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 Semester 2
Course Author * Faculty proposing/revising the course	Nguwi Yok Yen
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Course Title	Decision Making with Programming and Data Analytics
Course Code	AB0403
Academic Units	3
Contact Hours	26
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 is an introductory course designed for business or accountancy undergraduate student who has no programming background and is interested to learn how to manage data and conduct business analytics programmatically. It is oriented to enhance your technical skillset. The aim of this course is to provide a broad understanding on how to manage data, the process of preparing data for analysis, basic of analytics, and the means to communicate analytics outcome. This course will equip you with the ability to write customized solutions to inform business decision, integrate statistical libraries for data analysis, and construct visuals or reports for business understanding. This module will provide you with individual hands-on practices to hone your coding skillset and opportunity to develop coding solution in a team. We utilize Python language as the medium of learning because it is one of the most in-demand coding language and its user-friendly syntax is well suited for beginner level. You will utilize modern development tools to turn information into insights.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Interpret different elements of programming components like programming syntax, control structures, data types and design methods.
ILO 2	Write codes that allow you to solve simple business problem programmatically.
ILO 3	Derive analytics outcome from managing data.
ILO 4	Present data graphically that aid and support decision with appropriate statistical and graphing modules or use visualization software.

Course Content

1.Programming Basic 2.Operators in Python 3.Control in Python 4.Using Functions and Defining Functions 5.Data types: String, List, Tuple, Dictionary 6.File Input and Output 7.Structured Query Language (SQL) 8.Data Preparation 9.Descriptive Analysis 10.Data Visualization 11.Web Scraping

Reading and References (if applicable)

You may refer to any resources that aids your understanding, some suggested references are listed below. Recommended Online Reference: (PT) Python 3 Tutorial: https://docs.python.org/3/tutorial/(SQ) SQLite Library: https://www.sqlite.org/index.html(PL) Pandas Library: https://pandas.pydata.org/(MP) MatplotlibLibrary: https://matplotlib.org/ Textbooks: (WP) William F. Punch, The Practice of Computing Using Python, 3rd Edition, 2017, Pearson, ISBN 978-1-2921-6668-1. (ML) Mark Lutz, Learning Python, 5th Edition, 2013, O'Reilly Media, ISBN 978-1-4493-5573-9. (WW) William Wesley McKinney, Python for Data Analysis, 2nd edition, 2017, O'Reilly Media, ISBN 978-1-4919-5766-0.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Introduction & Programming Basic: 1. Programming environment 2. Programming syntax 3. Variables 4. Basic data types		Installation guide; WP Chp 1; ML Chp 2, 3	In-person	
2	Operators in Python and Debugging: 1. Mathematical operators 2. Comparison operators 3. Logical operators		WP Chp 1, 2	In-person	
3	Control: 1. Decision 2. Iterations		WP Chp 2, 5 ML Chp 12, 13, 16	In-person	
4	Function: 1. Using functions 2. Defining functions		WP Chp 2, 5 ML Chp 12, 13, 16	In-person	
5	Data Types: 1. String 2. List 3. Tuple 4. Dictionary		WP Chp 7 ML Chp 7, 8	In-person	
6	File Input and Output: 1. File reading and writing 2. Processing text/CSV files		WP Chp 7, 9 ML Chp 14	In-person	

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
7	Structured Query Language (SQL): 1. SQL basic 2. Data Manipulation Language		SQL Documentation	In-person	
8	Data Preparation: 1. Dataframe 2. Data cleaning		WW Chp 4, 5, 7 PL Documentation	In-person	
9	Descriptive Analysis: 1. Data wrangling 2. Descriptive analysis		WW Chp 4, 5, 7 PL Documentation	In-person	
10	Data Visualization: 1. Plotting in Python 2. matplotlib		MP Documentation	In-person	
11	Project Consultation			In-person	
12	Presentation Week			In-person	
13	Web Scraping (eLearning)			Online	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
LAMS Lesson & Seminar Discussion	Lesson content will be pre-recorded and students are expected to complete the relevant content before each seminar. Seminar discussions allow opportunities to clarify content, concepts and demonstrate the analytical tools to the students as well as to hear about their intuition, experience and difficulties pertaining to the content. It also offers the opportunity to assess their ability to think critically and articulate clearly.
Coding Demonstration	This allows instructor to demonstrate programming codes and guide students through the steps of solving business analytics problem.
In-class Activities and Exercises	This would allow the students to get their hands dirty and solve simple to challenging problems and apply the programming and data modelling knowledgecovered in the course.

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)	1,2,3,4	Oral Comm, Critical Thinking	15	Individual	Holistic	Multistructural
2	Continuous Assessment (CA): Test/Quiz(LAMS Attempts (OnlineMCQ & Short Answers))	1,2,3,4	Acquisition of knowledge, problem solving & decision-making	10	Individual	Holistic	Multistructural
3	Summative Assessment (EXAM): Final exam(Online Final Exam conducted via NTULearn)	1,2,3,4	Acquisition of knowledge, problem solving & decision-making	45	Individual	Holistic	Multistructural
4	Continuous Assessment (CA): Presentation(Presentation)	1, 2, 3, 4	Oral Comm, Critical Thinking	15	Individual	Holistic	Multistructural
5	Continuous Assessment (CA): Project(Group Project)	3, 4	Teamwork and Interpersonal Skill, PSDM	15	Team	Analytic	Multistructural

Description of Assessment Components (if applicable)

NA

Formative Feedback

Feedback will be provided during the class discussions. For practical assessment, the instructor will grade the submissions, discuss common mistakes and weaknesses. For the group project, graders will provide qualitative feedback for individual groups to point out what have been done right and what could have been done better.

NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Decision Making	Intermediate
Digital Fluency	Basic
Problem Solving	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-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 they have missed. You are expected to participate in all seminar discussions and activities. You are to attend lesson puctually.

Policy (Absenteeism)

Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate.If you miss aseminar, you must inform the course instructor via email prior to the start of the class.

Similarly for absence from assessment. Absence from assessment must be supported by valid approved reason. Valid approved reasons include unwell for the test or obtained approved Leave of Absence from schoolprior to the test. For the case of unwell for the test, only Singapore's issued medical certificatecan be accepted. Make up test will be arrangedfor valid approved reason. Absence from make up test will receive zero mark.

Policy (Others, if applicable)

NA

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