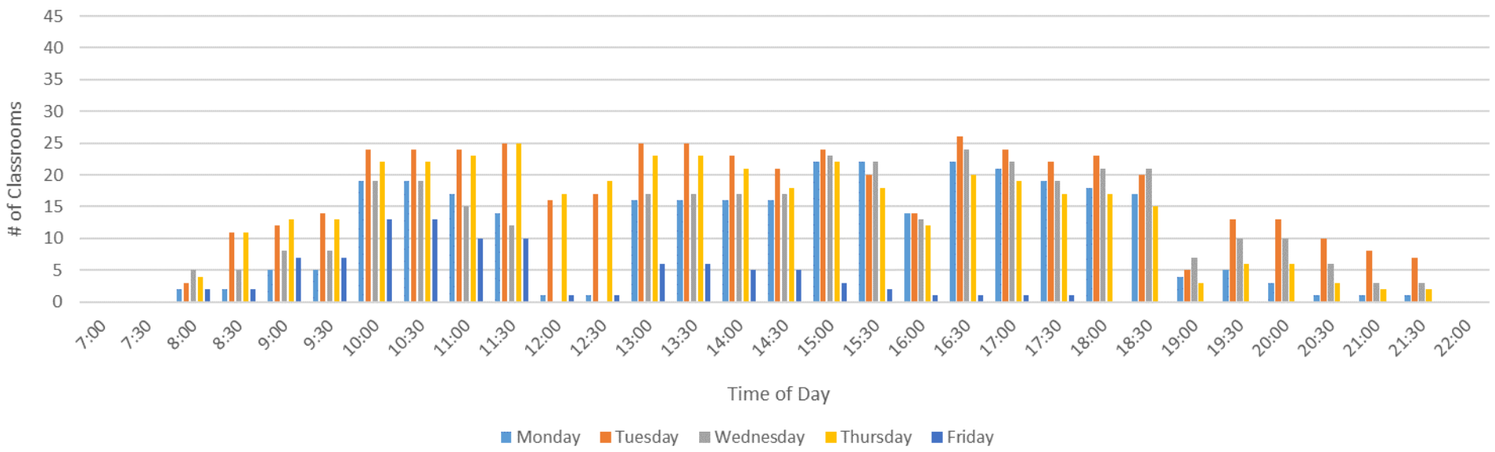
Spring – All Classrooms (127 Rooms)



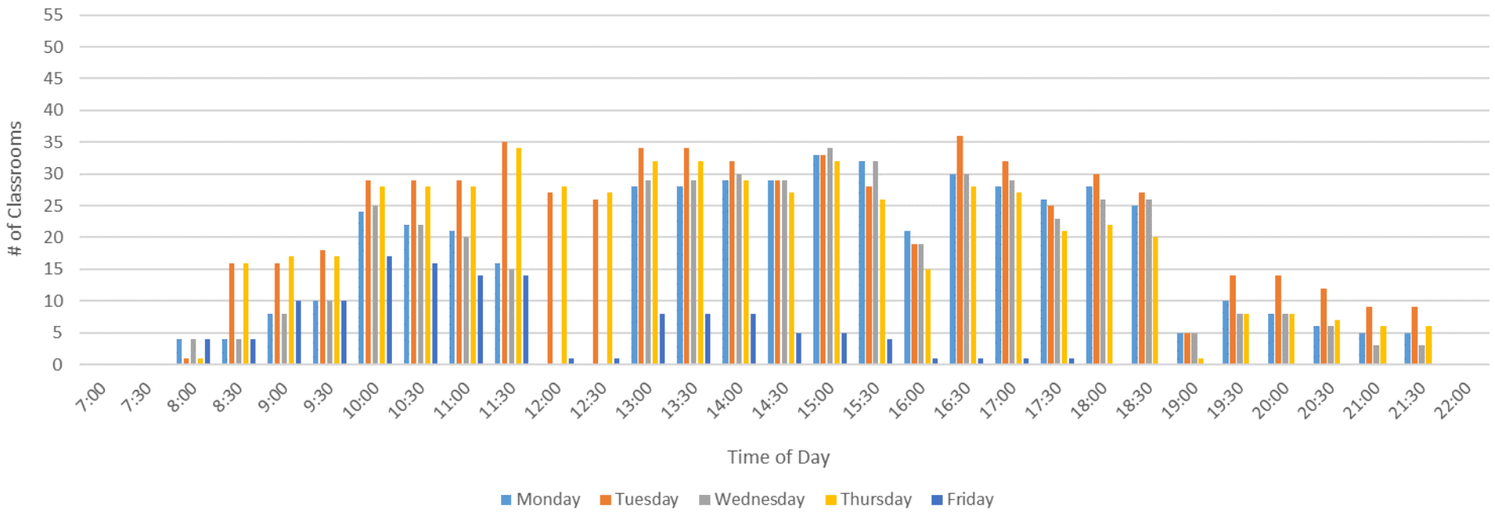
Spring – Centrally-Scheduled Classrooms (82 Rooms)



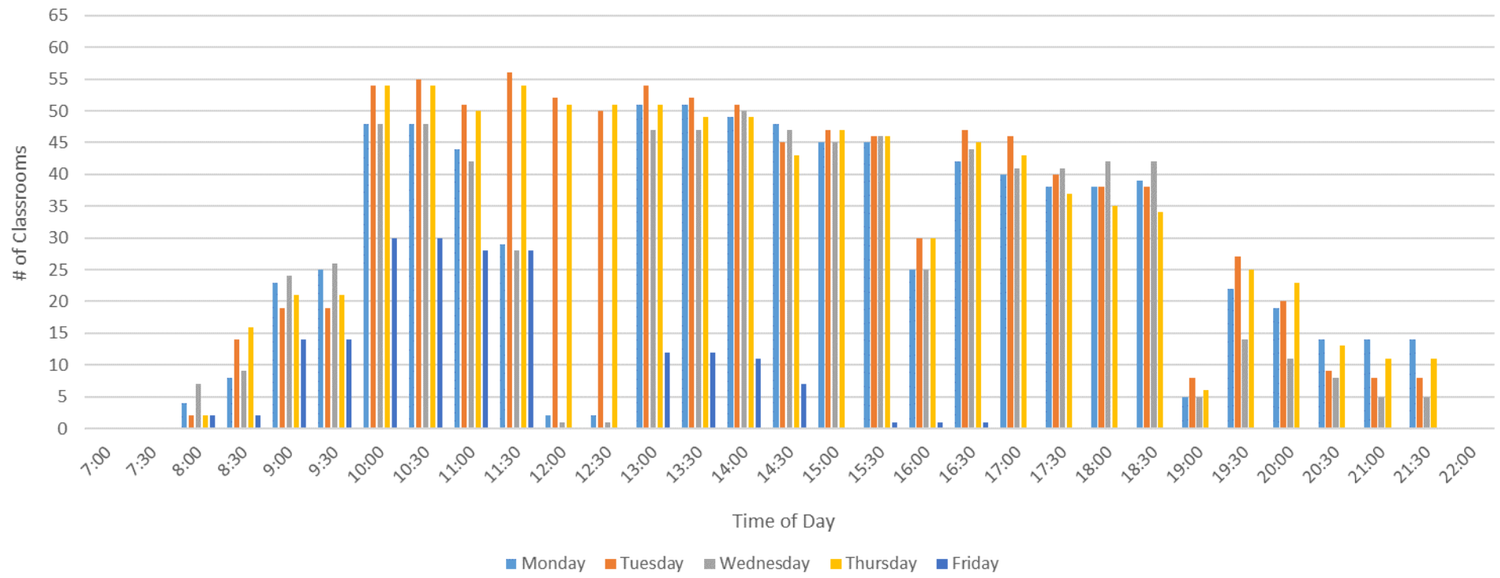
Spring – Locally-Scheduled Classrooms (45 Rooms)



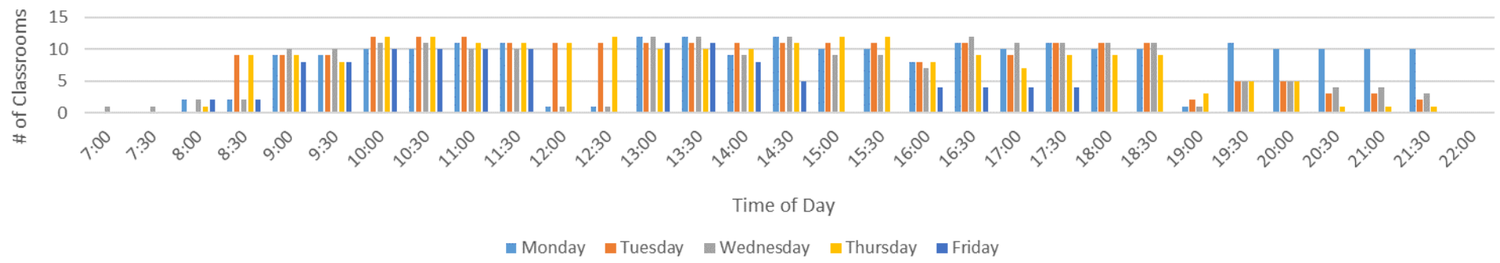
Spring – Small Classrooms: 1-32 Seats (53 Rooms)



Spring – Medium Classrooms: 33-80 Seats (62 Rooms)



Spring – Large Classrooms: 80+ Seats (12 Rooms)



Time-of-Day by College / School

To understand activity patterns by academic unit, the following tables show the distribution of scheduled hours across days of the week and time of day for both fall and spring semesters by College / School. Note the tables record a count of course event start times and do not reflect course delivery durations as do the time of day graphics on the previous pages.

The tables show that most course event activity is driven by the three largest colleges - 51% by CAHSS, 23% by CNMS and 20% for COEIT. The pattern of activity is consistent across academic units. Mondays to Thursdays show comparable levels of activity with significantly lower use on Fridays.

Fall Semester

	MONDAY					TUESDAY					WEDNESDAY					THURSDAY					FRIDAY				
College	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	MON Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	TUES Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	WED Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	THURS Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	FRI Total	Grand Total
CAHSS	4%	5%	1%	1%	11%	5%	5%	2%	1%	13%	4%	5%	2%	1%	11%	5%	5%	1%	0%	12%	3%	1%	0%	4%	**51%**
CNMS	2%	2%	1%	1%	5%	2%	1%	1%	0%	4%	2%	2%	1%	1%	6%	2%	2%	1%	0%	5%	2%	1%		2%	**23%**
COEIT	1%	2%	1%	0%	4%	1%	2%	1%	0%	4%	1%	2%	1%	0%	5%	1%	2%	1%	1%	5%	1%	1%		2%	**20%**
DPS	1%	0%			1%	0%	1%			1%	1%	0%	0%		1%	0%	0%			1%	1%			1%	**4%**
Erickson		0%			0%		0%	0%	0%	0%		0%	0%		0%		0%	0%		0%					**0%**
Social Work	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%	0%					**1%**
Total	8%	10%	3%	2%	**22%**	9%	9%	3%	2%	**23%**	8%	10%	3%	2%	**23%**	9%	9%	4%	1%	**23%**	6%	2%	0%	**9%**	**100%**

Spring Semester

	MONDAY					TUESDAY					WEDNESDAY					THURSDAY					FRIDAY				
College	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	MON Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	TUES Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	WED Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	THURS Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	FRI Total	Grand Total
CAHSS	4%	5%	2%	1%	11%	6%	5%	1%	1%	13%	4%	5%	2%	0%	11%	6%	5%	1%	0%	12%	3%	1%		4%	**51%**
CNMS	2%	2%	0%	0%	5%	1%	2%	1%	0%	5%	2%	2%	0%	0%	5%	1%	2%	1%	0%	4%	2%	1%		3%	**22%**
COEIT	1%	2%	1%	0%	5%	2%	2%	1%	0%	5%	1%	2%	1%	0%	4%	2%	2%	1%	1%	5%	1%	0%		1%	**20%**
DPS	0%	1%			1%	0%	1%			1%	0%	1%	0%		1%	0%	1%			1%	0%			0%	**5%**
Erickson						0%	0%		0%	0%			0%		0%	0%	0%	0%		0%					**1%**
Social Work	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%	0%	0%					**1%**
Total	7%	10%	3%	1%	**22%**	10%	10%	3%	2%	**24%**	7%	10%	3%	1%	**22%**	10%	9%	3%	1%	**24%**	6%	2%		**8%**	**100%**

Note: In both tables, blank cells indicate time of no activity; 0% indicates activity that totals less than 0.5%.

Time-of-Day by Course Level

To understand activity patterns by undergraduate / graduate level, the following tables show the distribution of scheduled hours across days of the week and time of day for both fall and spring semesters by course code. The analysis records a count of course event start times.

The tables show that the majority of course event activity (89%) is driven by undergraduate course delivery (course codes from 100 to 400). Undergraduate programs show highest activity during the morning and early afternoon timeslots. Graduate programs have highest delivery activity in the early and late afternoons. All levels show significantly less activity on Fridays.

Fall Semester

	MONDAY					TUESDAY					WEDNESDAY					THURSDAY					FRIDAY				Grand Total
Course Code	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	MON Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	TUES Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	WED Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	THURS Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	FRI Total	
100-400	7.0%	9.4%	1.9%	1.1%	19.5%	8.2%	8.1%	2.7%	1.3%	20.4%	7.3%	9.3%	2.4%	0.9%	20.0%	8.5%	8.1%	2.7%	1.2%	20.5%	5.8%	2.3%	0.0%	8.1%	**88.5%**
500	0.1%				0.1%	0.0%	0.0%			0.1%	0.1%				0.1%	0.0%	0.0%			0.1%	0.1%			0.1%	**0.4%**
600+	0.5%	0.8%	0.8%	0.4%	2.5%	0.6%	0.8%	0.8%	0.3%	2.4%	0.6%	0.8%	1.0%	0.7%	3.0%	0.5%	0.9%	0.8%	0.3%	2.5%	0.6%	0.1%		0.7%	**11.1%**
Total	7.6%	10.2%	2.8%	1.5%	22.1%	8.8%	9.0%	3.5%	1.5%	22.9%	8.0%	10.1%	3.4%	1.6%	23.1%	9.0%	9.1%	3.5%	1.4%	23.1%	6.4%	2.4%	0.0%	8.9%	100.0%

Spring Semester

	MONDAY					TUESDAY					WEDNESDAY					THURSDAY					FRIDAY				Grand Total
Course Code	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	MON Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	TUES Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	WED Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	Evening 19:00 to 22:00	THURS Total	Morning 8:00 to 12:00	Early Afternoon 12:00 to 16:30	Late Afternoon 16:30 to 19:00	FRI Total	
100-400	6.9%	9.2%	2.5%	1.1%	19.7%	9.0%	8.9%	2.5%	1.3%	21.7%	6.9%	8.8%	2.6%	0.5%	18.9%	9.0%	8.7%	2.3%	1.3%	21.3%	5.3%	2.0%		7.3%	88.8%
500	0.1%	0.0%			0.1%	0.0%	0.0%			0.1%	0.1%	0.0%			0.1%	0.0%	0.0%			0.1%	0.1%			0.1%	0.5%
600+	0.5%	0.9%	0.8%	0.3%	2.5%	0.6%	0.8%	1.0%	0.3%	2.7%	0.5%	1.0%	0.8%	0.3%	2.6%	0.6%	0.7%	0.7%	0.2%	2.2%	0.4%	0.2%		0.7%	10.7%
Total	7.4%	10.2%	3.3%	1.5%	22.3%	9.6%	9.8%	3.4%	1.6%	24.5%	7.5%	9.9%	3.5%	0.8%	21.6%	9.6%	9.5%	3.0%	1.5%	23.5%	5.9%	2.2%		8.1%	100.0%

Seat Utilization & Optimal Classroom Pool

The following tables present a two-part analysis of how the UMBC classroom pool was used in Fall 2017 and Spring 2018 at the Main Campus.

Part 1 - Seat Utilization

The upper portions of the tables (coloured) compare the capacity of the rooms in which classes were scheduled (Y-axis of the table) to the size of the student groups enrolled in those classes (X-axis of the table). The body of each table totals the number of hours per week in which classes of a certain group size were scheduled in rooms of a certain capacity. The background colours indicate the following:

- GOLD **background:** Hours for which the **size of the student group exceeded the capacity of the room.** In principle this should not occur, and the calculated percentage of hours in this category is negligible. It is assumed that these are data anomalies whereby the number of students exceeds the capacity of the room by one or two students only, a situation that corrects itself a few weeks into the semester through normal course attrition.
- WHITE **background:** Hours for which the **capacity of the room matched the size of the student group.**
- GREY **background:** Hours for which the **capacity of the room exceeded the size of the student group**.

The tables suggest that the capacities of the rooms that are part of the classroom pool are less than optimal given the high percentage of activity taking place in rooms that are too big (shown with a GREY background). The definition of what the optimal classroom pool should be, all other variables remaining constant, is further discussed below.

Part 2- Optimal Classroom Pool

The lower portion of the tables calculate what an optimal classroom pool should be in terms of both the number of rooms and their capacities:

- **Line A** details the total number of hours of utilization occurring per week, by student group size
- **Line B** details the total number of existing classrooms available for scheduling by room capacity
- **Lines C, D, and E** illustrate how the utilization target per room, expressed in hours per week, is calculated. The target is set at 80% of a 45-hour week, or 36 hours per room
- **Line F** calculates how many rooms would *optimally* be required to absorb the number of hours of activity taking place by student group size
- **Line G** calculates the difference in the number of existing classrooms available for scheduling and the optimal number of classrooms calculated as per Line F at each capacity range

In ECS's experience, the reason for any mismatches presented in the tables is linked to the way academic departments communicate their scheduling requirements to the scheduling office of a university or college. Academic departments tend to overestimate how many students will register in a course, but, just-in-case, the scheduling office schedules that course in a room that could hold that maximum number of students. When the actual course registrations are finalized and are found to be lower than the projected maximum, it is too late in the scheduling cycle to make changes whereby rooms with the correct capacities are used instead.

Impact of New ISLB Classrooms

The lower portion of the optimal classroom pool graphics for both Fall and Winter semesters shows results for the existing classroom pool as well as the future pool that will be in place with the opening of the new Interdisciplinary Life Sciences Building (ILSB) which will add 12 new classrooms with capacities as shown in the table below.

ILSB New Classroom	Capacity	# of Rooms	Total Seats	ECS Room Capacity Range
Large Active Learning Lecture Rooms	92	2	184	81-100 Seats
	90	2	180	81-100 Seats
Medium Active Learning Classroom	48	4	192	41-48 Seats
Large Seminar Room	24	4	96	17-24 Seats
Total Seats			**652**	

Gold shading in the optimal classroom pool graphics shows the room capacity ranges that will increase once the ILSB is open and the corresponding impact on room requirements. The addition of new large lecture rooms will address the current shortfall in 81-100 seat classrooms.

Seat Utilization & Optimal Classroom Pool
Fall 2017 Week of August 28, 2017

		Student Section Size Range															
	Room Capacity Range	1-8 Students	9-16 Students	17-24 Students	25-32 Students	33-40 Students	41-48 Students	49-60 Students	61-80 Students	81-100 Students	101-120 Students	121-140 Students	141-180 Students	181-220 Students	221-300 Students	300+ Students	Grand Total
	1-8 Seats																
	9-16 Seats	2.0	25.0	29.5	0.5												57.0
	17-24 Seats	17.5	48.5	225.5	33.0		0.5										325.0
	25-32 Seats	2.0	65.0	156.0	248.5	18.5	3.0								3.0		496.0
	33-40 Seats	1.0	25.0	56.5	320.0	207.0	7.0	4.0									620.5
	41-48 Seats		2.5	10.0	37.5	56.5	21.5										128.0
	49-60 Seats	9.5	23.5	15.0	91.5	170.0	25.5	49.0									384.0
	61-80 Seats	3.5	13.5	23.5	48.0	91.0	30.0	89.5	33.5								332.5
	81-100 Seats			1.5	17.0				6.5	6.0							31.0
	101-120 Seats	3.0		3.5	7.5		1.5	5.0	5.0	8.5							34.0
	121-140 Seats	6.5	1.5	3.0	9.5	19.5	5.0	19.0	22.5	33.0	4.5	9.0					133.0
	141-180 Seats																
	181-220 Seats				1.5				33.0	21.0	14.5	10.0	16.0				96.0
	221-300 Seats	6.0	2.0	3.0	4.0	0.5		6.0	3.0	10.0	5.5	6.0	5.0	9.0	5.0		65.0
	300+ Seats			3.0		0.5				2.0			6.0		10.0	10.0	31.5
A	**Grand Total**	**51.0**	**206.5**	**530.0**	**818.5**	**563.5**	**94.0**	**172.5**	**103.5**	**80.5**	**24.5**	**25.0**	**27.0**	**9.0**	**18.0**	**10.0**	**2,733.5**

4%	Total Hours of Use Whereby the Number of Students Exceeds the Capacity of the Classroom
31%	Total Hours of Use Whereby the Number of Students Matches the Capacity of the Classroom
66%	Total Hours of Use Whereby the Capacity of the Classroom Exceeds the Number of Students

B	Number of Classrooms - Existing	0	4	24	27	26	6	15	13	1	1	4	0	3	2	1	127
C	Weekly Daytime Scheduling Window (Hours)	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
D	Weekly Utilization Target (%)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
E = C x D	Weekly Utilization Target (Hours)	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
F = A / E	Optimal Classroom Pool	1.4	5.7	14.7	22.7	15.7	2.6	4.8	2.9	2.2	0.7	0.7	0.8	0.3	0.5	0.3	75.9
G = B - F	Notional Surplus or Shortage of Classrooms	**-1.4**	**-1.7**	**9.3**	**4.3**	**10.3**	**3.4**	**10.2**	**10.1**	**-1.2**	**0.3**	**3.3**	**-0.8**	**2.8**	**1.5**	**0.7**	**51.1**
H	Number of Classrooms - Future	0	4	28	27	26	10	15	13	5	1	4	0	3	2	1	139
I = H - F	Notional Surplus or Shortage of Classrooms	**-1.4**	**-1.7**	**13.3**	**4.3**	**10.3**	**7.4**	**10.2**	**10.1**	**2.8**	**0.3**	**3.3**	**-0.8**	**2.8**	**1.5**	**0.7**	**63.1**

Seat Utilization & Optimal Classroom Pool
Spring 2018 Week of January 29, 2018

		Student Section Size Range															
	ECS Room Capacity Range	1-8 Students	9-16 Students	17-24 Students	25-32 Students	33-40 Students	41-48 Students	49-60 Students	61-80 Students	81-100 Students	101-120 Students	121-140 Students	141-180 Students	181-220 Students	221-300 Students	300+ Students	Grand Total
	1-8 Seats																
	9-16 Seats	6.0	32.5	25.5	0.5				0.5								65.0
	17-24 Seats	12.0	58.0	212.0	46.0												328.0
	25-32 Seats	6.5	83.5	157.0	212.0	10.0	1.0										470.0
	33-40 Seats	3.0	23.5	49.0	280.5	221.5		7.0									584.5
	41-48 Seats	5.5	15.0	15.5	33.0	68.5	6.5	6.0									150.0
	49-60 Seats	15.0	8.0	31.0	59.5	197.5	12.0	54.0									377.0
	61-80 Seats	6.5	15.5	11.0	49.0	64.0	19.5	107.5	38.0								311.0
	81-100 Seats				16.0				3.0	8.5							27.5
	101-120 Seats				1.0	3.5		8.0	16.5	3.0	3.0						35.0
	121-140 Seats	3.0	1.0	1.5	2.0	18.5	0.5	6.5	26.0	32.0	19.5	9.0					119.5
	141-180 Seats																
	181-220 Seats					9.0		6.0	22.5	20.5	12.0	15.0	11.0	7.0		1.0	104.0
	221-300 Seats					4.0			10.0	6.0	6.0	3.0	10.0	4.0	19.0	2.0	64.0
	300+ Seats							2.0		5.0					10.0	15.0	32.0
A	**Grand Total**	**57.5**	**237.0**	**502.5**	**699.5**	**596.5**	**39.5**	**197.0**	**116.5**	**75.0**	**40.5**	**27.0**	**21.0**	**11.0**	**29.0**	**18.0**	**2,667.5**

4%	Total Hours of Use Whereby the Number of Students Exceeds the Capacity of the Classroom
31%	Total Hours of Use Whereby the Number of Students Matches the Capacity of the Classroom
65%	Total Hours of Use Whereby the Capacity of the Classroom Exceeds the Number of Students

B	Number of Classrooms	0	4	24	27	26	6	15	13	1	1	4	0	3	2	1	127
C	Weekly Daytime Scheduling Window (Hours)	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
D	Weekly Utilization Target (%)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
E = C x D	Weekly Utilization Target (Hours)	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
F = A / E	Optimal Classroom Pool	1.6	6.6	14.0	19.4	16.6	1.1	5.5	3.2	2.1	1.1	0.8	0.6	0.3	0.8	0.5	74.1
G = B - F	Notional Surplus or Shortage of Classrooms	**-1.6**	**-2.6**	**10.0**	**7.6**	**9.4**	**4.9**	**9.5**	**9.8**	**-1.1**	**-0.1**	**3.3**	**-0.6**	**2.7**	**1.2**	**0.5**	**52.9**
H	Number of Classrooms - Future	0	4	28	27	26	10	15	13	5	1	4	0	3	2	1	139
I = H - F	Notional Surplus or Shortage of Classrooms	**-1.6**	**-2.6**	**14.0**	**7.6**	**9.4**	**8.9**	**9.5**	**9.8**	**2.9**	**-0.1**	**3.3**	**-0.6**	**2.7**	**1.2**	**0.5**	**64.9**

Laboratory & Specialized Workshop Utilization

The following tables summarize how laboratories at UMBC were used during daytime hours in Fall 2017 and Spring 2018 semesters. Labs are clustered according to type and considered independently from one another, for example, computer labs, wet labs, dry labs, etc. Utilization is calculated using the same peak weeks of classroom activity outlined in Section 2 under the assumption that weeks of peak classroom use will also yield peak laboratory/workshop use. Open labs are not included in this analysis. Each table considers:

- The room number (column A)
- The room description as per inventory records (column B)
- The total number of hours scheduled in the room on a weekly basis (columns C & E) during peak weeks of activity in Fall 2017 and Spring 2018 semesters
- The average weekly daytime utilization (columns D & F) in Fall 2017 and Spring 2018 semesters expressed as a percentage of the total time these laboratories and workshops are available in daytime during the week, i.e. 45 hours

Peak Weeks

Fall 2017 Week of August 28, 2017
Spring 2018 Week of January 29, 2018

Computer Laboratory, Specialized

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
ENGR-021	Unknown	14.5	32%	6.5	14%
ENGR-021A	Unknown	9.5	21%	6.0	13%
ENGR-114	CAD Specific Class	7.5	17%	6.5	14%
ENGR-333	Computer	20.0	44%	19.0	42%
FA-112	Computer	20.0	44%	6.0	13%
ITE-458	Unknown	10.5	23%	14.0	31%
ITE-467	Unknown	10.5	23%	10.5	23%
ITE-468	Unknown	18.5	41%	18.5	41%
ITE-469	Unknown	13.5	30%	6.0	13%
PAHB-230	Sonic Computer Lab	9.0	20%	12.0	27%
UC-203	Unknown	20.0	44%	10.0	22%

Dry Laboratory

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
PAHB-314	Writing Lab	31.0	69%	31.0	69%
PAHB-317	Writing Lab	31.0	69%	25.0	56%
PAHB-318	Writing Lab	31.0	69%	20.0	44%
PHYS-108	Unknown	19.0	42%	12.0	27%
PHYS-109	Unknown	12.5	28%	13.0	29%
PHYS-110	Unknown	6.0	13%	6.0	13%
PHYS-208	Unknown	7.0	16%	8.0	18%
PHYS-209	Unknown	-	-	2.5	6%
PHYS-213	Unknown	8.0	18%	-	-
SOND-001	Unknown	12.0	27%	8.0	18%
SOND-006	Unknown	17.0	38%	10.0	22%
SOND-007	Unknown	17.0	38%	13.0	29%

Electronics & Electrical Bench

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
ENGR-005B	Unknown	4.0	9%	12.0	27%
ENGR-104	Unknown	8.0	18%	10.0	22%
ENGR-104A	Unknown	23.0	51%	20.0	44%
ENGR-122	Unknown	12.0	27%	12.0	27%
ENGR-122A	Unknown	11.0	24%	8.0	18%
ENGR-336	Unknown	8.0	18%	10.0	22%

Wet Laboratory, Life Sciences

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
BIOL-005	Undergraduate Teaching Lab	7.0	16%	7.0	16%
BIOL-006	Undergraduate Teaching Lab	8.5	19%	11.5	26%
BIOL-007	Undergraduate Teaching Lab	15.0	33%	13.0	29%
BIOL-008	Undergraduate Teaching Lab	14.5	32%	12.0	27%
BIOL-051	Undergraduate Teaching Lab	-	-	11.0	24%
BIOL-156	Undergraduate Teaching Lab	9.0	20%	9.0	20%
BIOL-160	Undergraduate Teaching Lab	16.0	36%	12.0	27%
BIOL-165	Undergraduate Teaching Lab	9.0	20%	9.0	20%
ENGR-334B	Unknown	11.0	24%	8.0	18%
PHYS-111	Unknown	31.5	70%	30.0	67%

Wet Laboratory, Physical Sciences

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
ENGR-118	Unknown	12.0	27%	15.0	33%
MEYR-201	Unknown	8.0	18%	-	-
MEYR-271	Undergraduate Teaching Lab	16.0	36%	-	-
MEYR-274	Undergraduate Teaching Lab	-	-	4.0	9%
MEYR-277	Undergraduate Teaching Lab	-	-	8.0	18%
MEYR-301	Undergraduate Teaching Lab	12.0	27%	19.0	42%
MEYR-302	Undergraduate Teaching Lab	12.0	27%	19.0	42%
MEYR-305	Undergraduate Teaching Lab	12.0	27%	19.0	42%
MEYR-310	Undergraduate Teaching Lab	4.0	9%	16.0	36%
MEYR-340	Undergraduate Teaching Lab	12.0	27%	8.0	18%
MEYR-352	Undergraduate Teaching Lab	16.0	36%	16.0	36%
MEYR-371	Undergraduate Teaching Lab	16.0	36%	20.0	44%
MEYR-372	Undergraduate Teaching Lab	16.0	36%	20.0	44%
MEYR-375	Undergraduate Teaching Lab	16.0	36%	20.0	44%
MEYR-378	Undergraduate Teaching Lab	16.0	36%	20.0	44%

Media Studio / Performance Arts Studio

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
FA-317	Open Dance Studio	9.0	20%	0.5	1%
FA-318	Theatre Acting Laboratory	12.0	27%	6.0	13%
FA-418	Unknown	8.5	19%	10.0	22%
PAHB-009	TECH AREA SUPPORT	3.0	7%		0%
PAHB-102	Studio	16.0	36%	24.0	53%
PAHB-105	Studio	7.0	16%		0%
PAHB-129	Music Tech/Keyboard Lab	10.0	22%	8.0	18%
PAHB-151	Instrument Ensemble, 2 PROJECTORS	18.0	40%	26.0	58%
PAHB-157	Recording Studio	8.5	19%	9.5	21%
PAHB-173	Ethno/Percussion Studio/Storage	5.0	11%	3.0	7%
PAHB-201	Unknown	14.0	31%	22.0	49%
PAHB-231	Dance Technology Studio	18.0	40%	17.0	38%
PAHB-255	Music Teaching Lab	2.0	4%	1.5	3%
PAHB-337	Dance Studio	29.0	64%	24.0	53%

Fine Arts / Graphic Arts / Drafting

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
FA-110C	Drawing Class	16.0	36%	16.0	36%
FA-114	Foundations	30.0	67%	26.0	58%
FA-208	Print Making Class	8.0	18%	8.0	18%
FA-221	Unknown	5.0	11%	4.0	9%
FA-221A	Cinematic Arts film screening room	-	-	14.0	31%
FA-323	Unknown	36.0	58%	10.0	22%
FA-330	Unknown	20.0	44%	14.0	31%
FA-343	Unknown	12.0	27%	12.0	27%
FA-353	Unknown	14.0	31%	16.0	36%
FA-354	Unknown	20.0	44%	12.0	27%

Patient Care Skills Lab / Simulation / Therapy

A	B	C	D = B / (A x 45)	E	F = D / (A X 45)
		Fall 2017		Spring 2018	
Room Number	Room Description	Daytime Hours per Week	Daytime Utilization	Daytime Hours per Week	Daytime Utilization
SHER-304	Unknown	6	13%	-	-

Classroom List – Existing Rooms

Building	Room ID	Description	Central/ Local	Fall Utilization	Spring Utilization
Administration	AD-101	LECTURE HALL	Central	66%	71%
Albin O Kuhn Library & Gallery	LIB-216M	LARGE SEMINAR ROOM	Central	40%	34%
Biological Sciences	BIOL-004	LARGE CLASSROOM	Local	69%	42%
	BIOL-120	LARGE CLASSROOM	Central	34%	62%
Engineering	ENGR-022	MEDIUM CLASSROOM	Central	42%	61%
	ENGR-023	MEDIUM ACTIVE LEARNING	Local	12%	1%
	ENGR-025	MEDIUM ACTIVE LEARNING	Local	0%	3%
	ENGR-027	LECTURE HALL	Central	77%	71%
	ENGR-112	MEDIUM CLASSROOM	Local	16%	13%
	ENGR-231	LARGE ACTIVE LEARNING	Local	34%	51%
Fine Arts	FA-001	MEDIUM CLASSROOM	Central	57%	44%
	FA-002	SMALL CLASSROOM	Local	36%	24%
	FA-006	MEDIUM CLASSROOM	Central	46%	60%
	FA-011	LARGE ACTIVE LEARNING	Local	59%	60%
	FA-014	MEDIUM CLASSROOM	Central	54%	60%
	FA-015	MEDIUM CLASSROOM	Central	62%	46%
	FA-018	MEDIUM CLASSROOM	Central	59%	53%
	FA-107	MEDIUM CLASSROOM	Local	20%	16%
	FA-207C	SMALL CLASSROOM	Local	0%	27%
	FA-215	LARGE CLASSROOM	Central	61%	41%
	FA-301	LARGE SEMINAR ROOM	Central	0%	0%
	FA-303	MEDIUM CLASSROOM	Central	3%	31%
	FA-306	LECTURE HALL	Central	73%	48%
	FA-342	SMALL SEMINAR ROOM	Local	7%	27%
	FA-424	LARGE SEMINAR ROOM	Local	52%	39%
	FA-427	LARGE SEMINAR ROOM	Local	64%	56%
	FA-459	LARGE SEMINAR ROOM	Local	51%	49%
	FA-526	LARGE SEMINAR ROOM	Local	34%	16%
	FA-533	SMALL CLASSROOM	Local	29%	29%
	FA-558	LARGE SEMINAR ROOM	Local	3%	13%
	FA-559	LARGE SEMINAR ROOM	Local	7%	12%
Information Technology/Engr	ITE-102	LECTURE HALL	Central	77%	74%
	ITE-104	LECTURE HALL	Central	68%	71%
	ITE-227	LARGE CLASSROOM	Central	54%	54%
	ITE-229	LARGE CLASSROOM	Central	67%	53%
	ITE-231	LARGE CLASSROOM	Central	64%	49%
	ITE-233	LARGE CLASSROOM	Central	60%	68%
	ITE-237	MEDIUM CLASSROOM	Central	40%	70%
	ITE-238	MEDIUM ACTIVE LEARNING	Local	72%	38%
	ITE-239	MEDIUM CLASSROOM	Central	72%	79%
	ITE-241	MEDIUM CLASSROOM	Central	77%	52%
	ITE-406	LARGE SEMINAR ROOM	Local	7%	13%
	ITE-456	MEDIUM CLASSROOM	Central	44%	41%
Janet & Walter Sondheim Hall	SOND-101	MEDIUM ACTIVE LEARNING	Central	67%	61%
	SOND-103	LARGE CLASSROOM	Central	53%	72%
	SOND-105	LARGE CLASSROOM	Central	51%	37%
	SOND-107	MEDIUM CLASSROOM	Central	51%	47%
	SOND-108	MEDIUM CLASSROOM	Central	61%	61%
	SOND-109	MEDIUM CLASSROOM	Central	68%	58%
	SOND-110	MEDIUM CLASSROOM	Central	64%	51%
	SOND-111	MEDIUM CLASSROOM	Central	67%	50%
	SOND-112	MEDIUM CLASSROOM	Central	51%	49%
	SOND-113	MEDIUM CLASSROOM	Central	54%	58%
	SOND-114	MEDIUM CLASSROOM	Central	53%	40%
	SOND-202	MEDIUM CLASSROOM	Central	48%	37%
	SOND-203	MEDIUM CLASSROOM	Local	59%	49%
	SOND-204	MEDIUM CLASSROOM	Central	54%	44%
	SOND-205	MEDIUM CLASSROOM	Central	47%	43%
	SOND-206	MEDIUM CLASSROOM	Central	42%	50%
	SOND-207	MEDIUM CLASSROOM	Central	67%	62%
	SOND-208	MEDIUM CLASSROOM	Central	42%	46%
	SOND-209	MEDIUM CLASSROOM	Central	43%	62%
	SOND-406	MEDIUM CLASSROOM	Local	32%	21%
	SOND-409	MEDIUM ACTIVE LEARNING	Central	60%	50%
	SOND-414	MEDIUM CLASSROOM	Local	24%	43%
Lecture Hall 1	LH1-101	LECTURE HALL	Central	78%	80%
Math & Psychology	MP-008	MEDIUM CLASSROOM	Central	57%	48%
	MP-010	MEDIUM CLASSROOM	Central	52%	47%
	MP-012	MEDIUM CLASSROOM	Central	38%	42%
	MP-101	LARGE CLASSROOM	Central	74%	67%
	MP-102	MEDIUM CLASSROOM	Central	46%	51%
	MP-103	LARGE CLASSROOM	Central	67%	71%
	MP-104	LARGE CLASSROOM	Central	69%	56%
	MP-105	MEDIUM CLASSROOM	Central	31%	56%
	MP-106	LARGE CLASSROOM	Central	53%	57%
	MP-401	MEDIUM CLASSROOM	Local	28%	29%
Meyerhoff Chemistry	MEYR-030	LECTURE HALL	Central	70%	71%
	MEYR-120	LARGE CLASSROOM	Local	13%	13%
	MEYR-256	SMALL CLASSROOM	Central	32%	62%
	MEYR-272	MEDIUM CLASSROOM	Local	42%	48%
Performing Arts & Humanities	PAHB-107	MEDIUM CLASSROOM	Central	62%	71%
	PAHB-108	MEDIUM CLASSROOM	Central	49%	64%
	PAHB-123	MEDIUM CLASSROOM	Central	47%	46%
	PAHB-124	MEDIUM CLASSROOM	Central	37%	38%
	PAHB-132	LARGE CLASSROOM	Central	76%	78%
	PAHB-229	LARGE SEMINAR ROOM	Local	29%	13%
	PAHB-234	MEDIUM CLASSROOM	Central	78%	73%
	PAHB-428	LARGE SEMINAR ROOM	Local	58%	44%
	PAHB-441	SMALL SEMINAR ROOM	Local	44%	42%

Building	Room ID	Description	Central/ Local	Fall Utilization	Spring Utilization
Physics	PHYS-101	LECTURE HALL	Central	79%	72%
	PHYS-107	SMALL CLASSROOM	Central	37%	37%
	PHYS-201	MEDIUM CLASSROOM	Central	58%	70%
	PHYS-226	LARGE CLASSROOM	Local	32%	23%
Public Policy	PUP-105	LECTURE HALL	Central	67%	71%
	PUP-203	LARGE SEMINAR ROOM	Central	51%	36%
	PUP-206	LARGE CLASSROOM	Central	61%	61%
	PUP-208	LARGE CLASSROOM	Central	59%	69%
	PUP-367	LARGE SEMINAR ROOM	Local	0%	4%
	PUP-438	LARGE SEMINAR ROOM	Local	2%	10%
Sherman Hall	SHER-003	LECTURE HALL	Central	70%	80%
	SHER-006	MEDIUM CLASSROOM	Central	54%	66%
	SHER-007	LARGE SEMINAR ROOM	Central	53%	27%
	SHER-011	MEDIUM CLASSROOM	Central	51%	53%
	SHER-013	LARGE CLASSROOM	Central	68%	61%
	SHER-014	LARGE CLASSROOM	Central	64%	48%
	SHER-015	LARGE CLASSROOM	Central	48%	58%
	SHER-108	MEDIUM CLASSROOM	Central	44%	43%
	SHER-109	MEDIUM CLASSROOM	Local	17%	22%
	SHER-110	MEDIUM CLASSROOM	Local	13%	13%
	SHER-121	MEDIUM CLASSROOM	Local	16%	14%
	SHER-145	LARGE CLASSROOM	Central	58%	57%
	SHER-148C	LARGE SEMINAR ROOM	Local	18%	7%
	SHER-150	LARGE CLASSROOM	Central	67%	60%
	SHER-151	LARGE CLASSROOM	Central	49%	51%
	SHER-207	MEDIUM CLASSROOM	Central	52%	46%
	SHER-208	MEDIUM CLASSROOM	Local	22%	18%
	SHER-210	MEDIUM CLASSROOM	Central	69%	61%
	SHER-305	MEDIUM CLASSROOM	Local	74%	63%
	SHER-464	SMALL SEMINAR ROOM	Local	22%	33%
Technology Research Center	TRC-122	SMALL CLASSROOM	Local	79%	0%
University Center	UC-115	LARGE CLASSROOM	Central	58%	61%
	UC-115D	LARGE ACTIVE LEARNING	Local	32%	61%
	UC-201	LARGE ACTIVE LEARNING	Local	51%	53%
	UC-201A	SMALL CLASSROOM	Local	67%	64%
	UC-201B	SMALL CLASSROOM	Local	51%	56%
	UC-201F	SMALL CLASSROOM	Local	61%	62%
	UC-204	SMALL CLASSROOM	Central	59%	53%