

University of
Lethbridge



Discussion Paper
of the
Academic Timetable
& Academic Space Utilization
Working Group
Spring 2018

April 2018: This report is currently only for the distribution to and use by the membership of the Provost Council and the Academic Timetable and Academic Space Utilization Working Group.

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Working Group Membership

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- Kristy Grant, Assistant to the Registrar, Recording Secretary
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- Prisca Basele, Project Coordinator
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- Shawn Johnsrude, Director, Curriculum & Academic Scheduling, Arts & Science
- Eunice Anteh, GSA – Representative
- Sandeep Parmar, SU – Representative
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Working Group Meeting Dates

August 21, 2017

September 19, 2017

October 10, 2017

November 16, 2017

February 8, 2018

April 9, 2018

August 29, 2018

September 24, 2018

October 22, 2018

Other Meeting Dates

Classroom Governance Committee – January 29, 2018

Part A: Background

1. Annual Timetable

The Academic Timetable and Academic Space Utilization Working Group was initially established as a special purpose working group as a result of feedback to the Registrar's Office from Deans' offices and the SEM committee to consider moving to an annual academic timetable. The working group received endorsement from the Provost Committee, the First Year Student Capacity Working Group(2016), the Classroom Governance Committee, the Campus Space Governance Committee(2016), and the SEM committee.

"2.2.2: Annual Timetable" of the First Year Student Capacity Working Group (2016) report recommended,

That the Academic Units and Registrar's Office work toward developing an annual timetable that allows students to register for multiple terms simultaneously.

From the Timetable Guidelines (2015) are the over-arching objectives of the Academic Timetable at the University of Lethbridge:

The University Academic Timetable is designed to deliver credential programs to students admitted to the University of Lethbridge. The timetable seeks to maximize students' access to programs over the course of a full-year (May-April) leading to timely completion and to deliver an effective timetable for teaching staff while making optimal and efficient use of instructional space resources. This can be accomplished by building a student-friendly, efficient academic timetable which ensures students get seats in the courses they need by balancing course offerings with student course demand.

2. A New Institutional Approach to Timetabling is Considered

Early spring 2014 saw a number of approaches, working with the Classroom Governance Committee, to address the issues and challenges related to timetabling.

Two motions were made at the Classroom Governance Committee meeting in November 2014 which designated tasks to the new Registrar.

MOTION: THAT the Registrar or Designate will develop a University of Lethbridge Timetable and Scheduling Policy

MOTION: THAT the Registrar or Designate will chair the Timetable and Scheduling subgroup with the goal of improving timetabling and scheduling practices.

In addition, the meeting in October tasked the Registrar with developing and submitting an RFP for timetabling and exam timetabling software.

In Spring 2016 the Institution approved strategic priority funding for "Revamping the Timetabling Process".

The objectives of the proposal requesting these funds were to:

- 1) purchase and implement a more robust timetabling system to support institutional objectives;
- 2) engage with a software vendor to consult on best timetable practices (such as patterns, procedures) considering the UofL programs, course offerings, inventory, constraints, and in light of the destination project and the recent (2014) utilization study.

Part B: Updates from October 2016 Report

1. Updates from October 2016

1.1 Annual Academic Timetable

A detailed draft plan has been created, to support discussion of the publishing of an annual timetable starting in March 2020 for the 2020-2021 Academic year.

1.1.1: Annual Academic Timetable: Transition Years 2018 & 2019

In order to bring the current processes timeline into alignment with the annual timetable processes, a transition period is required, which will “catch up” the timetable processes and allow other concerns to be addressed within affected offices. Once the “transition period” is complete we can begin the timetable process in Summer 2019 for an annual timetable for the 2020-2021 calendar year. Timetable submissions from the Academic Units to the timetabling unit are proposed as follows:

2019-2020 Academic Year – Timetable

- Room assignment using InfoSilem
- Current patterns
- Registrar’s Office continues to use DCU for data input;
- June 30, 2018 for Summer (May ‘19);
 - Maintain current summer timetabling operating procedures - ongoing
- November 15, 2018 for Fall (September ‘19);
- January 20, 2019 for Spring (January ‘20).

2020-2021 Academic Year – Timetable

- Proposal to begin Annual Academic Timetable
- Proposal to use Co-ordinated Scheduling (new approach) using Infosilem
- Proposal to use new, proposed patterns
- June 30, 2019 for Summer (May ‘20);
- November 15, 2019 for Fall (September ‘20);
- January 20, 2020 for Spring (January ‘21).

1.2 Registration Periods

1.2.1 Registration Dates – Options Considered

Two options for consideration as a result of the review process have been proposed to be implemented in alignment with the annual Academic Timetable. The working group was divided in preferring one option over the other.

Finally, through much discussion, the team continues to favour an initial implementation with two registration periods,

- March 15 for Summer (May), Fall (September)
- November 1 for Spring (January)

To be considered for future implementation of the annual Timetable, one registration period,

- March 1 for Summer (May), Fall (September), and Spring (January)

The working group proposes the implementation of two registration periods which is preferred as a transition to the annual Academic Timetable. This type of phased implementation will allow the institution to understand the implications and impacts more fully before considering a commitment to a single registration period.

The working group recommends that following implementation, a similar working group convene to consult with regard to a single registration period, the annual academic timetable.

2.2.2 Registration Restrictions Lift Dates

The **2.3.1: Communicating the Removal of Partitions or Reserved Seats of the First Year Student Capacity Working Group** report recommended (page 40) that,

The Academic Units in consultation with the Registrar's Office and Enrolment Services define the date for the removal of most partitions or reserved seats [now referred to as registration restrictions] for each semester. A later date could be set for courses which serve limited enrolment programs, programs which typically require more contact hours per student (e.g., due to associated lab/tutorial hours), and programs which require particular forms of adjudication to enter (such as the review of portfolios). It will be important to proceed with care regarding courses previously identified as particular "bottlenecks" in a given year in order to balance access needs for majors as well as access for other students. General removal of partition dates will be included in the institutional academic schedule.

Understanding that the current open studies registration dates are:

August 1 for the fall term and,
December 16 for the spring term,

and given the preference for two registration periods, the work group has implemented:

- 1) an early lift of registration restrictions after the clearing of the waitlist and,
- 2) a general lift of registration restrictions on:
 - a. July 26 for the fall term and,
 - b. November 26 for the spring term.

Communication to students is co-ordinated across a number of departments/units. As noted in the First Year Capacity Working Group report, some sections will not have restrictions lifted (e.g. specific fourth year specialized courses) and some sections will have restrictions lifted at a later date (e.g. Fine Arts).

Part C: Approach to Timetabling - For Discussion

1. The UofL Approach to Timetabling

InfoSilem consultants attended campus starting in Spring 2016 and the Registrar hosted a meeting for Deans (or designates) in the Prentice Boardroom. During that on-site visit, the consultants began to review our academic space inventory, programming, and processes. Their feedback is reflected in this and the previous report.

1.1 Our Current Approach - Room Assignment and Forced Scheduling

The University uses a combination of Room Assignment and Forced Scheduling.

Room Assignment takes place in General Instructional Space, where the space is available to all Academic Units for the purposes of timetabling, and the Academic Units assign each CRN a day/time using the standard delivery patterns. The RO assigns the appropriate room when a specific room is not requested.

Forced Scheduling takes place in Exclusive Instructional Space, where an academic unit is exclusively allocated the space for the purposes of offering its programming, and the Academic unit assigns day/time/room.

The current room assignment software simply assigns rooms where requested and provides a report of all CRNs that cannot be accommodated because of space/time conflicts.

1.2 A Co-ordinated Timetabling Solution

InfoSilem's Co-ordinated Timetabling uses a software algorithm that takes into account the inter-relatedness of professor, student and space constraints to assign times and rooms that ensure a faculty, student (program, year, term), and academic space, conflict-free, balanced timetable. Some forced scheduling is practiced within this solution as appropriate to accommodate the specific needs of specialized programming.

A consultation plan is in development and the Working Group will seek the advice of Provost Council in Fall 2018 to finalize the plan.

1.3 Timetable Patterns

1.3.1 Introduction

The working group had reviewed the Classroom Space Utilization Study – University of Lethbridge – 2014, to understand the institutional classroom utilization, recognizing that the data collected was for Fall 2012, and included a specified number of classrooms identified for the study (not labs or specialized space, which will need to be considered). The study also did not take into account how the Destination Project will affect room availability and instructional space. From the report, Table 3-11 on page 3.12 (Appendix C) it was observed that:

- 1) The Tuesday/Thursday pattern was preferred over the Monday/Wednesday/Friday pattern
- 2) The Tuesday/Thursday pattern was generally not active until 9:30am and
- 3) The Monday/Wednesday/Friday pattern was generally not active until 9:00am and generally became significantly less active after 3:00pm with Friday afternoon usage being minimal.

The working group reviewed the current timetable patterns in light of the classroom demand and recognized that improvement could be made keeping in mind that pedagogy, faculty and student needs are of primary concern.

1.3.2 Timetabling Patterns – Consultant Feedback – for Discussion

As part of the work engagement, InfoSilem was tasked with reviewing our programming and academic inventory to provide feedback about options that would improve our service to students, ensuring our programming credential requirements were offered in a way to support timely program completion, as well as support academic needs, and lead to improved space utilization. Suggestions to the University included a change to our timetable patterns.

1. The Rules for Good Patterning:
 - a. Avoid a pattern advantage or disadvantage. Currently, the T/Th pattern guarantees no Friday classes while the M/W/F pattern guarantees a Friday class.
 - b. Minimize effect of one pattern on another. Currently a 3 hour class during the day blocks the T/Th and M/W/F patterns offered on those days. The three hour class does not complement the other offerings.
 - c. Do not have patterns that do not fit within the recommended three hour time blocks and/or start and end times contrary to those defined.
 - d. Do not use non-institutional patterns because although it can have less of an impact on the institutional timetable if this is applied to “exclusive” space, it still limits students’ access to courses overall.

2. The Proposed Time Blocks/Bands:

The proposed Pattern should be thought of in three hour bands of time:

- 9:00-12:00 p.m.
- 12:00-3:00 p.m.
- 3:00-6:00 p.m.
- 6:00-9:00 p.m.

In addition, there is an 8:00a.m. – 9:00a.m. Time Block available for the 1 hour patterns.

The existing patterns will remain available but there will be increased availability of 50 and 75 minute (preferred pattern by faculty) classes as well as three hour classes. The implementation of additional patterns will increase the availability of 50 minute and 75 minute patterns three-fold.

Current vs Proposed Timetable Pattern:

	Current Pattern	Proposed Pattern	Difference
One hour 3 x 1hr	3 x 50 minutes M/W/F	3 x 50 minutes M/W/F 3 x 50 minutes T/Th/F 3 x 50 minutes M/T/Th	The proposed pattern removes the guaranteed Friday class disadvantage
One and a half hours 2 x 1.5hrs	2 x 75 minutes T/Th	2 x 75 minutes T/Th 2 x 75 minutes M/W 2 x 75 minutes W/F	The proposed pattern removes the guaranteed no-Friday class advantage
Three Hours 1 x 3hr	After 3:00pm	1 x 2 hours 45 minutes M 1 x 2 hours 45 minutes T 1 x 2 hours 45 minutes W 1 x 2 hours 45 minutes TH 1 x 2 hours 45 minutes F	In the proposed pattern, the 3 hour pattern impact is reduced on other patterns, though may still negatively impact students' access to courses as electives and liberal education requirements <ul style="list-style-type: none"> • Core requirements and tightly scheduled programs that do not offer service courses or require the full liberal education requirement component are less impacted • Use mirror scheduling in a program if possible

Proposed Timetable Pattern

Pattern (2 X 1:15)					
8:00 - 9:15	MONDAY	TUESDAY	WEDNESDAY 1	THURSDAY	FRIDAY
	1	2	WEDNESDAY 3	2	3
9:30 - 10:45	MONDAY	TUESDAY	WEDNESDAY 4	THURSDAY	FRIDAY
	4	5	WEDNESDAY 6	5	6
Pattern (1 X 2:45)					
8:00 - 9:15	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:30 - 10:45					
Pattern (3 X 0:50)					
8:00 - 8:50	MONDAY		WEDNESDAY		FRIDAY
9:00 - 9:50		TUESDAY		THURSDAY	FRIDAY
10:00 - 10:50	MONDAY	TUESDAY		THURSDAY	

The proposed patterns create increased availability of all patterns across the week. This proposal will also reduce the impact of patterns on each other, and increases students' access to sections.

The three hour time bands have the same start and end times to prevent overlapping of classes throughout the day. Smaller patterns and sections offered within these patterned times, when the coordinated scheduling is engaged, will not overlap, resulting in increased student access to courses.

1.4 Constraints

Constraints are requirements that will be taken into consideration when timetabling. While the term “constraint” may have a negative connotation, constraints are simply requirements that limit options available to the software for timetabling a particular academic block, room, or professor.

Rules: At an institutional rule level, constraints are used to define items for the timetable such as the start of the day and can also be used to enforce breaks during the day.

Preferences: Institutional preferences can also be coded into the system but these constraints are disregarded by the scheduling software if required. For example, set the late Friday afternoons to a lower preference.

The use of constraints demonstrate the inter-relatedness of all factors in producing an institutional timetable. Of particular complexity are the courses offered by one Faculty/School or Department as a service course to other Faculties and Departments. The inter-relatedness of those courses serving students from programs across multiple areas creates complexity in timetabling and wide-spread fall-out when changes to the timetable are made.

A constraint which requires a specific day, time, and/or place for a section offering is often referred to as “forced scheduling”. A phrase which is commonly used to describe constraints and their inter-relatedness, when one or more constraints are applied and impact the factors of other offerings, is “the constraint drives the timetable”.

Examples below demonstrate these more fully.

Example 1: An academic block of B.N. students are required to do their practicum on M/T each week. This required programming constraint affects the offering of other courses that B.N. students are required to take, all of the teaching spaces attached to this academic block, as well as the professors delivering the other courses for this academic block, and other academic blocks where the same professor is teaching.

Example 2: A professor might be working at the Lethbridge campus but will be teaching one section on the Calgary campus. The Faculty/School timetabling unit may request a “forced” day/time for that professor. This constraint will drive the rest of the academic block schedule. In addition, this constraint will affect the availability of the professor for remaining assignments in Lethbridge and therefore the course offerings related to this professor.

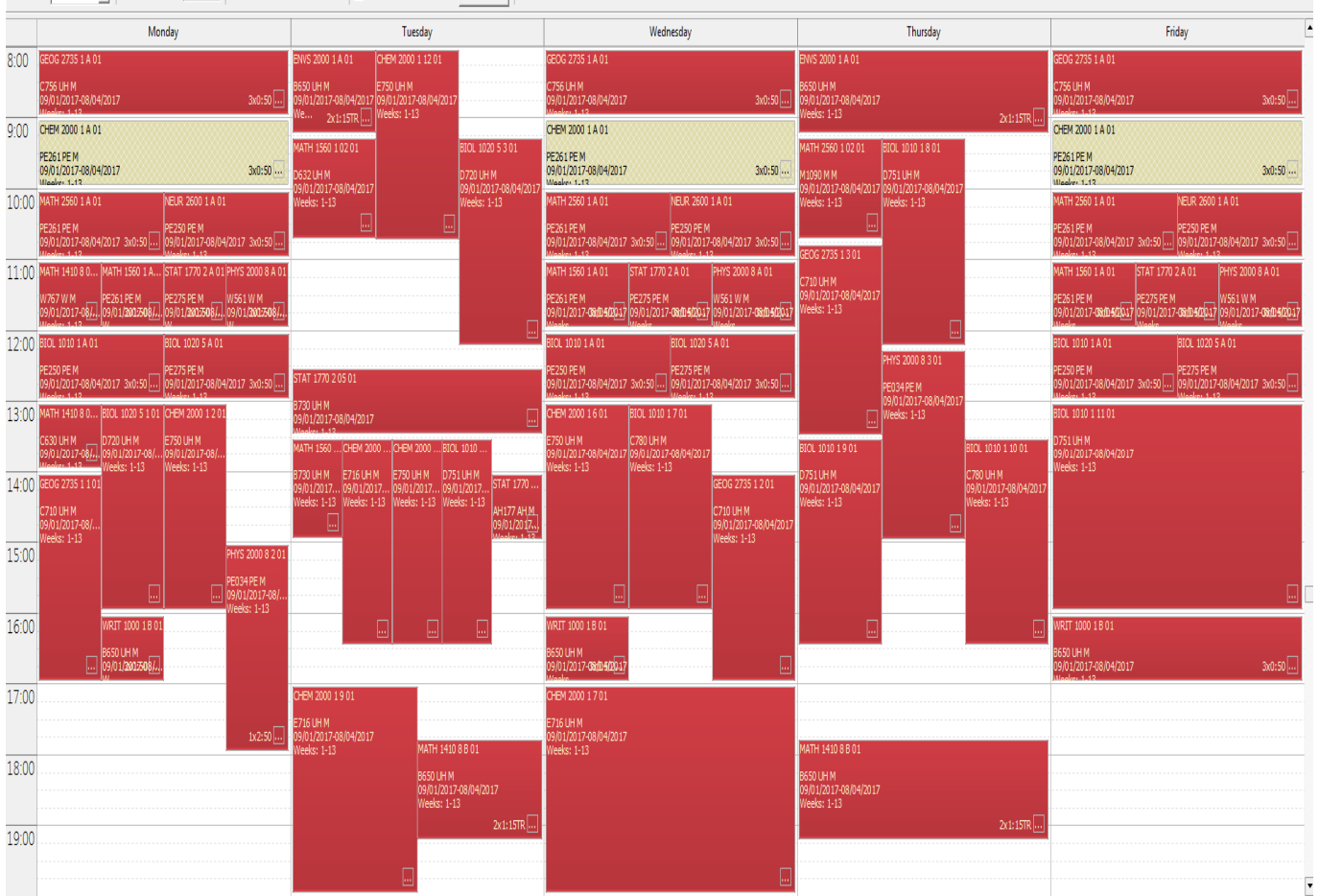
Example 3: A section of a required course that is offered to A&S students as well as MGT students is tied to academic blocks of students in both Arts & Science and the Dhillon School of Business. Therefore, there are a great number of constraints to ensure students from all related academic blocks have access to this one section as well as their other courses in a conflict free timetable. It also creates a constraint in terms of this particular instructor to support the assignment.

Example 4: An academic unit requests a change to the published timetable which includes a change to the day/time of a section offering. Because of the inter-relatedness of all factors, this change affects not only the day/time of the offering, but may also change the room, professor schedule, students’ schedules, and not only for this offering but of other offerings, rooms, professors, and student schedules as well.

DRAFT: Discussion Paper of the Academic Timetable and Academic Space Utilization
Working Group (Spring 2018)

Example 5: Inter-relatedness

Below is a diagram from one of the simulations that shows one section of CHEM 2000 scheduled on M/W/F at 9:00 a.m. and all the section deliveries connected with it due to inter-relatedness of students, faculty, and space/day/time.



Part D: Future Growth – Simulations Using Software

In an attempt to create a simulation of increased enrolment, academic teaching spaces were removed from the inventory (inactivated) as part of the simulation. In addition, the two approaches to timetabling were tested.

Scenario A – Use all rooms to represent current enrolment as a benchmark

Scenario B – Inactivate 10 rooms of varying sizes – to represent a large enrolment increase

Simulation Results:

	Schedule Type	# of Sections that Could Not be Accommodated Using Fall 2017 CRN data
Scenario A: Used all available teaching spaces		
1.	Current Approach: Classroom Assignment with Forced Scheduling & Current Patterns	20 (Actual: Fall 2018-38 sections - 4,000+seats)
2.	InfoSilem's Co-ordinated Scheduling with Proposed Patterns	0
Scenario B: Decreased available teaching spaces by 10 rooms		
1.	Current Approach: Classroom Assignment with Forced Scheduling & Current Patterns	82
2.	InfoSilem's Co-Ordinated Scheduling with Proposed Patterns	0

Simulation Analysis:

1. The current approach to timetabling cannot accommodate an increase in enrolment even though our room utilization appears to be low and space is available. This is due to constraints, currently imposed. Using our current approach and patterns in the simulation, the decrease by 10 rooms resulted in 82 unscheduled sections.
2. Co-ordinated scheduling with proposed patterns can accommodate an increase in enrolment without any issues related to space. It also offers value in areas that, in the short term, are difficult to quantify like student access to courses due to pattern flexibility.
3. Simulations using the Science and Academic Building will be run shortly, once there is an understanding of spaces available, spaces that remain available in U-Hall and the preferred relocation of courses in the new building.

Part E: Key Performance Indicators

As recommended by the Consultant, Key Performance Indicators (KPIs) help measure the success of implementation against the goals of implementation. The following draft KPIs, are included for discussion. Additional KPIs relating to the student experience and supporting other needs such as Academic Research will be discussed.

(Draft) KPI Table for Timetabling -RO		
	Key Results Areas	Key Performance Indicators
1	Space	Room characteristics requested vs. scheduled
		Monitoring room utilization by general and exclusive room spaces
2	Section Delivery Changes	No more than ?% section changes after the timetable is published
3	General Inventory	General / Exclusive academic space inventory ratio remains the same or increases
4	Even Distribution of Sections	% of sections timetabled in alignment with institutional patterns
5	Professor Timetable	%? of professor timetable that accommodates work responsibilities outside of teaching
6	Elapsed Time of Students' Schedule	Measure and monitor average elapsed time of students' schedules
7	Institutional Constraints	All professor constraints are documented and approved at the Deans' (designate) level or through HR (accessibility)
		Annual review of block off guidelines
9	Lecture Times	Frequency of change over between lecture sessions
10	Student Access & Average Credit Load	Monitor the student credit load – an increase in load over time might suggest improved access to courses
11	Measure Student Satisfaction-Survey	Access to course sections
		New patterns
		Annual timetable
		Co-ordinated scheduling that defines an academic block (cohort style) for timetabling increasing the likelihood of group members in same sections

Part F – Items Identified for Institutional Consultation

#1: Two Registration Periods be maintained

The Working Group monitors the implementation of the Annual Academic Timetable in 2020-2021, with consultation required in consideration of a future move to an annual registration period.

#2: Update to the Institutional Time Blocks/Bands for the 2020-2021 Academic Year and Onward

- 8:00 – 9:00 a.m.
- 9:00-12:00 a.m.
- 12:00-3:00 p.m.
- 3:00-6:00 p.m.
- 6:00-9:00 p.m.

#3: Institutional Course Delivery Patterns for the 2020-2021 Academic Year and Onward

The implementation of additional patterns within the three hour Time Blocks/Bands will increase the 1 hour and 2x1.5 hour patterns three-fold.

	Current	Recommended
One hour 3 x 1hr	3 x 50 minutes M/W/F	3 x 50 minutes M/W/F 3 x 50 minutes T/Th/F 3 x 50 minutes M/T/Th
One and a half hours 2 x 1.5hrs	2 x 75 minutes T/Th	2 x 75 minutes T/Th 2 x 75 minutes M/W 2 x 75 minutes W/F
Three Hours 1 x 3hr	After 3:00pm	1 x 2 hours 45 minutes M 1 x 2 hours 45 minutes T 1 x 2 hours 45 minutes W 1 x 2 hours 45 minutes TH 1 x 2 hours 45 minutes F

#4: Consulting on Constraints

- a) Institutional constraints are those that are adopted across the institution. Some examples for discussion are:
- Timetabling is primarily accomplished using the time blocks from 9:00a.m. to 6:00 p.m.;
 - **Specific requests for time blocks, ie 8:00a.m. to 9:00a.m. or in the 6:00p.m. to 9:00p.m. time block;**
 - The 8:00a.m.- 9:00a.m. block is used for one hour patterns only;
 - Friday afternoons are identified in the system as “non-preferred”. These patterns will only be applied if requested, or if the software has no other solution, upon consultation with the Academic Unit;
 - Where a specific constraint has been submitted and the software is unable to find a solution, consultation with the Academic Unit will take place;
 - Tenured and tenure-track faculty have a minimum of two teaching-free days per week.

- b) Other constraints have been initially identified. Some examples for discussion are:
- In Exclusive space, it is possible that the Academic Unit request off-pattern deliveries, recognizing that such a request might negatively impact students' access to courses which are electives and liberal education requirements;
 - Programs, such as Nursing and Drama, will have specific needs related to specialized programming;
 - Faculty/School committee membership on an institutional committee which precludes the individual from teaching at a specific time, such as GFC.
 - Accommodations for an affected student or instructor, which can be identified in advance, related to classroom/lab accessibility (See Timetabling Guidelines document);
 - Accommodations for research commitments off campus requiring participation on specific days;
 - Other Accommodations to be identified.

Part G – A Few Words in Summary

The Academic Timetable and Academic Space Utilization Working Group has been working together since 2015 and has reviewed policies, processes and have articulated challenges and opportunities for discussion, to enhance service to students, to improve the timetable development process in light of an annual academic timetable, and to increase the institution's space utilization.

This project will continue to be a consultative and collaborative process which will require input from Provost Council, Academic Faculties, Schools and Departments, IA, and Student Affairs.

The Academic Timetable and Academic Space Utilization Working Group will continue to meet to support the consultation process and to monitor progress and to investigate issues to better understand the day-to-day workings of the timetable development process.

This project is intended to support the strategic directions within the University of Lethbridge Strategic Plan -- to inspire and support student potential and promote access to post-secondary education. It is our intention that this project will improve service to students and promote a positive work experience for all employees at the University of Lethbridge.