# Course Syllabus

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| **1. Course Number** | 5602201 |
| **2. Course Credit** | 3 Credits |
| **3. Course Title** | Data Structures (+Big Data and Database Programming) |
| **4. Faculty / Department** | Chulalongkorn School of Integrated Innovation, Chulalongkorn University |
| **5. Semester** | First Semester |
| **6. Academic Year** | 2024 |
| **7. Instructor / Academic Staff** | Marko Niinimaki |
| **8. Condition** | None |
| **9. Status** | Required |
| **10. Curriculum** | Bachelor of Arts and Science in Integrated Innovation (International Program) |
| **11. Degree** | Undergraduate, 2nd Year |
| **12. Hours / Week** | 3 Hours |

**13. Course Description**

Processing data with Python, Data Structures, SQL, Interfacing SQL databases with Python, Big Data, Text and multimedia databases, noSQL, noSQL with Python.

**14. Course Outline**

**15. 14.1 Learning Objectives / Behavioral Objectives**

By the end of this course, students should be able to do the following:

- Understand the role of data structures in databases.
- Retrieve and display data using Python (text, csv, JSON, database using SQL).
- Understand the relational model and use of the SQL query language.
- Implement database interfaces with Python.

- Understand the most important Big Data concept.
- Use noSQL databases.

**14.2 Learning Contents**

**Class Day and Time: Mondays, 1pm - 3:45 pm except where otherwise indicated below.**

| Session | Date | Content | Instructor |
|---|---|---|---|
| 1 | 5 Aug | Course overview, Python review. | |
| 2 | TBA | [Aug 12 is a national holiday]<br>Accessing data with Python | |
| 3 | 19 Aug | Different flavours of databases | |
| 4 | 26 Aug | The relational model | |
| 5 | 02 Sep | SQL queries | |
| 6 | 09 Sep | Building a database, the Python database interface. | |
| 7 | 16 Sep | Summary | |
| **Midterm week: 23-27 Sep** | | | |
| 8 | 30 Sep | Hash coding, lists and blockchains | |
| 9 | 7 Oct | Big Data concepts | |
| 10 | TBA | JSON in data storage and programming. | |

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|---|---|---|---|
| 11 | 21 Oct | MongoDB as an example of a noSQL database | |
| 12 | 28 Oct | MongoDB and Python | |
| 13 | 04 Nov | Cloud databases | |
| 14 | 11 Nov | Working with Data | |
| 15 | 18 Nov | Summary | |
| **Final exams: 25 Nov – 09 Dec** | | | |

**16. 14.3 Method**

❒ Lecture and discussion 70 %

❒ Lab/Project Work 30 %

**14.4 Media**

❒ PowerPoint media

❒ Electronics and website media

**14.5 Assignment through Network System**

14.5.1 Assigning and Submitting Method: Online (mycourseville)

14.5.2 Learning Management System: Online (mycourseville)

**14.6 Evaluation**

Weekly Assignments (20%), Mid-Term Examination (35%), Final Examination (35%), Attendance (10%).

Attendance is compulsory and attendance information is collected at the beginning of each class. For absences, a valid, documented reason is required.

**14.7 Class Rules and Etiquette**

Students must not arrive later than 15 minutes after the class started. Students who fail to arrive in time will not receive attendance points for the lecture.

**14.8 Rules and Regulations for AI Usage**

When you use AI in information gathering, ensure information usage is from credible and reliable sources.

AI tools can be used for grammar checking, proofreading and editing drafts, but review suggestions critically and make your own final edits.

For outline structures for papers and projects, ensure the final works reflect your thought, Al should be used just for the starting point.

In using AI for assignment completion, only submit the work that represents your own understanding and effort. If you submit assignment answers generated by an AI, the instructor will grade them using an AI.

AI tools can not be used in the exam, unless explicitly allowed by the instructor, it should be your own work.

Avoid copying AI generated content directly into your assignment without proper attribution.

Examples of Attribution:

If AI is used for editing: "This document was proofread with the assistance of [AI Tool Name]."

If AI is used for idea generation: "Initial ideas for this project were generated with the help of [AI Tool Name]."

If AI is used to assist in assignments: "The following prompt was used with [AI tool name]."

**15. Reading List**

Material provided during the course by the course management system.

**16. Teacher Evaluation**

16.1 Evaluation through CUCAS system

16.2 Changes made in accordance with previous teaching evaluation

| Instructor | Contact Number | Email |
|---|---|---|
| Marko Niinimaki | 0 925 700 131 | marko.n@chula.ac.th |