

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

Course Overview

Expected Implementation in Academic Year (New format)	
Semester/Trimester/Others (specify approx. Start/End date)	
Course Author * Faculty proposing/revising the course	Jean Hew Ghim Foon
Course Author Email	jgfhew@ntu.edu.sg
Course Title	Mathematics I
Course Code	CY1601
Academic Units	0
Contact Hours	48
Research Experience Components	Not Applicable

Course Requisites (if applicable)

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

Course Aims

This course aims to equip you with the subject knowledge, logical reasoning and communication skills required to independently and in teams, apply the concepts and methods of calculus of one variable, to problems encountered in science.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Independently process and interpret concepts and methodologies related to differentiation and integration of single- and multivariate functions, and apply them to solve science and engineering related problems.
ILO 2	Critically assess the applicability of mathematical tools in the workplace.
ILO 3	Critically assess the validity of a mathematical argument involving concepts from the course content.
ILO 4	Present mathematical ideas logically and coherently at the appropriate level for the intended audience.
ILO 5	Work in teams on problems that require applications of the course content, and communicate the results verbally and in written form. These problems may also involve some programming in a suitable programming language, e.g. Python.
ILO 6	Identify the role of mathematics in other sciences, such as physics, chemistry, biology, or earth science.

Course Content

• Sets and functions. • Limits and continuity, one-to-one and inverse functions. • Differentiation and optimization. • Definition of the Riemann integral, Fundamental Theorem of Calculus, applications of integration. • Methods of integration. • Series, Power series, Taylor Series • Elementary theory and methods of ordinary differential equations

Reading and References (if applicable)

Main text: Provided lecture notes. Supplementary: Stewart – Calculus

Planned Schedule

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
1	Introduction		In-person		
2	Sets, logic and functions	1-5	In-person		IRA / TRA
3	Limits.	1-5	In-person		AE
4	Limits, continuity, inverse functions.	1-5	In-person		IRA / TRA
5	Differentiation and optimization.	1-5	In-person		AE
6	The Mean Value Theorem and its consequences. Higher order derivatives and applications.	1-5	In-person		IRA / TRA
7	Definition of the Riemann integral. Fundamental Theorem of Calculus. Applications of integration.	1-5	In-person		Revision
8	Methods of integration.	1-5	In-person		IRA / TRA
9	Differential equations.	1-5	In-person		AE
10	Vector geometry. Multivariate functions and limits of such functions.	1-5	In-person		IRA / TRA
11	Partial derivatives. Geometry of gradients and level sets.	1-5	In-person		AE

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
12	Multiple integration.	1-5	In-person		IRA / TRA
13	Revision.	1-5	In-person		Revision

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Team Based Learning	For a typical iRA/tRA, the student is asked to determine whether some given statements are true or false. The answers can't be directly found in the reading material but has to be logically deduced from the given information using the tools and concepts from the reading material. On the individual level, this relates directly to LOs 1-3 and for the team based assessment, LO 4. Application Exercises require the student teams to work together to solve problems reaching beyond the examples found in readings or tutorials, and will often involve some simple computer programming. This relates in particular to LOs 2--5.

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)	1, 2, 3, 4	a,f	50		Individual	Holistic	Extended Abstract
2	Continuous Assessment (CA): Test/Quiz(Continuous Assessment 1 (CA1): Individual Readiness assessments (iRA).)	1, 2, 3, 4, 5	a,f,i	15		Individual	Analytic	Relational
3	Continuous Assessment (CA): Test/Quiz(Continuous Assessment 1 (CA1): Team Readiness assessments (tRA).)	1, 2, 3, 4, 5	a,f,i	10		Team	Analytic	Relational
4	Continuous Assessment (CA): Assignment(CA2: Application Exercises)	2, 3, 4, 5, 6	a,f,i	10		Team	Analytic	Relational
5	Continuous Assessment (CA): Others(CA3: Peer Evaluation)	4, 5	f,i,j	15		Individual	Analytic	Not Applicable

Description of Assessment Components (if applicable)

Formative Feedback

For the final exam, comments on answers and common errors are given to you after the exams are marked.
 For CA1 and CA2, you are able to submit questions that will be answered in class. Immediate feedback on your answers and common errors are also given in class.
 For CA3, you can give anonymous comments to your team members.

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	Basic
Digital Fluency	Basic
Problem Solving	Basic
Sense Making	Basic

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)

(1) General

You are expected to complete all assigned pre-class readings and activities, attend all seminar classes punctually and take all scheduled assignments and tests by due dates. You are expected to take responsibility to follow up with course notes, assignments and course related announcements for seminar sessions you have missed. You are expected to participate in all seminar discussions and activities.

Policy (Absenteeism)

(2) Absenteeism

TBL requires you to be in class to contribute to team work. In-class activities make up a significant portion of your course grade. Absence from class 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. There will be no make-up opportunities for in-class activities. If you miss a seminar session, you must inform your team members and me via email (include email address) prior to the start of the class. Students who miss in-class activities with valid reasons will be exempted from that activity in score calculations. Students who miss class activities without a valid reason will get a zero score for that session of absence.

Policy (Others, if applicable)

Last Updated Date: 03-03-2026 20:37:50

Last Updated By: Tan Shin Lu