

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

Course Overview

The sections shown on this interface are based on the templates [UG OBTL+](#) or [PG OBTL+](#)

If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to [Data Transformation Status](#) for more information.

Expected Implementation in Academic Year	AY2023-2024
Semester/Trimester/Others (specify approx. Start/End date)	Special Term
Course Author * Faculty proposing/revising the course	Lew Wen Siang (Prof)
Course Author Email	wensiang@ntu.edu.sg
Course Title	Professional Attachment
Course Code	PH4416
Academic Units	5
Contact Hours	400
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	For PPHY/APHY: PH1104, PH1105, PH1106, PH1107, PH1198, PH1199, PH2101, PH2103, PH2198, PH2199; or by permission. For PHMS: PH1104, PH1105, PH1106, PH1107, PH1198, PH2101, PH2198, PH2199; or by permission
Co-requisites	
Pre-requisite to	
Mutually exclusive to	PH2900 PA I (Co-op), PH3900 PA II (Co-op), PH4406 PA, PH4407 PI, PH4412 PA, PH4413 PI, PH4417 PI, PH4420 PI, PH4900 PI I (Co-op), PH4901 PI II (Co-op)
Replacement course to	
Remarks (if any)	

Course Aims

This 10-week Professional Attachment is offered as an ICC Foundational Core (AY21/22 or later) and Unrestricted Elective course (AY16/17 to AY20/21) for all BSc in Physics and Applied Physics and BSc in Physics and Mathematical Sciences (Double Major) undergraduate students.

The purpose of this Professional Attachment is to enable the application of knowledge and skills you have learned in the university in an authentic work environment. This is such that you can gain relevant exposures and develop practical industry experiences and skills that will facilitate your career decision and future transition into your selected vocation. It aims for you to develop professional competencies that will enhance your employability and lifelong learning capabilities to support your career and life endeavours and your readiness for the future of work.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	<p>I. Cognitive</p> <ol style="list-style-type: none">1. Apply knowledge and skills relevantly and appropriately in the workplace. [Apply relevant science and engineering knowledge, logical reasoning, mathematical and computational skills to analyse, model and solve problems].2. Identify your own competency gaps at the internship workplace.3. Evaluate and develop personal learning and development pathways towards bridging competency gaps identified in point (2) above, i.e., identify technical skills needed to solve problems.4. Develop and apply strategies to solve problems effectively.5. Evaluate resources and develop insights to make informed judgements and recommendations. <p>Able to source relevant scientific/non-scientific information and conduct effective discussion.</p>
ILO 2	<p>II. Context</p> <ol style="list-style-type: none">6. Discuss the internship organisation's nature and context of business.7. Reflect on the organisational culture at the internship organisation.8. Appraise the significance and impact of the project/work/assignment undertaken at the internship organisation. <p>[Perform rigorous information search and review of literature that is related to the preparation of the work. Information is well organised and presented in written report with appropriate layout].</p> <ol style="list-style-type: none">9. Describe the career pathways within the internship organisation as well as the broader industry.10. Reflect on personal and professional development needs within the internship organisation as well as in the broader industry and set strategic goals for advancing along an intended career path.11. Apply time and task management strategies effectively. Project execution is well planned and quality work is produced. <p>[Able to put interpreted and discussed results into context, with good understanding of the underlying assumptions and limitation while being rationale to various approaches. Logical statements are used to conclude the outcome of the project with proposed solutions for future work].</p>
ILO 3	<p>III. Relationship and Communication</p> <ol style="list-style-type: none">12. Apply effective written and oral communication skills in professional settings when connecting with relevant stakeholders. [Able to convey scientific and non-scientific ideas effectively in writing and oral to professionals and to the general public.]13. Assimilate into the work environment (people, team, hierarchy) and function effectively [Taking initiative to communicate with team/project leader and working closely with colleagues. Able to contribute as a valued team member in the work environment.]

ILO 4	<p>IV. Work Standard, Ethics and Personal Discipline</p> <p>14. Tolerate ambiguity and handle anxiety.</p> <p>15. Contribute proactively to the internship organisation.</p> <p>16. Demonstrate responsibility, integrity and professionalism in the fulfilment of all workplace and internship requirements. Adhere to the code of conduct, rules and regulations. Behaving ethically and morally when performing a task.</p> <p>17. Demonstrate the perseverance to learn, overcome and improve.</p>
ILO 5	<p>V. Technical Knowledge and Skills</p> <p>18. Use tools that enable and facilitate effective project/work/assignment undertaken at the internship organisation.</p> <p>[Demonstrate the ability to analyse and interpret information. Apply fundamental physics and engineering concepts to evaluate results and formulate appropriate action plans.]</p> <p>[Able to give a clear and concise presentation, with logical technical points conveyed. Appropriate choice of words, understandable, proper pace, good timing and informative presentation materials].</p>

Course Content

This attachment programme, being a work-integrated education course, has its educational content embedded within the work environment and assignments that students will undertake at each internship organisation. For this reason, the attachment job scope will be evaluated by the course instructor/coordinator using the following criteria:

- a. It is relevant to the student's discipline of study;
- b. It provides the required attachment duration;
- c. It accommodates NTU's attachment periods;
- d. It provides sufficient structure and rigour that will enable students to achieve the intended learning outcomes listed above;
- e. It provides the appropriate workload for the stipulated attachment period;
- f. It enhanced the career prospects of the student;
- g. The attachment workplace is safe and conducive for student learning and development;
- h. The attachment workplace is equipped with the necessary tools and resources for the attachment work;
- i. The internship organisation has standing policies to safeguard the welfare of interns;
- j. The internship organisation supervisor possesses the competencies, experience, and commitment to provide guidance to the students;
- k. The internship organisation will use NTU's attachment assessment scheme for students

Reading and References (if applicable)

List of readings and references are dependent on the organization requirements. Your supervisor will recommend the list of readings and references related to your work.

NTU Student Internship Handbook

Please refer to the respective Professional Internship/Attachment Teamsites via NTU Studentlink for the Internship Handbook.

NTU Work-Integrated Education Blog – WIE ARISE

<https://blogs.ntu.edu.sg/wie-arise/>

Harvard Business Review: 6 Ways to Make the Most of Your Internship

<http://bit.ly/2J81BU2>

Huffington Post: 21 Ways to Make the Most of Your Internship

<http://bit.ly/2kK6Fz5>

Vault: How to Successfully Manage your Assignments:

<http://bit.ly/2LNfrIX>

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Key Meetings (with NTU supervisor) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.
2	Key Meetings (with NTU supervisor) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.
3	Key Meetings (with NTU supervisor) - Review of E Journal 1 and performance in first 3 weeks.		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.	In-person	Weekly updating logbook.
4	Key Meetings (with NTU supervisor) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.
5	Key Meetings (with NTU supervisor) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.
6	Key Meetings (with NTU supervisor) - Review of E Journal 2 and performance in first 6 weeks		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.	In-person	Weekly updating logbook.
7	Key Meetings (with NTU supervisors) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
8	Key Meetings (with NTU supervisor) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.
9	Key Meetings (with NTU supervisor) - Nil		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.		Weekly updating logbook.
10	Key Meetings (with NTU supervisor) - Submission of final E Journal and give oral presentation.		Your detail internship work schedule will follow that provided by your Internship Organisation with the respective check points with your NTU supervisor.	In-person	Weekly updating logbook.

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Experiential Learning	<p>An attachment is an experiential learning programme done in a professional setting. Students will be placed in an organisation for the entire attachment period and will undertake work assignments and/or projects in the organisation. It is through such work in the real-world environment where students learn and develop the competencies and experiences relevant to the intended learning outcomes of this course.</p> <p>Each student will be supervised by (1) an Organisation Supervisor at the internship organisation, and (2) a Faculty Supervisor in NTU.</p> <p>The Organisation Supervisor will be the key person working with and interacting with the student on a day-to-day basis. The Organisation Supervisor will be one providing guidance and feedback to the student on a regular basis.</p> <p>The Faculty Supervisor from NTU will serve to facilitate student's learning and progress through interactions via E Journal submissions, email, phone, and/or visits. The Faculty Supervisor will also be each student's first point of contact for any matters arising from the attachment. Student can also contact the respective Internship Programme Manager at NTU's Career and Attachment Office as an alternative.</p>

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Others(Assessment of Work in the Organisation (AWO) (See Appendix 1 for rubric. Assessed by Organisation Supervisor at the end of your internship.)	ILO 1 - 1, 4, 5; ILO 2 - 11; ILO 3 - 12, 13; ILO 4 - 14, 15, 16, 17; ILO 5 - 18	Not Applicable	50	Individual	Analytic	Multistructural
2	Continuous Assessment (CA): Others(E Journal 1 (See Appendix 2 for rubric. Assessed by NTU Faculty Supervisor.))	ILO 1 - 1; ILO 2 - 6, 7	Not Applicable	10	Individual	Holistic	Multistructural
3	Continuous Assessment (CA): Others(E Journal 2 (See Appendix 2 for rubric. Assessed by NTU Faculty Supervisor.))	ILO 1 - 2, 4, 5	Not Applicable	10	Individual	Holistic	Multistructural
4	Continuous Assessment (CA): Others(Final E Journal and Oral Presentation (See Appendix 3 for rubric. Assessed by NTU Faculty Supervisor))	ILO 1 - 3; ILO 2 - 8, 9, 10; ILO 3 - 12	Not Applicable	30	Individual	Holistic	Multistructural

Description of Assessment Components (if applicable)

This is a Pass/Fail course, with the outcome determined collectively by the Faculty Supervisor and the Organisation Supervisor.

The assessments will be based on the intended learning outcomes (ILO) above, and you should familiarise yourself with them as they will be your focus throughout the attachment.

Your Organisation Supervisor will assess your performance at the internship workplace through an evaluation form "Assessment of Work in the Organisation" (AWO). He/She will complete this evaluation at the end of your attachment.

Your Faculty Supervisor will facilitate and assess your learning, development, and growth through your E-Journal submissions. The E-Journal and final presentation are where you will reflect on your experience, learning, growth and achievement of the relevant ILOs. Keep the ILOs in mind throughout your experience and undertake or seek challenges in the workplace that will provide you with opportunities to generate experience and evidences regarding your competencies.

Formative Feedback

Continuous feedback on progress and performance can be expected from student's attachment organisation supervisor.

Student's faculty supervisor will also provide feedback through the student's attachment E Journal submissions and/or site visits.

NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Adaptability	Advanced
Building Inclusivity	Advanced
Collaboration	Advanced
Curiosity	Intermediate
Self-Management	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)

Throughout the internship period, students will be supervised by a designated member of a company and by an academic advisor who will oversee their progress, provide support and guidance, and assess their performance. The academic supervisor may require periodic check-ins with the student and the host company to ensure that learning objectives are being met.

Policy (Absenteeism)

Regular attendance is crucial for success in this course, as it enhances learning through participation and interaction. Students are expected to communicate absences in advance to their company supervisor and catch up on missed work promptly. Repeated absences may impact grades.

Policy (Others, if applicable)

Please refer to the respective Professional Internship/Attachment Teamsites via NTU Studentlink for detailed Internship Policy and Procedures.

Further information can be obtained from NTU's Career and Attachment Office (CAO) via cao_internship@ntu.edu.sg.

Appendix 1: Assessment Rubrics for Assessment of Work in the Organisation (AWO)

Criteria for the assessment of student performance in the internship organisation by the organisation supervisor:

ILOs	Focus	Criteria
1	Knowledge and Skills	Able to apply knowledge and skills (whether prior or newly learned) appropriately in the workplace and/or projects/tasks. [Able to put together analytical, mathematical and/or computational skills to solve quantitative problems.]
4	Problem-solving	Able to solve problems systematically and effectively. [Scientific approach to problem solving]
5	Resourcefulness [Awareness of relevant knowledge, skills needed]	Able to source for relevant information to make informed judgement, decisions and/or recommendations. [Able to handle information critically and propose systematic approaches to handling problems.]
10	Time and Task Management	Able to plan, organise, manage and complete assignments effectively and in a timely manner.
12	Written and Oral Communication	Able to communicate effectively and appropriately in writing and verbally
13	Team Work	Able to function effectively with other colleagues/stakeholders in the work environment.
14	Adaptability	Able to function effectively under ambiguity and/or change.
15	Initiative	Able to remain consistently pro-active towards contributing to the work and/or organisation.
16	Responsibility	Consistently demonstrates commitment, responsibility, integrity, professionalism and ethical behaviour at the workplace.
17	Perseverance to Learn and Improve	Consistently demonstrates persistence and grit to overcome challenges, to learn and improve continuously at the workplace, particularly in technological tools.
18	Skilfulness with Tools	Able to use tools, whether software or hardware tools, (and learn new ones where necessary) proficiently to accomplish tasks and assignments.

Please refer to detailed assessment rubrics.

Appendix 2: Assessment Rubrics for E Journal 1 and E Journal 2

You are required to submit a total of two (2) E Journals documenting and reflecting on your attachment experience in relation to the relevant intended learning outcomes of this course.

The two (2) E Journals will be assessed in week 3 and week 6 during the attachment. These are purposed to be formative assessments where you will receive feedback on your progress.

For each of these E Journals submissions, you are to present reflections on each of the specified three (3) ILOs indicated in section D above. The E Journal guide and template will be provided to you at the start of your attachment:

- Reflect critically on the experience, relating them to how they demonstrated your achievement of the specific ILO (or how they helped you to do so): Particularly but should not be limited to - what were the tasks (or observations) and their contexts, actions taken (or lessons drawn) by you and their reasons, and results achieved? What did you learn (e.g. information, knowledge, skills)? Evaluate your own capabilities and attitude where appropriate.
- E Journals should focus on another 3 ILOs as specified.

Criteria for E Journal 1 (Week 3) – 10%

Focus	Criteria
Reflection on each ILO	Critical and thoughtful reflection on the experience of achieving the ILO. Clear and concise articulation of thoughts.

Please refer to detailed assessment rubrics.

Criteria for E Journal 2 (Week 6) - 10%

Focus	Criteria
Reflection on each ILO	Critical and thoughtful reflection on the experience of achieving the ILO. Clear and concise articulation of thoughts.

Please refer to detailed assessment rubrics.

Appendix 3: Assessment Rubrics for Final E Journal and Oral Presentation

Final E Journal

Your Final E journal submission will be assessed at the end of your attachment.

For this final submission, your focus is to cover the remaining ILOs listed and present evidences and reflections on them. In addition, an overall reflection on your attachment experience as a whole is expected:

- Reflect critically on the experience, relating them to how they demonstrated your achievement of each ILO (or how they helped you to do so): Particularly but should not be limited to - what were the tasks (or observations) and their contexts, actions taken (or lessons drawn) by you and their reasons, and results achieved? How are the achievements validated (by supervisor, colleagues, stakeholders, etc.)? What did you learn (e.g. knowledge, skills)? How will you do things differently and better?
- Your overall attachment reflection will include but not limited to: Your overall experience in the attachment, what are your strengths and weaknesses? Did the experience affirm or revealed them? How will you build up your strengths and reduce your weaknesses? How do you now view this industry and this sort of work? What alternatives will you consider? Knowing what you now know, what are your tentative career plans after graduation? What will you do from this point onwards to put those plans in act?

Final Oral Presentation

As part of your final completion for this Professional Attachment, you are required to do an individual presentation to your Faculty Supervisor with the following guidelines:

ILO	Focus	Criteria Description
ILO1 - 5	Resourcefulness	Able to source for relevant information to make informed judgement, decisions and/or recommendations.
ILO2 - 8	Project Impact	Appraise the significance and impact of the project/work/assignment undertaken at the internship organisation
ILO3 - 12	Written and Oral Communication	Able to communicate effectively and appropriately in writing and verbally (including listening). Able to give a clear and concise presentation, with logical technical points conveyed. Appropriate choice of words, understandable, proper pace, good timing and informative presentation materials
ILO4 - 17	Perseverance to Learn and Improve	Consistently demonstrates persistence and grit to overcome challenges, to learn and improve continuously at the workplace.

18	Skilfulness with Tools	Able to use tools, whether software or hardware tools, (and learn new ones where necessary) proficiently to accomplish tasks and assignments.
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Please refer to detailed assessment rubrics.

This presentation will be based on the content in the Final E Journal. You are given 20 mins to present followed by a 10-min Question and Answer session.

Category	Scoring Criteria
Organization	The presentation is pitched at an appropriate level for the topic and audience.
	Information is presented in a logical sequence.
Content	Introduction captures attention; the problem is well defined and establishes a framework for the rest of the presentation.
	Technical terms are well-defined in language appropriate for the target audience.
	Presentation contains accurate information.
	Material included is relevant to the overall message/purpose.
	Appropriate amount of material is prepared and points made reflect well their relative importance.
	There is an obvious conclusion summarizing the presentation.
Delivery	Speaker maintains good eye contact with the audience and is appropriately animated (e.g., gestures, moving around, etc.).
	Speaker uses a clear and audible voice.
	Delivery is poised, controlled, and smooth.
	Good language skills and pronunciation.
	Visual aids are well prepared, informative, effective, and not distracting.
	Length of presentation is within the assigned time limits.
	Content is presented in a clear and concise way.
Q & A	Able to answer questions in a way that reflects a good understanding of the internship.

Please refer to detailed assessment rubrics.

Criteria for Final E Journal and Oral Presentation submission (30%):

Focus	Criteria
Reflection on each ILO	Critical and thoughtful reflection on the experience of achieving the ILO. Clear and concise articulation of thoughts.
Oral Presentation	Articulate achievement of ILO.

Please refer to detailed assessment rubrics.