

## A. EDUCE pre-course survey - Fall 2017

### Page 1

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#### Introduction

Data science is an increasingly common component of science, technology, engineering, and math (STEM) as well as related careers. Therefore, the U. of British Columbia is employing a number of programs to improve and expand its undergraduate data science curricula. One such program is the Experiential Data Science for Undergraduate Cross-disciplinary Education (EDUCE) initiative, which will impact this course through the introduction of short data science modules.

The goal of this survey is to determine your previous experience with data science before participating in the targeted data science EDUCE modules in this course.

For which course are you completing this survey?

- MICB301: Microbial Ecophysiology
- MICB405: Bioinformatics
- MICB421: Experimental Microbiology
- MICB425: Microbial Ecological Genomics

Please create an anonymous identifier that is the first three letters of your mother's first name and the last 4 digits of your cell phone number.

If you do not have a person whom you identify as your mother, please use your father's first name. If you do not have a cell phone, please use your home phone number. For example, if your mother's name is Nancy and your phone number is 555-555-1828, your identifier would be NAN1828.

Your identifier will be the same throughout this course as well as other courses and workshops, so please follow the setup correctly.

Type here

### Key terminology

In this section, we would like to determine your previous experience with the terms "data science" and "bioinformatics".

Have you heard the term "data science"?

Yes

No

How would you define data science?

Type here

Where have you been exposed to data science? Courses, popular media, books, etc.

Type here

Have you heard the term "bioinformatics"?

Yes

No

How would you define bioinformatics?

Type here

Where have you been exposed to bioinformatics? Courses, popular media, books, etc.

Type here

## Related fields

Please rate your interest and experience in fields related to data science.

Please indicate which interfaces and/or programs you have used *prior to this course*.

Check all that apply.

- Unix command line
- R
- mothur
- QIIME/QIIME2
- Metagenomic tools (like aligning, assembling, binning)
- None of the above

## How would you rate your interest in

	None	Low	Medium	High
computer science?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
statistics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bioinformatics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
microbiology?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## What level of experience do you have in

Levels provide some examples but you may have other experience not listed. Please choose the level you feel fits you best.

	None	Low (like taking a workshop or doing some readings)	Medium (like taking a course)	High (like taking multiple, high-level courses)	Very high (like publishing in a peer-reviewed journal)
computer science?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bioinformatics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
microbiology?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
statistics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Related coursework

Please detail your previous coursework related to data science.

## What is your academic major?

## Have you previously completed EDUCE module(s)?

Yes

No

## If so, in which course(s)?

Please check all the apply.

MICB301: Microbial Ecophysiology

MICB405: Bioinformatics

MICB421: Experimental Microbiology

MICB425: Microbial Ecological Genomics

Please indicate if you have previously completed, are currently enrolled in, or plan to enroll in any of the following data science-related courses.

### Microbiology

	Completed previously	Currently enrolled	Plan to enroll in the future	None
MICB301: Microbial Ecophysiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB405: Bioinformatics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB421: Experimental Microbiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB425: Microbial Ecological Genomics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Statistics

	Completed previously	Currently enrolled	Plan to enroll in the future	None
STAT200: Elementary Statistics for Applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT203: Statistical Methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT241: Introductory Probability and Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT251: Elementary Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BIOL300: Introduction to Biostatistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Computer science

	Completed previously	Currently enrolled	Plan to enroll in the future	None
CPSC100: Computational Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Text S1. Pre- and post-course surveys.

	Completed previously	Currently enrolled	Plan to enroll in the future	None
CPSC101: Introduction to Systematic Program Design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC110: Computation, Programs, and Programming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC121: Models of Computation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC301: Computing in the Life Sciences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please list any other relevant courses which you *completed previously*. This could be from the departments listed above (MICB, STAT, CPSC) or any other department with an equivalent course.

Please list any other relevant courses in which you are *currently enrolled*. This could be from the departments listed above (MICB, STAT, CPSC) or any other department with an equivalent course.

Please list any other relevant courses in which you *plan to enroll*. This could be from the departments listed above (MICB, STAT, CPSC) or any other department with an equivalent course.

### Related extra-curriculars

Please indicate your experience and interest in other data science-related learning opportunities.

Have you participated in any data science-related activities outside of class? Workshops, hackathons, etc.

Yes

No

If so, please specify.

Type here

Are you interested in participating in workshops outside of class to develop or continue to develop your skills in data science?

Yes

No

Are you aware of any such workshops currently offered at UBC?

Yes

No

If so, please specify.

Type here

Thank you for taking the time to complete this survey. Please click "Submit" before exiting.

If you have any questions regarding the study or are interested in learning about our findings, please contact Dr. Steven Hallam ([shallam@mail.ubc.ca](mailto:shallam@mail.ubc.ca)).





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## B. EDUCE pre-course survey - 2018-19

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### Intro

#### Introduction

Data science is an increasingly common component of science, technology, engineering, and math (STEM) as well as related careers. Therefore, the U. of British Columbia is employing a number of programs to improve and expand its undergraduate data science curricula. One such program is the Experiential Data Science for Undergraduate Cross-disciplinary Education (EDUCE) initiative, which will impact this course through the introduction of short data science modules.

The goal of this survey is to determine your previous experience with data science before participating in the targeted data science EDUCE modules in this course.

#### Course & ID

For which course are you completing this survey?

- MICB301: Microbial Ecophysiology
- MICB322: Molecular Microbiology Laboratory
- MICB323: Molecular Immunology and Virology Laboratory
- MICB405: Bioinformatics
- MICB421: Experimental Microbiology
- MICB425: Microbial Ecological Genomics
- MICB447: Experimental Molecular Biology
- BIOL436: Integrated Functional Genomics

Please create an anonymous identifier that is the first three letters of your mother's first name and the last 4 digits of your cell phone number.

If you do not have a person whom you identify as your mother, please use your father's first name. If you do not have a cell phone, please use your home phone number. For example, if your mother's name is Nancy and your phone number is 555-555-1828, your identifier would be NAN1828.

Your identifier will be the same throughout this course as well as other courses and workshops, so please follow the setup correctly.

## Key terms

### Key terminology

In this section, we would like to determine your previous experience with the terms "data science" and "bioinformatics".

Have you heard the term "data science"?

Yes

No

How would you define data science?

Where have you been exposed to data science? Courses, popular media, books, etc.

Have you heard the term "bioinformatics"?

Yes

No

How would you define bioinformatics?

Where have you been exposed to bioinformatics? Courses, popular media, books, etc.

### Related fields

Please rate your interest and experience in fields related to data science.

Please indicate which interfaces and/or programs you have used *prior to this course*.

- Unix command line
- R
- mothur
- QIIME/QIIME2
- Metagenomics tools (like aligning, assembling, binning)
- None of the above

How would you rate your interest in

	None		Low			Medium			High		
	0	1	2	3	4	5	6	7	8	9	10
microbiology?											
bioinformatics?											
statistics?											
computer science?											

What level of experience do you have in

	None		Low (like taking a workshop or doing some readings)			Medium (like taking a course)			High (like taking multiple, high-level courses)		Very high (like publishing in a peer-reviewed journal)	
	0	1	2	3	4	5	6	7	8	9	10	
microbiology?												
bioinformatics?												
statistics?												
computer science?												

### Coursework

### Related coursework

Please detail your previous coursework related to data science.

What is your academic major?

Have you previously completed EDUCE module(s)?

- Yes  
 No

If so, in which course(s)?

- MICB301: Microbial Ecophysiology  
 MICB405: Bioinformatics  
 MICB421: Experimental Microbiology  
 MICB425: Microbial Ecological Genomics

Please indicate if you have previously completed, are currently enrolled in, or plan to enroll in any of the following data science-related courses.

#### Microbiology

	Completed previously	Currently enrolled	Plan to enroll in the future	None
MICB301: Microbial Ecophysiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB405: Bioinformatics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB421: Experimental Microbiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB425: Microbial Ecological Genomics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB447: Experimental Molecular Biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### Statistics

	Completed previously	Currently enrolled	Plan to enroll in future	None
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Text S1. Pre- and post-course surveys.

	Completed previously	Currently enrolled	Plan to enroll in future	None
STAT200: Elementary Statistics for Applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT203: Statistical Methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT241: Introductory Probability and Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT251: Elementary Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BIOL300: Introduction to Biostatistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Computer science

	Completed previously	Currently enrolled	Plan to enroll in future	None
CPSC100: Computational Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC101: Introduction to Systematic Program Design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC110: Computation, Programs, and Programming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC121: Models of Computation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC301: Computing in the Life Sciences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please list any other data science relevant courses from the departments listed above (MICB, STAT, CPSC) or any other department with an equivalent course that you

- Previously completed
- Are currently enrolled in
- Plan to enroll in future

Co-curricular

Related co-curriculars

Please indicate your experience and interest in other data science-related learning opportunities.

Have you participated in any data science-related activities outside of class? Workshops, hackathons, etc.

Text S1. Pre- and post-course surveys.  
If so, please specify.

Yes

No

Are you interested in participating in workshops outside of class to develop or continue to develop your skills in data science?

Yes

No

Are you aware of any such workshops currently offered at UBC?

If so, please specify.

Yes

No

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## C. EDUCE post-course survey - Fall 2017

### Page 1

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#### Introduction

During this semester, you completed one or more data science modules as part of the Experiential Data Science for Undergraduate Cross-disciplinary Education (EDUCE) initiative. The goal of this survey is to measure the impact that these EDUCE modules had on your understanding and experiences in data science.



For which course are you completing this survey?

- MICB301: Microbial Ecophysiology
- MICB405: Bioinformatics
- MICB421: Experimental Microbiology
- MICB425: Microbial Ecological Genomics

Please create an anonymous identifier that is the first three letters of your mother's first name and the last 4 digits of your cell phone number.

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Your identifier will be the same throughout this course as well as other courses and workshops, so please follow the setup correctly.

Type here

### Key terminology

In this section, we would like to determine how your definitions of "data science" and "bioinformatics" have changed over this semester.

Have you heard the term "data science"?

Yes

No

How would you define data science?

Type here

Where have you been exposed to data science? Courses, popular media, books, etc.

Type here

Have you heard the term "bioinformatics"?

Yes

No

How would you define bioinformatics?

Type here

Where have you been exposed to bioinformatics? Courses, popular media, books, etc.

Type here

### Related fields

Please rate your current interest and experience in fields related to data science.

#### How would you rate your interest in

	None	Low	Medium	High
statistics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
microbiology?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
computer science?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bioinformatics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### What level of experience do you have in

	None	Low (like taking a workshop or doing some readings)	Medium (like taking a course)	High (like taking multiple, high-level courses)	Very high (like publishing in a peer-reviewed journal)
bioinformatics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
statistics?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
microbiology?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
computer science?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Related coursework

Please indicate how the EDUCE data science module(s) impacted your interest in related coursework.

As a result of the EDUCE *data science module(s)* within this course, are you more or less likely to enroll in the following courses?

### Microbiology

	Less	More	No change	N/A, previously completed course
MICB301: Microbial Ecophysiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB405: Bioinformatics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB421: Experimental Microbiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB425: Microbial Ecological Genomics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Statistics

	Less	More	No change	N/A, previously completed course
STAT200: Elementary Statistics for Applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT203: Statistical Methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT241: Introductory Probability and Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT251: Elementary Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BIOL300: Introduction to Biostatistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Computer science

	Less	More	No change	N/A, previously completed course
CPSC100: Computational Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC101: Introduction to Systematic Program Design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC110: Computation, Programs, and Programming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC121: Models of Computation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC301: Computing in the Life Sciences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please list any other relevant courses in which you are more or less likely to enroll based on your experiences in the *data science modules* in this course.

### Related extra-curriculars

Please indicate your current experience and interest in other data science-related learning opportunities.

Have you taken a data science workshop outside of class *this semester*?

Yes

No

If so, please specify.

Type here

Are you interested in participating in workshops outside of class to develop or continue to develop your skills in data science?

Yes

No

If so, which one(s) interest you?

Please check all that apply.

### Introductory

Introduction to R

Data carpentry: Basic data organization, manipulation, and visualization in R

Software carpentry: Programming in Python, the Unix shell, and version control with Git

### Intermediate

Working with tabular data in R

Graphics with ggplot in R

Statistical models in R

Functions, workflows, and reproducible research in R and Git

### Microbiome

Amplicon sequence data analysis in mothur or QIIME

Microbiome analysis in R

Metagenomics analysis

Metatranscriptomics analysis

## Demographics

This section is entirely optional and for research purposes only.

Do you identify as a racial or ethnic minority?

- Yes
- No
- Prefer not to answer

Do you identify as a first-generation university student?

*i.e.* Neither of your parent(s) or guardian(s) attended college.

- Yes
- No
- Prefer not to answer

Do you identify as a non-traditional university student?

This includes those who:

- Delay enrollment after high school by more than a year or
- Attend part-time for at least part of the academic year or
- Work full-time while enrolled or
- Have dependents other than a spouse

- Yes
- No
- Prefer not to answer

Thank you for taking the time to complete this survey.

Please click "Submit" and you will be redirected to a page asking if you are willing to participate in a follow-up survey in the future.

If you have any questions regarding the study or are interested in learning about our findings, please contact Dr. Steven Hallam ([shallam@mail.ubc.ca](mailto:shallam@mail.ubc.ca)).



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## D. EDUCE post-course survey - 2018-19

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### Intro

#### Introduction

During this semester, you completed one or more data science modules as part of the Experiential Data Science for Undergraduate Cross-disciplinary Education (EDUCE) initiative. The goal of this survey is to measure the impact that these EDUCE modules had on your understanding and experiences in data science.

#### Course & ID

For which course are you completing this survey?

- MICB301: Microbial Ecophysiology
- MICB322: Molecular Microbiology Laboratory
- MICB323: Molecular Immunology and Virology Laboratory
- MICB405: Bioinformatics
- MICB421: Experimental Microbiology
- MICB425: Microbial Ecological Genomics
- MICB447: Experimental Molecular Biology
- BIOL436: Integrated Functional Genomics

Please create an anonymous identifier that is the first three letters of your mother's first name and the last 4 digits of your cell phone number.

If you do not have a person whom you identify as your mother, please use your father's first name. If you do not have a cell phone, please use your home phone number. For example, if your mother's name is Nancy and your phone number is 555-555-1828, your identifier would be NAN1828.

Your identifier will be the same throughout this course as well as other courses and workshops, so please follow the setup correctly.

#### Key terms

### Key terminology

In this section, we would like to determine how your definitions of "data science" and "bioinformatics" have changed over this semester.

Have you heard the term "data science"?

Yes

No

How would you define data science?

Where have you been exposed to data science? Courses, popular media, books, etc.

Have you heard the term "bioinformatics"?

Yes

No

How would you define bioinformatics?

Where have you been exposed to bioinformatics? Courses, popular media, books, etc.

### Related fields

### Related fields

Please rate your current interest and experience in fields related to data science.

How would you rate your interest in

	None		Low				Medium			High	
	0	1	2	3	4	5	6	7	8	9	10
microbiology?											
bioinformatics?											
statistics?											
computer science?											

What level of experience do you have in

	None		Low (like taking a workshop or doing some readings)			Medium (like taking a course)			High (like taking multiple, high-level courses)		Very high (like publishing in a peer-reviewed journal)	
	0	1	2	3	4	5	6	7	8	9	10	
microbiology?												
bioinformatics?												
statistics?												
computer science?												

**Related coursework**

**Related coursework**

Please indicate how the EDUCE data science module(s) impacted your interest in related coursework.

As a result of the EDUCE *data science module(s)* within this course, are you more or less likely to enroll in the following courses?

**Microbiology**

	Less	More	No change	N/A, previously completed course
MICB301: Microbial Ecophysiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB405: Bioinformatics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Text S1. Pre- and post-course surveys.

	Less	More	No change	N/A, previously completed course
MICB421: Experimental Microbiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB425: Microbial Ecological Genomics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MICB447: Experimental Molecular Biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Statistics

	Less	More	No change	N/A, previously completed course
STAT200: Elementary Statistics for Applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT203: Statistical Methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT241: Introductory Probability and Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STAT251: Elementary Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BIOL300: Introduction to Biostatistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Computer science

	Less	More	No change	N/A, previously completed course
CPSC100: Computational Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC101: Introduction to Systematic Program Design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC110: Computation, Programs, and Programming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC121: Models of Computation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CPSC301: Computing in the Life Sciences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please list any other relevant courses in which you are more or less likely to enroll based on your experiences in the *data science modules* in this course.

## Related co-curriculars

Please indicate your current experience and interest in other data science-related learning opportunities.

Have you taken a data science workshop outside of class *this semester*?

If so, please specify.

- Yes
- No

Are you interested in participating in workshops outside of class to develop or continue to develop your skills in data science?

- Yes
- No

If so, which one(s) interest you? Please check all that apply.

### Introductory

- Introduction to R: RStudio base R graphics and data
- Advanced introduction to R: RStudio graphics with ggplot and data manipulation with dplyr
- R for researchers: RStudio reproducible research with GitHub and data manipulation with dplyr

### Intermediate

- Working with data: RStudio complex data manipulation with dplyr and tidyr
- Graphics with ggplot: RStudio customizable graphics with ggplot
- Statistical model: RStudio model assumptions, outputs, and functions
- Reproducible research: RStudio and GitHub integration

### Advanced

- Advanced R programming: RStudio function, class, and package creation
- Microbiome data analysis in mothur: from fastq to OTU table
- Microbiome data analysis in QIIME2: from fastq to ASV table
- Microbiome data analysis in R: uses of vegan and phyloseq in microbiome research

## Demographics

### Demographics

This section is entirely optional and for research purposes only.

Do you identify as a racial or ethnic minority?

- Yes
- No
- Prefer not to answer

Do you identify as a first-generation university student?

*i.e.* Neither of your parent(s) or guardian(s) attended college.

- Yes
- No
- Prefer not to answer

Do you identify as a non-traditional university student?

This includes those who:

- Delay enrollment after high school by more than a year or
- Attend part-time for at least part of the academic year or
- Work full-time while enrolled or
- Have dependents other than a spouse

- Yes
- No
- Prefer not the answer

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Text S1. Pre- and post-course surveys.