



FACULTY OF APPLIED SCIENCES
BACHELOR OF SCIENCE IN COMPUTING
LEARNING MODULE OUTLINE

| | | | |
|-----------------------|---------------------------|---------------|-----------------------|
| Academic Year | 2023/2024 | Semester | 1 |
| Module Code | COMP211 | | |
| Learning Module | Database Design | | |
| Pre-requisite(s) | Nil | | |
| Medium of Instruction | English | | |
| Credits | 3 | Contact Hours | 45 hrs |
| Instructor | Calana Chan | Email | calanachan@mpu.edu.mo |
| Office | Rm.511, Meng Tak Building | Office Phone | 8599 3277 |

MODULE DESCRIPTION

This module provides students with an understanding of the principles of relational database design and the ability to apply these principles in the design and development of database projects. Principles of good design and modelling, structure queries using SQL will be the focus. For demonstration purpose, examples will be illustrated using MS Access.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

On completion of this learning module, students will be able to:

| | |
|-----|---|
| M1. | Explain basic database concepts and terminology; (EA1p) |
| M2. | Produce data models, schemas and instances; (EA1p, EA4p) |
| M3. | Design, model and implement relational databases; (D2p, D5p) |
| M4. | Produce well-structured database using functional dependencies and normalization; (D5p) |
| M5. | Apply the structured query language for database manipulation; (EP2p) |
| M6. | Work in different roles within a team. (EP9p) |

These ILOs aims to enable students to attain the following Programme Intended Learning Outcomes (PILOs):

| PILOs | M1 | M2 | M3 | M4 | M5 | M6 |
|---|----|----|----|----|----|----|
| P1. Select and apply proven methods, tools and techniques to the effective and efficient implementation of information systems; | | | | ✓ | ✓ | |



| | | | | | | | |
|------|--|---|---|---|---|---|---|
| P2. | Evaluate computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks; | | | | | | |
| P3. | Be competent in system development in the Internet and the web platform; | | | | | | |
| P4. | Work independently to design and implement a relational database, with an emphasis on how to organise, maintain and retrieve information from a DBMS; | ✓ | ✓ | ✓ | ✓ | ✓ | |
| P5. | Acquire essential knowledge in specific fields of computing disciplines including multimedia, security and artificial intelligence; | | | | | | |
| P6. | Acquire the perceptive skills needed to understand information presented in the form of UML diagram, flow chart or other industry standard formats; | | | ✓ | | | |
| P7. | Understand the need for and use of the necessary mathematical techniques; | | | | | | |
| P8. | Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks; | | | | | | |
| P9. | Work as an effective member of a team in the analysis, design and development of software systems; | | | | | | ✓ |
| P10. | Use project planning and management techniques in systems development; | | | | | | |
| P11. | Understand the fundamental and operational issues of computer systems in business environments; | | | | | | |
| P12. | Equip with adequate written, oral communication and interpersonal skills; | | | | | | |
| P13. | Build the capacity and desire for lifelong learning and to learn advanced and emerging technologies on one's own; | | | | | | |
| P14. | (For Enterprise Information Systems specialisation) Gain an in-depth understanding of the information technology related to enterprise information systems, with an emphasis on development of such systems to support business processes; | | | | | | |
| P15. | (For Gaming Technology specialisation) Acquire the general and advanced knowledge of current technologies and operating environment in the gaming industry; | | | | | | |
| P16. | (For Computer Education specialization) Acquire the general and practical knowledge of computer education and its practicing environment in secondary education. | | | | | | |

MODULE SCHEDULE, COVERAGE AND STUDY LOAD

| Week | Content Coverage | Contact Hours |
|------|--|---------------|
| 1 | 1. Introduction to Databases | 3 |
| | 1.1 Three-Level ANSI-SPARC Architecture | |
| | 1.2 External/conceptual and conceptual/internal mappings | |



| | | |
|-------|--|-----|
| | 1.3 Logical and physical data independence | |
| 2-3 | 2. Relational Model | 4.5 |
| | 2.1 Terminology | |
| | 2.2 Entity integrity and referential integrity | |
| 3 | 3. Database Development Lifecycle | 1.5 |
| | 3.1 Major stages of the database system development lifecycle | |
| | 3.2 Main phases of database design | |
| 4-6 | 4. Entity-relationship modeling | 7.5 |
| | 4.1 Basic concepts associated with ER model in database design | |
| | 4.2 Diagrammatic technique for displaying ER model using Unified Modeling Language (UML) | |
| | 4.3 Enhanced ER modeling | |
| 6-8 | 5. Normalization | 6 |
| | 5.1 Purpose of normalization | |
| | 5.2 Data redundancy and update anomalies | |
| | 5.3 Functional dependencies | |
| | 5.4 Process of normalization | |
| 8-10 | 6. Conceptual, Logical and Physical database design for the relational model | 7.5 |
| 11 | 7. Microsoft ACCESS tutorial | 3 |
| 12-14 | 8. SQL: Data manipulation | 9 |
| | 8.1 Purpose of SQL statements | |
| | 8.2 Using SELECT statement | |
| | 8.3 Using INSERT, UPDATE, and DELETE statements | |
| 15 | 9. Data Modelling Trends [optional] | 3 |

TEACHING AND LEARNING ACTIVITIES

In this learning module, students will work towards attaining the ILOs through the following teaching and learning activities:

| Teaching and Learning Activities | M1 | M2 | M3 | M4 | M5 | M6 |
|----------------------------------|----|----|----|----|----|----|
| T1. Lectures | ✓ | ✓ | ✓ | ✓ | ✓ | |
| T2. In-class exercises | | ✓ | | ✓ | ✓ | |



ATTENDANCE

Attendance requirements are governed by the Academic Regulations Governing Bachelor's Degree Programmes of the Macao Polytechnic University. Students who do not meet the attendance requirements for the learning module shall be awarded an 'F' grade.

ASSESSMENT

In this learning module, students are required to complete the following assessment activities:

| Assessment Activities | Weighting (%) | AHEP3 LOs | ILOs to be Assessed |
|----------------------------|---------------|----------------------------|---------------------|
| A1. Project and Assignment | 20% | D2p, D5p, EA1p, EP2p, EP9p | M2, M3, M4, M5, M6 |
| A2. In-class exercises | 10% | EA1p, EA4p | M2, M4, M5 |
| A3. Test | 25% | EA1p, EA4p | M1, M2, M4, M5 |
| A4. Examination | 45% | EA1p, EA4p, EP2p | M1, M2, M4, M5 |

The assessment will be conducted following the University's Assessment Strategy (see www.mpu.edu.mo/teaching_learning/en/assessment_strategy.php). Passing this learning module indicates that students will have attained the ILOs of this learning module and thus acquired its credits.

Students with an overall score of less than 35 in the coursework must take the re-sit examination even if the overall score for the module is 50 or above.

Students with a score of less than 35 in the final examination must take the re-sit examination even if the overall score for the module is 50 or above.

Students with an overall final grade of less than 35 are NOT allowed to take the re-sit examination.

REQUIRED READINGS

1. Connolly, T., & Begg, C. (2015). *DATABASE SYSTEMS: A Practical Approach to Design, Implementation and Management* (6th ed.). Pearson.

REFERENCES

1. Michael J. Hernandez (2020). *Database Design for Mere Mortals: A Hands-On Guide to Relational Database Design* (4th ed.). Addison-Wesley Professional

STUDENT FEEDBACK

At the end of every semester, students are invited to provide feedback on the learning module and the teaching arrangement through questionnaires. Your feedback is valuable for instructors to enhance the module and its delivery for future students. The instructor and programme coordinators will consider all feedback and respond with actions formally in the annual programme review.



澳門理工大學
Universidade Politécnica de Macau
Macao Polytechnic University

ACADEMIC INTEGRITY

The Macao Polytechnic University requires students to have full commitment to academic integrity when engaging in research and academic activities. Violations of academic integrity, which include but are not limited to plagiarism, collusion, fabrication or falsification, repeated use of assignments and cheating in examinations, are considered as serious academic offenses and may lead to disciplinary actions. Students should read the relevant regulations and guidelines in the Student Handbook which is distributed upon the admission into the University, a copy of which can also be found at www.mpu.edu.mo/student_handbook/.