



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

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|-----------------------|--|---------------|--------------------|
| Academic Year | 2023/2024 | Semester | 1 |
| Module Code | COMP1121 | | |
| Learning Module | Introduction to Computer Science and its Application | | |
| Pre-requisite(s) | Nil | | |
| Medium of Instruction | English | | |
| Credits | 3 | Contact Hours | 45 hrs |
| Instructor | Phillip Cheong | Email | ncheong@mpu.edu.mo |
| Office | Room M520, Meng Tak Building | Office Phone | 8599-3333 |

MODULE DESCRIPTION

This module will introduce: 1) fundamental electronic data processing concepts and associated terminologies; 2) the development of computers and computer applications; 3) network security, malware, security software and the use of encryption and decryption for secure data communication; 4) programming languages; and 5) concepts of algorithms, data structures, resource management. Furthermore, computer science related fields such as AI and its applications will be introduced and discussed.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

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| M1. | Explain the concepts and associated terminologies of fundamental electronic data processing; (C1) |
| M2. | Identify the development of computers and the impact of computers on society; (C1, C7) |
| M3. | Explain the hardware configuration of a computer; (C1) |
| M4. | Apply some popular computer applications, like word processor, spreadsheet, and presentation software, in their projects; (C1, C2, C16) |
| M5. | Identify the professional ethical issues in computing, including responsibilities and benefits of equality, diversity and inclusion; (C1, C8, C11, C15) |
| M6. | Achieve an understanding of how to develop a career in the information technology field. (C18) |



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 on common platforms, including the Internet platform; | ✓ | | | | | |
| P2. Acquire essential knowledge in specific fields of artificial intelligence, including machine learning, computer vision and natural language processing; | | ✓ | | | | |
| P3. Apply necessary mathematical techniques to model, analyse and devise solutions to complex problems; | | | ✓ | | | |
| P4. Work independently to develop an understanding of, and the knowledge and skills associated with the general support and mitigation of security risks of computer systems and networks; | | | | ✓ | | |
| P5. Design and implement both relational and non-relational data stores, with an emphasis on how to organise, maintain, retrieve and analyse information; | | | ✓ | | | |
| P6. Distinguish the fundamental and operational issues of computer systems and artificial intelligence applications, with considerations of user, business, ethical, societal and environmental needs; | | ✓ | | | | |
| P7. Evaluate, prepare and communicate effectively on technical information to both technical and non-technical audience; | | ✓ | | | | |
| P8. Work as an effective member of a team in the analysis, design and development of software systems, with recognition of requirement to support equality, diversity and inclusion; | | | | ✓ | | |
| P9. Use project planning, risk management and quality management techniques in solutions to complex problems; | | | | | ✓ | ✓ |
| P10. Build the capacity and desire for lifelong learning and to learn advanced and emerging technologies on one's own. | | | | | | ✓ |

MODULE SCHEDULE, COVERAGE AND STUDY LOAD

| Week | Content Coverage | Contact Hours |
|------|---|---------------|
| 1 | 1. Introducing Today's Technologies: Computers, Devices, and The Web | 3 |
| | 1.1 Today's Technology | |
| | 1.2 Computers, Mobile and Game Device | |
| | 1.3 Data and Information | |
| 2 | 2. Connecting and Communicating Online: The Internet, Websites, and Media | 3 |
| | 2.1 The Internet | |
| | 2.2 The World Wide Web | |
| | 2.3 Other Internet Services | |



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| 3 | 3. Computers and Mobile Devices: Evaluating Options for Home and Work | 3 |
| | 3.1 Mobile Computers and Desktops | |
| | 3.2 Cloud Computing | |
| | 3.3 Protecting Hardware | |
| | 3.4 Health Concerns of Using Technology | |
| 4-5 | 4. Programs and Apps: Productivity, Graphics, Security, and Other Tools | 4.5 |
| | 4.1 Productivity Applications | |
| | 4.2 Graphics and Media Applications | |
| | 4.3 Personal Interest Applications | |
| | 4.4 Communications Applications | |
| | 4.5 Utility Programs | |
| 5-6 | 5. Digital Security, Ethics, and Privacy: Threats, Issues, and Defences | 4.5 |
| | 5.1 Digital Security Risks | |
| | 5.2 Internet and Network Attacks | |
| | 5.3 Unauthorized Access and Use | |
| | 5.4 Software Theft, Information Theft, and Hardware Theft | |
| | 5.5 Ethics and Society | |
| | 5.6 Information Privacy | |
| 7 | 6. Input and Output: Extending Capabilities of Computers and Mobile Devices | 1.5 |
| | 6.1 Input Devices | |
| | 6.2 Output Devices | |
| | 6.3 Assistive Technology Input and Output | |
| 7-8 | 7. Communicating Digital Content: Wired and Wireless Networks and Devices | 3 |
| | 7.1 Communications | |
| | 7.2 Types of Networks | |
| | 7.3 Communications Software | |
| | 7.4 Network Communications Standards and Protocols | |
| | 7.5 Communications Devices and Transmission Media | |
| 8-9 | 8. Digital Storage: Preserving Content Locally and on the Cloud | 3 |



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| | 8.1 Hard Drives | |
| | 8.2 Portable Flash Memory Storage | |
| | 8.3 Cloud Storage and Enterprise Storage | |
| | 8.4 Other Types of Storage | |
| 9-10 | 9. Computing Components: Processors, Memory, the Cloud, and More | 3 |
| | 9.1 Inside the Case | |
| | 9.2 Processors, Cloud Computing, Memory, Adapters, Buses, and Power Supply | |
| | 9.3 Data Representation | |
| 10 | 10. Operating Systems: Managing, Coordinating, and Monitoring Resources | 1.5 |
| | 10.1 Operating Systems Functions | |
| | 10.2 Desktop Operating Systems, UNIX, Server Operating Systems | |
| | 10.3 Mobile Operating Systems | |
| 11-12 | 11. Computer Science and Applications: Programs, Algorithms, and Data Structures | 6 |
| | 11.1 Computer Science | |
| | 11.2 Data structures and Algorithms | |
| | 11.3 Application Development Languages and Tools | |
| | 11.4 Applications of Computer Science | |
| 13-14 | 12. Building Solutions: Database, System, and Application Development Tools | 6 |
| | 12.1 Databases, Data, and Information | |
| | 12.2 File Processing Systems and Databases | |
| | 12.3 Database Management Systems | |
| | 12.4 Big Data and Smart City | |
| | 12.5 System Development | |
| 15 | 13. Working in the Enterprise: Systems, Certifications, and Careers | 3 |
| | 13.1 The Technology Industry | |
| | 13.2 Information Systems in the Enterprise | |
| | 13.3 Technology Careers | |



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 |
|----------------------------------|----|----|----|----|
| T1. Lectures | ✓ | | | |
| T2. Case studies | | ✓ | ✓ | ✓ |
| T3. In-class practice | | ✓ | ✓ | ✓ |

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 (%) | AHEP4 LOs | ILOs to be Assessed |
|-----------------------|---------------|----------------------------|---------------------|
| Assignments | 10% | C1, C8, C11, C15, C16, C18 | M1 M2 M3 M4 |
| Test | 30% | C1, C2, C7, C8, C11, C15 | M1 M2 M3 |
| Project | 10% | C1, C16, C18 | M6 |
| Exam | 50% | C1, C2, C7, C8, C11, C15 | M1 M2 M3 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

Vermaat, Sebok, Freund, Campbell, and Frydenberg (2018). *Discovering Computers 2018 Digital Technology, Data, and Devices* (16th ed.). Cengage Technology. (e-book available)



REFERENCES

1. D. Morley, C. S. Parker. (2017). Understanding Computers: Today and Tomorrow, Comprehensive (16th ed.). Cengage Technology.
2. B. K. Williams, S. C. Sawyer. (2010). Using Information Technology: a practical introduction to computers & communications (8th ed.). McGraw-Hill.

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.

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/.