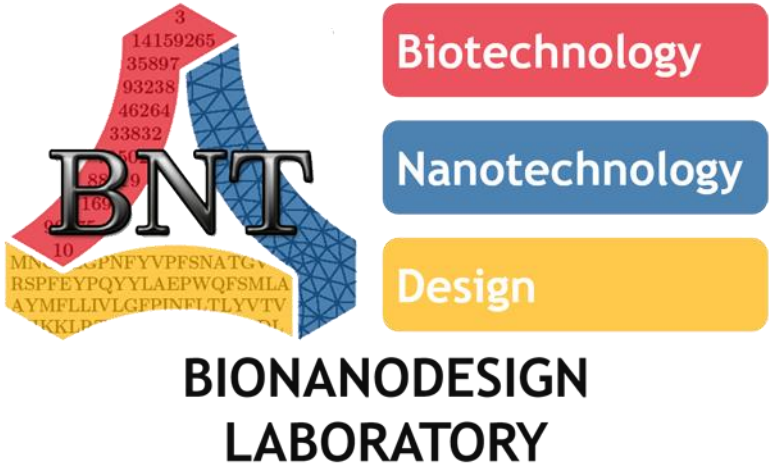
BMM 310
Numerical Methods in Biomedical Engineering



Introduction to Numerical Methods

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Department of Materials Science & Nanotechnology Engineering

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2020-2021 Fall Semester:

	Monday	Tuesday	Wednesday	Thursday	Friday
08:30-09:20					
09:30-10:20				BMM 310	
10:30-11:20				BMM 310	
11:30-12:20					
12:30-13:20					
13:30-14:20					
14:30-15:20		BMM 310			
15:30-16:20		BMM 310			
16:30-17:20					
17:30-18:20					

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BMM 310 Course Description:

BMM 310 course will cover both the theoretical and practical studies in the computational bio(nano)technology and theoretical materials science areas. Within the frame of this course, students will learn the numerical methods and algorithms in general.

This course will provide information about describing and solving partial differential equations to model various biomedical engineering problems, bioinformatics, molecular dynamics, and homology modeling. This course will also give practical information about state of the art computer software, which will adapt the students into this rapidly developing field.

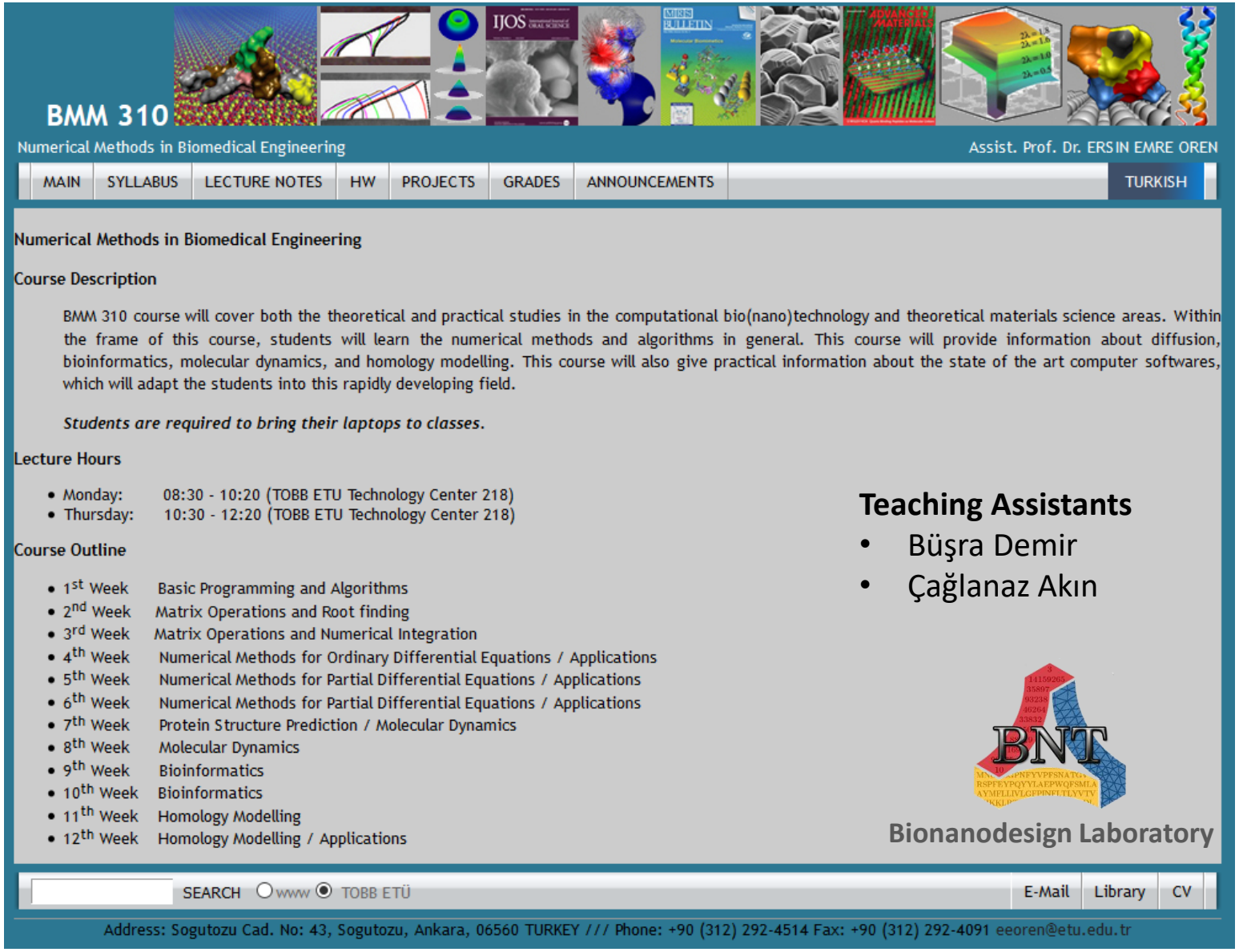
Course Outline

Week	Subject
1	Basic Programming and Algorithms
2	Matrix Operations and Root finding
3	Matrix Operations and Numerical Integration
4	Numerical Methods for Ordinary Differential Equations / Applications
5	Numerical Methods for Partial Differential Equations / Applications
6	Numerical Methods for Partial Differential Equations / Applications
7	Protein Structure Prediction / Molecular Dynamics
8	Molecular Dynamics
9	Bioinformatics
10	Bioinformatics
11	Homology Modeling
12	Homology Modeling / Applications

Evaluation Criteria

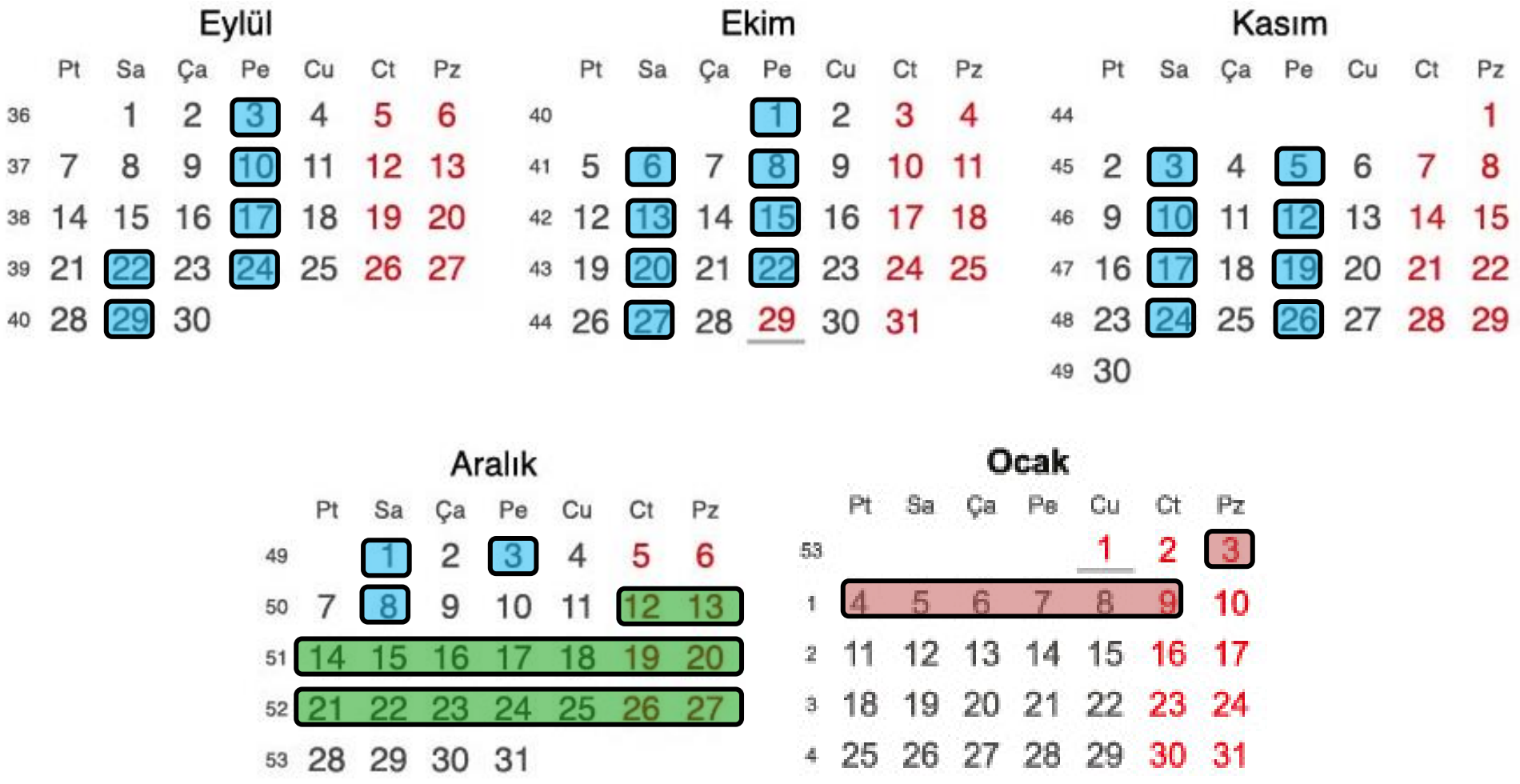
	Adet	Impact (%)
Midterm Exams	1	25
Quiz+Homework	5+	25
Projects	1	15
Final	1	35

http://eeoren.etu.edu.tr/BMM310/



Lecture Plan

2020-2021



October 05, 2020
Add/drop
(Ekle/Sil)

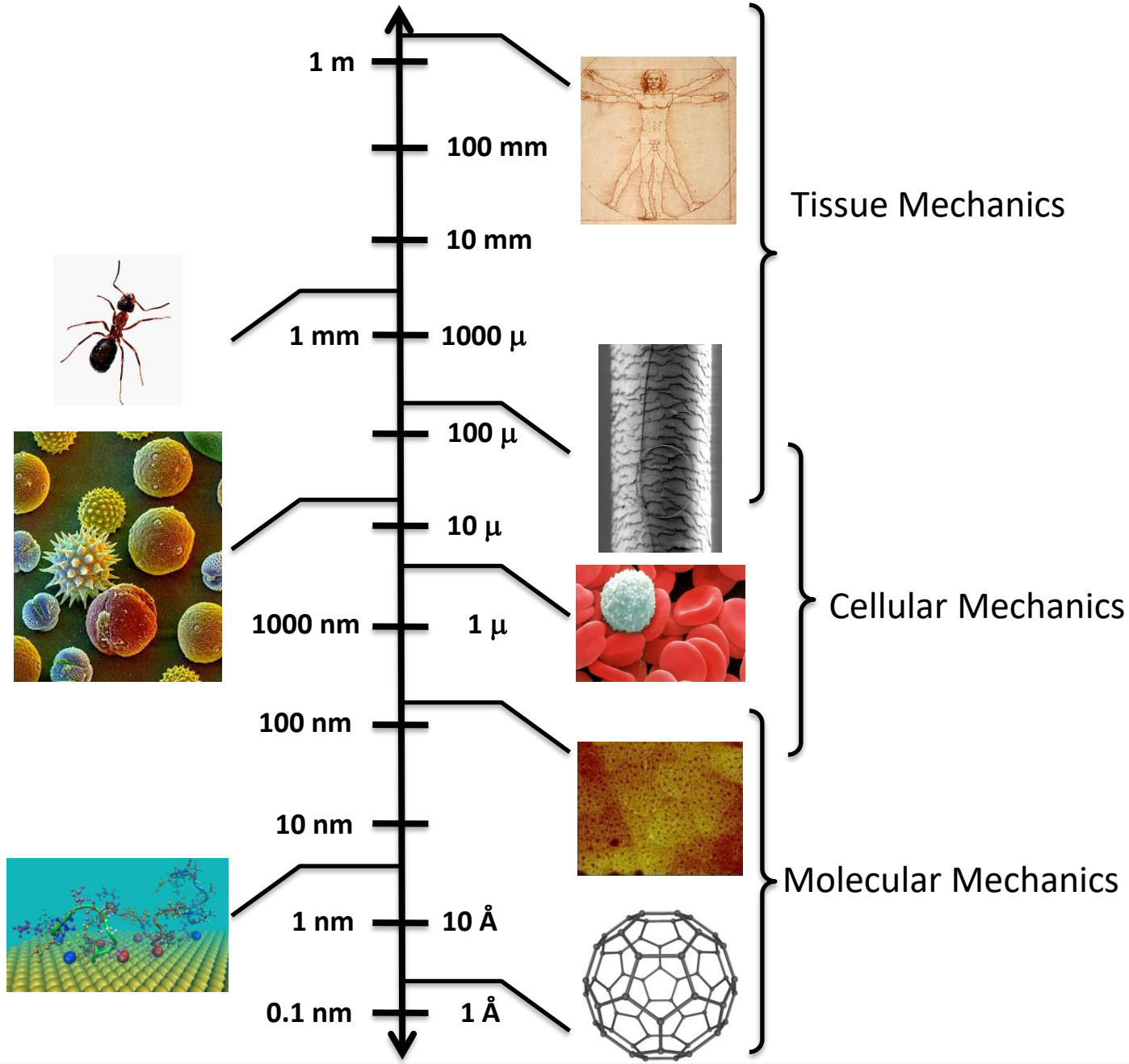
November 09, 2020
Withdraw
(Dersten Vazgeçme)

Aims and Scope

International Journal for Numerical Methods in Biomedical Engineering is an international journal which publishes both full length and short refereed papers describing significant developments in numerical methods and their application to biomedical engineering problems.

Contributions are encouraged in all areas of biomedical engineering, such as:

- *patient-specific modeling,*
- *biofluid and biosolid mechanics,*
- *tissue engineering,*
- *cardiovascular and respiratory mechanics,*
- *tumor modeling,*
- *medical imaging and image processing,*
- *visualization,*
- *meshing,*
- *numerical modeling of organs,*
- *drug delivery,*
- *surgical simulation,*
- *micro- and nano- mechanics,*
- *multiscale problems,*
- *human body electromagnetics,*
- *molecular biology,*
- *medical device design,*
- *health care models,*
- *numerical methods specially designed for biomedical problems.*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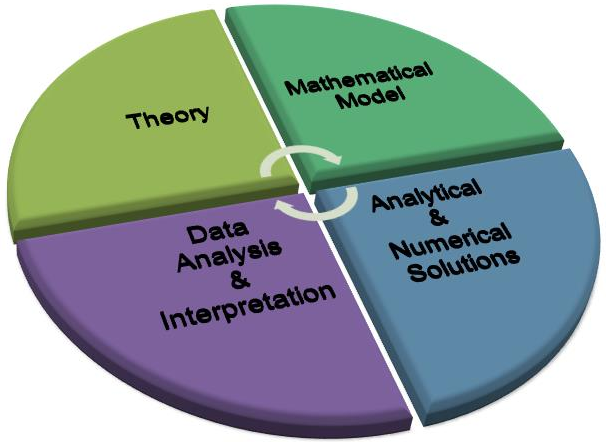
Tissue Mechanics
Cellular Mechanics
Molecular Mechanics

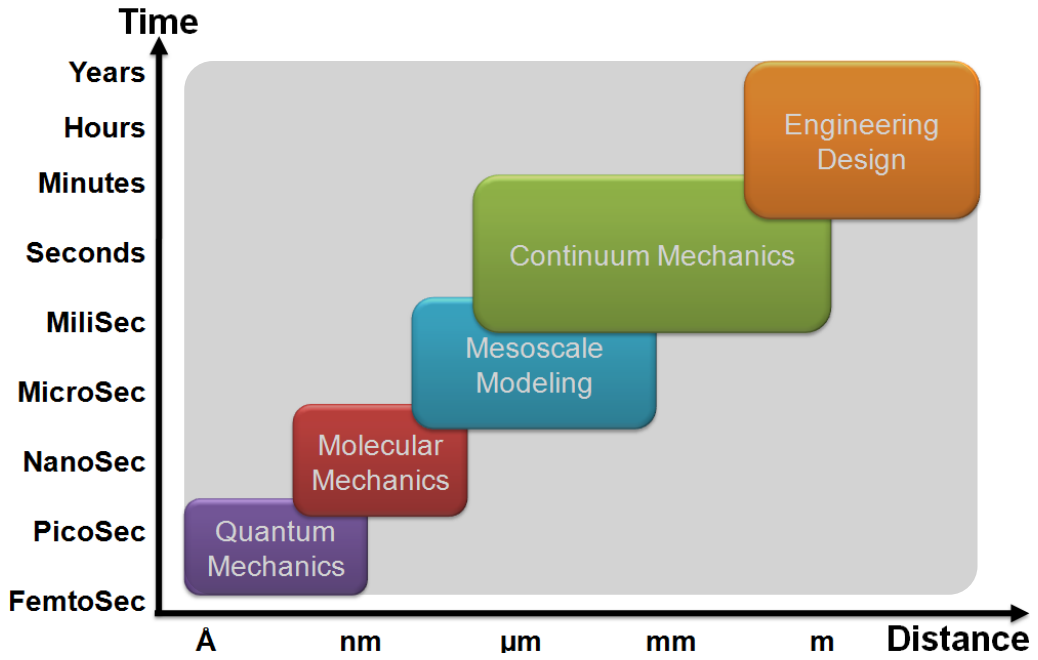
constructs theories, mathematical models and quantitative analysis techniques and uses computers to analyze and solve scientific problems.



one of the fastest growing disciplines.

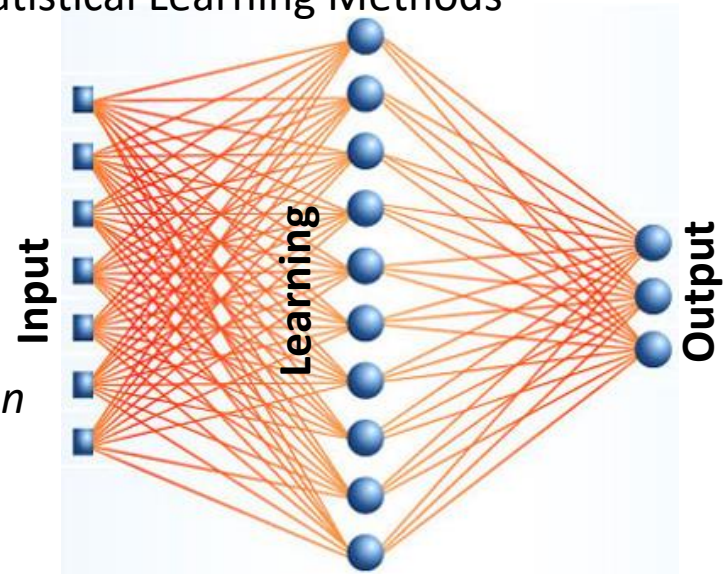
crucial for characterizing, predicting and simulating physical events and systems.

simulate the behavior of materials across various time and length scales.



Data Analysis / Statistical Learning Methods

Bioinformatics
Machine learning
Network analysis
Neuroinformatics
Neurol Networks
Weather forecast
Pattern recognition
…
…




Indianapolis
MARYLAND
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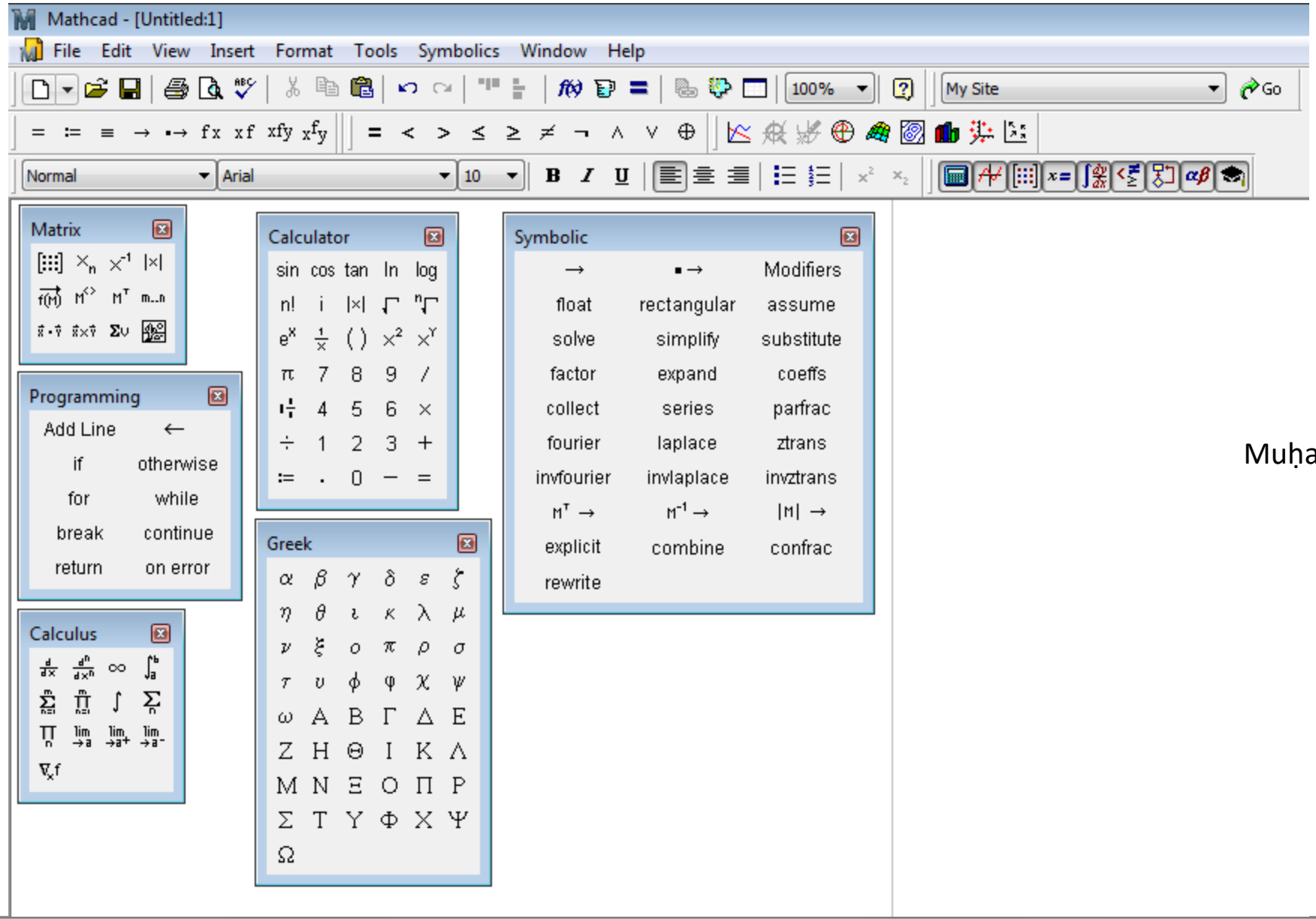
DE
WEST VIRGINIA
Washington
KENTUCKY
VIRGINIA
Nashville
TENNESSEE
NORTH CAROLINA
Charlotte
Atlanta
SOUTH CAROLINA
SSISSIPPI
ALABAMA
GEORGIA
5-day forecast of storm's path
Bermuda
Jacksonville
Orleans
Wednesday 8 a.m.
Orlando
Tampa
FLORIDA
Hurricane-force winds
Miami
Gulf of Mexico
The Bahamas
Havana
Turks and Caicos Islands
Cuba
Mérida
Cancún

Programming & Algorithm



780-850
Muḥammad ibn Mūsā al-Khwārizmī