

MS IN COMPUTING: DATA MANAGEMENT & ANALYSIS

A student may pursue an MS with a (1) thesis option, or (2) a project option, or (3) a course-only option. The minimum number of credits for any of the three options is 30 from graduate level classes. A maximum of 6 project hours or 9 thesis hours is allowed to be included in the program of study for students in the project or the thesis option. A minimum of 6 hours of thesis research is required for the thesis option.

TRACK FACULTY

Aditya Bhaskara (Track Director), Lajos Horvath (Math), Chris Johnson, Sneha Kumar Kasera, Mike Kirby, Alexander Lex, Feifei Li, Miriah Meyer, Baxton Osting (Math), Valerio Pascucci, Bei Wang Phillips, Jeff Phillips, Vivek Srikumar, Hari Sundar, Suresh Venkatasubramanian, Shandian Zhe

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| CORE CLASSES - Must take 4 core classes, at least one from each line. | |
| CS 6140 | Data Mining /or/ CS 6350 Machine Learning |
| CS 6150 | Advanced Algorithms |
| CS 6530 | Advanced Database Systems |
| CS 6630 | Visualization for Data Science (CS 6635 Visualization for Scientific Data may be taken as a substitute) |

A average grade of B or greater is required for core classes.

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| ELECTIVES: Three courses from the following list are required: (or CS 6140/CS 6350 if not counted above) Students may also substitute most graduate classes taught by track faculty. |
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ALGORITHMICS

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| CS 6160 | Computational Geometry |
| CS 6170 | Computational Topology |
| CS 6180 | Clustering |
| CS 6966 | Theory of Machine Learning |

ANALYTICS

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|---------|-------------------------------|
| CS 6190 | Probabilistic Modeling |
| CS 6210 | Advanced Scientific Computing |
| CS 6300 | Artificial Intelligence |
| CS 6340 | Natural Language Processing |
| CS 6355 | Structured Prediction |

MANAGEMENT

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|---------|---|
| CS 6230 | High-Performance Computing and Parallelization |
| CS 6235 | Parallel Programming for GPUs/Many Course/Multi-Cores |
| CS 6480 | Advanced Computer Networks |
| CS 6490 | Network Security |
| CS 6963 | Distributed Systems |

Students may substitute other SoC graduate-level courses for elective requirements with approval of the Track Director (especially those taught by track faculty). With approval of the supervisory committee, a student may take two elective courses (6 credit hours) at the graduate level or higher from other departments, excluding independent study, seminars and research credit. Students may place out of the above requirements by substituting or transferring courses from other institutions at the discretion of the Track Director.

In all three options, seminar hours cannot be included to fulfill the 30 graduate level credits requirement. Independent study credit hours can only be used on the Program of Study for students who pursue the project based degree. However, once a student enters the project or the thesis option, his/her prior independent study or thesis research hours can be converted into project or thesis hours whichever is applicable, if the student's advisor deems these hours relevant to the student's project or thesis.

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DATA SCIENCE OPTION

| CORE CLASSES | |
|---------------------|---|
| CS 5530 | Database Systems /or/ CS 6965 Big Data Computer Systems |
| CS 6140 | Data Mining |
| CS 6190 | Probabilistic Modeling |
| CS 6350 | Machine Learning |
| CS 6630 | Visualization for Data Science (CS 6635 Visualization for Scientific Data may be taken as a substitute) |
| MATH 5080 | Statistical Inference I |
| MATH 6010 | Linear Models |
| SUGGESTED ELECTIVES | |
| CS 6150 | Advanced Algorithms |
| CS 6300 | Artificial Intelligence |
| CS 6340 | Natural Language Processing |
| CS 6530 | Database Systems |
| CS 6961 | Structured Prediction |
| MATH 5770 | Introduction to Optimization |
| MATH 6030 | Multivariate Models |
| MATH 6070 | Mathematical Statistics |

A average grade of B or greater is required for core classes.

Students may place out of the above requirements by substituting or transferring courses from other institutions at the discretion of the Track Director. Students may complete the required 30 credits with SoC graduate-level courses or Math graduate-level courses, or from other departments with approval of the Track Director.

In all three options, seminar hours cannot be included to fulfill the 30 graduate level credits requirement. Independent study credit hours can only be used on the Program of Study for students who pursue the project based degree. However, once a student enters the project or the thesis option, his/her prior independent study or thesis research hours can be converted into project or thesis hours whichever is applicable, if the student's advisor deems these hours relevant to the student's project or thesis.

PHD IN COMPUTING:

DATA MANAGEMENT & ANALYSIS

Course work listed on the approved Program of Study form must comprise at least 50 semester hours of graduate course work and dissertation research, exclusive of independent study. At least 14 semester hours of dissertation research (CS 7970) and 24 semester hours of graduate course work must be included. Up to 12 hours of graduate level course work already applied to other degrees may be used in the program of study as approved by the track director. Students may place out of the following requirements by substituting or transferring courses from other institutions at the discretion of the track director.

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A student must take four elective courses (twelve hours) which involve the areas related to data, or are directly applicable to the student's dissertation research. Up to three courses (nine hours) may be taken from other departments at the University of Utah. All elective courses on the Program of Study must be taught at the graduate level. For those classes taken within the School of Computing, the students needs to take 6000 level courses and above when available/appropriate. In addition to the following electives, other 6000 level and above classes taught by track faculty are also typically allowed as electives. All courses taken by a track student to fulfill the elective requirements must be approved by the student's committee and the track director.

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| ELECTIVES |
| Three courses from the following list are required: (or CS 6140/CS 6350 if not counted above.) Students may also substitute most graduate courses taught by track faculty. |

ALGORITHMIC

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