# Tamkang University Academic Year 112, 1st Semester Course Syllabus

| Course Title | PRACTICAL DATA SCIENCE ON PYTHON | Instructor | HO THI TRANG |
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| Course Class | TEIBM1A<br>MASTER'S PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING (ENGLISH-TAUGHT PROGRAM), 1A | Details | ◆ Blended Course<br>◆ Selective<br>◆ One Semester<br>◆ 3 Credits |
| Relevance to SDGs | SDG5  Gender equality<br><br>SDG9  Industry, Innovation, and Infrastructure<br><br>SDG16 Peace, justice and strong institutions<br><br>SDG17 Partnerships for the goals | | |

## Departmental Aim of Education

Ⅰ. Cultivate the ability to conduct independent research and problem solving.

Ⅱ. Strengthen creativity and research capacity.

Ⅲ. Build profound professional knowledge in computer science and information engineering.

Ⅳ. Engage in self-directed lifelong learning.

## Subject Departmental core competences

A. Independent problem solving ability.(ratio:20.00)

B. Independent innovative thinking ability.(ratio:20.00)

C. Research paper writing and presentation ability.(ratio:10.00)

D. Research & development (R&D) ability in information engineering.(ratio:20.00)

E. Project execution and control ability.(ratio:20.00)

F. Lifelong self-directed learning ability.(ratio:10.00)

## Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:20.00)

3. A vision for the future. (ratio:10.00)

4. Moral integrity. (ratio:10.00)

5. Independent thinking. (ratio:10.00)

6. A cheerful attitude and healthy lifestyle. (ratio:10.00)

7. A spirit of teamwork and dedication. (ratio:20.00)

8. A sense of aesthetic appreciation. (ratio:10.00)

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| Course Introduction | The course will introduce practice of data science using the popular python pandas data science library and introduce the abstraction of the Series and DataFrame as the central data structures for data analysis, along with tutorials on the process of a typical data science project, including: defining project goals, collecting, preparing, managing and visualizing data, building models, evaluating the models and results. |

**The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.**

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

 I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of
         the course's veracity, conception, procedures, outcomes, etc.
II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal,
         morals, attitude, conviction, values, etc.
III.Psychomotor: Emphasis upon the study of the course's physical activity and technical
         manipulation.

| No. | Teaching Objectives | objective methods |
|---|---|---|
| 1 | Data Manipulation and Cleaning Techniques using the Popular Python Pandas Data Science Library | Cognitive |
| 2 | Explore Different Approaches for Creating Predictive Models on Data using Machine Learning | Cognitive |
| 3 | Text Mining and Text Manipulation Basics | Cognitive |

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

| No. | Core Competences | Essential Virtues | Teaching Methods | Assessment |
|---|---|---|---|---|
| 1 | ABE | 1234578 | Lecture, Discussion, Practicum | Testing, Study Assignments, Discussion(including classroom and online) |
| 2 | ABCDEF | 1245678 | Lecture, Discussion, Practicum | Testing, Study Assignments, Discussion(including classroom and online) |
| 3 | ADEF | 12456 | Lecture, Publication, Practicum | Testing, Study Assignments, Discussion(including classroom and online) |
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# Course Schedule

<span style="color:red">Note for Blended Course : When utilizing weekly digital instruction, please fill in "Online Asynchronous Instruction".</span>

| Week | Date | Course Contents | Note |
|---|---|---|---|
| 1 | 112/09/11 ~ 112/09/17 | Course Introduction, Introduction to Data Science | |
| 2 | 112/09/18 ~ 112/09/24 | Fundamentals of Data Manipulation with Python(1) (Online Asynchronous Instruction) | Online Asynchronous Instruction |
| 3 | 112/09/25 ~ 112/10/01 | Fundamentals of Data Manipulation with Python(2) | |
| 4 | 112/10/02 ~ 112/10/08 | Basic Data Processing with Pandas | |
| 5 | 112/10/09 ~ 112/10/15 | Basic Charting | |
| 6 | 112/10/16 ~ 112/10/22 | Charting Fundamentals, Applied Visualizations (1) | |
| 7 | 112/10/23 ~ 112/10/29 | Charting Fundamentals, Applied Visualizations (2) | |
| 8 | 112/10/30 ~ 112/11/05 | Fundamentals of Machine Learning, Introduce to Scikit Learn (1) (Online Asynchronous Instruction) | Online Asynchronous Instruction |
| 9 | 112/11/06 ~ 112/11/12 | Fundamentals of Machine Learning, Introduce to Scikit Learn(2) | |
| 10 | 112/11/13 ~ 112/11/19 | Midterm exam week | |
| 11 | 112/11/20 ~ 112/11/26 | Supervised Machine Learning (1) | |
| 12 | 112/11/27 ~ 112/12/03 | Supervised Machine Learning (2) | |
| 13 | 112/12/04 ~ 112/12/10 | Supervised Machine Learning (3) | |
| 14 | 112/12/11 ~ 112/12/17 | Evaluation(1) (Online Asynchronous Instruction) | Online Asynchronous Instruction |
| 15 | 112/12/18 ~ 112/12/24 | Evaluation(2) | |
| 16 | 112/12/25 ~ 112/12/31 | Final Presentation | |
| 17 | 113/01/01 ~ 113/01/07 | Final Presentation | |
| 18 | 113/01/08 ~ 113/01/14 | Final exam week | |
| Key capabilities | | | |
| Interdisciplinary | | | |

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| Distinctive teaching | |
| Course Content | Computer programming or Computer language (students have hands-on experience in related projects)<br>AI application |
| Requirement | |
| Textbooks and Teaching Materials | Self-made teaching materials:Textbooks<br>Using teaching materials from other writers:Textbooks<br>Name of teaching materials:<br>Wes McKinney, "Python for Data Analysis.", ISBN: 978-1-449-31979-3, O'REILLY. |
| References | |
| Grading Policy | ◆ Attendance： 10.0 % ◆ Mark of Usual： % ◆ Midterm Exam： 30.0 %<br>◆ Final Exam： 40.0 %<br>◆ Other〈Assignmen〉：20.0 % |
| Note | 1. This syllabus may be uploaded at the website of the Course Syllabus Management System at https://info.ais.tku.edu.tw/csp or through the link of the Course Syllabus Upload posted on the home page of the TKU Office of Academic Affairs http://www.acad.tku.edu.tw/CS/main.php<br><br>2. According to the Implementation regulations of distance education for junior college and above are prescribed pursuant to Article 2, "The distance learning course referred to in these Measures refers to more than one-half of the teaching hours in each subject."<br><br>3. According to the regulations of Tamkang University Enforcement Rules for digital teaching, Paragraph 2 and Article 3, the distance learning course of our school must be "The course of digital teaching with distance learning platform or synchronous video system in our school. Teaching Hours include course lectures, teacher-student interaction discussions, quizzes and other learning activities."<br><br>4. If there are any temporary course changes (including time changes and classroom changes of distance learning courses, blended courses), please make out an application according to regulations to the Office of Academic Affairs.<br><br>※ **Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.** |