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	AY2024/AY2025
Semester/Trimester/Others (specify approx. Start/End date)	Semester 1
Course Author * Faculty proposing/revising the course	Ben Choi
Course Author Email	benchoi@ntu.edu.sg
Course Title	Designing & Developing Databases
Course Code	BC2402
Academic Units	4
Contact Hours	52
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

The course aims to equip you with skills in solvingdata-related problems and making business decisionsrelated to data issues in organizations. After the completion of this course, you should be equipped with a strong conceptual and technical knowledgein database designing and implementation. Students should understand how databases support business processes and gather information for business analytics. You should be able to applyyour knowledge and skills to analyzea variety of business processes, identifydata requirements, and createcorresponding data management strategies.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Appraise the nature and limitations of both relational and non-relational database design
ILO 2	explain and distinguish the key concepts, methodologies, and characteristics of database design and management
ILO 3	Adapt database modeling techniques to document business processes
ILO 4	Devise database management plans relevant to organizational requirements
ILO 5	Construct deployable database implementations

Course Content

The class is organized along the following themes: 1.Introduction to relational databases 2.Relational database design concepts 3.Relational database implementation 4.Introduction to non-relational databases 5.Non-relational database design concepts 6.Non-relational database implementation 7.Data governance and ethical issues

Reading and References (if applicable)

Main Readings 1. Carlos Coronel and Steven Morris(C&M). Database Systems: Design, Implementation, & Management, 13th, 2018, Cengage. Supplementary Readings 1. Harry J. Rosenblatt. Systems Analysis and Design, 10e 2014 or later, Cengage 2. Whitten, Jeffery L. and Bentley, Lonnie D. Systems Analysis and Design Methods, 7e 2008 or later, McGraw-Hill

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Fundamental Query Language: Basic Topics in Structured Query Language (SQL)	ILO5	C&M Chapter 7, 8 Appendix N		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)
2	Fundamental Query Language: Basic Topics in Structured Query Language (SQL)	ILO5	C&M Chapter 3, 4, 5, 6, 9 Appendix E, H, D		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
3	Fundamental Query Language: Advanced Topics in Structured Query Language (SQL)	5	C&M Chapter 7, 8 Appendix N		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)
4	Introduction to Relational Databases ; Process & Data Modelling	ILO1 and 2	Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%) C&M Chapter 7, 8 Appendix N	Online	Complete videos (CP: 1%) and an online quiz (Q:2%)

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
5	Relational Data Model ; Normalization	ILO 3 and 4	C&M Chapter 3, 4, 5, 6, 9 Appendix E, H, D		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)
6	Fundamental Query Language: Advanced Topics in Structured Query Language (SQL)	5	C&M Chapter 7, 8 Appendix N		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
7	Ethics and Data Management - Case Discussions	ILO1, ILO2, ILO3, and 4			During the session Discuss and present data management cases; post-class submission (CE: 5%, CP:5%)
8	Recess Week				Individual Assignment submission due: Oct-6 2024, 2359
9	Contemporary Query Language: Basic Topics in noSQL	ILO1, ILO2, ILO3, and 4	C&M Chapter 14 and additional readings		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
10	Contemporary Query Language: Advanced Topics in noSQL	ILO5	C&M Chapter 14 and additional readings		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)
11	Contemporary Query Language: Advanced Topics in noSQL	ILO5	C&M Chapter 14 and additional readings		Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
12	Conceptual Discussion: Non-Relational Databases ; HBase and Hadoop Expert Topics in noSQL: Next-Gen Data Modeling ; Expert Topics in noSQL	ILO1, ILO2, ILO3, and 5	C&M Chapter 14 and additional readings	Online	Before the session Complete pre-session videos During the session Complete a check-in quiz (to be held during sessions) (Q: 2%) Attempt and discuss in-class exercises (CE: 1%, CP:1%)
13	Advanced Topics in noSQL ; Strategy Data Management – Case Discussions	ILO1, ILO2, ILO3, and 4			During the session Discuss and present data management cases; post-class submission (CE: 6%, CP:5%)
14	Project Consultation (details to be advised)				Group Project submission due: Nov-23 2024, 2359.

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Pre-session videos	The slide deck and other course materials relevant for a week will be published on NTULearn one week prior to the session. Prior to each weekly session, you are expected to complete a short video that provides an introduction to the week's topic and complete an online quiz. This will permit flexibility of access to learning materials and assessments and can help you develop independent learning and critical thinking skills. .
Interactive discussion and activities	Through interactive discussions and activities, you will get to exercise your acquired knowledge in solving database-related problems. Additionally, you will get to practice your oral communication in presenting your solutions and engaging in interactive discussions. We will also conduct an in-depth discussion on the week's content.
Group Project	This will provide the opportunity for you to learn from one another and to become active participants in others' learning. The project requires careful collaboration among members to develop a working database solution for a real-life business data problem. The group setting will help you develop skills valued by employers, such as problem-solving and decision-making, planning and execution, oral communication and written communication, as well as teamwork and interpersonal skills. Details will be announced in the group project document later.

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): Class Participation(Class Participation)	ILO1, ILO2, ILO3	Acquisition of Knowledge, Critical Thinking & Creative Thinking, Problem Solving & Decision Making, Oral Communication & Written Communication_x000D_	20	Individual	Holistic	Multistructural
2	Continuous Assessment (CA): Test/Quiz(Quizzes)	ILO1, ILO2, ILO3	Acquisition of Knowledge, Critical Thinking & Creative Thinking, Problem Solving & Decision Making	20	Individual	Holistic	Multistructural
3	Continuous Assessment (CA): Others(Class Exercises)	ILO1, ILO2, ILO3	Acquisition of Knowledge, Critical Thinking & Creative Thinking, Problem Solving & Decision Making	20	Individual	Holistic	Multistructural
4	Continuous Assessment (CA): Assignment(Individual Assignment)	ILO1, ILO3, ILO4,ILO5	Problem Solving & Decision Making, Planning & Execution	10	Individual	Holistic	Multistructural
5	Continuous Assessment (CA): Project(Group Project (database implementation, written report, and presentation))	ILO1, ILO3, ILO4, ILO5	Problem Solving & Decision Making, Planning & Execution, Oral Communication & Written Communication, Teamwork & Interpersonal Skills	30	Team	Holistic	Multistructural

Description of Assessment Components (if applicable)

Note 1: All members are expected to present as part of the assessment of the group project.

Note 2: Details on the individual assignment will be made available at a later date.

Note 3: The group project consists of three key deliverables, namely (i) one instance of database implementation, (ii) a project report, and (iii) a recorded presentation. The specific breakdown of marks allocation is as follows:
(i)An instance of database implementations: 15% (7.5% team-based evaluation, 7.5% individual-based evaluation)

(ii)The project report: 5% (team-based evaluation: 2.5%, individual-based evaluation: 2.5%)
(iii)The presentation: 10% (team-based evaluation: 5%, individual-based evaluation: 5%)
Since the deliverables are evaluated on both the team-basis and individual-basis, it is essential that the team provide a clear report on task-responsibility. For details, please consult the group project document.

Note 4: Peer evaluation is mandatory for the group project. Specifically, two peer evaluations will be conducted (i.e., during the recess week and after project submission deadline). The first peer evaluation will be conducted during the recess week and the second will be conducted in the last teaching week of the

Formative Feedback

I will employ several strategies to provide constructive and timely feedback to you. For class exercises, upon the completion of each, I will perform immediate assessment and provide verbal feedback. On a weekly basis, I will provide a summary of observations and suggested solutions to class exercises.For the group project, I will provide both feedback at the intermediate period and at project completion. Intermediate feedback will be provided through project consultation sessions, whereby your group will be provided with consultation sessions and email responses.

NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Digital Fluency	Intermediate
Information Literacy	Advanced
Critical Thinking	Advanced
Design Thinking	Intermediate
Systems Thinking	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 pre-session videos, pre-class readings and activities, attend all sessions punctually and take all scheduled assignments and quizzes by due dates. You are expected to take responsibility to follow up with course notes, assignments and course related announcements for discussions and activities that you have missed. You are expected to participate in all discussions and activities.

Policy (Absenteeism)

Absence from online discussion and activitieswithout 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.If you miss a session, you must inform the course instructor via email prior to the start of the class.

Policy (Others, if applicable)

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 websitefor more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

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Last Updated By: Rohit Bhatnagar (Dr)