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# The Hong Kong University of Science and Technology

HKUST - A dynamic, international research university, in relentless pursuit of excellence, leading the advance of science and technology, and educating the new generation of front-runners for Asia and the world.

# Programa de cursos integrados Mathematics for Engineers

Learn the mathematics needed to become an engineer. Study matrix algebra, differential equations, vector calculus, numerical methods and complete a capstone project.

**4.9**

**estrelas**

451 classificações

[[Imagem do instrutor, Jeffrey R. Chasnov](https://www.coursera.org/specializations/mathematics-engineers#instructors)Jeffrey R. Chasnov](https://www.coursera.org/specializations/mathematics-engineers" \l "instructors)

**[INSTRUTOR PRINCIPAL](https://www.coursera.org/specializations/mathematics-engineers" \l "instructors)**

## Instrutores

[[](https://www.coursera.org/instructor/jeffchasnov)](https://www.coursera.org/instructor/jeffchasnov" \t "_blank)

### [Jeffrey R. Chasnov](https://www.coursera.org/instructor/jeffchasnov" \t "_blank)

### [INSTRUTOR PRINCIPAL](https://www.coursera.org/instructor/jeffchasnov" \t "_blank)

[Professor](https://www.coursera.org/instructor/jeffchasnov" \t "_blank)

[Department of Mathematics](https://www.coursera.org/instructor/jeffchasnov" \t "_blank)

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### [Universidade de Ciência e Tecnologia de Hong Kong](https://www.coursera.org/hkust)

HKUST - A dynamic, international research university, in relentless pursuit of excellence, leading the advance of science and technology, and educating the new generation of front-runners for Asia and the world.

**O QUE VOCÊ VAI APRENDER**

* How to work with matrices and understand some fundamental concepts from linear algebra.
* How to solve differential equations and apply them to model physical phenomena.
* How to extend single variable calculus to three dimensions and differentiate and integrate scalar and vector fields.
* How to analyze basic numerical techniques and write scientific computation programs in MATLAB.

**HABILIDADES QUE VOCÊ TERÁ**

* Differential Equations
* Vector Calculus
* Matrix Algebra
* Numerical Analysis
* Computational Fluid Dynamics (CFD)

Sobre este Programa de cursos integrados

**13.521 visualizações recentes**

This specialization was developed for engineering students to self-study engineering mathematics. We expect students to already be familiar with single variable calculus and computer programming. Through this specialization, students will learn matrix algebra, differential equations, vector calculus, numerical methods, and MATLAB programming. This will provide them with the tools to effectively apply mathematics to engineering problems and be well-equipped to pursue a degree in engineering. To get a better understanding of what this specialization has to offer, be sure to watch the [Promotional Video](https://youtu.be/9q7bENvKKas)!

Projeto de Aprendizagem Aplicada

Learners will write MATLAB programs to solve the computational fluid dynamics problem of the flow around a cylinder. At the end of the "Mathematics for Engineers: The Capstone Course", learners will be able to compute the iconic Kármán vortex street. To watch a video of the Kármán vortex street, you can visit the following link: <https://youtu.be/FlM1de9Sxh0>

Este Programa de cursos integrados contém 5 cursos

**CURSO**1

[Matrix Algebra for Engineers](https://www.coursera.org/learn/matrix-algebra-engineers?specialization=mathematics-engineers)

**4.9**

**estrelas**

4.005 classificações

This course is all about matrices, and concisely covers the linear algebra that an engineer should know. The mathematics in this course is presented at the level of an advanced high school student, but it is recommended that students take this course after completing a university-level single variable calculus course. There are no derivatives or integrals involved, but students are expected to have a basic level of mathematical maturity. Despite this, anyone interested in learning the basics of matrix algebra is welcome to join.

The course consists of 38 concise lecture videos, each followed by a few problems to solve. After each major topic, there is a short practice quiz. Solutions to the problems and practice quizzes can be found in the instructor-provided lecture notes. The course spans four weeks, and at the end of each week, there is an assessed quiz. Download the lecture notes from the link https://www.math.hkust.edu.hk/~machas/matrix-algebra-for-engineers.pdf And watch the promotional video from the link https://youtu.be/IZcyZHomFQc

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**CURSO**2

[Differential Equations for Engineers](https://www.coursera.org/learn/differential-equations-engineers?specialization=mathematics-engineers)

**4.9**

**estrelas**

1.964 classificações

This course is all about differential equations and covers both theory and applications. In the first five weeks, students will learn about ordinary differential equations, while the sixth week is an introduction to partial differential equations.

The course includes 56 concise lecture videos, with a few problems to solve after each lecture. After each major topic, there is a short practice quiz. At the end of each week, there is an assessed quiz. Solutions to the problems and practice quizzes can be found in the instructor-provided lecture notes. Download the lecture notes from the link https://www.math.hkust.edu.hk/~machas/differential-equations-for-engineers.pdf Watch the promotional video from the link https://youtu.be/eSty7oo09ZI

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**CURSO**3

[Vector Calculus for Engineers](https://www.coursera.org/learn/vector-calculus-engineers?specialization=mathematics-engineers)

**4.8**

**estrelas**

1.285 classificações

This course covers both the theoretical foundations and practical applications of Vector Calculus. During the first week, students will learn about scalar and vector fields. In the second week, they will differentiate fields. The third week focuses on multidimensional integration and curvilinear coordinate systems. Line and surface integrals are covered in the fourth week, while the fifth week explores the fundamental theorems of vector calculus, including the gradient theorem, the divergence theorem, and Stokes' theorem. These theorems are essential for subjects in engineering such as Electromagnetism and Fluid Mechanics.

Note that this course may also be referred to as Multivariable or Multivariate Calculus or Calculus 3 at some universities. A prerequisite for this course is two semesters of single variable calculus (differentiation and integration). The course includes 53 concise lecture videos, each followed by a few problems to solve. After each major topic, there is a short practice quiz. At the end of each week, there is an assessed quiz. Solutions to the problems and practice quizzes can be found in the instructor-provided lecture notes. Download the lecture notes from the link https://www.math.hkust.edu.hk/~machas/vector-calculus-for-engineers.pdf Watch the promotional video from the link https://youtu.be/qUseabHb6Vk

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**CURSO**4

[Numerical Methods for Engineers](https://www.coursera.org/learn/numerical-methods-engineers?specialization=mathematics-engineers)

**4.9**

**estrelas**

272 classificações

This course covers the most important numerical methods that an engineer should know, including root finding, matrix algebra, integration and interpolation, ordinary and partial differential equations. We learn how to use MATLAB to solve numerical problems, and access to MATLAB online and the MATLAB grader is given to all students who enroll.

We assume students are already familiar with the basics of matrix algebra, differential equations, and vector calculus. They should have a working knowledge of a programming language, and be willing to learn MATLAB. The course contains 74 short lecture videos and MATLAB demonstrations. After each lecture or demonstration, there are problems to solve or programs to write. The course is organized into six weeks, and at the end of each week, there is an assessed quiz and a longer programming project. Download the lecture notes from the link https://www.math.hkust.edu.hk/~machas/numerical-methods-for-engineers.pdf And watch the promotional video from the link https://youtu.be/qFJGMBDfFMY

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* **CURSO**5

[Mathematics for Engineers: The Capstone Course](https://www.coursera.org/learn/mathematics-engineers-capstone?specialization=mathematics-engineers)

**4.9**

**estrelas**

13 classificações

Mathematics for Engineers: The Capstone Course provides a capstone project for students who are completing the Mathematics for Engineers specialization. Students will first learn some basic concepts in computational fluid dynamics, and then apply these concepts to compute the fluid flow around a cylinder. Access to MATLAB online and the MATLAB grader is given to all students who enroll.

Before enrolling, students should have already taken courses in matrix algebra, differential equations, vector calculus and numerical methods, and be able to program in MATLAB. The course contains 22 short video lectures and a full set of lecture notes. After each lecture, there are problems to solve, and at the end of the second and third weeks, there is a substantial MATLAB programming assignment. Download the lecture notes from the link https://www.math.hkust.edu.hk/~machas/flow-around-a-cylinder.pdf Watch the promotional video from the link https://youtu.be/FlM1de9Sxh0

MOSTRAR MENOS ABOUT MATHEMATICS FOR ENGINEERS: THE CAPSTONE COURSEMostrar menos