

TIGP Bioinformatics Program
Advanced Algorithms (C2)
Spring 2025 Syllabus

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

Place: Room 308, Institute of Statistical Science, Academia Sinica
Time: Friday 14:00-17:00
Chair: Dr. Li Su (lisu@iis.sinica.edu.tw)
Co-Chair: Dr. Trees-Juen Chuang (trees@gate.sinica.edu.tw)
Outline: This course is basically about data mining, machine learning and statistical modeling from data, and some other algorithms and applications.

Resources:
There are 7 topics given in the way of **Videos Preview** (about 2~3 hours) + **In-class discussions** (about 1~1.5 hours).
Please find the link (<https://reurl.cc/GWko1L>) 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>

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Office hours: Wednesday, 17:00 pm - 19:00 pm
Office location: Room A622, Agricultural Biotechnology Research Center
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/oK7vJzzrx9EvybbT9>
(2) TIGP-BP Course Registration Consent Form
https://idv.sinica.edu.tw/tigpbio/index/TIGP%20Bioinformatics_Class%20Registration%20Consent%20Form.docx

※ 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	2025/2/21	Data Classification	Dr. Li Su	Lectures	Take-home exam with a specified deadline: ▶ March 7th	lisu@iis.sinica.edu.tw
2	2025/2/28	Class rescheduled to 3/25 . 228 Peace Memorial Day (no class)	--	--	--	--
3	2025/3/7 @Webex Only	Convolutional Neural Networks, Recurrent Neural Networks (optional: Graph Neural Networks)	Dr. Che Lin	Preview videos + Online discussions	Take-home exam with a specified deadline: ▶ April 7th	chelin@ntu.edu.tw
4	2025/3/14	Hidden Markov Models	Dr. Yu Tsao	Lectures	In-class exam on midterm exam date	yu.tsao@citi.sinica.edu.tw
5	2025/3/21 @Webex Only	[DL in Life Science] GWAS and Variants	Dr. Tzu-Pin Lu	Preview videos + Online discussions	Take-home exam with a specified deadline: ▶ April 7th	tplu@ntu.edu.tw
6	2025/3/25 (Tues) @Webex Only 14:00-17:00	Boolean and Bayesian networks	Dr. Henry Horng-Shing Lu	Online lectures	Take-home exam with a specified deadline: ▶ April 11th	henryhslu@nycu.edu.tw
6	2025/3/28	Single cell RNA-seq	Dr. Yao-Ming Chang	Preview videos + in-class discussions	Take-home exam with a specified deadline: ▶ April 17th	petitming@ibms.sinica.edu.tw
7	2025/4/4	Tomb-Sweeping Day and Children's day / Review Week (no class)	--	--	--	--
8	2025/4/11	Midterm Exam	--	--	--	--
9	2025/4/18 @Webex Only	Network Analysis	Dr. Hsuan-Cheng Huang	Lectures	Take-home exam with a specified deadline: ▶ May 9th	hsuancheng@nycu.edu.tw
10	2025/4/25	[DL in Life Science] Graph Analysis [DL in Life Science] Drug Discovery	Dr. Yueh-Hua Tu	Preview videos + in-class discussions	Take-home exam with a specified deadline: ▶ May 9th	a504082002@gmail.com
11	2025/4/30 (Wed) 14:00-17:00	[DL in Life Science] Protein Structure Prediction	Dr. Chien-Yu Chen	Preview videos + in-class discussions	Take-home exam with a specified deadline: ▶ May 14th	chienyuchen@ntu.edu.tw
12	2025/5/6 (Tues) 14:00-17:00	Advanced Algorithms for Proteomics	Dr. Ching-Tai Chen	Preview videos + in-class discussions	Take-home exam with a specified deadline: ▶ May 30th	ctchen@utaipai.edu.tw

13	2025/5/13 (Tues) 14:00-17:00	Exploring modeling in enzyme kinetics and pharmacokinetics	Dr. An-Chi Wei	Lectures	Take-home exam with a specified deadline: ▶ 11:59 PM, June 6th	acwei86@ntu.edu.tw
14	2025/5/23 @Google Meet Only	Systems Biology and Biological Modeling of Gene Regulation	Dr. Yu-Chao Wang	Preview videos + Online discussions	Take-home exam with a specified deadline: ▶ June 6th	yuchao@nycu.edu.tw
15	2025/5/30	Make-up Holiday for Dragon Boat Festival / Review Week (no class)	--	--	--	--
16	2025/6/6	Final Exam (take-home exams, no class)	--	--	--	--