

TIGP Bio 2023 Spring Syllabus

Advanced Algorithms (C2)

For the latest syllabus, please visit the BP website: <https://tigpbp.iis.sinica.edu.tw>

Place: Room 308, Institute of Statistical Science, Academia Sinica
Time: Friday 14:00-17:00
Chair: Dr. Chien-Yu Chen (chienyuchen@ntu.edu.tw)
Outline: This course is basically about data mining, machine learning and statistical modeling from data, and some other algorithms and applications.
Resources: <https://bit.ly/41vGP3G>
 There are 8 topics given in the way of **Videos Preview** (about 2~3 hours) + **In-class discussions** (about 1~1.5 hours).
 Below please find the link that WILL provide the links of the following:
 (1) the videos to be watched BEFORE the class
 (2) the questions to be discussed IN the class
 (3) the homework to be completed AFTER the class
References:
 1. Learning from Data- A Short Course (Abu-Mostafa, Magdon-Ismael, Lin, 2012)
 2. Learning Pattern Classification (Duda, Harg, and Stork, 2001)
 3. An Introduction to Support Vector Machines and Other Kernel-based Learning Methods (Cristianini and Shawe-Taylor, 2000)
 4. [DL in Life Science] <https://mit6874.github.io/>
 5. [ML for Genomics] <https://www.classcentral.com/course/youtube-6-047-6-878-machine-learning-for-genomics-fall-2020-48203>
TA: Yu-Chun Huang (r01628119@gmail.com)
Office hours: Friday 10:00-12:00
Office location: R316, Institute of Plant and Microbial Biology, Academia Sinica.
Grades: Midterm exam 50%. Final exam 50%.

【For Non-BP student】

For Non-BP student to register/sit-in any BP course, it is required to gain course chair's permission:
 (1) Basic Enrollment Information form (<https://forms.gle/dbthaUe77GeNziNw5>)
 (2) TIGP-BP Course Registration Consent Form (<http://bit.ly/3ubl2Bs>)
 ※ Deadline: **the 4th week** of each semester.
 ※ Signature of the course chair should be collected before submission. Incomplete form will not be accepted.
 ※ Course grade will NOT be given (even class enrollment is completed at school) if fail to follow the above procedures.

Week	Date	Topics/Brief Description	Lecturers	Lecture Style	Evaluation Method	Email
1	2023/2/17	Data Classification	Dr. Li Su	Lectures	HW with a specified deadline: ▶ April 7th	lisu@iis.sinica.edu.tw
2	2023/2/22 (Wed) 14-17:00	Convolutional Neural Networks, Recurrent Neural Networks (optional: Graph Neural Networks)	Dr. Che Lin	Preview videos + in-class discussions	HW with a specified deadline: ▶ March 15th	che.lin@gmail.com
3	2023/3/3	Preview Week (no class)	--	--	--	--
4	2023/3/8 (Wed) 14-17:00	[DL in Life Science] Epigenomics	Dr. Huai-Kuang Tsai	Preview videos + in-class discussions	HW with a specified deadline: ▶ April 7th	hktsai@iis.sinica.edu.tw
5	2023/3/15 (Wed) 14-17:00	Identification and analysis of circular RNAs	Dr. Trees-Juen Chuang	Lectures	HW with a specified deadline: ▶ April 14th	trees@gate.sinica.edu.tw
6	2023/3/24	[DL in Life Science] GWAS and Variants	Dr. Tzu-Pin Lu	Preview videos + in-class discussions	HW with a specified deadline: ▶ April 17th	tplu@ntu.edu.tw
7	2023/3/31	Single cell RNA-seq	Dr. Yao-Ming Chang	Preview videos + in-class discussions	HW with a specified deadline: ▶ April 18th	petitming@ibms.sinica.edu.tw
8	2023/4/7	Midterm Exam (take-home exams, no class)	--	--	--	--
9	2023/4/14	Hidden Markov Models	Dr. Yu Tsao	Lectures	HW with a specified deadline: ▶ June 2nd	yu.tsao@citi.sinica.edu.tw
10	2023/4/21	Network Analysis	Dr. Hsuan-Cheng Huang	Lectures	HW with a specified deadline: ▶ June 2nd	hsuancheng@nycu.edu.tw
11	2023/4/28	[DL in Life Science] Graph Analysis [DL in Life Science] Drug Discovery	Dr. Yueh-Hua Tu	Preview videos + in-class discussions	HW with a specified deadline: ▶ May 29th	a504082002@gmail.com
12	2023/5/5	[DL in Life Science] Protein Structure Prediction	Dr. Chien-Yu Chen	Preview videos + in-class discussions	HW with a specified deadline: ▶ June 2nd	chienyuchen@ntu.edu.tw
13	2023/5/12	Advanced Algorithms for Proteomics	Dr. Ching-Tai Chen	Preview videos + in-class discussions	HW with a specified deadline: ▶ June 2nd	ctchen@asia.edu.tw
14	2023/5/17 (Wed) 14-17:00	Biological systems modeling	Dr. An-Chi Wei	Preview videos + in-class discussions	HW with a specified deadline: ▶ June 2nd	acwei86@ntu.edu.tw
15	2023/5/26	Review Week (no class)	--	--	--	--
16	2023/6/2	Final Exam (take-home exams, no class)	--	--	--	--