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	AY2025-26
Semester/Trimester/Others (specify approx. Start/End date)	Special Term
Course Author * Faculty proposing/revising the course	So Cheuk Wai
Course Author Email	cwso@staff.main.ntu.edu.sg
Course Title	UNDERGRADUATE RESEARCH EXPERIENCE IN CHEM & BIOLOG CHEM III
Course Code	CM5073
Academic Units	4
Contact Hours	300
Research Experience Components	Research Defined Course (at least 50% of deliverables involve practical research activities: problem identification, hypothesis forming, data collection/analysis/interpretation, result communication)

Course Requisites (if applicable)

Pre-requisites	Approval by the Division
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

The purpose of this undergraduate research course is to enable the application of advanced knowledge and skills you have learnt in the university in an authentic research environment. This is such that you can gain relevant exposures and develop advanced research experiences and skills, which allow you to cultivate research competencies for the future of work and graduate studies. This course provides you with an opportunity to carry out research with one or more faculty members in the Division of Chemistry and Biological Chemistry.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Apply advanced knowledge and skills relevantly and appropriately in the chemistry research laboratory. [Apply advanced fundamental chemistry knowledge, logical reasoning, advanced chemical laboratory and/or computational skills to analyse and solve problems in a research project]
ILO 2	Identify your own competency gaps at the chemistry research laboratory.
ILO 3	Evaluate and develop personal learning and development pathways towards bridging competency gaps identified in point (2) above. [Identify technical skills needed to solve problems in a research project]
ILO 4	Develop and apply strategies to solve problems effectively (involves critical thinking and creativity, generating questions, resourcing, application and reiteration). [To formulate research question; methodically develop approaches to tackle problems using scientific approach; collect and analyse data to make rigorous and objective deductions.]
ILO 5	Evaluate resources and develop insights to make informed judgements and recommendations. [Exhibit awareness of relevant knowledge through literature review and critically evaluate sources of scientific/non-scientific information.]
ILO 6	Discuss and Appraise significance, impact results and future plan of the research project
ILO 7	Reflect on the culture at the chemistry research laboratory.
ILO 8	Reflect on personal and professional development needs within the chemistry research laboratory.
ILO 9	apply time and task management strategies effectively. [Spend adequate time on the project to ensure rigour and quality]
ILO 10	Apply effective written and oral communication skills in professional settings when communicating and connecting with research supervisor and colleagues. [Communicate (in writing and speaking) scientific and non-scientific ideas effectively to professional scientists]
ILO 11	Assimilate into the work environment (people, team, hierarchy) and function effectively. [Communicate effectively with team members when working in a group and contribute as a valued team member when working in a group]
ILO 12	Tolerate ambiguity and handle anxiety.
ILO 13	Contribute proactively to the chemistry research laboratory

ILO 14	Demonstrate responsibility, integrity and professionalism in the fulfilment of all research requirements. [Readily pick up new skills, particularly technology related ones, to tackle new problems.]
ILO 15	Demonstrate the persistence to learn, overcome and improve.
ILO 16	Use tools that enable and facilitate effective project/work/assignment undertaken at the chemistry research laboratory.

Course Content

In this undergraduate programme, you (as a student) will experience supervised research work in a selected field of study. You will be supervised by the faculty from the Division of Chemistry and Biological Chemistry to achieve the intended learning outcomes listed above. The specific content is dependent on the selection field of study.

Reading and References (if applicable)

Reading materials are dependent on the selected field of study and specific to each project. Faculty Supervisor will recommend reading materials, and students will conduct a comprehensive literature review as well.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	The weekly schedule will be discussed and agreed on between students and their Faculty Supervisors.			In-person	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Research	This undergraduate research programme is an experiential research programme done in a professional setting. You will be placed in a chemistry research laboratory and will undertake work assignments and research projects, where you learn to be responsible, independent, self-disciplined and self-motivated. You are expected to become better at managing your time, resources and emotions in this supervised research work. You would also acquire critical and logical thinking skills, and creative problem solving skills. You would gain confidence in your work and themselves, and develop fine oral and written communication skills. The CBC Faculty Supervisor will be the key person working with and interacting with you on a day-to-day basis.

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(Performance)	1-16	Competency, Creativity, Communication, Character, Civic-mindedness	28	Individual	Holistic	Not Applicable
2	Continuous Assessment (CA): Report/Case study(Written Report)	1-5, 10-11, 16	Competency, Creativity, Communication, Character	36	Individual	Holistic	Multistructural
3	Continuous Assessment (CA): Presentation(Oral Presentation)	1-5, 10-11, 16	Competency, Creativity, Communication, Character	36	Individual	Holistic	Multistructural

Description of Assessment Components (if applicable)

This is a Graded course with the final outcome determined collectively by your Faculty Supervisor and Faculty Examiners.

The assessments will be based on the above intended learning outcomes (ILOs) and you should familiarise yourself with them as they will be your focus throughout this undergraduate research programme.

Your Faculty Supervisor will assess your performance at the chemistry research laboratory and your written report through “Assessment of Work in the Chemistry Research Laboratory” and “Assessment Rubrics for Written Report”, respectively. He/She will complete the evaluation at the end of your programme.

Your Faculty Examiners evaluate your learning and development through your written report and oral presentation, where will reflect on your experience, learning, growth and achievement of the relevant ILOs. The evaluation of written report and oral presentation are based on “Assessment Rubrics for Written Report” and “Assessment Rubrics for Oral Presentation”, respectively.

Formative Feedback

Continuous feedback on progress and performance can be expected from your supervisor

NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Critical Thinking	Intermediate
Embrace Challenge	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)

Students are expected to complete all assigned readings and research activities, attend all research group meetings punctually and take all scheduled laboratory duties by due dates. Students are expected to participate in all research discussions and activities.

Policy (Absenteeism)

Absence from daily research activities without a valid reason will affect your overall 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. You must inform your Faculty Supervisor via email prior to any absence.

Policy (Others, if applicable)

Diversity and Inclusion Policy

Integrating a diverse set of experiences is important for a more comprehensive understanding of science and engineering. It is our goal to create an inclusive and collaborative learning environment that supports a diversity of perspectives and learning experiences. 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 your performance in the course is being impacted by your experiences outside of class:hi Ai HUa
- If something was said in the course (by anyone, including instructor/supervisor) that made you uncomfortable.

Please e-mail our Associate Chair (Students & Continuing Education) at ac-cceb-stud@ntu.edu.sg 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, actively making sure all voices are being heard, and refraining from the use of derogatory or demeaning speech or actions.

All members of the course are expected to strictly adhere to the student code of conduct (https://www.ntu.edu.sg/life-at-ntu/student-life/student-conduct). If you witness something that goes against this or has any other concerns, please speak to your instructors or a faculty member.

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