

A complex network graph composed of numerous small, semi-transparent black dots connected by thin gray lines, forming a dense web of triangles and polygons. This pattern serves as a background for the title text.

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# Neural Modeling and Computational Neuroscience

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## Administrative Info

Make up lectures:

1. 25 March 2022: 4-6 pm, room C31
2. 8 April 2022: 4-7 pm, room C31 [LAB]

...so, next classes (lecture, lab):

25 Mar, 28 Mar, 30 Mar, 4 Apr, 6 Apr, 8 Apr

part 2

part 2

part 2

part 2

# Organization



**Strongly recommended**

- illustrate the assignments
- provide clarifications

specific questions, or  
assistance with the  
assignments



**Strongly discouraged**

1. kindly wait for your turn
  - (raise your hand)
2. interact with the instructor (sharing your screen)
3. return to the General Channel



Something  
about the  
assignments



## Organization (Disclaimer)

See the CNS-LEZ1-0.1.pdf file in the Lecture Notes section of the Moodle website ([link](#))

What is the purpose?

## Written exam:

- Corpus of lab exercises – source code (at the date of exam)
- Labs material is individual
  - (you can work helping each other in class but the delivery should be original and unique for each student)

## How to deliver the assignments?

- Email to us (Micheli, Gallicchio, Rudy Semola)  
[micheli@di.unipi.it, [gallicch@di.unipi.it](mailto:gallicch@di.unipi.it),  
[rudy.semola@phd.unipi.it](mailto:rudy.semola@phd.unipi.it)]
  - Subject: [CNS-2022] student <YOUR-SURNAME> exam material
  - Body (email text):
    - Name Surname, email contact
    - Master degree programme (Bionics eng., Computer Science, Physics, etc)
    - File name for the material inserted on Moodle (and any note you find useful to us)
    - **Please, DO NOT attach the exam material to the email**

## How to deliver the assignments?

- Upload the material (lab source code files, report for the project or slides for the presentation) in the Moodle platform (we will create a section Prj Student Material)
  - Note: all the material in only one delivery
  - Only deliveries announced also by email will be picked up and considered
  - Further details for the material (assignments) will be discussed during the course

## Laboratory Assignment 1 (LAB1)

- **Lab1-Assignments.pdf** in the LABS section of the Moodle website
- Laboratory Assignment 1 (LAB1) Implementing Spiking Neurons using Izhikevich's Model

## General Info

- Solve all the assignments and put all the required files into a zipped folder including one subfolder for each laboratory.
- The subfolder for this lab should be called “LAB1”
  - Matlab scripts & the other requested files
- Bonus track assignments?
  - those who finish early
  - not formally required for completing the Lab Assignment

## Supporting Material

You will find a list of supporting materials.

For this assignment (Lab1)

- E.M. Izhikevich, "Simple model of spiking neurons." IEEE Transactions on neural networks 14.6 (2003): 1569-1572.  
Available online at: <http://izhikevich.org/publications/spikes.pdf>
- E.M. Izhikevich, "Which model to use for cortical spiking neurons?." IEEE transactions on neural networks 15.5 (2004): 1063-1070.  
Available online at:  
<http://izhikevich.org/publications/whichmod.pdf>
- Web page: <http://izhikevich.org/publications/whichmod.htm>

## Supporting Material

You will find a list of supporting materials.

For this assignment (Lab1)

- MATLAB documentation - MATLAB User's Guide  
<https://www.mathworks.com/help/index.html>
- MATLAB onramp  
[https://matlabacademy.mathworks.com/?s\\_tid=getstart\\_mlacad](https://matlabacademy.mathworks.com/?s_tid=getstart_mlacad)
- MATLAB documentation using the help command

## In a Nutshell

Implement all the 20 neuro-computational  
features using the Izhikevich model

## Additional Material

- The values of a, b, c and d parameters are reported in the LAB1-AdditionalMaterial.pdf document (section LABS in the Moodle platform).
- The values of the Izhikevich's model parameters and the shape of the input in all the cases are provided in:

<http://izhikevich.org/publications/figure1.m>

Do not copy/paste it! But use it!



