# URP 581/582 MUP Studio

## [Smart Mobility] Implementing New and Smart Mobility in the Buffalo Niagara Region: A Framework for Local Governments

Spring 2019
*Version: ~~January 28, 2019~~*
*The instructor reserves the right to make changes on this syllabus as needed. This syllabus is a working document to be dynamically developed with students throughout the semester.*

# Studio Outline

**Main aim**: The studio will develop a framework and policy templates for local governments to implement new and smart mobilities in the Buffalo Niagara Region.
**Client**: Greater Buffalo Niagara Regional Transportation Council (GBNRTC, explained later)

# Course Information

Instructor: Bumjoon Kang, Ph.D. <bumjoonk@buffalo.edu>
Class Time: Tuesdays and Thursday 1:00 PM – 5:40 PM
Classroom: Hayes 410
Office Hours: You can book a time on my homepage at:
https://bumjoon.github.io/contact/
Office Location: Hayes 230
Credits: 6

# Planning Issues: New and Smart Mobility

*What are new and smart mobilities?*
*How smart mobilities will change cities?*
*What kinds of policies will be needed for smart mobilities?*
*What are social challenges for planners in adopting and developing smart mobilities?*

New (or smart) mobility is the next generation of transportation. It will offer shared, electric, and autonomous travel options, and relies on technology and data to create an integrated and seamless transportation system (Fig. 1).

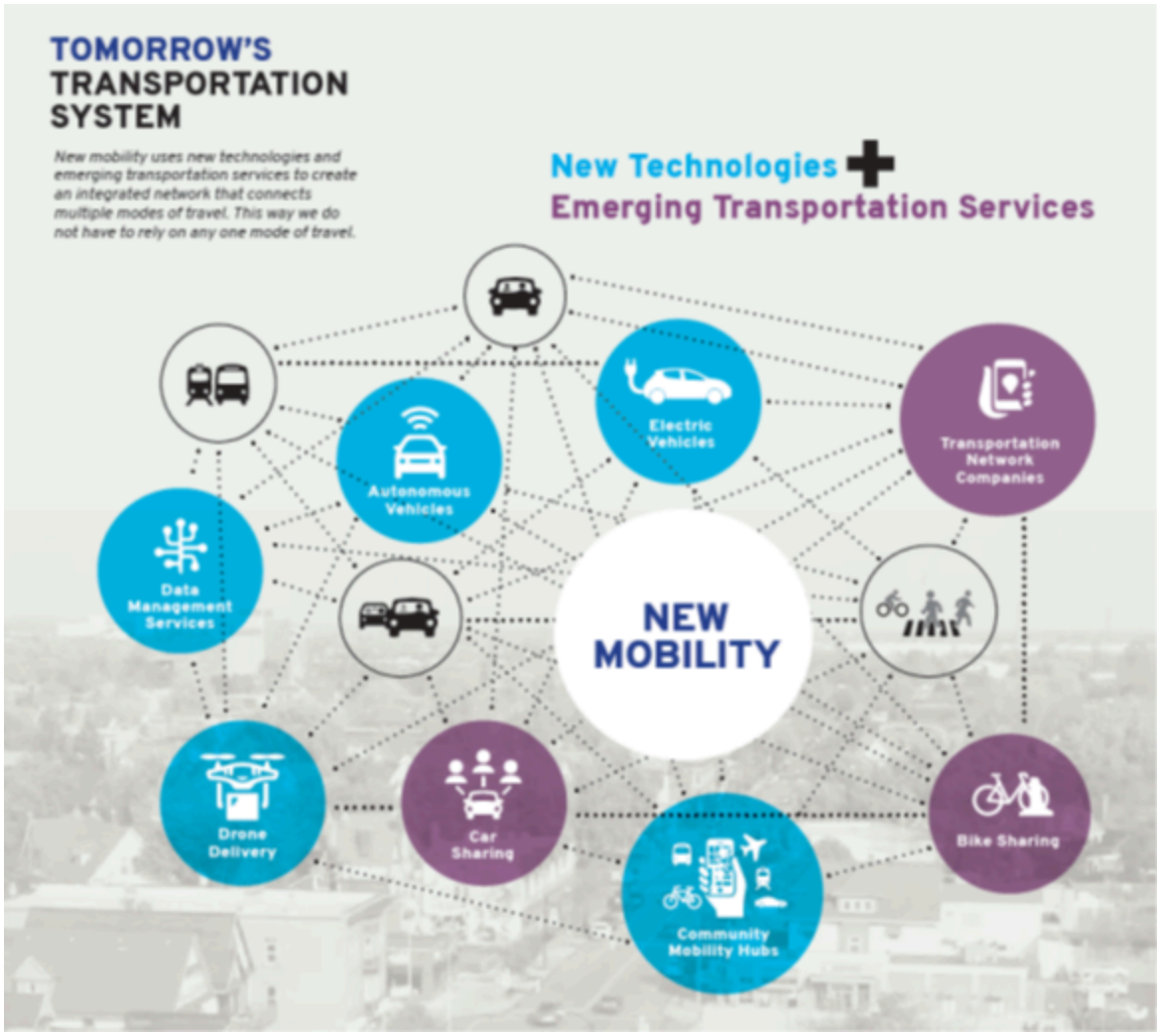



**Figure 1: New and smart mobilities (all figures from Moving Forward 2050)**

Technology will significantly transform our current system of human-driven private automobiles, public transit, and the network of social service and volunteer-provided transportation options. Travelers will have more choices, and there will be greater coverage and frequency for those who cannot or choose not to use a personally owned vehicle. In the longer term, personal automobile ownership will likely decrease as a result, and instead we will have "mobility as a service" (Fig. 2). Land use and development patterns may also be affected due to a reduced demand for parking and greater concentration of services around transportation hubs and corridors.

We will need to ensure that new mobility is accessible to all residents, and that we utilize technology to enhance equity, safety and sustainability.

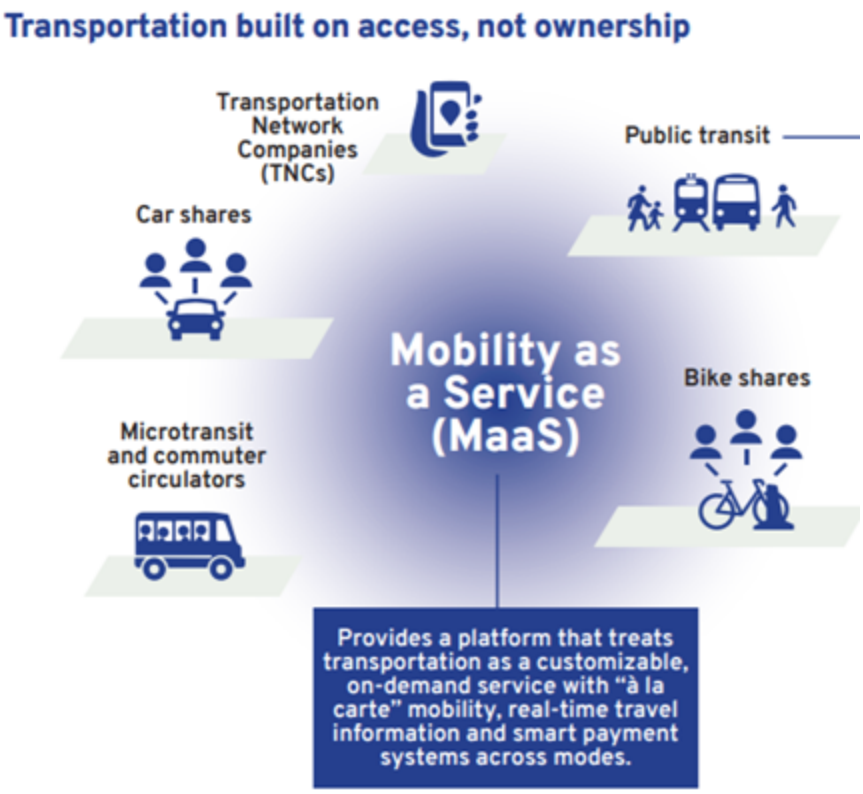



**Figure 2: Mobility as a service**

The current capacity and skills among governments—locally and elsewhere—to implement new mobility is limited. The rapid pace of technological innovation makes it challenging for planners, public works departments, and elected officials to consider new mobility in addition to their everyday maintenance and planning activities. This project, therefore, will provide guidance to local governments on how to start integrating new mobility elements into their communities.

# Client: GBNRTC

Greater Buffalo Niagara Regional Transportation Council (GBNRTC, https://www.gbnrtc.org/) is the region's Metropolitan Planning Organization (MPO), and is a partnership of local and state governments working together to make decisions about transportation planning in the Buffalo Niagara region. GBNRTC's members work to allocate federal, state and local dollars to transportation projects across the region, while staff help with data collection and analysis, research, and planning. GBNRTC members include:

- City of Buffalo
- City of Niagara Falls
- Erie County

- Niagara County
- Niagara Frontier Transportation Authority (NFTA)
- New York State Department of Transportation (NYSDOT)
- New York State Thruway Authority (NYSTA)

The Empire State Development Corporation, the Buffalo Niagara Partnership, and the Seneca Nation of Indians serve formally as Regional Strategic Stakeholders.

GBNRTC develops a long-range regional transportation plan, known as the Metropolitan Transportation Plan (MTP) and maintains a short-range program of projects, known as the Transportation Improvement Program (TIP).

** A MPO is, by federal law, designated by each state's governor for every urban area in the United States of America with at least 50,000 residents. MPOs devise solutions to regional transportation problems, which involves addressing land use, air quality, energy, economic development, and commerce.*

## Client Contact

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Smart Mobility Advisor

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# Background: Moving Forward 2050

## New Regional Transportation Plan

In May 2018, GBNRTC released the updated long-range transportation plan, Moving Forward 2050 (https://www.gbnrtc.org/movingforward2050). The plan uses transportation investments to achieve goals related to the economy, environment, communities and innovation. Moving Forward 2050 provides a framework to identify the strategies we need to accomplish these goals, and builds upon One Region Forward (http://www.oneregionforward.org/), the regional sustainable development plan.

Much of *Moving Forward 2050* focuses on ways to integrate new mobility elements into the region's transportation system, as well as into urban and regional planning efforts. These

elements include mobility hubs (Fig. 3), which bring together multiple transportation modes into one location, “smart” corridors or intersections that accommodate all modes and utilize technology to improve safety and the flow of goods and people (Fig. 4), and flexible curb space that allows for different uses of the curb throughout the day (Fig. 5).

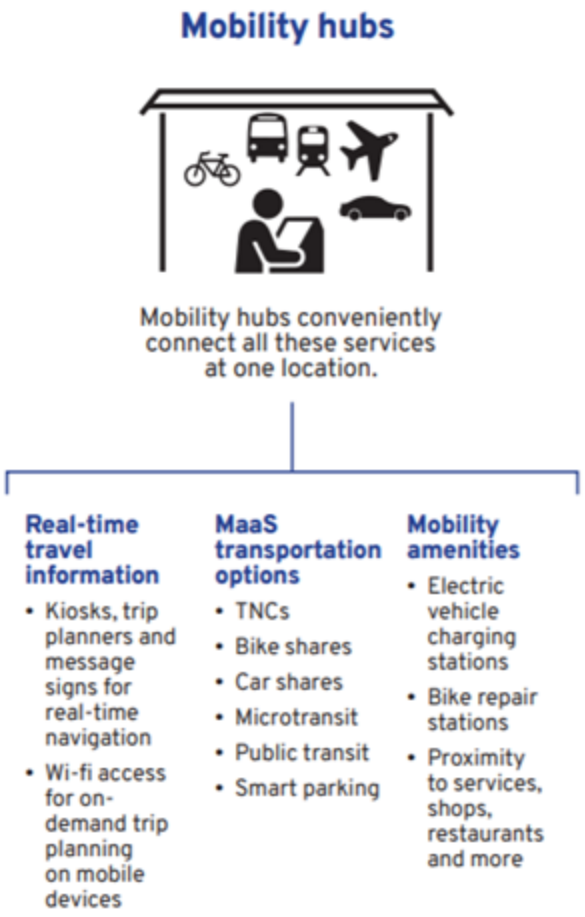



**Figure 3: Mobility hub concept**



## Improving Walkability

**A Pedestrian focused safety improvements**

Crosswalks, bike lanes, and pedestrian-activated traffic signals make streets safe for walking and bicycling.

**B Concentrated development**

Focused investment and concentrated development at targeted nodes to make the street vibrant.

**C Flexible curb space**

Flexible use of the street and curb space to accommodate different uses throughout the day, like TNC or AV drop-off, deliveries, markets or festivals.

## Integrating Technology

**D Vehicle-to-infrastructure (V2I) communications**

Coordinated signals help make vehicle traffic smooth and efficient.

**E Vehicle charging stations**

Charging stations for electric vehicles.

**F AV shuttles and dedicated lanes**

AV shuttles and autonomous TNC vehicles supplement traditional fixed route transit service in dedicated lanes.

**G Coordinated traffic signals**

Traffic signals coordinated across jurisdictions with real-time traffic information to make vehicle traffic smooth and efficient.

## Enhancing Mobility

**H Optimized bus routes**

Optimizing fixed route bus service with support from TNC operators and autonomous vehicles

**I Mobility hubs**

Mobility hubs provide access to transit, TNCs, bike routes and bike and car sharing.

**Figure 4: Smart corridor illustration**

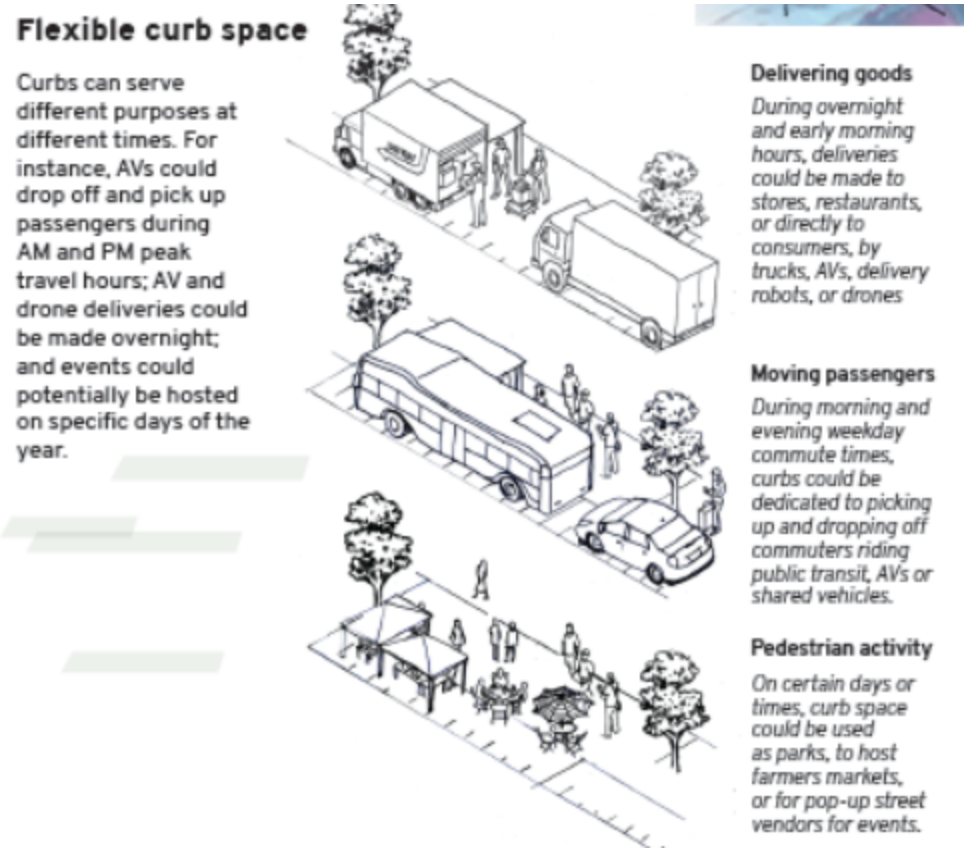



**Figure 5: Flexible curb space management**

Beyond the physical design and construction of these new mobility elements, equally important is data management. New or smart mobility relies on data to integrate schedules and payment systems, to collect and analyze the number of road users, and to control signals. Questions remain in terms of who owns this data, how is it managed, and if it can be turned into revenue generating opportunities (e.g., cities sell traffic count data to third parties).

And because we're entering a time of increasingly limited state and federal funding, of technological complexity and where transportation projects involve multiple jurisdictions and agencies, we need to reconsider new ways to design, fund and deliver projects.

## Transportation Challenges and Opportunities

The studio should address the following challenges and opportunities that the region is currently facing.

Challenges:

- *Regional transportation challenges*: workforce access, public transit reliability, disconnected communities, limited waterfront access, availability of active transportation

options across the region, overbuilt and underutilized infrastructure, pedestrian and cyclist safety
- *Others challenges that transportation investments can address*: disinvestment in some communities, vacant parcels, housing and retail spaces, sprawl without population growth, stagnant local government revenue
- *Challenges related to new mobility*: uncertainties (globally and locally) about policies and regulations, autonomous vehicles (about safety, when they will be available), funding sources, and data management and governance

Opportunities:
- *Moving Forward 2050* lays out a number of long-term strategies related to new mobility. Additionally, a number of other initiatives in the region will help to further promote more seamless, reliable and efficient mobility:
- The Niagara Frontier Transit Authority (NFTA) is expected to roll out its new electronic, account-based fare payment system in 2019. This would enable the NFTA to integrate its bus and light rail services with bike share, car share, scooters, and other options into "mobility as a service".
- The NFTA is also continuing to advance the extension of its light rail system to connect to UB's north campus. This presents opportunities for mobility hubs linking together multiple transportation modes.
- The NFTA, GBNRTC, the City of Buffalo and others are planning a number of transit oriented development sites, which focuses land uses around a transit station or within a transit corridor, and typically includes housing, retail, and other amenities.
- The Buffalo Niagara Medical Campus is planning a smart corridor along Main Street near the campus, which aims to use technology to improve energy efficiency, emissions reduction, access and mobility, and traffic safety.
- Cycling infrastructure in parts of the region has seen great improvements in recent years. GOBike has been a crucial partner in developing the Buffalo Bike Master Plan, and similar efforts in Niagara Falls. Continued improvements are planned for both the Shoreline Trail and the Empire State Trail.
- Complete streets efforts have gained momentum in the region, including in the City of Buffalo, the Town of Tonawanda, and the Village of Hamburg, with others expressing interest as well.
- After years of population loss, the Buffalo Niagara region is experiencing some population growth, as well as reinvestment due much in part to the Buffalo Billion funds from New York State.

# Project Description and Deliverables

This project will create a framework for local governments to guide the implementation of a new mobility initiative(s). Some cities and organizations have started to do this, and serve as good starting points. For example, Seattle and LA prepared new mobility policies.[1] The studio may produce similar deliverables.

The project team could address a specific new mobility element or technology like a mobility hub, flexible curb space, preparing for autonomous vehicles, or developing mobility as a service platforms. The team could also focus on a specific place type(s) (i.e., city, suburban, village). For example, the team might create a mobility hub framework for three different place types and address the following:

- Design and siting considerations (include renderings if possible)
- Available services and amenities
- Stakeholder and community engagement activities
- Management and maintenance (and any new staff or roles required)
- New necessary policies or regulations
- Data management: how and who; include IT/technology requirements and considerations
- Funding

The audience for this project includes planners in local municipalities, departments of public works, lawmakers, police departments, parking enforcement, and elected officials. The final product should consist of a written report with a usable framework, some best practices examples, local applications, and considerations and initial steps for the region's municipalities. This may be a combination of both design and policy, as appropriate to project team's skill sets.

# Evaluation and Grading

All of your activities over the studio project will be graded. Attendance, participation, work outcomes, and professional attitudes are all important. Students will be evaluated at the individual-, the group-, and the class-levels by the instructor and by peers within multiple working groups and within the class.

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[1] Seattle: https://www.seattle.gov/Documents/Departments/SDOT/NewMobilityProgram/NewMobility_Playbook_9.2017.pdf
Los Angeles: http://www.urbanmobilityla.com/strategy/, NACTO: https://nacto.org/publication/bau/, Alta Planning: https://altaplanning.com/projects/preparing-new-mobility-writing-effective-resolutions/

*The instructor reserves the right to modify the following assignments and grading criteria as appropriate. Any changes to the following will be discussed with students and posted on the course website.*

- **Attendance and participation** (class input, 20%): Attendance is important because most of the studio works are group projects. Students must understand other students' works and are expected to provide feedback to other students.
- **Work outcomes** (class output, 60%):
    - A number of sectional reports and a final comprehensive report will be graded. Work scope of the reports and additional job tasks will be defined within the course.
    - Student-defined tasks will be assigned voluntarily as a team.
    - The grading criteria: outcome quality and process (leadership, organizational skills, and timely completion)
- **Professional attitudes** (20%): They include interpersonal skills, self-motivation, efficiency, the ability to prioritize, and team player.
- **Extra points** (up to 20%): Final report and presentation require unexpected and excessive workloads when everyone is busy in the end of the semester. Final efforts to complete the project determine overall quality of the project. Students who volunteer to make extra efforts in the final report and presentation will get extra points.
- In the end of the semester, students will submit a 1-page self-promotion portfolio highlighting their contributions to the studio (no pre-determined formats required) and complete a peer evaluation form (a form will be provided).

## Grading schema

| | | |
|---|---|---|
| A | 95% and above | Excellence in the everything |
| A- | 90-94% | Excellence in both individual and group works |
| B+ | 85-89% | Excellence in either individual or group works |
| B | 80-84% | Satisfy requirements |
| B- | 75-79% | |
| C+ | 70-74% | |
| C | 65-69% | |
| C- | 60-64% | |

| | | |
|---|---|---|
| D | 55-59% | |
| F | <55% | |

## Late Work

No late works will be accepted. Students will not receive any grade for the work submitted after the specified deadline.

# Readings

O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy* (First ed.). New York: Crown.

Free e-book is available through UBLibraries. http://tinyurl.com/y7lhjpdr
About $10 at Amazon [link]

Bloomberg Philanthropies, The Aspen Institute (2017) *Taming Autonomous Vehicle, A Primer for Cities*.

https://www.bbhub.io/dotorg/sites/2/2017/05/TamingtheAutonomousVehicleSpreadsPDF.pdf
https://www.planning.org/knowledgebase/resource/9137796/

Seattle Department of Transportation. (2017). *New Mobility Playbook.*

http://www.seattle.gov/Documents/Departments/SDOT/NewMobilityProgram/NewMobility_Playbook_9.2017.pdf

Portland Bureau of Transportation. (2018). *E-Scooter Findings Report*

https://www.portlandoregon.gov/transportation/article/709719

To be added.

# Work Plan & Log

** The schedule is subject to change.*
*** Assignments and deliverables are to be submitted*

| Meeting | Date* | Planned Tasks* | Assignments/deliverables** |
|---|---|---|---|
| W01-Tue | 1/29/2019 | Studio selection | |

| | | | |
|---|---|---|---|
| W01-Thu | 1/31/2019 | Introduction<br>Case study assignment | Read O'Neal 2016 |
| W02-Tue | 2/5/2019 | Case study 1 | |
| W02-Thu | 2/7/2019 | Case study 2 & presentation | Case study slide |
| W03-Tue | 2/12/2019 | **Client meeting @ GBNRTC (2:30 PM)** | |
| W03-Thu | 2/14/2019 | Define work scope<br>Make a table of contents | 1-page work proposal |
| W04-Tue | 2/19/2019 | Develop data collection strategy (A) | |
| W04-Thu | 2/21/2019 | Motion simulation lab tour @ 2PM Furnas Hall, UB North | |
| W05-Tue | 2/26/2019 | Report progress | |
| W05-Thu | 2/28/2019 | Data collection strategies | |
| W06-Tue | 3/5/2019 | Each team presents progress to the whole class for coordination (~10 min per team). | ~~Background section draft~~ |
| W06-Thu | 3/7/2019 | **** Clarkson Chair event (The Future of Preserving Modern Architecture: Challenges, Successes, and Losses, Martin House Complex, 3-4:30PM) | |
| W07-Tue | 3/12/2019 | Work day 1-5pm | |
| W07-Thu | 3/14/2019 | Section review<br>(Team evaluation) | Section draft |
| W08-Tue | 3/19/2019 | No class (Spring Recess) | |
| W08-Thu | 3/21/2019 | No class (Spring Recess) | |
| W09-Tue | 3/26/2019 | Discuss/coordinate directions<br>Start 2nd tasks | |
| W09-Thu | 3/28/2019 | | |
| W10-Tue | 4/2/2019 | Mid review presentation prep | |

| | | | |
|---|---|---|---|
| W10-Thu | 4/4/2019 | **Mid review** at Hayes Hall (Room 401; 2pm)<br>- Paul Becker (Hamburg)<br>- Julie Fetzer (City of Buffalo)<br>- Jim Jones (Tonawanda). | Mid-review slide |
| W11-Tue | 4/9/2019 | | |
| W11-Thu | 4/11/2019 | **NFTA panel discussion** at Hayes Hall (Room 401; 3pm)<br>- Robert Jones <Robert_Jones@nfta.com>,<br>- Nadine Chalmers <Nadine.Chalmers@nfta.com>,<br>- Eric Svenson <Eric_Svenson@nfta.com> | Recommendation/proposal section draft |
| W12-Tue | 4/16/2019 | | |
| W12-Thu | 4/18/2019 | | |
| W13-Tue | 4/23/2019 | Progress presentation | |
| W13-Thu | 4/25/2019 | | Final slides |
| W14-Tue | 4/30/2019 | Final presentation practice | |
| W14-Thu | 5/2/2019 | **Final presentation (3 PM ) @ GBNRTC (tentative schedule)** | |
| W15-Tue | 5/7/2019 | Follow-up meeting | Draft |
| W15-Thu | 5/9/2019 | Report production | Final report submission |
| W16-Tue | 5/14/2019 | Exam week | |
| W16-Thu | 5/16/2019 | Exam week | Real **FINAL** report |

*** *Additional tours/guest-lectures may be scheduled.*

**** TBD

## Homeworks

Read O'Neil, C. (2016) and prepare discussions **in the ~~Jan-31~~ Feb-5 class.**

Students should have answers to the following (but not limited to) questions: What are issues in big data?  If big data are widely used in planning, what issues we will face? Do you know any examples involving big data issue in planning?

Submit your CV (resume) via UBLearns by Feb-4 5 PM.

## Ideas and Recommendations

A: Data collection may include interviews/surveys:

- Interview planners/policy makers/engineers in local governments to understand what they need (County, Town, City, …)
- Interview activists who are concerned with public data privacy (e.g., Bianca Wylie).
- ...