Carnegie Mellon University
Heinz College
INFORMATION SYSTEMS • PUBLIC POLICY • MANAGEMENT

MASTER OF SCIENCE IN HEALTH CARE ANALYTICS AND INFORMATION TECHNOLOGY

2020 – 2021 HANDBOOK

Heinz College
Carnegie Mellon University
Ramayya Krishnan, Dean
Denise Rousseau, Faculty Chair
Jackie Speedy, Associate Dean
Alexandra Lutz, Program Director

healthcare@Heinz

Contents

HEINZ COLLEGE POLICIES AND GUIDELINES

This handbook provides specific information on the curriculum and program requirements for the Master of Science in Health Care Analytics and Information Technology (MSHCA) Program. The Heinz College also publishes a separate handbook which details College-wide policies and procedures pertaining to educational planning, program committee, teaching, scheduling and course credit, performance standards, academic standing, ethics and discipline, student privacy rights and major forms and deadlines. Students should familiarize themselves with both handbooks as they include information that is critical for your success. Both handbooks can be obtained through your program director and via the Heinz College website at: https://www.heinz.cmu.edu/current-students/

1 PROGRAM OUTCOMES AND COMPETENCIES

Students in the Master of Science in Health Care Analytics & Information Technology (MSHCA) program learn how to convert raw data into actionable solutions for complex problems facing the health care system and medical firms. Heinz College will empower students to use advanced tech and data to change the health care system for the better.

Competencies:

- To lead and manage in health care analytics and IT entities
- To analyze and synthesize data to solve problems and make decisions
- To assess the role and use of information technology to address business problems
- To communicate and interact effectively with health care industry stakeholders
- To understand and apply foundational knowledge of the evolving health care industry

2 CURRICULUM

In order to successfully complete the MSHCA program, you must complete:

- 198 units of course credit;
- all Common Core and Health Care Core courses (unless you exempt them);
- an approved internship between the first and second year;
- all other standards for graduation, including meeting minimum grade point averages.

Please note: *You will be pre-registered for your first semester of classes. You will register yourselves for the remaining semesters.*

2.1 Core Curriculum

You must complete the Common Core, Health Care Core, and elective requirements listed on the pages that follow in order to graduate. Be sure you are referencing the schedule for your incoming year. You must take Core courses in the sequence shown on the next pages, unless you obtain permission in advance from the Program Director.

Incoming Class of F2019 Healthcare Analytics and IT Course Schedule			
Common/ Health Core	**Course #**	**Course Title**	**Units**
		Fall Courses - Year 1	**54 total**
CC	90710 90709	Applied Economic Analysis **or** Intermediate Economic Analysis	12
CC	90777	Intermediate Statistical Methods **or** Statistical Reasoning with R*** (12 units)	6
CC	90838	Database Management for Policy Analytics	12
HC	90836	Health Systems	6
CC	90812 95888	Introduction to Programming with Python **or** Data Focused Python (only with permission)	6
CC	94842	Programming R for Analytics	6
CC	90717 94701	Writing for Public Policy** **or** Business English**	6
		Spring Courses – Year 1	**54 total**
CC	90718	Strategic Presentation Skills**	6
CC	94834	Applied Econometrics I	6
CC	90722	Management Science I: Optimization & Multicriteria Methods	6
CC	90760	Management Science II: Decision & Risk Modeling	6
CC	90723	Financial Statements and Analysis of Companies	6
HC	90831	Advanced Financial Management of Health Care	6
HC	90861	Health Policy	6
HC	94706	Health Care Information Systems	12
HC	94900	Analytics Summer Internship Required	0
		Fall Courses – Year 2	**48 total**
HC	94705	Health Economics	12
CC	94700	Organizational Design and Implementation**	6
CC	95791	Data Mining	6
CC	90739	Systems Synthesis	12
	--	Electives	12
		Spring Courses – Year 2	**42 total**
CC	94867	Decision Analytics for Business & Policy	12
CC	94887	Applied Analytics: the Machine Learning Pipeline	12
CC	94775	Unstructured Data Analytics for Policy	6
	--	Electives	12
*198 Units required to graduate (174 core; 24 elective)			

**The sequence of these courses may shift depending on Fall year 1 registration

***Students who place into 90-711 Statistical Reasoning with R will shift their writing course to Fall 2

Incoming Class of F2020 Healthcare Analytics and IT Course Schedule			
Common/ Health Core	**Course #**	**Course Title**	**Units**
		Fall Courses - Year 1	**54 total**
CC	90710 90709	Applied Economic Analysis **or** Intermediate Economic Analysis	12
CC	90777	Intermediate Statistical Methods	6
CC	90838	Database Management for Policy Analytics	12
HC	90836	Health Systems	6
CC	90812 90819 95888	Introduction to Programming with Python** **or** Intermediate Programming with Python **or** Data Focused Python (only with permission)	6
CC	94842	Programming R for Analytics	6
CC	90717 94701	Writing for Public Policy **or** Business Writing	6
		Spring Courses – Year 1	**54 total**
CC	90718	Strategic Presentation Skills	6
CC	94834	Applied Econometrics I	6
CC	95791	Data Mining	6
CC	90722	Management Science I: Optimization & Multicriteria Methods	6
CC	90760	Management Science II: Decision & Risk Modeling	6
HC	94706	Health Care Information Systems	12
CC	90723	Financial Statements and Analysis of Companies	6
HC	90861	Health Policy	6
HC	94900	Analytics Summer Internship Required	0
		Fall Courses – Year 2	**48 total**
HC	94705	Health Economics	12
CC	94700	Organizational Design and Implementation	6
CC	94867	Decision Analytics for Business & Policy	12
CC	*94739*	*Systems Synthesis/Capstone Project (fall/spring preference)*	*12*
	--	Electives	6 - 18
		Spring Courses – Year 2	**42 total**
CC	94887	Applied Analytics: the Machine Learning Pipeline	12
CC	94775	Unstructured Data Analytics for Policy	6
HC	90831	Advanced Financial Management of Health Care	6
CC	*94739*	*Systems Synthesis/Capstone Project (fall/spring preference)*	*12*
	--	Electives	6 - 18
*198 Units required to graduate (174 core; 24 elective)			

**Students who enter in Introduction to Programming with Python 90-812 will also need to take Intermediate Programming with Python 90-819 before taking 94-775 Unstructured Data Analytics for Policy in Spring Year 2.

3 PROJECT COURSES

Project courses are organized around significant policy, management, analytics or information technology problems in health care and require a solution that involves a mix of technological, economic, social and political skills. Project courses are sponsored by an external organization and have a project advisory committee of people from a range of agencies interested in the project's outcome. As opposed to the traditional classroom setting, project courses are organized as an exercise in group problem solving. Students are divided into teams guided by faculty from the Heinz College and other colleges and departments in the university.

3.1 Systems Synthesis

Systems Synthesis Projects allow students to apply the diverse skills developed in the classroom to a "real world" problem with a "real world client" in the design of a specific functioning public or non-profit sector system. The term "system" refers to the fact that the particular entity studied has an identifiable objective or function, and the word "synthesis" refers to the fact that the desired output is an integrated "design" for improved operation of that system.

In a Systems Synthesis Project, you will work in a group to structure a problem, do appropriate analysis using quantitative and analytical tools, generate recommendations to solve or ameliorate the problem, and present the analysis and recommendations to the client in both written and oral form. The experience will be designed to sharpen your problem-solving skills and skills in working effectively in groups.

3.2 Organization of Systems Synthesis Projects

Projects must be supervised by at least one faculty member who maintains relations with the client, directs and critiques the students' work, coaches them for their presentations, coordinates relationships with a Project Advisory Committee, and grades the students on their contributions to the projects as well as grading the overall projects.

Systems Synthesis Projects involve both oral and written work. Generally, each project should make at least one oral presentation to the client per semester; this presentation is open to the public and is advertised accordingly. Each student should participate in at least one oral presentation to the client. In addition, groups must produce an interim report and a final report. Each student should write a significant and identifiable section of the report and perform some nontrivial analysis, even if these efforts have to be improved upon by other members of the group before being included in a report to the client. The written report is expected to be of high quality but also produced on time. Each group must submit an electronic copy of the final report to the Program Director's and Associate Dean's Office.

3.3 Development of Systems Synthesis Projects

Typically, proposals are generated by faculty and by organizations external to the School. In recent years, some very successful proposals have come from students with an interest in a particular problem. The HCA Program Director, Associate Dean, and other faculty designated by the Dean are available to assist students who are interested

in developing their own proposals. If you are interested in organizing a project, you must submit a proposal to the HCA Program Director or Associate Dean including as many of the following items as possible:

- a brief description of the system to be studied
- the system client if identified
- the kinds of alternative improvements to be considered
- the types of data that would be used in such an analysis and how you intend to gather that data
- the analytical approaches you anticipate you will use in the study
- the name(s) of proposed faculty advisors
- a list of students interested in the project

It is certainly not necessary to have all of the aspects of a project listed above in place in order to submit a proposal. If you need assistance with any aspect of developing a project, contact the HCA Program Director. The three most critical factors are a well-defined project idea, significant interest from students, the feasibility of completing the project, and the ability of the Associate Dean to assign a faculty member to supervise the project. The latter depends a great deal on the needs for individual faculty to teach other courses in the curriculum.

Projects proposed by students will be subject to review by the faculty for feasibility and suitability as a systems project.

3.4 Assignment of Students to Projects

The Program Director will solicit student preferences in the spring of the first year. Student preference is an important consideration in project assignment. A Committee consisting of the Program Director and Faculty will also consider the link between the skills of the student and the nature of the tasks in the Systems courses.

3.5 Grading of Systems Synthesis Projects

You will receive a Systems Synthesis grade based on your individual and group performance. In any group project there is an inherent tension between rewarding individual and group performance. This tension is in part by design, as it reflects some of the realities of group staff work in public and private organizations. Grades in Systems Synthesis courses are a combination of individual and group considerations. It is generally desirable that students perform multiple roles in projects, and it is recommended that faculty and student evaluations consider these various contributions.

4 SUMMER INTERNSHIP

All MSHCA students are required to spend the summer following their first year in the program gaining professional experience in management and analysis by working in a public agency, non-profit organization, or private firm. Your internship duties must have significant educational value.

Your internship will train you in ways significantly different from classroom instruction.

By working in a professional environment, you will solidify the knowledge gained in your Heinz College coursework, refine career interests, and establish personal networks that might lead to later career opportunities. You also can earn income, though the Heinz College does accept volunteer internships. The internship also provides the faculty with feedback about the relevance of the curriculum and the effectiveness of the teaching program.

4.1 Internship Requirements

The completion of an internship is a graduation requirement.

- Minimally, the internship requires 300 hours of full-time employment that has formal supervision, is professional in nature, includes work that is of importance to the organization, and has significant educational value.

- Before beginning the internship, students must complete the online Career Services Internship Reporting Form for approval: https://login.heinz.cmu.edu/secure/InternshipReporting.asp

- The internship will be verified with the students' supervisors and then approved. Students must notify their Career Advisor of any significant changes in their internships, such as length, location, hours of work, etc.

- Once the internship has been approved, students will be registered for the zero-unit internship course. Students will not receive academic credit for the internship, but it will be reflected on their transcript as a course with P/F grade.

- At the end of your internship your Career Services Advisor will request that your supervisor complete an evaluation form about your internship performance. You are also required to complete an evaluation survey as well as a self-reflection statement describing how your internship fulfilled the educational goals of the program. **If you do not successfully complete an eligible internship along with your survey and self-evaluation, you will not fulfill your internship requirement necessary for graduation.**

- **F1 Visa Students:** You must apply for Curricular Practical Training (CPT) employment authorization for your summer internship. CPT authorization is required regardless of the internship being paid or unpaid. CPT is only available to F-1 students who have not graduated and who have been enrolled on a full-time basis for one full academic year (i.e. fall and spring.) If your degree program requires you to complete a summer internship, you can qualify for CPT. Processing CPT may take up to 2 weeks and you cannot begin employment until you receive authorization. Guidelines, forms and instructions can be found at the Office of International Education's website: https://www.cmu.edu/oie/

4.2 Securing an Internship

You will be responsible for securing a suitable internship. Career Services will

provide assistance through counseling, workshops on resume preparation and interview skills, and listings of potential internships. You can make an appointment to discuss your situation and you are encouraged to come to workshops that cover the essential skills for finding the right internship.

4.3 Internship Funding

Many organizations offer paid internships. For those that do not, there are other options.

Federal Community Service Work-Study (FCSWS)

Heinz College participates in the FWS/FCSWS programs, which are need-based federal financial aid programs that provide part-time employment to eligible students who need the earnings to help meet their educational expenses. The programs encourage students receiving FWS assistance to seek employment in the community (within an eligible organization). Student eligibility is determined from information provided on the student's Free Application for Federal Student Aid (FAFSA) and Heinz College Financial Aid Application. Interested students for summer FCSWS funds are also required to submit a Summer Request Form for Federal Community Service Work Study. To be eligible, a student must meet all the following requirements:

- Be enrolled as a regular student in an eligible program of study.
- Be eligible for Federal Financial Aid.
- Be a U.S. citizen or Federal Aid eligible noncitizen.

For more information about FCSWS, visit: https://www.heinz.cmu.edu/current-students/student-employment

Internship Opportunity Fund (IOF)

Students who are required to complete internships and accept internships that do not qualify for funding under the Federal Work Study (FWS) program, either because the student does not have federal financial aid eligibility or because the employer and/or the job does not meet federal regulations for FWS eligibility, may apply to the Heinz College Internship Opportunity Fund (IOF) for consideration of awards to help support non-paying and low paying internships. Students are never eligible to receive both IOF and FWS funds to subsidize the same position.

The Internship Opportunity Fund (IOF) is a student-run group that holds various fundraising activities throughout the year to raise money that will be matched by the College and then redistributed to students taking low-paying or unpaid summer internships, regardless of the employer's sector. The IOF is open to students in all programs who do not qualify for FWS and that have a required summer internship component, regardless of the employer's sector. Students that actively participate in the fundraising, and that have a demonstrated financial need, will receive preference when the funds are distributed.

The number of students that can receive IOF support, and the amount of support they can receive, depends directly on the success of the fundraising effort organized by students. Students who may wish to seek support from IOF should begin working early in the year to help raise funds.

5 JOINT PROGRAMS

5.1 Accelerated Master's Program (AMP)

The Heinz College offers an Accelerated Master's Program (AMP) for selected Carnegie Mellon undergraduates from the Dietrich College of Humanities and Social Sciences, the College of Fine Arts, the Mellon College of Science, the Carnegie Institute of Technology, and the Department of Engineering and Public Policy. AMP students finish their undergraduate degrees in their senior years while beginning the HCA program at the Heinz College. During the senior year, students remain on undergraduate financial aid and pay undergraduate tuition. After one additional year at the Heinz College, during which they are graduate students and are eligible for Heinz College financial aid, they receive their MSHCA degree. AMP students are required to spend one full academic year (two semesters) as a Heinz College student. **In order to receive your HCA degree, you must pay for two full-time semesters of Heinz College tuition, even if you can complete all degree requirements in a shorter period of time.** Students apply to the AMP program as juniors. Students interested in the program are encouraged to contact the Heinz College Admissions Office.

The curriculum sequence for AMP students will differ than normal track MSHCA's. Please refer to the course plan established with the Program Director.

6 DEPARTMENT PERSONNEL

Alexandra Lutz, Director, Health Care Policy and Management Masters Programs
Email: alutz@cmu.edu

Advisor: Rema Padman, Professor of Management Science and Healthcare Informatics.
Email: rpadman@andrew.cmu.edu

7 STATEMENT OF ASSURANCE

Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state, or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be

directed to the university ombudsman, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-1018.

Obtain general information about Carnegie Mellon University by calling 412-268-2000.