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	AY2020-2021
Semester/Trimester/Others (specify approx. Start/End date)	Semester 1 Semester 2
Course Author * Faculty proposing/revising the course	So Cheuk Wai
Course Author Email	cwso@ntu.edu.sg
Course Title	Honours Project 1
Course Code	CM4080
Academic Units	10
Contact Hours	520
Research Experience Components	Final Year Project (FYP)

Course Requisites (if applicable)

Pre-requisites	CM3061 and CM3062 or by permission
Co-requisites	
Pre-requisite to	
Mutually exclusive to	CM4071, CM4072, CM4074, CM4075, CM4076, CM4077, CM4078, CM4079, CM4081, CM4900
Replacement course to	
Remarks (if any)	

Course Aims

This 13-week research-based Final Year Project programme is offered as an optional course for all Chemistry and Biological Chemistry undergraduate students in their final year. This is a 10-AU course.

The purpose of this Final Year Project programme is to enable the application of knowledge and skills you have learned in the university in an authentic research environment. This is such that you can gain relevant exposures and develop research experiences and skills that will facilitate your career decision and future transition into your selected vocation. It allows you to develop research 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. The Final Year Project programme provides an opportunity to apply and integrate the knowledge you have gained through various subjects in your degree programme, and to demonstrate practical research skills through solving real life problems in related field.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Apply knowledge and skills relevantly and appropriately in the research laboratory. [Apply fundamental chemistry knowledge, logical reasoning, chemical laboratory and/or computational skills to analyse and solve problems in a research project]
ILO 2	Identify your own competency gaps at the 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, 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 research laboratory
ILO 8	Reflect on personal and professional development needs within the research laboratory and set strategic goals for advancing along an intended career path
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 and to the general public]
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 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 research laboratory

Course Content

In this Final Year Project programme, you (as a student) will experience independent 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 you will conduct a comprehensive literature review as well.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	In this Final Year Project programme, you (as a student) will experience independent supervised research work in a selected field of study. You will be supervised by the faculty from the School of Chemistry, Chemical Engineering and Biotechnology to achieve the intended learning outcomes listed above. The specific content is dependent on the selection field of study.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16		In-person	The weekly schedule will be discussed and agreed on between you and your Faculty Supervisors

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Final Year Project (520 hours)	The Final Year Project programme is an experiential research programme done in a professional setting. You will be placed in a 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 independent 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 (Faculty Supervisor))	1, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16	1. a, b, c 2. a, b 3. a, b 4. a, b 5. a, b, c	28	Individual	Holistic	Multistructural
2	Continuous Assessment (CA): Presentation(Oral Presentation (Chemistry Faculty))	1, 2, 3, 4, 5, 10, 11, 16	1. a, b, c 2. a, b 3. a, b 4. a, b 5. a, b, c	36	Individual	Holistic	Multistructural
3	Continuous Assessment (CA): Report/Case study(Written Report (Chemistry Faculty))	1, 2, 3, 4, 5, 10, 11, 16	1. a, b, c 2. a, b 3. a, b 4. a, b 5. a, b, c	36	Individual	Holistic	Multistructural

Description of Assessment Components (if applicable)

These are the relevant SPMS-CBC Graduate Attributes.

1. Competence
a. Be well-versed in the foundational and advanced concepts of chemical science
b. Evaluate chemistry-related information critically and independently
c. Use complex reasoning to solve emergent chemical problems

2. Creativity
a. Synthesize and integrate multiple ideas across the curriculum
b. Propose innovative solutions to emergent chemistry-related problems based on their training in chemistry

3. Communication
a. Demonstrate clarity of thought, independent thinking, and sound scientific analysis and reasoning through written and oral reports to audiences with varying technical backgrounds
b. Effectively engage other professional chemists in collaborative endeavours

4. Character
a. Act in responsible ways
b. Uphold the high ethical standards that the society expects of professional chemists

5. Civic-mindedness
a. Be aware of the impact of chemistry on society
b. Apply chemistry to benefit mankind
c. Uphold the best chemical safety practices

Formative Feedback

Continuous feedback on progress and performance, along with the strength and weakness of personal and professional development toward the culture of research laboratory (ILO 7 and 8), 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
Communication	Intermediate
Creative Thinking	Intermediate
Curiosity	Intermediate
Problem Solving	Intermediate
Self-Management	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)

Your Faculty Supervisor for the Final Year Project programme will be allocated to you after the placement process is completed. The Final Year Project programme is managed and administered by your school's course coordinator.

The Final Year Project programme concerns research work in a professional setting. As with good academic work, good research work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of research and 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. Refer to this link for details: http://www.ntu.edu.sg/ai/Pages/shared-values-honour-code.aspx.

Policy (Absenteeism)

You could get F grade for the course.

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;
- If something was said in the course (by anyone, including instructor/supervisor) that made you

uncomfortable.

Please e-mail to your 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 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 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 have any other concerns, please speak to your instructors or a faculty member.

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Last Updated By: Pullarkat Appukuttan Sumod (Dr)