Systems Synthesis Project
Course Guide
for
Students & Faculty

2019 - 2020
Academic Year

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Carnegie Mellon University

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1. GOALS

The major goal of the Systems Synthesis project course is to provide MSPPM, MAM and MSHCPM/MSHCA students with the skills necessary for structuring, managing, and carrying out projects in an organization. Textbooks and lecture courses cannot provide these skills. Instead, students need to acquire them through first-hand project experiences in relatively small groups with the guidance of seasoned faculty. Therefore, from its beginning in 1969, Heinz College has required students to complete a Systems Synthesis project.

Systems Synthesis projects must also contribute significantly to solving or ameliorating important problems of the public sector, non-profit sector, or arts organizations. Systems Synthesis has potentially enormous benefits for service to public and non-profit organizations with the resources of nearly 16,200 student hours and approximately 2,340 faculty hours of project work per year![1] If the school selects important projects, and project teams use rigorous methods and make sound recommendations, Systems Synthesis can make significant and substantial contributions to public policy and non-profit management.

1.1 Problem Structuring and Solving Skills

There are four educational goals of Systems Synthesis. The first is to develop skills in problem structuring and solving including how to:

- define a problem, its boundaries, and a project's scope;
- determine a client's requirements;
- identify/obtain data or information;
- determine data limitations;
- determine appropriate analytical methods and theories;
- design alternative solutions;
- characterize and manage risks of alternatives; and
- document results and communicate recommendations.

Structuring a problem and doing procedural work is intellectually challenging, and somewhat of an art. It requires project teams to initially formulate the "problem" and move to precise conceptualizations and sets of coordinated steps to meet the desired ends.

1.2 Project Management, Teamwork, and Communication Skills

The second educational goal is to develop students' project management, teamwork, and communication skills. Each project team member and a team as a whole need to learn how to:

- develop/effectively use the capabilities of each member;
- take initiative and responsibility;
- design tasks that are feasible, linked, and phased;
- keep members informed and coordinated;
- communicate results and obtain useful feedback;
- professionally resolve interpersonal problems; and
- meet deadlines.

[1] 90 students x 12 hours per week per student x 15 weeks per semester = 16,200 hours. Also, an estimate of faculty time is 13 projects x 1 faculty member per project x 12 hours per week per faculty member x 15 weeks per semester = 2,340 hours per year.

Being able to participate effectively on a project team, either as a manager or a team member, is a highly marketable skill.

1.3 Capstone Experience

The third educational goal is to provide a *capstone experience* for Heinz College MSPPM, MAM and MSHCPM/MSHCA degree programs — integrating, synthesizing and putting into practice skills and materials from several courses. Lecture courses contribute primarily to a student's knowledge, comprehension, and analytical skills. Higher-level educational goals addressed by Systems Synthesis are synthesis — to provide new solutions from a variety of inputs and analytical steps — evaluation and recommendation. Students need to learn how to:

- frame technical/organizational/economic/political criteria;
- conduct applied multidisciplinary research;
- learn new methods, theories, or skills as needs arise;
- draw on the comparative advantages of individuals;
- be alert and receptive to new ideas;
- evaluate alternatives from many perspectives;
- be able to work comfortably with partial knowledge; and
- develop contingency plans.

Project courses provide the opportunity to "put it all together" and critically evaluate alternatives.

1.4 Organizational Experience

MSPPM, MAM and MSHCPM/MSHCA graduates work with organizations who have missions, strategic plans, personnel, other resources, ongoing projects, cultures, practices, etc. Graduates need to learn how to quickly:

- fit into an organization,
- get on board in projects, and
- add value to organizational outputs.

Indeed, work experiences gained from student projects provide strong comparative advantages to graduating students in job interviewing and getting job offers. Modern organizations are moving rapidly away from the hierarchical structure inherited from high-volume production to loose networks of entrepreneurial teams engaged in high-value production.

1.5 Non-Disclosure Agreements and Student Intellectual Property

Many projects will include an Educational Project Agreement between students and sponsors. Students will attend an informational session to understand the nature of these agreements before signing.

If the project does not have an EPA at the onset, and then a client asks about intellectual property rights or a non-disclosure agreement, please inform your Program Director.

2. PROJECT MILESTONES

While Systems Synthesis projects may differ considerably in format, there are several requirements common to all projects. A number of these requirements can be stated in terms of project milestone events. Detailed discussions of several of the items follow. See exhibit 1 for the suggested timeline.

2.1 Overall Structure of Projects

The early weeks of a Systems Synthesis project are devoted primarily to problem definition/structuring, a unique contribution to the MSPPM, MAM and MSHCPM/MSHCA programs. No other project course or project has a substantial requirement for structuring problems. This is a high-value-adding activity that is sought after by employers. In parallel with problem structuring, work *must* proceed on certain data collection, analysis, design, or other tasks that are known from the very beginning. Still other tasks, of course, are only identified later, or cannot proceed until precedence relationships are satisfied. A strong project proposal makes the job of problem definition much easier and allows the group to begin work sooner.

The second half of a project is devoted primarily to completing identified tasks, with some fine-tuning of structure. Quite often the scope of a project narrows as the critically important contributions are identified and time runs out. At the end of the project, students incorporate client and Advisory Board feedback into their final written report. Under the guidance of their faculty advisor, they also debrief the project process and experience.

Note that each half of a Systems project requires different management skills. Problem structuring requires a student project manager who is comfortable with uncertainty and ambiguity, who is a cheerleader in dark hours, and who can grasp important features and concepts of the problem and its solution. Project task management, in the second half, requires a manager who is somewhat compulsive about closure, is time conscious, can keep track of many tasks, and can coordinate efforts of individuals. One person may have both capabilities, but it is a good idea to open up the question of who should be the second-half manager.

2.1.1 Initial Presentations

Within the first couple of weeks, communicate with the client to refine the problem statement, scope and work plan.

A mid-term presentation is required to give members of the Advisory Board an update on project progress and seek feedback.

2.1.2 Final Presentation

The final project presentation should take place on Tuesday, December 10th and Wednesday, December 11th, times to be determined.

In order to encourage maximum attendance and prevent scheduling conflicts, please be sure to invite the Advisory Board and other desired attendees well in advance.

Barb Diecks (bdiecks@andrew.cmu.edu) and Barb Pacella for MSHCPM/MSHCA (bpacella@andrew.cmu.edu) will arrange for rooms..

2.1.3 Final Report

Final project reports typically include the following components:

- Executive Summary
- Project Objectives
- Basic Analytic Approach
- Data Analysis
- Conclusions

- Recommendations, including recommendations for further research needed to address the problem

You must provide three digital copies of your final report to the Associate Dean, the Program Director, and Barb Diecks (Barb Pacella for MSHCPM/MSHCA). This digital version of your report must have all of the charts, graphs, tables and graphics incorporated into the document. PDF versions are preferred. Final reports to be submitted within a week of your final presentation

2.1.4 Poster Day Requirements

The Heinz College hosts a poster day per semester to showcase your team's work and your colleagues as well as the faculty and staff. On the day of the event, your team's poster will be displayed on an easel on the first floor of Hamburg Hall from 9am to 5:30pm. In addition to the poster day, we will also be creating an online virtual gallery of Systems Synthesis projects.

Each team needs to design a poster with relevant information that helps a viewer understand your project. The poster needs to be 22x34 and backed with foam board. Each team is responsible for having their poster printed at the Tartan Ink at Carnegie Mellon University. Instructions will be sent to you prior to Poster Day.

- Poster Day for Fall, 2019 will be held on Thursday, December 5th
    - Time – noon – 1:30 p.m.
    - Plan to arrive by 11:30 a.m. dressed in business attire
    - Plan to stay until you finish presenting to the last person – usually by 1:45 p.m.

Poster Templates in the past have included the following information:

- Introduction: Description of problem and context
- Objectives: Specific objectives and questions
- Scope summary
- Your methods to solve the problem
- Results-data collection, interviews, analysis
- Conclusion and recommendations
- References

2.1.5 Abstract

Students must provide a short abstract summarizing the key aspects of the project to Program Directors. Below is an example of the format.

Title: A DSS to Predict Risk for Adverse Reactions Resulting from the Seasonal Influenza Vaccine
Team: M. Early, S. Li, B. Light, N. Patkar
Client: CDC
Abstract: Nearly 100 million United States residents receive the seasonal flu vaccine each year. According to the CDC, however, over 26,000 of these patients reported an adverse event following their vaccination during the 2015 flu season. There is currently no robust method for screening patients to determine their risk of any adverse event upon receiving the seasonal flu vaccine. Our DSS predicts a patient's risk of suffering a negative reaction to the vaccine by analyzing several health indicators, including the patient's allergies, current medications, and recent illnesses. The DSS notifies the practitioner of the patient's risk and records an explanation of their decision to administer/not administer the vaccine. Recording both the practitioner's decision and the patient's risk helps ensure continuity of care should the patient experience a future negative event. Our DSS system also seeks to characterize the at-risk patient population and identify factors that elevate a patient's risk of experiencing a negative reaction to the vaccine. This information, combined with the system's predictive capabilities, will enhance decision making and improve health outcomes.

2.1.6 Presentation Skills Resources

A select number of Teaching Assistants for Strategic Presentation Skills are available to video record mid-term presentations and/or dry-runs and provide a secondary source of feedback to student presenters.

The hope is that the presentation skills feedback will be incorporated for the mid-term or final presentation. Contact Barb Diecks (bdiecks@andrew.cmu.edu) (or Barb Pacella bpacella@andrew.cmu.edu MSHCPM/MSHCA) at least 5 business days in advance of your presentation to schedule the filming.

2.1.7 Composition and Role of Advisory Board

The student team is responsible for assembling the advisory board. The Advisory Board for a Systems Synthesis project is comprised of representatives of the client organization, the project's faculty advisor, representatives of the client's and issue's stakeholders, faculty and other experts in the relevant field. As such, the Advisory Board may have as many as a dozen members or more.

The role of the Advisory Board is to provide diverse — and sometimes opposing — stakeholder perspectives, and to assist in determining the scope of the project by engaging in a discussion of what is feasible, and encouraging the students to think through a variety of options, factors and approaches. Due to their positions in their fields and the community, Advisory Board members may also point the students toward data, and may help students gain access to otherwise inaccessible data.

2.2 Initial Information Packages

While it is essential that Systems Synthesis projects require project teams to define and structure problems, project advisors nevertheless must provide some initial structure and information. Appropriate materials may be assembled and made available to students to read prior to the first class meeting. Included in the initial information package are items such as:

- organization charts, key contact persons of important organizations;
- key papers, bibliographies from appropriate literatures;
- memos or minutes summarizing initial meetings between the client staff and the advisor;
- previous project reports on the same organization or policy issue, especially for multi-year projects;
- documents supplied by the client; and
- newspaper clippings related to the client organization or policy issue.

2.3 Peer Review of Students and Individual Consultations

The advisor (or advisors) of a Systems Synthesis project assign individual letter grades to team members at the end of each mini. While grades are the advisor's responsibility, it is important to conduct a peer review in which each team member provides a written evaluation of all other members and him/herself. Reasons for peer review are:

- the results of peer review inform the advisor for grading purposes;
- the results also provide the basis for feedback in individual consultations with students; and
- peer review – *the giving and receiving of constructive criticism in a professional manner* – is an activity that professionals will increasingly be asked to undertake, so it is worthwhile to get some practice.

See Exhibit 2 for the peer review template.

The recommended format is to have the advisor conduct and summarize the peer review, and then have individual meetings with each team member. The basis of the meetings can be the overall performance of all team members, with the identity of the particular student in the meeting given, plus a summary of the written comments. While peer review information has flaws, such as misinformation stemming from personality clashes, it is nevertheless concrete, and supplements and informs the faculty advisor's assessment.

Feedback is essential for the development of individual team members, especially at mid-semester. For students doing a good job, it provides rewards and an opportunity to discuss future work in an upbeat setting. For students doing poorly, it lets them know while there is still time to fix problems so that they can improve in the second half of the semester.

2.4 Student Evaluation of Advisors

Students in Systems evaluate their project advisors just as they do in other Heinz College courses.

3. ADMINISTRATIVE MANAGEMENT

3.1 Scheduling Presentations: Calendar, Room Reservations, Computing

Room Reservations: To request a room go to https://25live.collegenet.com/cmu/

Initial and final presentations should be scheduled and organized in a way that encourages maximum attendance and prevents schedule conflicts.

- Book a room for mid-term using the online room reservation system:
- Check Heinz College events calendar at <http://www.heinz.cmu.edu/events/index.aspx> for available dates and to check for potential conflicts. Rooms must be reserved well in advance of presentations to insure space availability.
- ***Before scheduling any of the presentations*** consult with the administrative assistants of the Dean, Associate Dean and the appropriate Program Director(s); and ask them to add the presentation date(s)/time(s) to their calendars. This should be done as early in the semester as possible, but, at the very least, one month in advance. The deans' calendars fill quickly, so the earlier you do this, the better chance you have of seeing them at your presentations.
- Barb Diecks (bdiecks@andrew.cmu.edu) and Barb Pacella (bpacella@andrew.cmu.edu) will help coordinate the scheduling of the mid-term and final presentations to prevent conflicts.
- Invite the following individuals to both your mid-term and final presentations: client(s), advisory board members, Dean Krishnan, Associate Dean Jackie Speedy, Program Directors, Associate Dean of Partnerships and Communication Strategy Program Jon Nehlsen, other members of the Heinz community,
    - MSPPM Projects: Professors Al Blumstein, Rick Stafford, Jon Caulkins, Mark Kamlet, Greg Lagana
    - MSHCPM/MSHCA Projects: Denise Rousseau
- Invite the Heinz community to your presentation by posting it to the Heinz College events calendar. Use the "submit an event" function on the calendar Web page. http://www.heinz.cmu.edu/events/index.aspx

Most presentations require **computing equipment**. Please adhere to the following guidelines when you schedule presentations.

- Most, but not all classrooms in Hamburg Hall have built in projection and data outlets. If you are not sure about the facilities in the room for your presentation, send mail with your questions to heinz-computing@andrew.cmu.edu.
- If you need to borrow a laptop computer and/or data projector for a presentation, please email the request to heinz-computing@andrew.cmu.edu specifying the date, time, location and software needed, at least *three weeks* before the presentation. If you do not know how to connect a laptop to the projector or data outlet, include that information in the request and someone will instruct you.
- If Heinz College cannot meet your needs for a computer at your presentation, you can request a computer from the CMU Instructional Technology office. More information about their services and how to request them are at http://www.cmu.edu/computing/class-event/.
- If your presentation involves a technical component, it's a good idea to include that component in your rehearsal. You can borrow a laptop and/or projector for rehearsal purposes in the same way as you would for your presentation.
- If you want to use your own systems project computer for your presentation, please email that request to heinz-computing@andrew.cmu.edu one week in advance of the presentation or rehearsal. These computers are secured via an alarm system, so their removal needs to be scheduled with the computing staff.
- Please try to give Heinz Computing a week's notice prior to your needs.

3.2 Video Conference Guidelines

It is critical to plan for video conferences prior to the start of your presentation to help avoid delayed presentations. **Build in sufficient time for testing of the equipment prior to the start of the presentation.**

Follow the steps below to insure a successful videoconference connection.

1. Contact Heinz Computing Services
   - Email heinz-computing@andrew.cmu.edu to schedule a videoconference. Include the room location, date and time of the event, the names of all the people in your group, and the approximate number of local audience members.
   - **Please contact Computing Services at least one week** (five work days) prior to the conference date, even if you are unsure of the exact details. Accommodations for requests less than one week in advance cannot be guaranteed.

2. Select a Room
   - Use SpaceQuest (25Live) https://25live.collegenet.com/cmu to schedule a room based on your needs and classroom availability. Include a 30-minute setup time if at all possible.
   - 2008, 1002, 1007, 1202, 1204, 1206, 1208, 1214, and 2003 – fully equipped with VC equipment, ample space for presenters and audience.
   - 1005, 1007, 1006, 2011 – used with mobile VC unit, ample space for presenters and audience.
   - 2108, Dean's Conference Room – meeting rooms with limited space. Cameras in these rooms face away from the monitors, so you cannot stand in front of the monitors during a presentation.
   - Interview Rooms (A001) – very limited space. A001F is large enough for a few audience members.
   - Auditorium (A301) and Computer Lab (2009) – ample space, not very suitable for VC and should be used only if no other space is available.

3. Schedule a Test
   - Tests allow Heinz Computing staff to meet with members of your group to go over everything. If any distant participants are available, they can join in the test as well. It is preferable to use the room that the presentation will be in a day or two before the event.

- Please bring the laptop that will be used during the videoconference to make sure settings are correct.

4. Send the Zoom invite to anyone who will be participating.
   - Heinz Computing will forward you an invite via email. The same invite can be used for the test.
   - The invite contains instructions for distant participants to connect via computer browser (Internet Explorer, Firefox, Safari), videoconference unit (H.323), or mobile app (Android, iOS). Chrome is **not** supported. Instructions to dial in using a telephone are also listed.
   - It is highly recommended that you encourage distant participants to download the plugin and test their connection beforehand. They can do this by clicking the link http://bluejeans.com/111 at the bottom of the invite.

5. At the time of the videoconference
   - Please have someone in the room with the laptop you will be using 30 minutes before the start (if room booking permits).
   - A member of the Heinz Computing staff will set up the equipment and start the connection approximately 15 minutes before the start. Distant participants often do not connect until right before or even after the start time.

A few things to remember when using the videoconference:

- Content sharing is designed to share PowerPoint slides. If you choose to use the computer for a live demonstration (ex. in Excel or a website), the screen must be in Clone, Duplicate, or Mirror mode the entire time and PowerPoint Presentation View must be off.
- Use ⊞ + P or ⌘ + F1 to switch to Clone, Duplicate, or Mirror modes.
- The system will only accept computer output resolutions of 1280x768 or less.
- Video content can only be shared if uploaded to Zoom beforehand. Sharing videos from the computer or YouTube during the presentation results in poor video quality and video lag. It is recommended that any videos be sent to the participants to view on their own.
- Clear your desktop of all open windows other than those you will need for the presentation.
- Complete all edits to your presentation ahead of time so the tech can work on connecting your laptop during the setup time.
- Email the presentation to distant participants and distribute printed copies to audience members so they can follow along in the event there is an issue.

3.3 Budget

Each Systems project will have a total budget of $750 assigned to it at the beginning of the semester. The Faculty Advisor of each Systems project must appoint a Financial Manager for the group within the first two weeks of the project. The role of the Financial Manager is to ensure that the project stays within budget by approving and tracking expenses, reviewing monthly accounting reports, and limiting spending to ensure no cost overruns. Need for additional funding should be brought to the attention of the Faculty Advisor as early as possible, so he/she may request any additional funds they deem appropriate from the Dean's office.

The Financial Manager will receive an accounting report and telephone report each month from the Program Office. The Financial Manager should review the report to verify that the charges posted to the account are correct and valid. Each Systems project will have its own budget and account string for managing expenditures associated with the project. Only those expenses that are necessary to the project should be charged to the account. **Consulting services and/or outsourcing of data analysis may not be purchased.** Food may be purchased for formal presentations with clients or panelists. However, budgeted funds may **not** be used cover food for working meetings. The maximum amount allowed for any meal reimbursements is $40.00 per meal/per person, any amount over that limit will not be reimbursed. Alcohol is **not** reimbursable.

Telephones are to be used only for project-related calls. All local and long distance calls are charged to the Systems project budget. Telephones will be accessed with a PIN number that will be assigned to each group.

Purchases should be made by the group's Financial Manager, using one of the university's auxiliary services groups such as the university bookstore and university catering. If purchases are made with personal money, a reimbursement can be requested by providing the **original receipt(s)**, account string, and a detailed justification to the Program Office's administrative assistant; but please note that tax is **not** reimbursed. You are required to abide by the university's "30-day rule" for processing reimbursements; this means that you must submit all receipts for reimbursement as soon as possible so that your request can be processed within the 30-day timeframe. Receipts for expenses more than 30 days old will not be reimbursed by the university.

Clients are responsible for their own travel costs.
Project teams will be held strictly to their budgets.

3.4 Computing Services

- **Consulting Services:** The Heinz Computing Services department is available for consultation on information technology related subjects. Email Heinz-computing@andrew.cmu.edu to setup an appointment.
- **File Storage**: Project files can be stores on the central file server. The initial quota is 10GB
- GB. Additional space can be requested as needed. All files stored on the central server are backed up overnight. Files deleted for longer than 30 days cannot be restored. Email Heinz-computing@andrew.cmu.edu to request file server space or to request file restores from backup. Please send the project name, faculty adviser and the Andrew ID's of all students/faculty needing access.
    - Project teams may request a single virtual machine for use as a server. Team members can access the server using Microsoft Remote Desktop from their personal computer (on or off campus). To request a virtual server, email heinz-computing@andrew.cmu.edu with the Subject of: System Project Virtual Machine Request. You may request the following Operating Systems:

Windows Server 2012 R2
Windows Server 2016
Windows 10
Ubuntu Linux (Latest LTS release-SSH/CLI access only) If you are not familiar with how to administer a Linux server via CLI, please refrain from requesting it.

You should also include the following information:

- **Project Name**
- **Technical lead (Andrew id). For Linux host, we provide this person with admin access and they are then responsible for granting access to all other team members.**
- **Andrew ID's of all team members needing access**
- **Requested RAM**:8-16GB (Request for additional RAM will be reviewed on case by case basis)
- **Number of CPUs/Cores**: Up to 2 sockets and 6 cores can be provided if necessary.
- **Hard Drive Capacity**: 250GB-500GB (Request for larger storage capacity will be reviewed on a case by case basis)
- **Network**: Note: By default Heinz Computing will place all virtual machines on a private network. We can provide proxy access to the internet, however internal connections from the Internet will not be allow unless you are using the Campus provided VPN. This means non CMU users will not be

able to access the machine. If there is a project or client need for direct access to the Internet, this will need to be explained up front in the request. Your team is responsible for installing all software and configuration of any services or platforms required to complete your project. Heinz Computing will provide the base system with all available security patches at the time of request. Once the virtual machine is handed over to your team, you will be responsible for all other security patches and configuration. Failure to keep the machine properly secured may result in revocation of network access. Please be sure to properly scope your project requirements **before** requesting a virtual machine. Failure to properly scope/understand your computing requirements can cause delays in your work waiting for machines to be reconfigured with additional capacity or features not originally requested.

Heinz Computing does NOT back up project machines. Your team is responsible for ensuring your data is backed up to another location.

Secure File Transfer

Heinz Computing operates a Secure File Transfer host that can be used to send\receive data from external clients. If you would like to make use of this server, send email to Heinz-computing@andrew.cmu.edu requesting an account for your team. We support certificate based authentication and IP based authentication.

4.2.3 Software

There is no charge for software that is licensed under an unlimited licensing agreement by the University or by Heinz College. Some software packages do have an additional charge — even if that software has a licensing agreement with the University or with Heinz College. Such charges will be assessed to the project budget. If there are questions about charges for project software, please email inquiry to Heinz-computing@andrew.cmu.edu.

PRE-APPROVAL IS REQUIRED TO PURCHASE (OR DOWNLOAD FREE) SOFTWARE NOT LICENSED BY THE UNIVERSITY;

see section 4.2 above. Please keep in mind that this includes any software that your client and advisor advise that you use. Pre-approval can be acquired by emailing Stefanie Vanhorn at srv@andrew.cmu.edu and requesting use of software. Please include the following information:

- Software Name, Direct link to software, Direct link to terms and conditions, 1-2 sentence statement explaining why and how you will be using the software

- **Equipment Loaning**: System groups can reserve portable projectors and laptops for presentations. Email Heinz-computing@andrew.cmu.edu for reservations.

3.5 Copying

Interim and final reports should be copied through the CMU's Copy Service in the Cohen University Center. Systems teams should **not** use internal printers or copiers, or the Heinz College Reprographics Office for these reports. CMU's Tartan Ink Center will charge the cost to your systems project if you provide them with the proper

account string. The cost for copying will be charged to the project budget. Be sure to consult with the CMU Tartan Ink Center associates about lead times for copying and binding reports.

3.6 Survey Design Assistance

The **Carnegie Mellon University Office of Institutional Research and Analysis** is a great resource for students who might need help in designing/analyzing surveys or crafting evaluation and research tools. Through their Survey Resource Center, students can consult with research specialists on a walk-in basis on Thursdays from 10 am – 2 pm in UTDC 414. For more information about this resource visit http://www.cmu.edu/ira/.

3.7 Process for Students to Request Student Email Addresses for Surveys and Research Papers

Students who would like access to CMU students' email addresses for any research purpose (including, but not limited to surveys and class projects) should contact the Office of Institutional Research at least two weeks prior to the date the addresses are desired. Follow the steps outlined on this page:

https://www.cmu.edu/ira/

3.7 Assessment of Student Learning for Accreditation

Programs may conduct a series of assessments to gather data as part of Middle States accreditation. The purpose of the assessments is to gather evidence of student learning. The Program Director will work with your faculty advisor to coordinate the assessments.

4. SYSTEMS SYNTHESIS OVERSIGHT COMMITTEE

The Systems Synthesis Operations Committee provides an organizational setting for Systems Synthesis work and a brokerage service for students, clients, and faculty ensuring that projects undertaken advance the interests of all involved groups in mutually beneficial ways.

4.1 Membership and Responsibilities of the Systems Synthesis Operations Committee

The Systems Synthesis Operations Committee includes faculty, MSPPM, MAM and MSHCPM/MSHCA Program Directors, MSPPM and MAM Program Chairs, and the Associate Dean.

Responsibilities of the Systems Synthesis Operations Committee include:

- identification of policy areas and organizations to target for projects;
- maintenance of a portfolio of projects in balance with student and faculty areas of interest;
- review and provision of feedback to advisors and students submitting proposals;
- review of current projects to ensure comparable standards in evaluating projects; and student grades.

4.2 Special Responsibility to Make Systems Synthesis Projects "Add Up"

Individual Systems Synthesis projects have time frames of a single semester. Nevertheless, projects in general should contribute to a larger effort or purpose. Overall, the purpose of Systems Synthesis is to serve the mission of Heinz College, and in particular with regard to education, community ties, and public service.

Heinz College has limited resources, however, so the goal is to promote projects that lead to targeted, cumulative impacts compatible with Heinz College's educational and research programs.

To make significant impacts on public policy and management, it will sometimes be necessary to make sustained efforts in targeted policy areas or client organizations. Public policy issues generally do not have solutions per se, but rather something more like a series of debates prior to political or administrative actions are taken, in order to anticipate and ameliorate problems. It may take a large effort to gain the knowledge, analytical results, and credibility to participate in a policy debate, so it is easy to imagine not one but perhaps two or three projects in a series on a given policy problem. In such a case, each project must have its own beginning and ending, with identifiable independent outputs.

The same may be true for management-oriented projects. In particular, it takes a great deal of time to build a working relationship with an organization, to get to know the major players and win their trust. Then with a success on one project, there is generally no shortage of additional projects, all of which can add up to a significant improvement in management.

Exhibit 1: Milestone Events

Fall Projects

- **Mid-September,** refine the problem statement, scope, and work plan with the client.
- **Mid-term presentation, Late October (end of Mini 1):**
  - **Mid-term presentation** to core members of the Advisory Board (update on progress)
  - Peer review of students/individual student consultations with advisor
  - Student evaluation of advisor
- **Final-presentation, Late November/early December Board** (to allow incorporation of the Board's comments into the final report)
  - **Fall Poster Day, December 5th**
  - **Final presentation dates, December 10th, 11th, and 12th**
- **End of semester:**
  - Completion and distribution of the **final report**
  - Peer review of students
  - Student evaluation of advisor

Spring Projects

- **Early-February:** refine the problem statement, scope, and work plan with the client.
- **Mid-term presentation, Early March (end of Mini 3):**
  - **Mid-term presentation** to core members of the Advisory Board (update on progress)
  - Peer review of students/individual student consultations with advisor
  - Student evaluation of advisor
- **Mid-April: Final presentation to Advisory Board** (to allow incorporation of the Board's comments into the final report)
  - **Spring Poster Day, April 30th**
  - **Final presentation dates, early May**
- **End of semester:**
  - Completion and distribution of the **final report**
  - Peer review of students
  - Student evaluation of advisor

Exhibit 2: Peer Review Template

LEVEL OF PROFICIENCY	Excellent (4)	Proficient (3)	Developing (2)	Rudimentary (1)
Problem Scoping	Clearly defines the problem, its boundaries and the project's scope. Identifies appropriate data for analysis and optimal methodology to address problem.	Defines the problem, with some understanding of its boundaries and the project's scope. Identifies appropriate data for analysis.	Sometimes makes contributions to defining the project's scope, but ideas are vague. Attempts to identify data for analysis but may not understand optimal methodology to solve problem.	Does not make contributions to define the project's scope. Does not identify appropriate data for analysis.
Problem Solving*	Identifies multiple approaches for solving the problem that applies within a specific context.	Identifies multiple approaches for solving the problem, only some of which apply within a specific context	Identifies only a single approach for solving the problem that applies within a specific context.	Identifies one or more approaches to solving the problem that do not apply within a specific context.
Project Management	Consistently executes tasks thoroughly, accurately, and in a timely fashion. Consistently coordinates tasks among group members.	Often executes tasks that are satisfactorily completed and on time. Often keeps members informed of their work.	Partially completes tasks and misses some deadlines. Limited communication on their progress to other constituencies.	Carelessly carries out tasks and frequently misses deadlines.
Teamwork**	Supports a constructive team climate by doing **all** of the following: • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. • Provides assistance and/or encouragement to team member	Supports a constructive team climate by doing **any three** of the following: • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. • Provides assistance and/or encouragement to team member	Supports a constructive team climate by doing **one or two** of the following: • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. • Provides assistance and/or encouragement to team member	Supports a constructive team climate by doing **none** of the following: • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. • Provides assistance and/or encouragement to team member
Conflict Resolution	Resolves interpersonal problems without interruption to the project.	Resolves interpersonal problems with limited interruption to the project.	Frequently loses focus from the project due to interpersonal conflict.	Allows personal conflict to significantly disrupt the progress of the project.

-Excerpted from Association of American Colleges and Universities Problem Solving (*) and Teamwork (**) Value Rubric

Exhibit 3: The Ten (plus Two) Commandments of Systems Synthesis

1. A systems project is the equivalent of a thesis project; please treat it with the seriousness it deserves.
   The systems project is one of the more tangible benchmarks of a student's work at Carnegie Mellon. It is an important milestone of a student's academic career.

2. Respectful and effective communication with the client and the advisory board is essential to a quality project.
   Keeping the client and advisory board informed of the project's progress and doing so in a professional manner are crucial to the project's success. Uninformed and/or uninvolved clients may diminish the project's impact in the community. Uniformed and/or uninvolved advisory board members will result in lost time and energy – resources too precious to waste! Equally important is the ability to be sensitive to the client and advisory board's communications needs and desires.

3. Any knowledge not possessed by the group should be obtained through research and by consulting with University and community experts.
   There is a vast universe of intellectual resources within the Pittsburgh region, more than any Systems project could possibly need. Discovering what information is lacking, where to find it, how to ask for it and how to use it is another critical learning opportunity of Systems; project teams should not expect information, resources or assistance to be handed to them.

4. Systems students are expected to put in a minimum of 12 hours of work per week on the project.
   Progress on the project will not *happen during weekly class meetings; class sessions will soon become reporting and decision-making meetings. The level of success a team achieves depends, to a significant extent, on the quantity of and the quality of time that the team invests* outside *of class meetings.*

5. It is every student's responsibility to know what each team member is doing within the group and within the project.
   In the sport of rowing, each member of the crew must be aware of and in sync with what the other rowers are doing. Without this awareness, efficiency and effectiveness is impossible. The same is true with Systems projects.

6. You succeed as a group; you fail as a group.
   Again, in rowing, no crew member ever wins a medal for the rugged independence of her or his rowing. It is in a student's own best interest to be selfless in assisting others on the project team.

7. Systems students are expected to treat each other with respect; gossip is not a productive way of dealing with conflict.
   All conflict should be handled within the group. Individuals must try to work out problems among themselves. If necessary, team leadership should become involved as mediators, not judges. The Advisor should be involved only as the "court of last resort."

8. Peer evaluation is an important tool for constructive criticism and quality improvement of the team; it is not a tool for personal attacks or retribution.
   Project team members are expected to use their peer evaluations in a professional manner. It is the responsibility of the team members to understand and endorse the evaluation criteria. Participation in peer evaluations is a vital part of the Systems process; failure to do so will be considered a failure to participate fully in Systems, and it will be reflected in the student's grade.

9. Systems students should understand the importance of fulfilling their responsibilities in a timely, professional and respectful manner.

Respect for the project is a student's duty as a member of the team. Following through on commitments in a timely manner, sharing information fully but succinctly, providing timely responses to inquiries, and having regular and effective communication with the team leadership are the critical student responsibilities that epitomize respect for the project.

10. The role of the facilitator is to structure the agenda, keep meetings moving in an organized and expeditious fashion, and to mediate internal disputes.

    The facilitator's key role in meetings is to help the process be inclusive and move forward. The Facilitator will encourage participation from team members who are not engaged, as well as discourage disruption, digression and obfuscation. The facilitator also will keep the meetings moving along according to the agenda timeline.

11. The project manager has very real and meaningful responsibilities. Disregarding that authority will adversely affect your project.

    The project manager has ultimate responsibility for all aspects of the work conducted by the group and the presentation of its findings in a public forum. They create and maintain a strong organizational structure and keep the group on-task toward completion. Failure to acknowledge and respect the burden of responsibility carried by this group member undermines everyone and everything associated with the project, and, ultimately, will cause unrest, conflict and failure.

12. The instructor's role is "advisory."

    The instructor is not the project manager. The instructor is not the boss. The instructor is there to offer guidance and support when s/he senses that the project may be going dangerously off-course, and to assist the project team in identifying resources.