

Data Science Undergraduate Certificate

The undergraduate certificate in Data Science is a five-course (15 credit hour) program. It provides skills, both statistical and computational, and technologies for the growing and popular fields involving data science and analysis. A student pursuing this certificate can choose from one of the two tracks, the computational track or the statistical track. Each track consists of three required courses (9 credit hours) and two additional elective courses (6 credit hours).

Computational Track

Required Courses

| | | |
|--------------|--|---|
| CMP SCI 4200 | Python for Scientific Computing and Data Science | 3 |
| CMP SCI 4340 | Introduction to Machine Learning | 3 |
| CMP SCI 4342 | Introduction to Data Mining | 3 |

Electives

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|--------------------------------------|--|---|
| Choose two of the following courses: | | 6 |
| CMP SCI 3411 | Introduction to Data Visualization | |
| CMP SCI 4030 | Introduction to Intelligent Web | |
| CMP SCI 4151 | Introduction to Statistical Methods for Data Science | |
| CMP SCI 4300 | Introduction to Artificial Intelligence | |
| CMP SCI 4370 | Introduction to Biological Data Science | |
| CMP SCI 4390 | Introduction to Deep Learning | |
| CMP SCI 4610 | Database Management Systems | |
| MATH 4005 | Exploratory Data Analysis with R | |
| MATH 4090 | Introduction to High-dimensional Data Analysis | |

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|--------------------|---------------------------------------|-----------|
| MATH 4220 | Bayesian Statistical Methods | |
| MATH 4225 | Introduction to Statistical Computing | |
| MATH 4260 | Introduction to Stochastic Processes | |
| Total Hours | | 15 |

Statistical Track Required Courses

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|-----------------|--|---|
| MATH 4200 | Mathematical Statistics I | 3 |
| MATH 4210 | Mathematical Statistics II | 3 |
| MATH 4250 | Introduction to Statistical Methods in Learning and Modeling | 3 |
| or CMP SCI 4340 | Introduction to Machine Learning | |

Electives

| | | |
|--------------------------------------|---|---|
| Choose two of the following courses: | | 6 |
| CMP SCI 4030 | Introduction to Intelligent Web | |
| CMP SCI 4200 | Python for Scientific Computing and Data Science | |
| CMP SCI 4300 | Introduction to Artificial Intelligence | |
| CMP SCI 4320 | Introduction to Evolutionary Computation | |
| CMP SCI 4340 | Introduction to Machine Learning (if course not used above) | |
| CMP SCI 4342 | Introduction to Data Mining | |
| CMP SCI 4370 | Introduction to Biological Data Science | |
| CMP SCI 4390 | Introduction to Deep Learning | |
| MATH 4005 | Exploratory Data Analysis with R | |

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|--------------------|---|
| MATH 4090 | Introduction to High-dimensional Data Analysis |
| MATH 4220 | Bayesian Statistical Methods |
| MATH 4225 | Introduction to Statistical Computing |
| MATH 4250 | Introduction to Statistical Methods in Learning and Modeling (if course not used above) |
| MATH 4260 | Introduction to Stochastic Processes |
| Total Hours | 15 |

A minimum of three courses must be taken from UMSL. Courses may be substituted with the permission of the certificate coordinator. For more information, contact the department chair or email info@arch.umsl.edu.

If other departments are affected by this proposal, please secure "sign-offs" and indicate for each department the following:

| Department | Contact Person | Phone # | O |
|-------------|----------------|---------|----|
| Mathematics | Erika Gibbs | | No |
| | Jim Craig | | No |

Justification for request:

Adding a related course to the list of electives