The background features a large, light blue circle on the right side, partially overlapping a teal gradient area. On the left, there are several orange and yellow autumn leaves. The text is centered within the light blue circle.

AID-521

Mathematics for Data Science

Inagural Class

Welcome all..

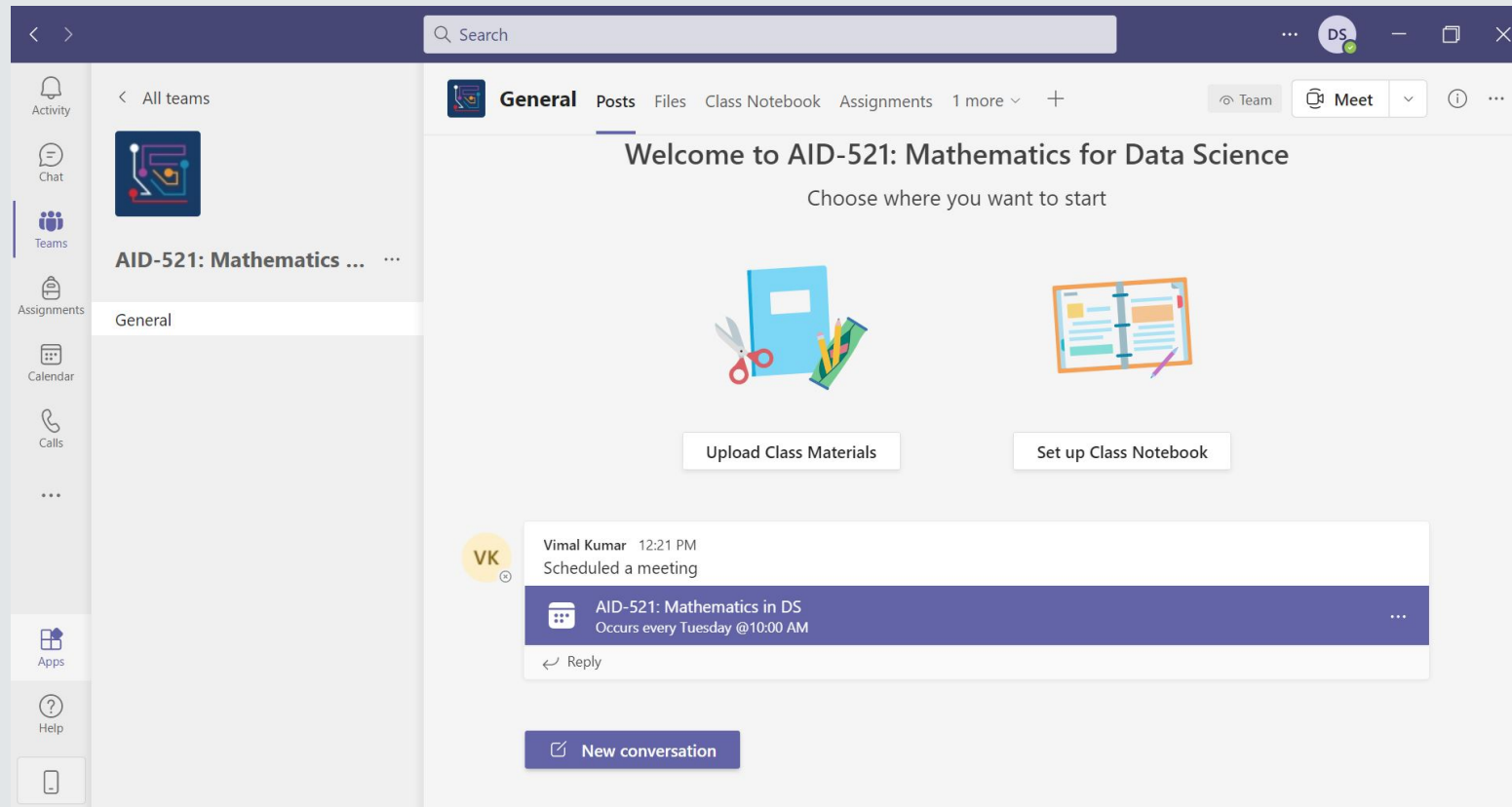
Course Instructors

Abhishek Samantray, Vimal Kumar

Course Webpage

abhishek-website.github.io

MS Teams Environment (IT Stuff)



Notifications

Website vs. Teams

Timetable

Classes also on some Saturdays, which will follow one of the weekday's schedule

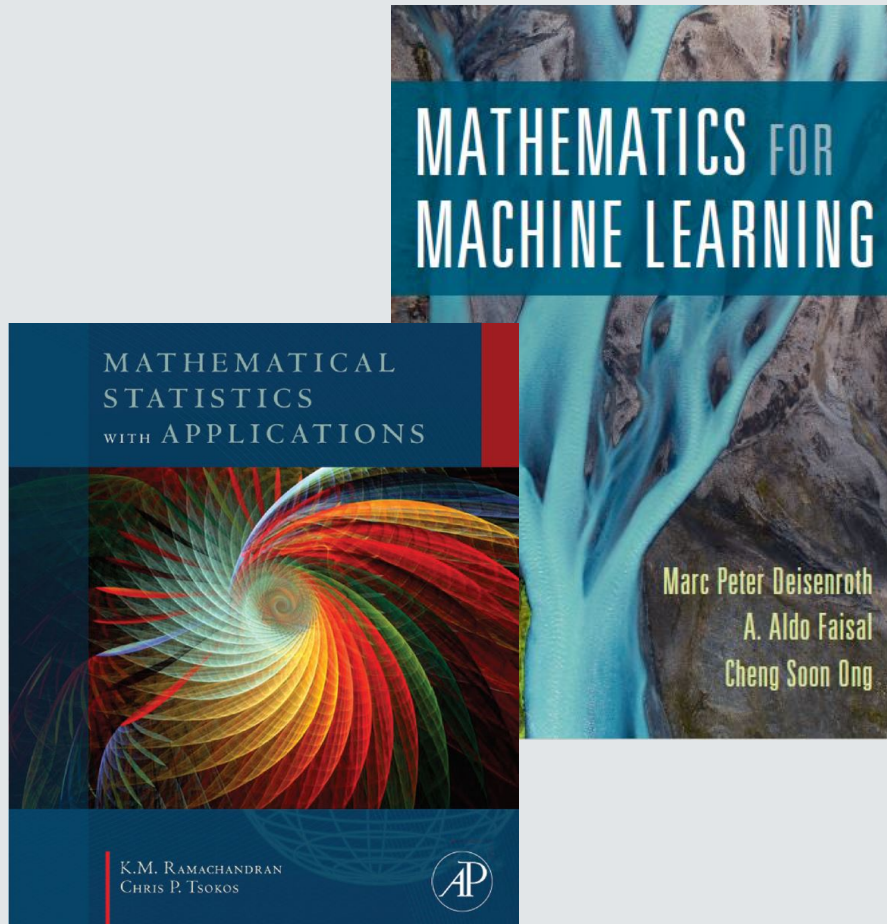
Links to online classes is available inside MS Teams in the **Posts** tab

Time Table (AUTUMN SEMESTER, 2021-22) for M.Tech (AI and DS)

Date: July 29, 2021

Time/Day	Monday	Tuesday	Wednesday	Thursday	Friday
8.00-8.55	X1 AID-501 (KD, SP)	H1	X2 AID-501 (KD, SP)	H2	X3 AID-501 (KD, SP)
9.00-9.55	A1 EEN 581 (GNP) AID-583 (AA, IG) AID-555 (RJJC, SP)	A1 EEN 581 (GNP) AID-583 (AA, IG) AID-555 (RJJC, SP)	G*	A1 EEN 581 (GNP) AID-583 (AA, IG) AID-555 (RJJC, SP)	G1
10.00-10.55	B1 AID-523 (SK) AID-507 (DT)	D1 AID-521 (AS, VK)	B1 AID-523 (SK) AID-507 (DT)	D1 AID-521 (AS, VK)	D1 AID-521 (AS, VK)
11.05-12.00	C1 AID-505 (GNP, JKG)	F1 AID-525 (RB)	C1 AID-505 (GNP, JKG)	B1 AID-523 (SK) AID-507 (DT)	C1 AID-505 (GNP, JKG)
12.05-1.00	E1 AID-503 (SM)	E1 AID-503 (SM)	F1 AID-525 (RB)	E1 AID-503 (SM)	F1 AID-525 (RB)
1-2	L U N C H				
2.00-2.55	X4 Tut EEN 581 (GNP)	P3/T3 AID-527 (MP) AID-509 (GD)	P7/T7 AID-527 (MP) AID-509 (GD)	P9/T9 AID-505 (GNP, JKG)	P13/T13 AID-523 (SK)
3.00-3.55	C/E/F Tut EEN 581 (GNP)	P4/T4 AID-527 (MP) AID-509 (GD)	P8/T8 AID-527 (MP) AID-509 (GD)	P10/T10 MAN-628 (KD)	P14/T14 AID-523 (SK)
4.05-5.00	P1/T1 AID-525 (RB)	P5/T5 MAN-628 (KD)		P11/T11 AID-507 (DT)	P15/T15 MAN-628 (KD)
5.05-6.00	P2/T2 AID-501 (KD, SP)	P6/T6 AID-521 (AS, VK)		P12/T12 AID-583 (AA, IG) AID-555 (RJJC, SP)	P16/T16 AID-503 (SM)
6.05-7.00	Y1	Y2		Y3	

Materials

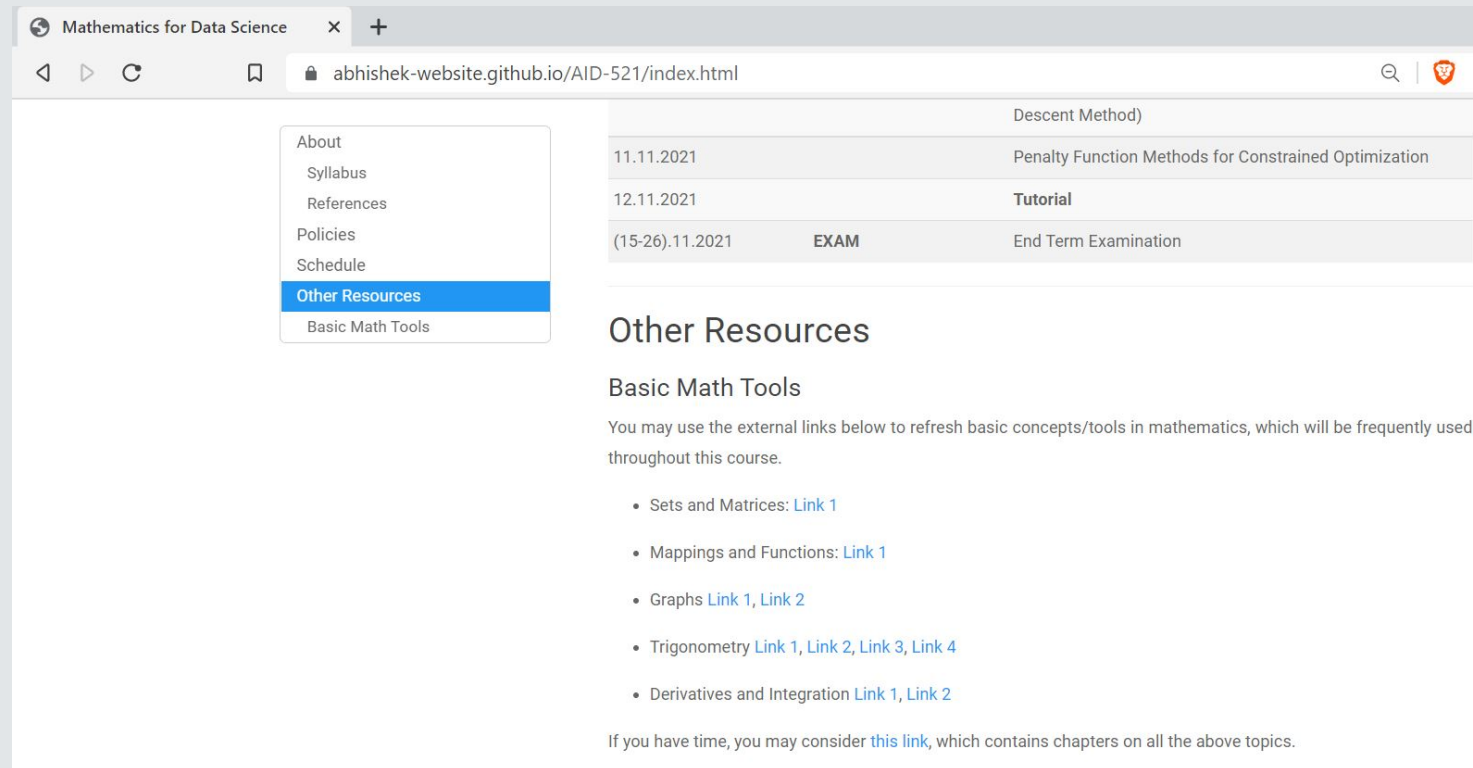


Lecture slides will appear on website,
or inside MS Teams under files
(to be decided)

Not all lectures will have slides

References to exact sections in
the books will be provided

Get Refreshed



The screenshot shows a web browser with the title "Mathematics for Data Science" and the URL "abhishek-website.github.io/AID-521/index.html". The sidebar menu on the left includes links for "About", "Syllabus", "References", "Policies", "Schedule", "Other Resources" (highlighted in blue), and "Basic Math Tools". The main content area features a table with dates and topics, followed by a section titled "Other Resources" and "Basic Math Tools" with a list of external links.

		Descent Method)
11.11.2021		Penalty Function Methods for Constrained Optimization
12.11.2021		Tutorial
(15-26).11.2021	EXAM	End Term Examination

Other Resources

Basic Math Tools

You may use the external links below to refresh basic concepts/tools in mathematics, which will be frequently used throughout this course.

- Sets and Matrices: [Link 1](#)
- Mappings and Functions: [Link 1](#)
- Graphs [Link 1](#), [Link 2](#)
- Trigonometry [Link 1](#), [Link 2](#), [Link 3](#), [Link 4](#)
- Derivatives and Integration [Link 1](#), [Link 2](#)

If you have time, you may consider [this link](#), which contains chapters on all the above topics.

Syllabus

●	Basics of Linear Algebra: Representation of vectors; Linear dependence and independence; vector space and subspaces (definition, examples and concepts of basis); linear transformations; range and null space; matrices associated with linear transformations; special matrices; eigenvalues and eigenvectors with applications to data problems; Least square and minimum normed solutions	
	Matrices in Machine Learning Algorithms: projection transformation; orthogonal decomposition; singular value decomposition; principal component analysis and linear discriminant analysis	●
●	Gradient Calculus: Basic concepts of calculus: partial derivatives, gradient, directional derivatives, Jacobian, Hessian.	VK
●	Optimization: Convex sets, Convex function and their properties, Unconstrained and Constrained Optimization, Numerical Optimization Techniques for Unconstrained Optimization, Derivative-Free methods (Golden Section, Fibonacci Search Method, Bisection Method), Methods using Derivatives (Newton's Method, Steepest Descent Method), Penalty Function Methods for Constrained Optimization.	AS
	Probability: Basic concepts of probability, conditional probability, total probability, independent events, Bayes' theorem, random variable, Moments, moment generating functions, some useful distributions, Joint distribution, conditional distribution, transformation of random variables, covariance, correlation.	●
	Statistics: Random sample, sampling techniques, statistics, sampling distributions, mixture models.	●

Recommended

Try to come to the class after reading the topics from the book

The order of topics
to be covered is already
available at the website
in **Schedule**

<div>About</div> <div>Syllabus</div> <div>References</div> <div>Policies</div> <div>Schedule</div> <div>Other Resources</div> <div>Basic Math Tools</div>																													
<h3>Schedule</h3> <p>Dates and links to files will be available gradually</p> <table><tr><th>Date and Time</th><th>Module</th><th>Topic</th></tr><tr><td></td><td>HOMEWORKS</td><td>Assignment 1 (Deadline: Sep 30)</td></tr><tr><td></td><td></td><td>Assignment 2 (Deadline: Oct 30)</td></tr><tr><td>31.07.2021 / 10am</td><td>OVERVIEW</td><td>Introduction to the course</td></tr><tr><td>03.08.2021</td><td>PROBABILITY</td><td>Random Events & Probability, Calculation of Probabilities; Conditional probability, Independent events, Total probability, Bayes' theorem</td></tr><tr><td>05.08.2021</td><td></td><td>Random Variable & Probability Distribution (probability space, random variable, discrete/continuous probability); Moments & expected values, Moment generating function</td></tr><tr><td>06.08.2021</td><td></td><td>Tutorial</td></tr><tr><td>07.08.2021</td><td></td><td>Discrete Probability Distributions; Binomial Distribution; Poisson Distribution</td></tr><tr><td>10.08.2021</td><td></td><td>Continuous Distribution; Gaussian/Normal Probability Distribution (Properties, Standard Normal, Applications); Continuous & Exponential Family</td></tr></table>			Date and Time	Module	Topic		HOMEWORKS	Assignment 1 (Deadline: Sep 30)			Assignment 2 (Deadline: Oct 30)	31.07.2021 / 10am	OVERVIEW	Introduction to the course	03.08.2021	PROBABILITY	Random Events & Probability, Calculation of Probabilities; Conditional probability, Independent events, Total probability, Bayes' theorem	05.08.2021		Random Variable & Probability Distribution (probability space, random variable, discrete/continuous probability); Moments & expected values, Moment generating function	06.08.2021		Tutorial	07.08.2021		Discrete Probability Distributions; Binomial Distribution; Poisson Distribution	10.08.2021		Continuous Distribution; Gaussian/Normal Probability Distribution (Properties, Standard Normal, Applications); Continuous & Exponential Family
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Assignments / Exams

Assignment 30%

MTE 30%

ETE 40%

No weightage
for class attendance

<div>About</div> <div>Syllabus</div> <div>References</div> <div>Policies</div> <div>Schedule</div> <div>Other Resources</div> <div>Basic Math Tools</div>																													
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Overview

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graph TD; applications --- methods; applications --- engineering; methods --- engineering;
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applications

methods

engineering

All the best!

Any Questions..