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	Dr Koh Teck Seng
Course Author Email	kohteckseng@ntu.edu.sg
Course Title	Physics
Course Code	CY1308
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	N.A.
Co-requisites	N.A.
Pre-requisite to	N.A.
Mutually exclusive to	PH1011 Physics PH1012 Physics A PH1104 Mechanics
Replacement course to	N.A.
Remarks (if any)	

Course Aims

This first year core course in the CN Yang programme aims to develop students' understanding of fundamental physical concepts in the topics of mechanics, electricity, magnetism and thermodynamics, which are applicable to science, mathematics and engineering specialisations.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Apply conservation principles to explain physical phenomena. Apply concepts, definitions and laws involving linear and rotational motion to explain and solve problems in equilibrium and non-equilibrium situations.
ILO 2	Apply the concept of a field of force and its related field quantities to solve problems involving electric and gravitational fields. Apply fundamental laws involving electricity and magnetism (e.g. Gauss' Law, Coulomb's Law, Ampere's Law, Biot-Savart Law, Faraday's Law, Lenz's Law, etc) to explain or analyse electrical and magnetic phenomena. Apply electromagnetism concepts and laws to analyse and solve problems involving chemical bonding and intermolecular interactions.
ILO 3	Apply circuit concepts and rules (e.g. Kirchhoff's Laws, resistance, capacitance and inductance) to solve static and time-dependent circuits.
ILO 4	Explain microscopic phenomena in terms of charge to macroscopic circuit quantities (e.g. current, resistance capacitance, etc.)
ILO 5	Appreciate and use fundamental laws and concepts (e.g. the zeroth law of thermodynamics, temperature, heat, thermal equilibrium, etc.) to explain or analyse thermodynamics phenomena qualitatively.
ILO 6	Carry out simple experiments to perform observations of, analyse and explain actual physical situations. Communicate relevant scientific information with clarity, critical thought and creativity.

Course Content

Vectors and Kinematics

Newton's Laws of Motion

Forces, Impulse and Momentum

Work, Energy and Power

Rotational Kinematics and Dynamics

Centre of Mass

Moment of Inertia

Gravitational Field

Electric Field

Electric Circuits

Magnetic Field

Electromagnetism

Thermodynamics

Reading and References (if applicable)

1. Physics for Scientists & Engineers with Modern Physics, 4th Edition, Douglas C. Giancoli, Pearson (2008).

2. University Physics with Modern Physics, 14th Edition, Hugh Young and Roger Freedman, Pearson (2015)

Planned Schedule

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
1	Vectors and Kinematics	1	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
2	Newton's Laws of Motion	1	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
3	Forces, Impulse and Momentum Micro-investigation 1	1, 6	In-person	Micro-investigation 1	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
4	Work, Energy and Power	1	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
5	Rotational Kinematics and Dynamics Micro-investigation 2	1, 6	In-person	Micro-investigation 2	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
6	Centre of Mass Moment of Inertia	1	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
7	Micro-investigation 3	6	In-person	Micro-investigation 3	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
8	Electric Field	2	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
9	DC Circuits	3, 4	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
10	Magnetic Field Midterm	1-4	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
11	Electromagnetic Induction	2	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
12	AC circuits	3	In-person	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.
13	Thermodynamics Micro-investigation 4	5, 6	In-person	Micro-investigation 4	All lectures are online, with accompanied slides, and MasteringPhysics learning quizzes will be assigned after each video lecture is viewed.

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Tiered Problem solving (from conceptual to mathematical)	Develop competence in understanding physical concepts and solving physics problems
Hands-on activities (during tutorial)	Develop physical intuition and competence in solving real-life problems. Relate everyday phenomena to physics.
Team-Based Learning during tutorials	Develop communication skills and competence in physics.

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	Summative Assessment (EXAM): Final exam(Final Examination)	All		60	Point-based marking (not rubric-based)	Individual	Analytic	Extended Abstract
2	Continuous Assessment (CA): Assignment(Homework)	All		10	Point-based marking (not rubric-based)	Individual	Analytic	Multistructural
3	Continuous Assessment (CA): Test/Quiz(Mid Term)	1-4		10	Point-based marking (not rubric-based)	Individual	Analytic	Relational
4	Continuous Assessment (CA): Test/Quiz(In-class micro-investigations)	6		20	Point-based marking (not rubric-based)	Individual	Analytic	Relational

Description of Assessment Components (if applicable)

Formative Feedback

Formative feedback is given through discussion within tutorial lessons as well as interactive, computer based hints and pointers in the MasteringPhysics online homework and resource system.

Feedback is also given after each midterm on the common mistakes and level of difficulty of the problems.

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
Communication	Basic
Curiosity	Intermediate
Problem Solving	Intermediate

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 make up a significant portion of your course grade. Absence from class without a valid reason will affect your participation 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 in-class activities.

Policy (Others, if applicable)

Absence Due to Medical or Other Reasons
If you are sick and unable to attend your class, you have to:
1. Send an email to the instructor regarding the absence and request for a replacement class.
2. Submit the original Medical Certificate* to administrator.
3. Attend the assigned replacement class (subject to availability).
* The medical certificate mentioned above should be issued in Singapore by a medical practitioner registered with the Singapore Medical Association

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Last Updated By: Jean Hew Ghim Foon