

**TIGP Bioinformatics Program**  
**Advanced Algorithms (C2)**  
**Spring 2025 Syllabus**

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

<p><b>Place:</b> Room 308, Institute of Statistical Science, Academia Sinica</p> <p><b>Time:</b> Friday 14:00-17:00</p> <p><b>Chair:</b> Dr. Li Su (<a href="mailto:lisu@iis.sinica.edu.tw">lisu@iis.sinica.edu.tw</a>)</p> <p><b>Co-Chair:</b> Dr. Trees-Juen Chuang (<a href="mailto:trees@gate.sinica.edu.tw">trees@gate.sinica.edu.tw</a>)</p> <p><b>Outline:</b> This course is basically about data mining, machine learning and statistical modeling from data, and some other algorithms and applications.</p> <p><b>Resources:</b>            There are 7 topics given in the way of <b>Videos Preview</b> (about 2~3 hours) + <b>In-class discussions</b> (about 1~1.5 hours).            Please find the link (<a href="https://reurl.cc/eGWkol">https://reurl.cc/eGWkol</a>) 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</p> <p><b>References:</b>            1. Learning from Data- A Short Course (Abu-Mostafa, Magdon-Ismail, 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] <a href="https://mit6874.github.io/">https://mit6874.github.io/</a>            5. [ML for Genomics] <a href="https://www.classcentral.com/course/youtube-6-047-6-878-machine-learning-for-genomics-fall-2020-48203">https://www.classcentral.com/course/youtube-6-047-6-878-machine-learning-for-genomics-fall-2020-48203</a></p> <p><b>TA:</b> Tzu-Hsiang Lin    <b>Email:</b> <a href="mailto:d84122701181@gmail.com">d84122701181@gmail.com</a>  <b>Office hours:</b> Wednesday, 17:00 pm - 19:00 pm  <b>Office location:</b> Room A622, Agricultural Biotechnology Research Center</p> <p><b>Grades:</b> Midterm exam 50%. Final exam 50%.</p>
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**【For Non-BP student】**

<p>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 <a href="https://forms.gle/oK7vJzrx9EvybbT9">https://forms.gle/oK7vJzrx9EvybbT9</a>            (2) TIGP-BP Course Registration Consent Form <a href="https://idv.sinica.edu.tw/tigpbio/index/TIGP%20Bioinformatics_Class%20Registration%20Consent%20Form.docx">https://idv.sinica.edu.tw/tigpbio/index/TIGP%20Bioinformatics_Class%20Registration%20Consent%20Form.docx</a></p> <p>※ Deadline: <b>the 4th week</b> 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.</p>
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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	<a href="mailto:lisu@iis.sinica.edu.tw">lisu@iis.sinica.edu.tw</a>
2	2025/2/28	Class rescheduled to 3/11. 228 Peace Memorial Day (no class)	--	--	--	--
3	<a href="#">2025/3/7</a> <a href="#">@Webex Only</a>	Convolutional Neural Networks, Recurrent Neural Networks (optional: Graph Neural Networks)	Dr. Che Lin	Preview videos + Online discussions	Take-home exam with a specified deadline	<a href="mailto:chelin@ntu.edu.tw">chelin@ntu.edu.tw</a>
4	<a href="#">2025/3/11 (Tues)</a> 14:00-17:00 <a href="#">@Webex Only</a>	Boolean and Bayesian networks	Dr. Horng-Shing Lu	Online lectures	Take-home exam with a specified deadline	<a href="mailto:henryshlu@nycu.edu.tw">henryshlu@nycu.edu.tw</a>
4	2025/3/14	Hidden Markov Models	Dr. Yu Tsao	Lectures	In-class exam on midterm exam date	<a href="mailto:yu.tsao@citi.sinica.edu.tw">yu.tsao@citi.sinica.edu.tw</a>
5	2025/3/21	[DL in Life Science] GWAS and Variants	Dr. Tzu-Pin Lu	Preview videos + Online discussions	Take-home exam with a specified deadline	<a href="mailto:tplu@ntu.edu.tw">tplu@ntu.edu.tw</a>
6	2025/3/28	Single cell RNA-seq	Dr. Yao-Ming Chang	Preview videos + in-class discussions	Take-home exam with a specified deadline. (2 weeks)	<a href="mailto:petitming@ibms.sinica.edu.tw">petitming@ibms.sinica.edu.tw</a>
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	Network Analysis	Dr. Hsuan-Cheng Huang	Lectures	Take-home exam with a specified deadline	<a href="mailto:hsuancheng@nycu.edu.tw">hsuancheng@nycu.edu.tw</a>
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	<a href="mailto:a504082002@gmail.com">a504082002@gmail.com</a>
11	2025/5/2 (Class will be rescheduled)	[DL in Life Science] Protein Structure Prediction	Dr. Chien-Yu Chen	Preview videos + in-class discussions	Take-home exam with a specified deadline	<a href="mailto:chienyuchen@ntu.edu.tw">chienyuchen@ntu.edu.tw</a>
12	<a href="#">2025/5/7 (Wed)</a> 14:00-17:00	Advanced Algorithms for Proteomics	Dr. Ching-Tai Chen	Preview videos + in-class discussions	Take-home exam with a specified deadline	<a href="mailto:ctchen@asia.edu.tw">ctchen@asia.edu.tw</a>

13	2025/5/16 (Class will be rescheduled)	Exploring modeling in enzyme kinetics and pharmacokinetics	Dr. An-Chi Wei	Lectures	Take-home exam with a specified deadline	acwei86@ntu.edu.tw
14	<a href="#">2025/5/23 @Webex Only</a>	Systems Biology and Biological Modeling of Gene Regulation	Dr. Yu-Chao Wang	Preview videos + <a href="#">Online</a> discussions	Take-home exam with a specified deadline: ▶ <a href="#">May 30th</a>	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)	--	--	--	--