澳 門 理 工 學 院

**Instituto Politécnico de Macau**
**Macao Polytechnic Institute**

# Macao Polytechnic Institute
# School of Applied Sciences

## Master of Science in Big Data and Internet of Things

Programme Handbook

2019-2020

# WELCOME

Welcome to the Master of Science Degree in Big Data and Internet of Things (the Programme) of Macao Polytechnic Institute (MPI) and welcome back if you are a returning student.

Please kindly be reminded that the institute has the following expectations from our students.

- To pursue their academic studies in an honest, ethical and responsible manner.
- To actively participate in various learning opportunities provided by MPI.
- To provide fair and constructive feedback on relevant aspects of their School/Programme.
- To enhance tolerance in the pursuit of knowledge.
- To attain ethical standards in support of the values and mission of MPI.
- To be aware of and follow the policies, procedures and regulations of MPI.
- To seek and pursue their own learning experiences.
- To engage in opportunities for self-development after their studies in MPI.

This handbook aids in your understanding of the Programme. It depicts the Programme and explains the Institute's procedures and aspects of the regulations that affect you. Read it carefully and keep it as a source of reference throughout the years. If you lose or mislay it, then you can obtain a copy from your year tutor or the soft copy from the programme website cp.ipm.edu.mo.

If you have questions about anything that you read in the guide, please ask your year tutor. You will be expected to be familiar with and observe the various guidelines, regulations and procedures that are covered in this handbook.

Please kindly be reminded that Student ID card is an important means to identify a student. Students are required to present this card when making use of library check-out service and computing facilities, and for examinations.

Students have the responsibility to provide updated personal details to the Student Affairs Office.

The Institute and Programme keep you informed about events and changes to teaching and activities in a number of ways: email and a virtual learning environment such as Canvas. We expect you to check these every day.

With best wishes for your time at the Programme

Rita Tse, PhD.
Director, School of Applied Sciences

# Table of Contents

# SECTION 1 PRELIMINARY INFORMATION

The *Master of Science in Big Data and IoT* (the MSc Programme) is a new master degree programme under the *School of Applied Sciences* (ESCA) in the *Macao Polytechnic Institute* (MPI). The MSc programme admitted its first cohort in the academic year 2019/20. The degree is taught and examined entirely in English. Students in the MSc programme will normally complete the programme in two years on a full-time basis. Students need to take 24 credits in Year 1 and 12 credits in Year 2 and a total of 36 credits must be taken in order to obtain their Master Degree. Scheduled teaching contact amounts to approximately 12 hours a week, and is timetabled between 6 pm and 11 pm Monday to Friday.

# SECTION 2 PROGRAMME INFORMATION

## Programme Aims and Objectives

The Internet of Things (IoT) refers to novel cutting edge technology that connects a plethora of digital devices equipped with several sensing and computing capabilities with the Internet. Through IoT, many physical items may be seamlessly integrated to the Internet for the purposes of data gathering, command and communication. It provides many opportunities for users, manufacturers, and service providers to offer various enhanced services to all users. A key issue today is, collected data from daily operations of enterprises and governments continues to grow. This raises the importance of Big Data, which involves the knowledge to use technology to capture, store, protect, search, analyze and visualize voluminous and complex data. Big data is the resource and even the core of a large amount of current and future Information and Communication Technology (ICT) applications, such as in the smart city technologies and artificial intelligence. It becomes a crucial factor to the development and success of our society.

There are several indications that demonstrate a need for skilled graduates with IoT and Big Data knowledge: 1) increasing number of connected devices, 2) increasing variety of IoT products, 3) evolving development of IoT standards, 4) integration of data from enterprise information systems and IoT devices, 5) demand for Big Data processing and analytics across all industries, 6) the need for implementation and development of an IoT-based smart city. This has created many specific IoT and Big Data job opportunities. Moreover, Big Data and IoT are the key elements in building a sustainable smart city. A Master of Science degree in Big Data and IoT allows students to take great advantage of the need for IoT and Big Data technologies, and become successful in the competitive Information Technology (IT) market.

This programme includes courses with required theories, approaches, applications and hands-on experience pertaining to IoT and Big Data processing, supported by our joint international R&D research centres in Ubiquitous Computing, Wireless Communication Technology, Multimedia Technology and Machine Learning.

The MSc in Big Data and IoT degree is designed to meet the demands for a new kind of IT specialist – those who have the ability to:

1. Compare key system architectures and communication mechanisms for IoT;
2. Design and develop innovative IoT applications to connect intelligent objects;
3. Apply leading-edge techniques for Big Data processing;
4. Extract information relevant for smart city applications;
5. Undertake IoT and Big Data research.

Programme graduates will be able to pursue careers in IoT and Big Data positions in industry and government, as well as initiate independent research via multiple scientific domains based on advanced IoT and Big Data technologies.

## Entry Requirement

Applicants must satisfy the following two requirements:
- Possess a Bachelor Degree in the relevant discipline. According to Article 20 of the Higher Education Law of Macao Special Administrative Region (MSAR), article n°8, applicants for admission to the MSc in Big Data and IoT must possess a Bachelor Degree in the relevant discipline.
- Have passed the medical examination.

## Programme Structure and Information

### Structure of the Programme

The programme is delivered over four semesters spanning two years, the first two being the taught courses and the 3rd and the 4th being the academic and research activities as well as the dissertation. Although there is no specific pathway for the Programme, the students are expected to select their specialist elective courses (one for each semester during the 1st and 2nd semester) suitable for their research interest and for the preparation of their dissertation.

As shown in the Figure 1 below, the courses can be divided into 3 main groups:

#### Big Data and Data Analytics

Courses in this group cover the first main theme of the MSc programme. There are two compulsory courses. First, the course "Introduction to Big Data" sets the foundation of the field of Big Data and Data Analytics. Second, the course "E-commerce with Big Data" specializes in the issues of massive data processing in E-commerce. This group also includes two specialist elective courses, namely "Machine Learning" and "Digital Media and Social Networking". These courses discuss advanced topics in data analytics using machine learning, and data processing of digital media and data generated from social networks.

## Internet of Things

The second theme of the MSc programme is Internet of Things, and is covered by three compulsory courses and two specialist elective courses. The compulsory course "Introduction to Internet of Things (IoT)" provides the foundation knowledge in the field of IoT. On top on this, the compulsory courses "Communication Technology for IoT" and "Multimedia Technology for IoT" examine more in-depth issues of communications and multimedia in state-of-the-art IoT systems. This group also includes two specialist elective courses, namely "Security and Authentication" and "Cloud Computing".

## Research Methodology and Dissertation

The compulsory course "Research Methodology" teaches the practical research and transferable skills applicable to applied research in computing and information technologies (IT) in Year 1. Afterwards, Students are required to apply the techniques and technologies which they have learned in a significant advanced research project in "Dissertation" in Year 2.
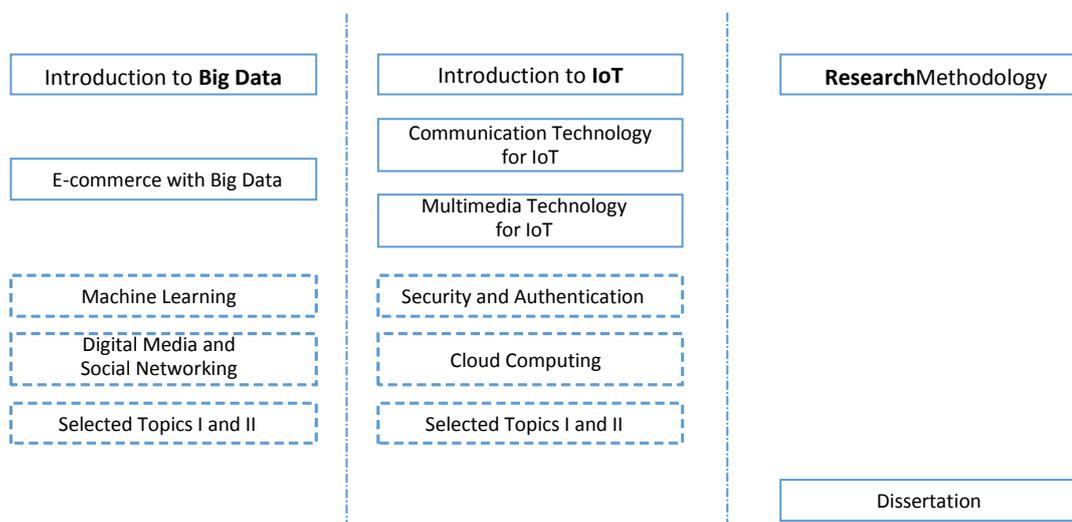


Figure 1 Course Structure of the Programme

## Design of Curriculum

### Period of Study

The length of study for the Programme is normally 2 years. There will be two semesters in each academic year for academic activities. To complete the curriculum, students are required to complete satisfactorily all course requirements.

Students are expected to graduate within the normal study period of 2 years. Any approved long leave of absence, including deferment of study, shall not be counted towards the period of study. Students who are not able to complete the Programme within the maximum period of study (48 months) shall be deregistered from the Institute.

Students who wish to extend their period of study beyond the maximum programme duration shall apply in writing to obtain prior approval from the School.

## Progression Arrangements

The Programme equips the students with the skills needed to work in the industry or pursue postgraduate studies in Macao or abroad.

The first year is designed to cover various aspects of the fields of Big Data and IoT. Three compulsory courses in the 1st semester set the foundation knowledge in the fields of Big Data, IoT and also research skills. On top of these, three more compulsory courses broaden students' knowledge base in Big Data and IoT. In Year 1, students also need to select two specialist elective courses to further strengthen their knowledge in advanced issues in the fields.

In the second year, students have to carry out research in the fields of Big Data and IoT and complete their dissertation.

## Graduation Requirement

The students are awarded the Master of Science in Big Data and IoT when they have gained 36 credits, and passed all the required courses, including all the compulsory courses (18 credits), two specialist elective courses (6 credits) and the dissertation (12 credits).

# SECTION 3 COURSE INFORMATION

## The Study Plan

| Code | Course | Semester | Type | Hour | Credit |
|------|--------|----------|------|------|--------|
| **Year 1** | | | | | |
| COMP6121 | Introduction to Internet of Things (IoT) | 1$^{st}$ | Compulsory | 45 | 3 |
| COMP6122 | Introduction to Big Data | 1$^{st}$ | Compulsory | 45 | 3 |
| COMP6123 | Research Methodology | 1$^{st}$ | Compulsory | 45 | 3 |
| COMP6124 | Communication Technology for IoT | 2$^{nd}$ | Compulsory | 45 | 3 |
| COMP6125 | Multimedia Technology for IoT | 2$^{nd}$ | Compulsory | 45 | 3 |
| COMP6126 | E-commerce with Big Data | 2$^{nd}$ | Compulsory | 45 | 3 |
| COMP6101 | Machine Learning | 1$^{st}$ / 2$^{nd}$ | Specialist Elective | 45 | 3 |
| COMP6102 | Security and Authentication | 1$^{st}$ / 2$^{nd}$ | Specialist Elective | 45 | 3 |
| COMP6103 | Cloud Computing | 1$^{st}$ / 2$^{nd}$ | Specialist Elective | 45 | 3 |
| COMP6104 | Digital Media and Social Networking | 1$^{st}$ / 2$^{nd}$ | Specialist Elective | 45 | 3 |
| COMP6105 | Selected Topics I | 1$^{st}$ / 2$^{nd}$ | Specialist Elective | 45 | 3 |
| COMP6106 | Selected Topics II | 1$^{st}$ / 2$^{nd}$ | Specialist Elective | 45 | 3 |
| **Year 2** | | | | | |
| COMP6299 | Dissertation | 1$^{st}$ / 2$^{nd}$ | Compulsory | -- | 12 |

## Course Descriptions

<u>Year 1</u>

### COMP6121 Introduction to Internet of Things
(3 credits; 45 hours; Pre-requisite: nil)

This module provides a comprehensive overview of the Internet of Things (IoT) from the global context. A number of technologies enabling IoT will be included, which are IP networking, wireless communication, Arduino programming, etc. They create the environment by allowing interaction between machines, smart devices, ubiquitous computers, physical objects and human users. This module is an introduction to the fundamentals of IoT, designed for either Information Communication Technology (ICT) or non-ICT students. In particular, the module will define the core system architectures, including but not limited to, the middleware to design single device and multi-device systems. It will also offer hands-on experience in labs to build smart device applications.

### COMP6122 Introduction to Big Data
(3 credits; 45 hours; Pre-requisite: nil)

This course covers the characteristics of Big Data, the sources of massive data in enterprises and sensor networks, and the challenges in data ingestion, data storage and analytic processing. The students will acquire skills and working knowledge of the Big Data tools and technologies. This course focuses on the planning, designing and implementing Big Data solutions. Examples and exercises of Big Data systems are used to provide hands-on experiences in the workings of major components in Big Data solutions. The students will also be able to integrate the Big Data tools to form coherent solutions for business problems. Finally, additional related topics in the area of Big Data, such as alternative large-scale processing platforms, non-relational data stores, and Cloud Computing execution infrastructure are presented.

### COMP6123 Research Methodology
(3 credits; 45 hours; Pre-requisite: nil)

The module will teach the practical research and transferable skills applicable to applied research in computing and information technologies (IT). It provides broad coverage of issues and topics related to applied IT research, including research philosophies and methodologies, research design, research ethics, and techniques pertaining to data collection and analysis applicable in IT research. It also covers risk management and various project management skills.

### COMP6124 Communication Technology For Internet of Things
(3 credits; 45 hours; Pre-requisite: nil)

This module provides a comprehensive study of the major communication technologies and emerging standards that enable applications on Internet of Things (IoT). It covers a wide range of technologies which IoT is expected to bridge in the formation of an autonomous communication network that supports smart applications and intelligent decision making. Topics include: cellular technologies (2G/3G/4G/5G) and M2M communications, covering their transmission characteristics, physical layer technologies, medium access protocols, and routing protocols; WiFi; Bluetooth; Radio Frequency Identification (RFID); Near Field Communication (NFC); Wireless Sensor Networks; Wireless Personal Area Networks including IEEE 802.15.4 and ZigBee, and the Low Power networks such as SigFox and LoRa.

### COMP6125 Multimedia Technology For Internet of Things
(3 credits; 45 hours; Pre-requisite: nil)

This module aims to provide students with the advanced topics of multimedia compression and communication, and the in-depth concepts and applications of computer vision. Topics include the principles of scalable video and audio codecs, file formats and codec settings for optimizing the quality and media bandwidth, applying the codecs in developing a basic media player application that is suitable for mobile access, in-depth concepts and methods of computer vision, and the structure of the applications of computer vision.

### COMP6126 E-Commerce With Big Data
(3 credits; 45 hours; Pre-requisite: nil)

Recent advances in information and communication technologies (ICTs) have led to the rapid explosion of consumer and user data. Business intelligence derived from big data can help firms to better understand market needs, develop new products and services, improve operational efficiency, and acquire competitive advantages. This module provides an overview of common big data applications and analysis techniques (e.g., market basket analysis, sentiment analysis, decision tree, clustering, etc.) in business and discusses some implementation issues related to big data projects. As part of a group project, students will need to demonstrate the ability to come up with a business plan based on a given case study and a relevant data set.

<u>Specialist Elective Courses</u>

### COMP6101 Machine Learning
(3 credits; 45 hours; Pre-requisite: nil)

Artificial Intelligence (AI) is so pervasive today that possibly you are using it in one way or the other and you don't even know about it. One of the popular applications of AI is Machine Learning (ML), which is the science of getting computers to learn without being explicitly programmed. In the past decade, machine learning has given us many amazing applications such as self-driving cars, speech recognition, image recognition, financial trading, machine translation, AlphaGo etc. This module covers some of the most important methods for machine learning including deep neural networks, reinforcement learning, etc. The aim of the module is to give students the theoretical underpinnings of machine learning techniques, and to allow them to apply such methods by practice in a range of areas such as image recognition, classification, automatic control, etc.

### COMP6102 Security and Authentication                    (3 credits; 45 hours; Pre-requisite: nil)

The module aims to give students an introduction to the principles, methods and applications of cryptography and authentication protocols used for network security. Security and authentication play an important part in the IoT. With sensitive information being delivered among an ever growing number of devices and parties, one wants to make sure that information will only be seen by someone with keys, and also the keys won't be stolen or faked. Cryptography and authentication protocols are the techniques to address these issues.

### COMP6103 Cloud Computing                                (3 credits; 45 hours; Pre-requisite: nil)

Cloud Computing has transformed how services and applications are delivered. With the rise of virtualization technology and new programming paradigms, applications can quickly be delivered to a growing audience, without the need to physically own and configure the infrastructure. With its rapid elasticity and scalability, cloud computing has become an enabling technology for processing of big data and IoT sensor data. This module covers the main characteristics of Cloud Computing, including the enabling technologies, main software and service paradigms underpinning it, as well as related aspects, namely security, privacy, and ethical concerns.

### COMP6104 Digital Media and Social Networking            (3 credits; 45 hours; Pre-requisite: nil)

The rapid spread of Online Social Networks (OSNs) and digital media has led to changes in the way users interact on the Internet, and most personal communication is now conducted through such tools. The adoption of services like Facebook, YouTube and Instagram also affect the traffic patterns on the Internet. Lately, there has been a great deal of research into the measurement and analysis of Internet user connectivity, traffic patterns and data sharing for OSNs. This module deals with the implications for the society from personal data collections. The main topics include analysis of personal data collections with data mining, current social media landscape and business models based on personal data.

### COMP6105 Selected Topics I                               (3 credits; 45 hours; Pre-requisite: nil)

The selected topics are designed to accommodate new, advanced and state-of-the-art technologies that are not included in this curriculum. One example is data mining. Data Mining is one of the most popular research fields in Computer Science. The aim of this is to give an applicable understanding of the usage of data mining as of decision making. In this module, several essential fields would be discussed, including the classes of different algorithms and models, and the methodology of how to choose a suitable algorithm. Classification, pattern recognition and different learning types would be discussed and covered.

### COMP6106 Selected Topics II                              (3 credits; 45 hours; Pre-requisite: nil)

The selected topics are designed to accommodate new, advanced and state-of-the-art technologies that are not included in this curriculum. One example is data mining. Data Mining is one of the most popular research fields in Computer Science. The aim of this is to give an applicable understanding of the usage of data mining as of decision making. In this module, several essential fields would be discussed, including the classes of different algorithms and models, and the methodology of how to choose a suitable algorithm. Classification, pattern recognition and different learning types would be discussed and covered.

### Year 2

### COMP6299 Dissertation                                    (12 credits; -- hours; Pre-requisite: nil)

Students are required to apply the techniques and technologies which they have learned in a significant advanced research project. Under the supervision of an advisor, the students shall focus on a contemporary research topic and make use of the leading-edge techniques to investigate or produce new research findings. Upon completion, a dissertation is to be submitted and evaluated using the standard criteria for scholarly work. In addition to a written report, there will be an oral defense, where the students will be required to explain and defend the dissertation.

## SECTION 4 TEACHING & LEARNING

The MSc Programme has a low student-staff ratio, which fosters a close relationship between students and lecturers. Students may contact lecturers in person at anytime during office hours (six hours per week), or through email. For many courses, a soft copy of lecture notes and supplementary material are available in course homepages and course folders in the campus network. Recommended book lists are provided at the beginning of each semester (see Appendix A1 for an example).

Basically, all courses (except for *Dissertation*) are lecture-based and must fulfil the number of contact hours per week assigned to those courses. Many of the courses offer tutorial and laboratory practice as specified in the course syllabi. As for the Dissertation, students are expected to complete a research project with the guidance, assistance and monitoring of supervisors.

The teaching methods applied in most of the courses are face-to-face lectures and laboratory work. Generally, the credit hours of each course equal the number of contact hours per week, which comprises both lectures and laboratory work.

Students with an overall score of less than 35 in the coursework will fail the course even if the overall score for the course is 50 or above. Students with a score of less than 35 in the final examination will fail the course even if the overall score for the course is 50 or above. There will be no re-sit examinations.

The medium of instruction is English. Students are expected to attend lectures and tutorials and must attain 80% attendance in order to sit for their final examinations.

The main teaching methods include the following:

### Face-to-face Lectures

In most courses, lecturers deliver pedagogical material to students in a logical and organized manner in the classroom. Students obtain concepts and knowledge of a specific course by attending the lectures, and learning is reinforced by assignments, laboratory practice and projects.

The Institute's policy on small class sizes of 20-30 facilitates an interactive learning experience in the classroom. Students are often challenged to solve problems, and encouraged to criticize information they are exposed to, both inside and outside the classroom. These approaches increase students' involvement and attentiveness.

Many lecturers use *Microsoft PowerPoint* to deliver lectures, while some lecturers may use audio/video material. The required equipment (projector and computers) is available in every classroom and computer laboratory.

### Laboratory Work

Courses related to programming, systems operation, multimedia authoring, and network administration generally involve a larger portion of hands-on practice than other courses. This is achieved by offering laboratory work in some general-purpose teaching computer laboratories and a special-purpose "hardware laboratory".

The Institute provides sufficient general-purpose teaching computer laboratories that offer PCs with Windows platforms and Apple Computer. System development tools (including compilers, database management system and project management software) and office software are accessible in the computer laboratories where teaching takes place. For network and system administration, the special-purpose "hardware laboratory" provides routers and switches for hands-on practice.

### Group Projects

Several courses require students to work on course projects. In addition to extended problem-solving in specific courses, students are also involved in group work in their studies.

### Research Laboratories

Teaching and research are professionally supported by our joint international laboratories and research centres as below.

### Chinese-Portuguese-English Machine Translation Laboratory

The Chinese-Portuguese-English Machine Translation Laboratory (CPE Lab) was jointly established by Macao Polytechnic Institute (MPI), Guangdong University of Foreign Studies and Global Tone Communication Technology Company Limited during October 2016. Macao Polytechnic Institute is a public institution of higher education. MPI bestowed the legacy of over one hundred years teaching and research experience in Chinese-Portuguese translation. CPE Lab features cutting-edge infrastructure and servers for machine translation (MT). Our team is composed of experienced computing and Chinese-Portuguese translation professionals. We focus on multidisciplinary teaching and applied knowledge. The main research topics of CPE Lab are statistical machine translation, hybrid machine translation, neural-network machine translation and Portuguese speech recognition.

## Joint Research Center in Ubiquitous Computing (UbiLab)

The Ubiquitous Computing Research Laboratory is a coordinated effort from the Macao Polytechnic Institute (MPI) and Henry Samueli School of Engineering & Applied Science of University of California, Los Angeles (UCLA). It is located at the MPI main campus. It conducts research on Wireless Mobile Systems. UbiLab activities include research projects in a broad range of wireless mobile networks and systems such as vehicular networks, sensor networks, mobile peer-to peer applications and health networks. The center features a cutting edge research infrastructure and is staffed by world-class scientists from both institutions.

UbiLab will undertake research and knowledge transfer projects which initially will be focused on vehicular communications and will leverage the current results and resources in the C-VeT testbed at UCLA. Research activities will explore the following directions: vehicular urban pollution monitoring, intelligent transportation systems and location based services.

## MPI-QMUL Information Systems Research Centre

Focusing on various cutting-edge technologies in Information Technology, the MPI-QMUL Information Systems Research Centre (ISRC) is a joint research laboratory between Macao Polytechnic Institute and Queen Mary Research Laboratories (Macao) Limited (QMRL), a subsidiary of Queen Mary University of London. Approved by the Macao SAR Chief Executive in 2004, its scope includes research and systems integration to the level of proof-of-concept demonstrators or operational prototypes in closely inter-related Information Systems technologies.

## Gaming and Entertainment R&D Laboratory

In 2007, MPI joined hands with the Melco Group and founded MPI-Melco Gaming and Entertainment Information Technology Research and Development Centre, which had been renamed as Gaming and Entertainment R&D Laboratory since 2011.

This Gaming and Entertainment R&D Laboratory, now solely operated by MPI, aims at conducting researches in the gaming area and developing gaming, entertainment, tourism, and MICE related prototypes and products. Areas of R&D include casino management applications, gaming tools, controlling and monitoring applications, tourism & MICE applications and gaming communication standards.

## IPv6 Network Research Laboratory

IPv6 Network Research Laboratory, established in April 2013, is the research laboratory collaborated by the Macao Polytechnic Institute and Macao Post and Telecommunications Bureau. The laboratory aims at promoting IPv6 knowledge and technology for the industry in Macao. The laboratory is equipped with a number of IPv6 network solutions and the IPv6 network connection for the following functions: IPv6 application demonstration, research and development, seminar/workshop organization and student project development.

## MPI-BMM Testing Centre for Gaming Devices

MPI-BMM Testing Centre for Gaming Devices is Asia's first gaming technology Test Centre.
- It assists in developing a suitable set of gaming standards for Macao;
- It provides test and certification services for gaming devices, such as slot machines;
- It offers training for local technicians to master professional and technical certification of gaming devices;
- It explores research areas in certification of gaming devices.

### Digital Terrestrial Television Research and Testing Center

The DTV Research and Testing Center aims at conducting in-depth technical testing on digital television receivers and performing high quality research in areas related to digital television technology. The first mission of the center is, by leveraging its modern facilities and the expertise of MPI research staff, to conduct compliance checking on digital TV set-top boxes available in Macau. The second mission is to conduct research in emerging areas related to digital television technology. Using our modern equipment, we are able to provide test-bed for new technologies such as internet TV, cognitive radio and video compression algorithms.

## SECTION 5 STUDENT SUPPORT

### Academic Support

At the Institute level, the Registry, the Student Affairs Office, the Library, and Computer Service Centre provide services that support students in their attainment of success.

In particular, the Registry and the Student Affairs Office cater to the many needs of students, from coping with their studies, to their need for personal, social and career development. Admissions, registration and enrolment, deferred study, withdrawal, transcripts and testimonials, student insurance, student counselling, financial aid and scholarships, student hostels, and recruitment seminars are all handled by the Registry and the Student Affairs Office. The Registry also serves as the central hub for disseminating information, and regulations and guidelines to students, including the academic calendar, class timetables, examination and supplementary examination timetables, booklists, job opportunities, academic regulations, subject equivalence, class attendance, tuition fee and payment methods etc. Most of this information is available online, with some services offered online as well. For instance, students may enrol for courses online, and also view their grades and unofficial transcripts.

### Student Counsellors
http://www.ipm.edu.mo/student_corner/en/student_counseling.php

The counselling service is intended to assist students in adapting to their studies in the Institute, assist them to effectively manage their studies or prevent personal difficulties and enrich their campus life. The Student Counsellors provide counselling services to students on an individual basis and organise various types of activities. The Student Counsellors visit hostel students and non-resident students residing in the city on a regular basis.

### Online Services for Students
http://www.ipm.edu.mo/student_corner/en/online_services_for_students.php

- Student Information Web (SIWeb)
- Class Timetable Enquiry
- Examination Timetable Enquiry
- Re-sit Examination Timetable Enquiry
- Class Cancellations & Make-up Classes Timetable Enquiry
- Student Payment Status Enquiry
- Canvas LMS – e-Learning Platform
- Requisition for Various Documentation

### IT Facilities

The Institute is keen to equip the campus with an efficient and effective IT infrastructure and computing environment and provides students especially those in Computing Programme the conditions, they may expect to find in their future work place, using the Project Lab, Hardware Lab & self-study laboratory and other facilities.

On the one hand, the 20-seats Student Lab (A216) providing high performance computers is dedicated to students in the Programme especially for their final year projects. Besides Intel based PCs and Apple computers, numerous mobile devices, including PDAs, smartphones, smartcard readers, finger-print readers, and GPS receivers, are available for use in selected projects.

On the other hand, the 33 seats Hardware lab allows students to have hand-on experience with CISCO networking equipment, and other hardware devices. The detailed configurations of the laboratories can be found in http://csc.ipm.edu.mo/index.php/computer-labs-intro.

The 50 seats self-study Computer Lab A213, equipped with Intel computers, Apple Computers, scanners and self-service "*MACAUpass*" color copiers and printers, is for students and registered public access only. In the lab, some lab assistants are hired to provide assistance in using the computing facilities and enforce the computer laboratory usage regulations. While working in the laboratory, the computer laboratory assistants are required to wear an identification badge with photo and official chop from the Computer Service Centre for identification. The contact phone number is 85996147. In addition, the 17 seats self-learning area and 31 seats Information Literacy Lab are setup in the Library in Wu Chi Building.

Basically, at least one of the computer labs opens 24 hours in normal days and until midnight in the evening of public holidays. The opening hours in the public holidays during Summer and Winter vacation are from 10am till 10pm. To access the computers in the labs, please login with your NetID and NetPassword as instructed in http://csc.ipm.edu.mo/index.php/accounts-a-passwords/netid-computer-account.

On the main campus, our IT facilities include a significant number of networked computers providing access to online services, Email and the Internet through 19 computer laboratories and self-learning facilities and the campus wireless network as well. The latter network on the main campus supports IEEE 802.11g standard.

In addition, Cyber cafés and information kiosks are available at a number of campus locations offering latest campus news and Internet access for students and visitors. Broadband Internet connections are provided in our student hostels to allow students to connect their computers to access the Internet within their rooms. *Canvas* is in use in the Institute offering our teachers and students an online teaching and learning management platform.

A helpdesk counter of the Computer Service Centre is located at A201 on the main campus to provide IT support services to all staff and students.

## Student Union
http://aeipm.ipm.edu.mo/

The Macao Polytechnic Institute Student Union was established on 5 August 1993. Currently the Student Union consists of 7 subsidiaries and 14 sports clubs such as the dragon boat team, the fencing team, the boxing clubs and the judo clubs. The mission of the Union is to protect the interests of students and to cultivate their team spirit through activities.

The Student Union organises different activities such as orientation parties, Halloween Festival, Christmas parties and a charity ball. To help students make contribution to the community, it organises and encourages students to participate in the Walk for a Million and the annual Bazaar and to serve as volunteer social workers. The Student Union is also responsible for organizing students to join the annual sports competitions for tertiary education organizations. The Student Union office is situated on the main campus of the Macao Polytechnic Institute.

## Scholarships and Grants
http://www.ipm.edu.mo/student_corner/en/overview.php

In order to encourage Macao's best students to enrol on the degree programmes offered by MPI, and to reward our current and graduate honours students, MPI and other enterprising organisations co-sponsor a number of different types of scholarships and grants in the form of reduced annual tuition fees and the granting of cash awards. Over one hundred students benefit from these scholarships annually.

Moreover, to attract the registration of the best students of the Mainland of China, MPI also offers three types of scholarship, as follows:

- full scholarships (including tuition fees, hostel fees, and monthly living subsidy);
- cash scholarships of MOP30,000.00;
- annual tuition fees waived.

MPI also provides a local student grants scheme to help those experiencing financial difficulties to enrol on its degree programmes offered by MPI, in order to enable equal opportunities for eligible students to enrol and enrich their individual capabilities so as to serve society in the future.

Therefore, MPI reserves more than one million patacas for such grants annually. According to previous data, some of the beneficiates may receive up to 80% annual tuition fee reduction. Currently more than 600 students have benefited from such grants with some, having successfully graduated, already serving our community.


## SECTION 6 MAJOR QUALITY ASSURANCE MECHANISM AND STUDENT FEEDBACK SYSTEM

In guaranteeing that the assessment and examination procedure is up to standard, the Subject Leaders of the Assessment Standards Task Group of the Quality Assurance Committee (see Figure 4) are responsible for vetting the final examination question papers and marking schemes before the final examination, and also moderating the grading of student scripts after the final examination. The Internal Examiner for each course is responsible for grading students' continuous and final examinations. The External Examiner vets examination papers, moderates examination scripts, and attends Programme Examination Board meetings at the end of each year. Grades are previewed and double-marked by the Assessment Standards Task Group, forwarded to the Programme Examination Board, which are then submitted to the Pedagogical Scientific Committee (PSC), the Examination Board at the School Level. Students are given the right to review their grades. In case of any dispute between a student and the teacher, the Assessment Standards Task Group will try to resolve the issue. If it is not resolved, the issue will be brought to the School level.
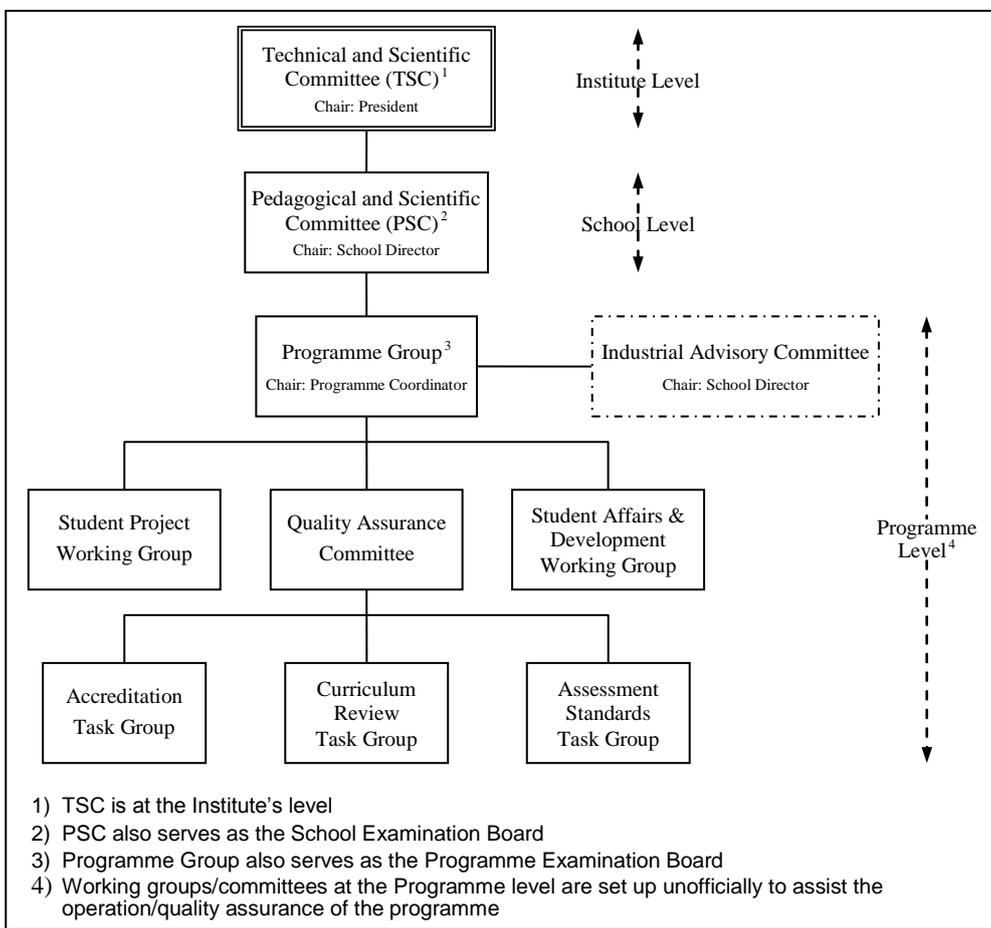
Figure 2  Academic Structure of MPI

## Student Feedback

The Institute gathers feedback from students by a variety of means. These include informal staff/student discussions, School Dialogue, Dialog with the Institute, student feedback questionnaires at course level, and engagement survey at the programme level.

Channels for student feedback are maintained and developed at the programme-level, being led by the Programme Coordinator, with the support of the School Director. At the School level, the School Dialog is a forum where student representatives can raise their problems and concerns. At the Programme level, students are encouraged to talk to their Year Tutors to discuss their personal as well as academic problems,

which will be directed to the Student Affairs Leader of the Programme's Student Affairs and Development Working Group. The Programme Coordinator may try to solve internal problems with the assistance of the Programme Team. If beyond the jurisdiction of the Programme level, problems will be directed to the School Dialog Meeting. If beyond the jurisdiction of the School level, the problems will be directed to the Institute level. The School provides counsellors for students who want to resolve their problems further.

## SECTION 7 GENERAL INFORMATION AND STUDENT ENQUIRIES

### Programme Matters

| Title and Name | Tel. No. | Email | Office |
|---|---|---|---|
| *Programme Coordinator*<br>Dr. Lam Chan Tong 林燦堂博士 | 85993342 | ctlam@ipm.edu.mo | M537 |
| *Assistant Programme Coordinator*<br>Dr. Ng Koon Kei, Benjamin 吳冠祺博士 | 85996431 | bng@ipm.edu.mo | A313 |
| *Assistant Programme Coordinator*<br>Dr. Liu Yue 劉玥博士 | 85996433 | yue.liu@ipm.edu.mo | A313 |

### List of Teachers

| Teacher's Name | Tel. No. | Email | Office |
|---|---|---|---|
| Tse Tan Sim, Rita 謝丹嬋 | 85993280 | ritatse@ipm.edu.mo | M512 |
| Chan Mei Pou, Calana 陳美寶 | 85993277 | calanachan@ipm.edu.mo | M511 |
| Cheong Ngai, Phillip 張毅 | 85993333 | ncheong@ipm.edu.mo | M520 |
| Choi Ka Cheng, Rebecca 蔡嘉靜 | 85996491 | rebeccachoi@ipm.edu.mo | A202a |
| Ho Ka Chong, Wilson 何家忠 | 85996586 | kcho@ipm.edu.mo | A216 |
| Ines Lau 劉曼玲 | 85993263 | ineslau@ipm.edu.mo | M503 |
| Ke Wei 柯韋 | 85996452 | wke@ipm.edu.mo | A319-A320 |
| Lam Chan Tong 林燦堂 | 85993342 | ctlam@ipm.edu.mo | M537 |
| Law Ka Lun, Eddie 羅家倫 | 85993287 | eddielaw@ipm.edu.mo | M541 |
| Lei Iat Seng, Philip 李日昇 | 85993356 | philiplei@ipm.edu.mo | M540 |
| Liu Yue, June 劉玥 | 85996433 | yue.liu@ipm.edu.mo | A313 |
| Ng Koon Kei, Benjamin 吳冠祺 | 85996431 | bng@ipm.edu.mo | A313 |
| Siu Ka Meng, Andrew 蕭嘉明 | 85996451 | kmsiu@ipm.edu.mo | A320 |
| Tang Su Kit, Jacky 鄧樹傑 | 85996491 | sktang@ipm.edu.mo | A202a |
| Yang Xu 楊旭 | 85996353 | xuyang@ipm.edu.mo | A323 |
| Yip Lee Wah 葉李華 | 85993262 | lwyip@ipm.edu.mo | M501 |
| Yung Yau Kong, Edmund 容祐江 | 85993354 | edmundyung@ipm.edu.mo | M511 |

## Student Enquiries

The Programme is operated with the *School of Applied Sciences* (*ESCA*).

Location of the ESCA office:
   Room M539, Meng Tak Building, Main Campus.

Opening hours of the ESCA office:

| | |
|---|---|
| Monday - Thursday | 9 am - 1 pm; 2:30 pm - 5:45 pm |
| Friday | 9 am - 1 pm; 2:30 pm - 5:30 pm |
| Saturday, Sunday and Public holiday | closed |

Phone: (853) 85993278 or 85993273
Fax:    (853) 28719227


## Other Useful Contacts, Telephone Numbers, and Websites

### WebMail

https://mail.ipm.edu.mo

### SIWeb

https://wapps.ipm.edu.mo/siweb/ – to check timetable and other useful information

### Programme Website

http://cp.ipm.edu.mo

### Institute Official Website

http://www.ipm.edu.mo/

### Library & Photocopying

Website: http://library.ipm.edu.mo/
Phone:    (853) 85996241, 85996708

### Computer Service Centre Website

http://csc.ipm.edu.mo/

### Computer Help Desk at A201

Phone: (853) 85996152
Fax:    (853) 28530505
Email: helpdesk@ipm.edu.mo

Submit requests via email or the web-based service request system (SRMS) at:
   http://csc.ipm.edu.mo/srms.

### Computer Lab Assistant at A213

Phone: (853) 85996147

### Bell Centre

Phone: (853) 28719592
Fax:    (853) 28719705
Email: mpibell@ipm.edu.mo

**Registry**
  Phone: (853) 85996111/(853) 85996149/(853) 85996103
  Fax:     (853) 28523746
  E-mail: registry@ipm.edu.mo

**Student Affairs Office**
  Phone: (853) 85996203/(853) 85996121/(853) 85996486
  Fax:     (853) 28706747
  E-mail: dge@ipm.edu.mo

**Student Counselling and Advisory Services at A119**
  Phone: (853) 85996139/(853) 85996141
  E-mail: priscillalai@ipm.edu.mo or thomasho@ipm.edu.mo

**Welfare and Recreation Department**
  http://www.ipm.edu.mo/en/wrd_general_information.php

**Student Union**
  http://aeipm.ipm.edu.mo/
  https://www.facebook.com/aeipm

**Alumni**
  http://ipm.edu.mo/aaaipm/Chinese/cindex.htm

## APPENDICES

## A1. Important Information and Regulations

Important guidelines and regulations are available in MPI website (Student > Postgraduate). Some of these resources are selected and listed here for your convenience.

**Student Handbook**
http://www.ipm.edu.mo/cntfiles/upload/docs/student_corner/common/student_handbook_e.pdf
The MPI Student Handbook provides students with such important information about the Institute as its regulations, services, facilities, and communication mechanisms. Printed copies of the Handbook are distributed to new students at the start of each academic year.

**Prospectus**
http://www.ipm.edu.mo/student_corner/en/prospectus_1920.php
The MPI prospectus provides students with such information as the academic calendar, MPI's profile, logo, motto, mission and vision, MPI's organisation and different study programmes.

**Academic Regulations**
http://www.ipm.edu.mo/student_corner/en/academic_regulations.php

**Academic Regulations Governing Master's Degree Programmes**
http://www.ipm.edu.mo/student_corner_p/en/ar_master.php

**Assessment Strategy**
http://www.ipm.edu.mo/student_corner/en/assessment_strategy.php

**Macao Polytechnic Institute Guidelines for Plagiarism Avoidance**
http://www.ipm.edu.mo/student_corner/en/guidelines_plagiarism_avoidancephp.php

**Examination Regulations for Students**
http://www.ipm.edu.mo/student_corner/en/examination_regulations_for_students.php

**MPI Rules Regarding Cheating and Other Violations of Examination Regulations**
http://www.ipm.edu.mo/student_corner/en/cheating_and_other_violations_of_examination_regul.php

**Regulations for the Management of Students' Motorcycle Parking Lot**
http://www.ipm.edu.mo/student_corner/en/regulations_for_the_management_of_students_motorcy.php

**Adverse Weather Arrangements**
http://www.ipm.edu.mo/student_corner/en/typhoons_and_heavy_rain.php

**Users, Opening Hours & Regulations of the Sports Court**
http://www.ipm.edu.mo/student_corner/en/users_opening_hours_regulations_of_the_sports_cour.php

## A2. MPI Campus Map

### Map of Macao Polytechnic Institute Main Campus (1)



澳 門 理 工 學 院
**Instituto Politécnico de Macau**
**Macao Polytechnic Institute**

# Map of Macao Polytechnic Institute Main Campus (2)
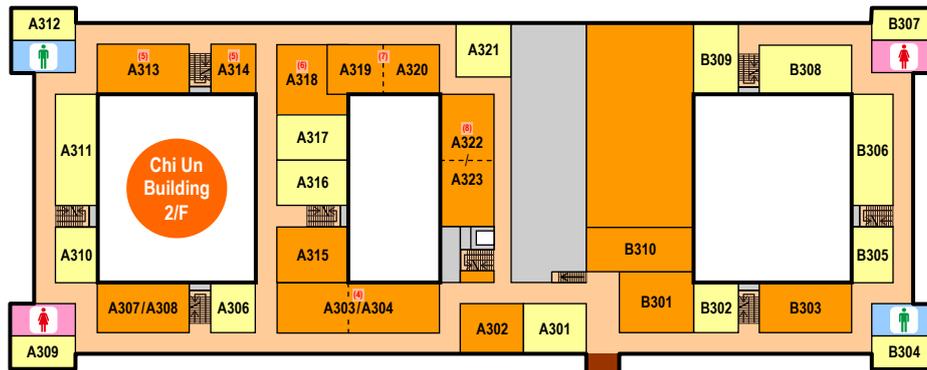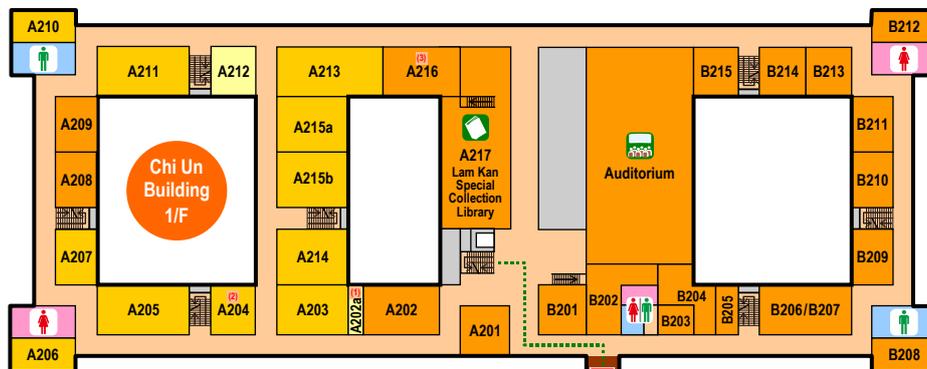


**Remarks**

**(1)** A202a – IPv6 Network Laboratory

**(2)** A204 – Computer Lab for CSP Students

**(3)** A216 – Digital Terrestrial Television Research and Testing Centre / CSP Project Lab

**(4)** A303/A304 – Chinese-Portuguese-English Machine Translation Laboratory

**(5)** A313/A314 – MPI-UMQL Information Systems Research Centre

**(6)** A318 – Electronic Lecture Theatre

**(7)** A319/A320 – MPI-Melco Gaming and Entertainment Information Technology Research and Development Centre

**(8)** A322/A323 – Joint Research Laboratory in Ubiquitous Computing

**(9)** M537 – Office of the Programme Coordinator of the Computing Programme
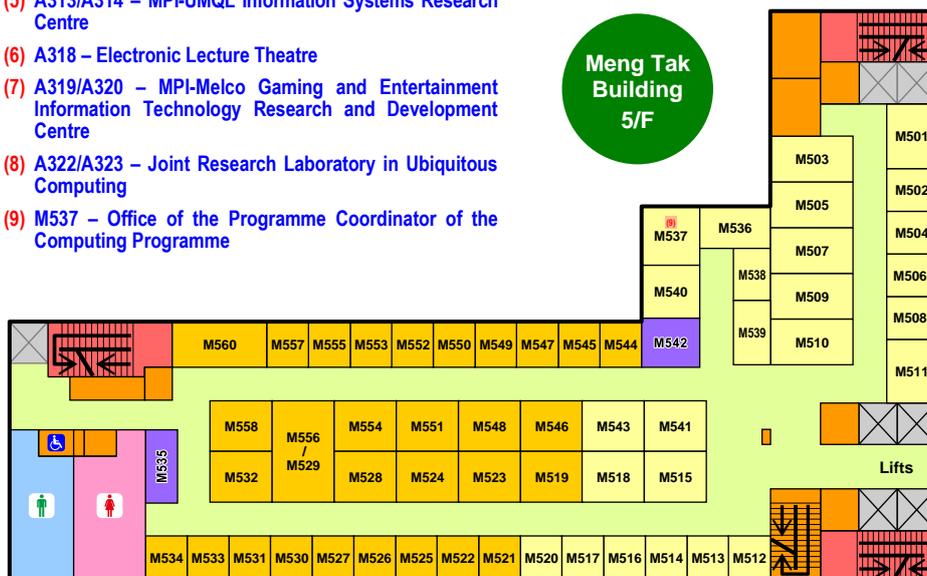
## A3. Academic Calendar

**Macao Polytechnic Institute**

**1ˢᵗ Semester, 2019/20**

| Week | Month | | | | | | | Events | | Public Holidays / Students' Recess | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **August 2019** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | | |
| | | | | | 1 | 2 | 3 | | | | |
| | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | | |
| | 18 | 19 | 20 | 21 | ⓐ22 | 23 | 24 | 20 | (開學禮) Opening Ceremony | | |
| 1 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 22 | (開課) First Day of Classes (1ˢᵗ Semester) | | |
| | **September 2019** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | | |
| 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | |
| 3 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | | 14 | (中秋節翌日) The day following Mid-Autumn Festival |
| 4 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | | 16 | (中秋節翌日之後首個工作日) First working day after the day following Mid-Autumn Festival |
| 5 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | | | | |
| | 29 | 30 | | | | | | | | | |
| | **October 2019** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | | |
| 6 | | | 1 | 2 | 3 | 4 | 5 | | | 1 | (國慶節) National Day |
| 7 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | 2 | (國慶節翌日)The day following National Day |
| 8 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | | | 7 | (重陽節) Chung Yeung Festival |
| 9 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | | |
| 10 | 27 | 28 | 29 | 30 | 31 | | | | | | |
| | **November 2019** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | | |
| | | | | | | 1 | 2 | | | 2 | (追思節) All Soul's Day |
| 11 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | 4 | (追思節之後首個工作日) First working day after All Soul's Day |
| 12 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | | | | |
| 13 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 27 | (課堂結束) Last day of classes (1ˢᵗ sem.) | | |
| 14 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 30 | (複習/補課) Revision/Make-up Classes | | |
| | **December 2019** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | | |
| 15 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 2-4 | (複習/補課) Revision/Make-up Classes | 8 | (聖母無原罪瞻禮) Immaculate Conception |
| | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 5-17 | (期末考試) Final Examinations (1ˢᵗ Sem.) | 9 | (聖母無原罪瞻禮之後首個工作日) First working day after Immaculate Conception |
| | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | | | |
| | 22 | 23 | 24 | 25 | 26 | 27 | 28 | | | 20/12-1/1 | (聖誕及新年假期) Christmas / New Year Recess |
| | 29 | 30 | 31 | | | | | | | | |

# Macao Polytechnic Institute

## 2nd Semester, 2019/20

| Week | Month | | | | | | | Events | | Public Holidays / Students' Recess | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **January 2020** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | 3 | (開課) First Day of Classes (2nd Semester) | 1 | (元旦) New Year Day |
| | | | | 1 | 2 | ③ | 4 | 4 | (期末考成績公佈) Final Grades Announced | | |
| 1 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 6-7 | (補考申請) Application for Re-sit Exam | | |
| 2 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 10-16 | (補考期) Re-sit Examinations | 23/1-2/2 | (春節假期) Lunar New Year Recess |
| 3 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 24 | (補考成績公佈) Re-sit Exam Grades Announced | | |
| | 26 | 27 | 28 | 29 | 30 | 31 | | | | | |
| | **February 2020** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | 1-2 | (春節假期) Lunar New Year Recess |
| | | | | | | | 1 | | | | |
| 4 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| 5 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | | | |
| 6 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | | | | |
| 7 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | | | |
| | **March 2020** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | | | | |
| 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | |
| 9 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | | | |
| 10 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | | | |
| 11 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | | | | |
| 12 | 29 | 30 | 31 | | | | | | | 30 | |
| | | | | | | | | | | 31 | |
| | **April 2020** | | | | | | | | | 4 | (清明節) Ching Ming Festival |
| | Su | M | T | W | T | F | Sa | | | 6 | (清明節之後首個工作日) First working day after Ching Ming Festival |
| | | | | 1 | 2 | 3 | 4 | | | | |
| 13 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | | 10 | (耶穌受難日) Good Friday |
| 14 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | 11 | (復活節前日) Holy Saturday/Easter Eve |
| | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 23 | (課堂結束) Last Day of Classes (2nd Sem) | 13 | (復活節前日之後首個工作日) First working day after Easter Eve |
| 15 | 26 | 27 | 28 | 29 | 30 | | | 24-27 | (複習/補課) Revision/Make-up Classes | | |
| | | | | | | | | 28/4-11/5 | (期末考試) Final Examinations (2nd Sem.) | 30 | (佛誕節) Buddha's Birthday |
| | **May 2020** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | 2-11 | (期末考試) Final Examinations (2nd Sem.) | 1 | (勞動節) Labour's Day |
| | | | | | | 1 | 2 | | | | |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | | | |
| | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 23 | (期末考試成績公佈) Final Grades Announced | | |
| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 25-26 | (補考申請) Application for Re-sit Exam | | |
| | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 29/5-4/6 | (補考期) Re-sit Examinations | | |
| | 31 | | | | | | | | | | |
| | **June 2020** | | | | | | | | | | |
| | Su | M | T | W | T | F | Sa | 1-4 | (補考期) Re-sit Examinations | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 11 | (補考成績公佈) Re-sit Exam Grades Announced | | |
| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | | | |
| | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | | | |
| | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | 25 | (端午節) Tuen Ng Festival |
| | 28 | 29 | 30 | | | | | | | | |

## A4. Class Timetable

**Master of Science in Big Data and Internet of Things**
**School of Applied Sciences**
**1$^{st}$ Semester of Academic Year 2019/2020**

| Weekday / Hour | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 19:00 - 22:00 | COMP6122-111 Introduction To Big Data A202 (Philip Lei) | COMP6123-111 Research Methodology A310 (Eddie Law) | COMP6101-111 Machine Learning A207 (Wang Yapeng) / COMP6102-111 Security & Authentication A310 (Ke Wei) | COMP6121-111 Introduction to IoT A206 (Eddie Law) | |

## A5. Textbook List

| Year | Course Name | Course Code | Teacher | Text Book (* = Reference Book) | Edition / Year | Publisher | Author | Remark / ISBN |
|---|---|---|---|---|---|---|---|---|
| 1 | Machine Learning | COMP6101 | Yapeng Wang | * Understanding Machine Learning: From Theory to Algorithms. | | Cambridge University Press | Shai Shalev-Shwartz and Shai Ben-David | |
| | | | | * Deep Learning. An MIT Press book | | http://www.deeplearning book.org | Ian Goodfellow, Yoshua Bengio and Aaron Courville | |
| | | | | * Reinforcement Learning: An Introduction | 2$^{nd}$ ed. | MIT Press | Richard S. Sutton and Andrew G. Barto | |
| | Security and Authentication | COMP6102 | Ke Wei | Security in Computing | 5$^{th}$ ed. | Prentice Hall | Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies | 9780134085043 |
| | | | | * Computer Security: Principles and Practice | 4$^{th}$ ed. | Pearson | William Stallings, Lawrie Brown | 9780134794105 |
| | | | | * Zero Trust Networks: Building Secure Systems in Untrusted Networks | 1$^{st}$ ed. | O'Reilly Media. | Evan Gilman, Doug Barth | 9781491962190 |
| | Introduction to Internet of Things | COMP6121 | Eddie Law | * Internet of Things, Architectures, Protocols and Standards | 2019 | John Wiley & Sons | Simone Cirani, Gianluigi Ferrari, Marco Picone, Luca Veltr | |
| | | | | * Arduino Applied: Comprehensive Projects for Everyday Electronics | 2019 | Apress | Neil Cameron | |
| | | | | * Real-Time BCI System Design to Control Arduino Based Speed Controllable Robot Using EEG | 2019 | Springer | Swagata Das, Devashree Tripathy, Jagdish Lal Raheja | |
| | | | | * Getting Started with Python for the Internet of Things | 2019 | Packt Publishing | Tim Cox, Steven Lawrence Fernandes, Sai Yamanoor, Srihari Yamanoor, Diwakar Vaish | |
| | | | | * Raspberry Pi IoT In C | 2016 | IO Press | Harry Fairhead | |
| | | | | * Building the Internet of Things with IPv6 and MIPv6 | 2013 | John Wiley& Sons | Daniel Minoli | |
| | Introduction to Big Data | COMP6122 | Philip Lei | * Big Data Analytics with Spark | 1$^{st}$ ed. | Apress | M. Guller | 9781484209653 |
| | | | | * Big Data Fundamentals: Concepts, Drivers & Techniques | 1$^{st}$ ed. | ServiceTech | T. Erl, W Khattak | 9780134291079 |
| | | | | * Hadoop: The Definitive Guide: Storage and Analysis at Internet Scale | 4$^{th}$ ed. | O'Reilly | T. White | 9781491901632 |
| | Research Methodology | COMP6123 | Eddie Law | No textbook required | | | | |