

Dynamic Schedule: Visit [Minerva Class Schedule](#)https://horizon.mcgill.ca/pban1/bwckschd.p_disp_dyn_sched for course dates & times.McGill.ca (<https://www.mcgill.ca>) / Overview (/study/2022-2023/) / All Courses (/study/2022-2023/courses/search)

MATH 323 Probability (3 credits)

Offered by: Mathematics and Statistics ([Faculty of Science \(/study/2022-2023/faculties/science/\)](#))

Overview

Mathematics & Statistics (Sci) : Sample space, events, conditional probability, independence of events, Bayes' Theorem. Basic combinatorial probability, random variables, discrete and continuous univariate and multivariate distributions. Independence of random variables. Inequalities, weak law of large numbers, central limit theorem.

Terms: Fall 2022, Winter 2023, Summer 2023

Instructors: Nadarajah, Tharshanna; Sajjad, Alia (Fall) Asgharian, Masoud; Sajjad, Alia (Winter)

- Prerequisites: [MATH 141 \(/study/2022-2023/courses/math-141/\)](#) or equivalent.
- Restriction: Intended for students in Science, Engineering and related disciplines, who have had differential and integral calculus
- Restriction: Not open to students who have taken or are taking [MATH 356 \(/study/2022-2023/courses/math-356/\)](#)

This course may be used as a required or complementary course in the following programs:

[Bachelor of Arts \(B.A.\) - Major Concentration Computer Science](#)

<https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-major-concentration-computer-science>

[Bachelor of Arts \(B.A.\) - Major Concentration Computer Science](#)

<https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-major-concentration-computer-science>

[Bachelor of Arts \(B.A.\) - Major Concentration Mathematics](#)

<https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-major-concentration-mathematics>

[Bachelor of Arts \(B.A.\) - Major Concentration Mathematics](#)

[.https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-major-concentration-mathematics\)](https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-major-concentration-mathematics)

Bachelor of Arts (B.A.) - Major Concentration Statistics

[.https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-major-concentration-statistics\)](https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-major-concentration-statistics)

Bachelor of Arts (B.A.) - Major Concentration Statistics

[.https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-major-concentration-statistics\)](https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-major-concentration-statistics)

Bachelor of Arts (B.A.) - Minor Concentration Mathematics

[.https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-minor-concentration-mathematics\)](https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-minor-concentration-mathematics)

Bachelor of Arts (B.A.) - Minor Concentration Mathematics

[.https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-minor-concentration-mathematics\)](https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-minor-concentration-mathematics)

Bachelor of Arts (B.A.) - Minor Concentration Statistics

[.https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-minor-concentration-statistics\)](https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-minor-concentration-statistics)

Bachelor of Arts (B.A.) - Minor Concentration Statistics

[.https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-minor-concentration-statistics\)](https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-ba-minor-concentration-statistics)

Bachelor of Arts (B.A.) - Supplementary Minor Concentration in Computer Science

[.https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-supplementary-minor-](https://www.mcgill.ca/study/2022-2023/faculties/arts/undergraduate/programs/bachelor-arts-ba-supplementary-minor-)

concentration-computer-science)

Bachelor of Arts and Science
(B.A. & Sc.) - Honours
Cognitive Science
(<https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-and-science-ba-sc-honours-cognitive-science>)

Bachelor of Arts and Science
(B.A. & Sc.) - Interfaculty
Program Cognitive Science
(<https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-arts-and-science-ba-sc-interfaculty-program-cognitive-science>)

Bachelor of Commerce
(B.Com.) - Major
Concentration Mathematics for
Management Students
(<https://www.mcgill.ca/study/2022-2023/faculties/desautels/undergraduate/programs/bachelor-commerce-bcom-major-concentration-mathematics-management-students>)

Bachelor of Education (B.Ed.)
- Secondary Mathematics
(<https://www.mcgill.ca/study/2022-2023/faculties/education/undergraduate/programs/bachelor-education-bed-secondary-mathematics>)

Bachelor of Engineering
(B.Eng.) - Honours Mechanical
Engineering
(<https://www.mcgill.ca/study/2022-2023/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-honours-mechanical-engineering>)

Bachelor of Engineering
(B.Eng.) - Minor Applied
Artificial Intelligence (22-25
credits)
(<https://www.mcgill.ca/study/2022-2023/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-minor-applied-artificial-intelligence-22-25-credits>)

Bachelor of Engineering
(B.Eng.) - Minor Mathematics
(<https://www.mcgill.ca/study/2022-2023/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-minor-mathematics>)

[2023/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-minor-mathematics\)](https://www.mcgill.ca/study/2022-2023/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-minor-mathematics)

[Bachelor of Science
\(Agricultural and
Environmental Sciences\).
\(B.Sc.\(Ag.Env.Sc.\)\) or
Bachelor of Science \(B.Sc.\) -
Major Environment -
Environmetrics
\(https://www.mcgill.ca/study/2022-2023/faculties/macdonald/undergraduate/programs/bachelor-science-agricultural-and-environmental-sciences-bscagenvsc-or-bachelor-science-bsc-major-2\)](https://www.mcgill.ca/study/2022-2023/faculties/macdonald/undergraduate/programs/bachelor-science-agricultural-and-environmental-sciences-bscagenvsc-or-bachelor-science-bsc-major-2)

[Bachelor of Science
\(Agricultural and
Environmental Sciences\).
\(B.Sc.\(Ag.Env.Sc.\)\) or
Bachelor of Science \(B.Sc.\) -
Major Environment -
Environmetrics
\(https://www.mcgill.ca/study/2022-2023/faculties/environment/undergraduate/programs/bachelor-science-agricultural-and-environmental-sciences-bscagenvsc-or-bachelor-science-bsc-major-2\)](https://www.mcgill.ca/study/2022-2023/faculties/environment/undergraduate/programs/bachelor-science-agricultural-and-environmental-sciences-bscagenvsc-or-bachelor-science-bsc-major-2)

[Bachelor of Science \(B.Sc.\) -
Honours Atmospheric Science
\(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-atmospheric-science\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-atmospheric-science)

[Bachelor of Science \(B.Sc.\) -
Honours Atmospheric Science
\(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-atmospheric-science\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-atmospheric-science)

[Bachelor of Science \(B.Sc.\) -
Honours Biology - Quantitative
Biology.
\(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-biology-quantitative-biology\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-biology-quantitative-biology)

[Bachelor of Science \(B.Sc.\) -
Honours Chemistry:
Biophysical Chemistry.
\(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-chemistry-biophysical-chemistry\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-chemistry-biophysical-chemistry)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-chemistry-biophysical-chemistry](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-chemistry-biophysical-chemistry)).

[Bachelor of Science \(B.Sc.\) - Honours Computer Science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science))

[Bachelor of Science \(B.Sc.\) - Honours Computer Science and Biology](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science-and-biology)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science-and-biology)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science-and-biology](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-computer-science-and-biology)).

[Bachelor of Science \(B.Sc.\) - Honours Earth System Science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-earth-system-science)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-earth-system-science)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-earth-system-science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-earth-system-science))

[Bachelor of Science \(B.Sc.\) - Honours Neuroscience](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-neuroscience)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-neuroscience)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-neuroscience](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-neuroscience))

[Bachelor of Science \(B.Sc.\) - Honours Physics and Computer Science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-and-computer-science)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-and-computer-science)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-and-computer-science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-and-computer-science))

[Bachelor of Science \(B.Sc.\) - Honours Physics: Biological Physics](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-biological-physics)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-biological-physics)

[2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-biological-physics](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-biological-physics))

[Bachelor of Science \(B.Sc.\) - Honours Software Engineering](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-biological-physics)
([https://www.mcgill.ca/study/2022-](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-physics-biological-physics)

[aduate/programs/bachelor-science-bsc-honours-software-engineering\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-honours-software-engineering)

[Bachelor of Science \(B.Sc.\) - Liberal Program - Core Science Component Computer Science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-liberal-program-core-science-component-computer-science)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-liberal-program-core-science-component-computer-science>)

[Bachelor of Science \(B.Sc.\) - Liberal Program - Core Science Component Mathematics](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-liberal-program-core-science-component-mathematics)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-liberal-program-core-science-component-mathematics>)

[Bachelor of Science \(B.Sc.\) - Liberal Program - Core Science Component Statistics](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-liberal-program-core-science-component-statistics)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-liberal-program-core-science-component-statistics>)

[Bachelor of Science \(B.Sc.\) - Major Atmospheric Science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-atmospheric-science)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-atmospheric-science>)

[Bachelor of Science \(B.Sc.\) - Major Atmospheric Science](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-atmospheric-science)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-atmospheric-science>)

[Bachelor of Science \(B.Sc.\) - Major Biology - Quantitative Biology](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-biology-quantitative-biology)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-biology-quantitative-biology>)

[Bachelor of Science \(B.Sc.\) - Major Biology and Mathematics](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-biology-mathematics)

[. \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-biology-and-mathematics\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-biology-and-mathematics)

[Bachelor of Science \(B.Sc.\) - Major Chemistry: Biophysical Chemistry \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-chemistry-biophysical-chemistry\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-chemistry-biophysical-chemistry)

[Bachelor of Science \(B.Sc.\) - Major Computer Science \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-computer-science\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-computer-science)

[Bachelor of Science \(B.Sc.\) - Major Computer Science - Computer Games \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-computer-science-computer-games\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-computer-science-computer-games)

[Bachelor of Science \(B.Sc.\) - Major Computer Science and Biology \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-computer-science-and-biology\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-computer-science-and-biology)

[Bachelor of Science \(B.Sc.\) - Major Earth System Science \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-earth-system-science\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-earth-system-science)

[Bachelor of Science \(B.Sc.\) - Major Mathematics \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-mathematics\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-mathematics)

[Bachelor of Science \(B.Sc.\) - Major Mathematics and Computer Science \(https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-mathematics-computer-science\)](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-mathematics-computer-science)

[aduate/programs/bachelor-science-bsc-major-mathematics-and-computer-science\)](#)

[Bachelor of Science \(B.Sc.\) - Major Neuroscience](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-neuroscience>)

[Bachelor of Science \(B.Sc.\) - Major Physics and Computer Science](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-physics-and-computer-science>)

[Bachelor of Science \(B.Sc.\) - Major Physics: Biological Physics](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-physics-biological-physics>)

[Bachelor of Science \(B.Sc.\) - Major Physiology and Mathematics](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-physiology-and-mathematics>)

[Bachelor of Science \(B.Sc.\) - Major Software Engineering](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-software-engineering>)

[Bachelor of Science \(B.Sc.\) - Major Statistics](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-statistics>)

[Bachelor of Science \(B.Sc.\) - Major Statistics and Computer Science](#)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-major-statistics-and-computer-science>)

[Bachelor of Science \(B.Sc.\) -
Minor Interdisciplinary Life
Sciences](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-minor-interdisciplinary-life-sciences)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-minor-interdisciplinary-life-sciences>)

[Bachelor of Science \(B.Sc.\) -
Minor Interdisciplinary Life
Sciences](https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-science-bsc-minor-interdisciplinary-life-sciences)
(<https://www.mcgill.ca/study/2022-2023/faculties/basc/undergraduate/programs/bachelor-science-bsc-minor-interdisciplinary-life-sciences>)

[Bachelor of Science \(B.Sc.\) -
Minor Statistics](https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-minor-statistics)
(<https://www.mcgill.ca/study/2022-2023/faculties/science/undergraduate/programs/bachelor-science-bsc-minor-statistics>)




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Class Schedule
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(<https://www.mcgill.ca>)

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