**Subject Description Form**

|  |  |
| --- | --- |
| **Subject Code** | ISE1002 |
| **Subject Title** | Basic Artificial Intelligence and Data Analytics: From Data to Decisions |
| **Credit Value** | 2 |
| **Level** | 1 |
| **Pre-requisite/****Co-requisite/Exclusion** | Nil |
| **Objectives** | This subject provides students with1. the basic concepts and knowledge of artificial intelligence and data analytics (AIDA);2. the appreciation of AIDA applications in making smart decisions from data; and3. the basic knowledge and skills to develop simple AIDA tools to improve decision making. |
| **Intended Learning Outcomes** | Upon completion of the subject, students will be able to a. demonstrate an understanding of the foundational concepts of AIDA;b. acquire basic skills in using AIDA technologies and applications;c. articulate examples of how the adoption of AIDA could enhance their chosen disciplines; andd. demonstrate an awareness of global contemporary ethical issues and impact from AIDA applications in daily life.  |
| **Subject Synopsis/ Indicative Syllabus** | 1. Introduction to Data Literacy Fundamentals and Decision Making

Data Information Knowledge Wisdom (DIKW) Pyramid, Systems of thinking, Domains of application, Types of data scales, Forms of data analysis, Ways of displaying data, Groups of data activities; Decision making process and skills.1. Introduction to Data Analytics

Concept of Data Analytics; Knowledge mining process; Descriptive analytics; Diagnostic analytics; Predictive analytics; Prescriptive analytics; Data analytics for decision making. 1. Introduction to Artificial Intelligence

Concept of artificial intelligence; Machine learning; Learning process; Supervised learning, Unsupervised learning; Reinforcement learning; Daily life applications of artificial intelligence. 1. Applications of Artificial Intelligence and Data Analytics to Improve Decision Making

Data analytics for prediction; Computational tools for data analytics. Creation of machine learning models; Image recognition; Generative design, and Motion detection applications; Smart decision making. |
| **Teaching/Learning Methodology**  | The teaching pedagogy of this subject takes a blended learning approach. It consists of the e-leaning module, classroom teaching, tutorials, and experiential learning activities, such as formal lectures, and laboratory sessions. Emphasis is put on the acquisition of required skills and knowledge in AIDA in daily life. The lectures provide the basics and theories while the laboratory activities cover the skills following an interest-based approach. Applying the flipped classroom approach, students are required to prepare for the laboratory exercises in advance. |
| **Assessment Methods in Alignment with Intended Learning Outcomes** |

|  |  |  |
| --- | --- | --- |
| Specific assessment methods/tasks  | % weighting | Intended subject learning outcomes to be assessed |
| a | b | c | d |
| Assignment  | 10% | ✓ |  |  | ✓ |
| Laboratory Exercises | 60% |  | ✓ | ✓ |  |
| Quizzes | 30% | ✓ | ✓ |  | ✓ |
| Total  | 100% |  |  |  |  |

Assignment and quizzes are used to assess students’ understanding on the concepts, technologies, and applications of AIDA. The laboratories are used to assess their ability on developing applications based on AIDA.  |
| **Student Study Effort Expected** | Class contact: |  |
| * Lecture 2 hours/week for 4 weeks
 | 8 Hrs. |
| * Laboratory 2 hours/week for 6 weeks
 | 12 Hrs. |
| * Tutorial 2 hours/week for 3 weeks
 | 6 Hrs. |
| Other student study effort: |  |
| * E-learning Module and Preparation for Laboratory Exercises
 | 38 Hrs. |
| * Preparation for Assignments and Quizzes
 | 16 Hrs. |
| Total student study effort  | 80 Hrs. |
| **Reading List and References** | 1. Lior Rokach, Oded Maimon, Data Mining with Decision Trees: Theory and Applications, Singapore: World Scientific, 2015 second edition.
2. Jay Liebowitz, Data Analytics and AI, Boca Raton, FL: CRC Press, 2021.
3. Tom Taulli, Artificial Intelligence Basics: A Non-technical Introduction, Findaway World, 2021.
4. Ameet V Joshi, Machine Learning and Artificial Intelligence, Cham: Springer, 2020.
5. Frances J. Roberts, Decision Support Systems: Types, Advantages and Disadvantages, New York: Nova Science Publishers, 2021.
 |