

Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

Expected Implementation in Academic Year (New format)	AY2026-2027
Semester/Trimester/Others (specify approx. Start/End date)	Semester 1
Course Author * Faculty proposing/revising the course	Leek Meng Lee
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Course Title	Advanced Topics in Astrophysics
Course Code	PH4423
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	PH2401 Introductory Astrophysics
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

This course aims to expose you to cutting-edge theoretical / data-analytical / experimental research in astrophysics. The instructor may be a visiting faculty from a distinguished astrophysics institute and the instructor will cover the latest research data and techniques in his/her area of research.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Discuss cutting-edge theories or data analysis methods in astrophysics.
ILO 2	Critique theoretical proposals or cross-checking analysed data in astrophysics research.
ILO 3	Conduct research on the latest topics in astrophysics.

Course Content

Due to the nature of this course, the course content will be decided by the faculty teaching the course.

Reading and References (if applicable)

To be decided by the faculty teaching.

Planned Schedule

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
1	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
2	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
3	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
4	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
5	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
6	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	Midterm 1	
7	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
8	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
9	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
10	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
11	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	
12	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	Midterm 2	

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
13	To be decided by the faculty teaching.	To be decided by the faculty teaching.	In-person	To be decided by the faculty teaching.	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lectures	The lecture component is where the instructor will introduce you to the frontier topic, as well as teaching the known theories and techniques in data analysis specific to the topic.
Tutorials	The tutorial component will serve as guided exercises where you get to practise applying the theories or data analysis techniques to simple cases. This is important for you to fully understand the concepts taught in the lectures and also be able to apply them.
Project	The project component will allow you to work quite independently on a larger scale problem mimicking an actual research project.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Description of Assessment Component	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Others(Homework)	To be decided by the faculty teaching	Not Applicable	20	These are problems to test your understanding of the concepts and allow you to apply the concepts to various case studies.	Individual	Analytic	Relational
2	Continuous Assessment (CA): Test/Quiz(Midterm 1)	To be decided by the faculty teaching	Not Applicable	25	Midterm 1 is a written test which serves to test your understanding of concepts and also to see if you can apply the concepts in simple cases during the halfway point in the course.	Individual	Analytic	Relational
3	Continuous Assessment (CA): Test/Quiz(Midterm 2)	To be decided by the faculty teaching.	Not Applicable	25	Midterm 2 is a written test which serves to test your understanding of concepts and also to see if you can apply the concepts in simple cases during the endpoint in the course.	Individual	Analytic	Relational

No.	Component	ILO	Related PLO or Accreditation	Weightage	Description of Assessment Component	Team/Individual	Rubrics	Level of Understanding
4	Continuous Assessment (CA): Project(The project component consists of 2 parts: a report and a presentation. Students will be graded separately on their report and presentation.)	To be decided by the faculty teaching.	Not Applicable	30	The project component allows you to work on a larger scale case study so that you can apply the concepts towards problems at a similar level to research problems.	Individual	Analytic	Relational

Description of Assessment Components (if applicable)

Formative Feedback

Formative feedback is given through discussions within tutorial lessons and a discussion after each midterm.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Collaboration	Basic
Creative Thinking	Advanced
Curiosity	Advanced
Decision Making	Intermediate
Problem Solving	Advanced

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

You are expected to complete all assigned readings, activities, assignments, attend all classes punctually and complete all scheduled assignments by due dates. You are expected to take responsibility to follow up with assignments and course related announcements. You are expected to participate in all project critiques, class discussions and activities.

Policy (Absenteeism)

In-class activities such as midterms 1 and 2, as well as project presentation make up a significant portion of your course grade. Absence from class without a valid reason will affect your course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for graded in-class activities.

Policy (Others, if applicable)

Diversity and inclusion policy

Integrating a diverse set of experiences is important for a more comprehensive understanding of science.

It is our goal to create an inclusive and collaborative learning environment that supports a diversity of perspectives and learning experiences, and that honours your identities; including ethnicity, gender, socioeconomic status, sexual orientation, religion or ability.

To help accomplish this:

- If you are neuroatypical or neurodiverse, have dyslexia or ADHD (for example), or have a social anxiety disorder or social phobia;
- If you feel like your performance in the class is being impacted by your experiences outside of class;
- If something was said in class (by anyone, including the instructor) that made you feel uncomfortable;

Please speak to your teaching team, our school pastoral officer or a peer or senior (either in-person or via email) about how we can help facilitate your learning experience.

As a participant in course discussions, you should also strive to honour the diversity of your classmates. You can do this by: using preferred pronouns and names; being respectful of others opinions and actively making sure all voices are being heard; and refraining from the use of derogatory or demeaning speech or actions.

All members of the class are expected to adhere to the NTU anti-harassment policy. if you witness something that goes against this or have any other concerns, please speak to your instructors or a faculty member.

Appendix 1: Assessment Criteria for Project

The project component's assessment consists of two parts: the report and the presentation. The report will be graded based on the depth and breadth of analysis manifest in the research project and bonus points will be awarded to the demonstration of original work. In the oral presentation component, the grade will reflect the ability of students to communicate and explain their ideas across to the audience, their response to spontaneous questions and the clarity of their overall presentation.

[By mark range](#)

Marks	Criteria
> 90%	A complete and impressive demonstration of the achievement of the learning outcomes. Project report indicates excellent understanding of the research question; demonstrates not only an overall solid understanding of the broad ideas in the techniques to tackle the research question but also some of the important concrete details to the extent of being able to reproduce equations and conclusions in the scientific articles; demonstrate ability to critically evaluate research techniques; demonstrates some form of original work built upon the known results in the literature. Oral presentation demonstrates clear and strong ability to communicate various concepts in the research project with high amount of clarity in the presentation, a sound understanding of physical ideas and conclusion of the research project. Student is able to comment constructively on the importance of various results. Presentation style is interesting and fluent. Able to respond intelligently to questions.
70% to 89%	A strong demonstration of the achievement of the learning outcomes Project report demonstrates that the student understood most of the concepts and techniques required in the research project. There is some fair attempt in applying the techniques to tackle the research question. Oral presentation shows excellent ability in communicating various concepts at various levels, and genuine understanding of the research techniques. Able to respond correctly and confidently to most questions.
60% to 69%	A valiant effort to achieve the learning outcomes Project report demonstrates a devoted attempt in covering the research techniques, but overall, the report lacks depth and clarity. There is some modest and reasonable attempt in applying the research techniques to the project.

	Oral presentation shows effort in presenting a coherent summary but the student is unable to respond to some (basic) questions showing possible lack of grasp of key ideas in the research project.
50% to 59%	A weak attempt at achieving the learning outcomes Project report shows a minimal summary of the research techniques put together without a strong sense of organization. Very shallow application of research techniques is demonstrated. Oral presentation lacks strong structural coherence and inability to convey clearly the research techniques. But there is a decent attempt to furnish a summary containing basic ideas of the research techniques but the student is unable to respond to most basic questions.
< 50%	An insufficient demonstration of the achievement of the learning outcomes Project report is very poorly written with a depth that is far less than what is expected if basic concepts covered in this course have been properly assimilated. Very little or complete lack of applications of research techniques. Oral presentation is rather incoherent, with signs of confusion indicating a weak grasp of the basic physical ideas and research techniques and the student is unable to respond to basic questions.