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INTRODUCTION
UTeM’s Senior Management

PROF. DR. GHAZALI BIN OMAR
Acting Vice Chancellor

PROF. DR. ZULKIFILIE BIN IBRAHIM
Deputy Vice Chancellor (Academic & International)

PROF. DR. GHAZALI BIN OMAR
Deputy Vice Chancellor (Research & Innovation)

ASSOC. PROF. DR. NURULFAJR BIN ABD MANAP
Deputy Vice Chancellor (Student Affairs)

ASSOC. PROF. IR. DR. MD NAZRI BIN OTHMAN
Assistant Vice Chancellor (Industry & Community)

ASSOC. PROF. Ts. MOHD RAHIMI BIN YUSOFF
Assistant Vice Chancellor (Development & Facility Management)
About UTeM

Universiti Teknikal Malaysia Melaka (UTeM) was established under Section 20 University and University College Act 1971 (Act 30) through “Perintah Universiti Teknikal Malaysia Melaka (Penerbadanan 2007)” gazetted as P.U. (A) 43 on the 1st of February 2007.
UTeM was initially known as Kolej Universiti Kebangsaan Malaysia (KUTKM), established on the 1st of December 2001.

VISION

To be one of the world’s leading innovative and creative technical universities.

MISSION

UTeM determined to lead and contribute to the wellbeing of the country and the world by:
1. Promoting knowledge through innovative teaching and learning, research and technical scholarship.
2. Developing professional leaders with impeccable moral values.
3. Generating sustainable development through smart partnership with the community and industry.

MOTTO

Excellence through competency
Education Goals and Objectives

Educational Goals:
1) To conduct academic and professional programmes based on relevant needs of the industries.
2) To produce graduates with relevant knowledge, technical competency, soft skills, social responsibility and accountability.
3) To cultivate scientific method, critical thinking, creative and innovative problem solving and autonomy in decision making amongst graduates.
4) To foster research development and innovation activities with industries for the prosperity of the Nation.
5) To equip graduates with leadership and teamwork skills as well as develop communication and life-long learning skills.
6) To develop technopreneurship and managerial skills amongst graduates.
7) To instill an appreciation of the arts and cultural values and awareness of healthy lifestyles amongst graduates.

Objectives:
1) To become a creative and innovative learning and knowledge organization that practice and application oriented academic programme in the fields of engineering and technology.
2) To lead in research, development, innovation, commercialization and consultancy activities based on the needs of the industry.
3) To produce competent graduates with moral who will be the preferred choice by the industry.
4) To have competent and highly qualified staff with vast practical experiences.
5) To play an effective role as the main impetus to the industrial development of the nation.
6) To establish cooperation and smart partnership between the university and the industries.
7) To provide infrastructure and conducive environment to generate and maintain excellence.
8) To implement comprehensive and extensive usage of ICT in both academic activities and management of the university.
Dean’s Message

Prof. Ts. Dr. Rabiah Ahmad
Dean,
Faculty of Information and Communication Technology

Assalamualaikum W.R.T. and Greetings,

On behalf of the Faculty members, I would like to welcome all of you to the Faculty of Information and Communication Technology, FTMK, Universiti Teknikal Malaysia Melaka, UTeM. It has been a privilege that you have chosen FTMK and we look ahead to support your success.

As the Dean of FTMK, it is my pleasure to serve you and enhance your learning experiences driven by industrial demand, practical oriented and professional certifications. It is important to note that you will gain much information and knowledge in related fields extracted from the curriculum and programmes offered. Throughout your undergraduate study, you will be attached to an academic advisor. Your academic advisor will provide guidance and advice in taking appropriate action for you to achieve success.

Apart from having an academic advisor, we at FTMK also provide structured information and it is documented in this academic handbook. The handbook will be your major reference in preparing your study plan and it is structured into four major topics, that is, programme educational objectives, facilities and their regulation, academic system and curriculum structure.

At the university, you are encouraged to have creative and critical thinking skill. In addition, you are also advised to focus and strive for academic success by actively engaging with classroom activities. These will help you survive in your working life. Moreover, you will receive great support and valuable experiences from the Faculty, which will aid you in facing global challenges as ICT leader in the future.

As a final note, I would like to express my appreciation to the Faculty Publication Committee and all parties involved in producing this academic handbook. Together we make a difference.

FTMK Truly World!
All the best and be a champion for today and future!
Faculty Vision, Mission and Objectives

Faculty Vision:
To become a creative, innovative and world class centre of excellence in education, research and services of information and communication technology field.

Faculty Mission:
To develop highly competent professionals with outstanding personalities through a world class technical education on the basis of application-oriented teaching, learning and research with smart partnership with industry and university.

Faculty Objectives:

i) To create ethical, competent and skilful ICT professionals of local, international and industry’s choice.

ii) To spearhead and develop applied research in the ICT field to produce new knowledge and innovative technology needed by the industry which can be commercialized and recognized internationally.

iii) To improve staff professionalism and competence and contribute to university income through consultation, professional training and continuous quality teaching.

iv) To improve ICT understanding, promote ICT culture in the society and provide social services which leads to social well-being and economic development.

v) To create continuous smart partnership with local and foreign industry and institutions of excellence.

vi) To develop high quality infrastructure and faculty administration system and support programme development to achieve faculty objectives.
Faculty’s Management
FTMK at a Glance

Faculty of Information and Communication Technology, for short FTMK, was one of the earliest formed faculty at Kolej Universiti Teknikal Malaysia Melaka (KUTKM) on the 1st December 2000. The faculty started to operate on 22nd June 2001 with its pioneer batch of students for academic session 2001/2002. Since 1st February 2007, Kolej Universiti Teknikal Malaysia Melaka (KUTKM) is known as Universiti Teknikal Malaysia Melaka (UTeM).

The faculty established five (5) departments as below:

1) Department of Software Engineering.
2) Department of Computer System and Communication.
3) Department of Interactive Media.
4) Department of Intelligent Computing and Analytics.
5) Department of Diploma Studies.

Department of Software Engineering

Software Engineering is a field of knowledge about computer software development using structured methods, techniques and schemes. In line with this, the Department of Software Engineering offers two bachelor programmes of Computer Science namely Software Development and Database Management. This department plays a major role in producing competent and professional software engineers to design and develop highly sophisticated and complex applications including Intelligent Systems. Our programmes have been designed carefully to produce professionals in software engineering with a combination of various technical aspects, soft skills and ethics.

The graduates are expected to understand the users, software and system requirements, competent in applying emerging software technologies design, manage, perform testing, maintain and develop the system with software engineering methodology. We also ensure that our graduates are equipped with project management skills, work ethics, risk management knowledge and the importance of team work in software development processes. The objective of specialization in Database Management is to produce skilled professionals in Database Management. The course equips the graduates with various skills such as database
analysis, design and development based on the system specifications. The students will also be exposed to data warehouse and data mining techniques. Application oriented approach could also produce highly competitive and creative software engineers in the job market.

Department of Interactive Media

The Department of Interactive Media offers undergraduate and graduate programmes in the area of multimedia. In addition to the basic courses in ICT, the programmes offered by this department focus on the concept of interactivity in the design and development of high quality multimedia products and web sites. This also includes applying the knowledge of interactivity in the area of computer graphics, animation, digital audio video technology, virtual reality and computer games development. With the emphasis on training and hands-on approach, we believe that the graduates are able to fulfill the job markets in the field of multimedia.

Department of Computer System and Communication

Computer System and Communication is a sub field of computer and telecommunication. The Internet is created based on communication systems that produce a complex computer networks which is built for LANs, MANs, WANs, mobile networks and massive global Internet in order to share information and having a human conversation with one another. Due to the necessity of computer networks towards the use of Internet in daily activities, Bachelor of Computer networking and Bachelor of Computer Security are introduced and act as the major bachelor programmes offered by Department of Computer System and Communication, to fulfill the nation’s need. Besides, students who have undergo this course are not only be knowledgeable and become expert in the area but also equipped with the professional certification for career advancement such as CompTIA and Cisco Academy certifications. Thus, students are more confident, creative and ready to face the challenges in real life in working environment.

In addition, throughout this programme, students are provided with fundamental of information technology subjects and are exposed with more advanced subjects that comprises of planning, designing, developing, troubleshooting and managing computer systems, computer networks and network security.
Department of Intelligent Computing and Analytics

Malaysia’s vision to become a developed country must be supported by the profound knowledge in advanced industrial technology. Hence, the Department of Intelligent Computing and Analytics was established to fulfill such aspiration by focusing on ICT applications in intelligent automation and augmented analytics. Intelligent automation is being used in many fields, from robotics and autonomous vehicles to cognitive computing and controlling quality, efficiency and business functionality that integrates multiple artificial intelligence, as well as machine learning and automation capabilities that tracks and automate business process and workflows. Augmented analytics on the other hand, is the next wave and the future trend to data and analytics. It is an approach that uses machine learning and natural language processing to automate insights by performing activities which includes data preparation, deciphering data pattern and building model as well as distribute and operationalizing data findings. Providing knowledge in both topics therefore prepares the students to stay at par with the needs and trends of the industry.

Department of Diploma Studies

Department of Diploma Studies is aimed to produce trained students in the field of computer technology and commercial computer application to meet the high demands from the government and private sectors. The programme is intended to produce students with knowledge in computer applications and programming. The students will also obtain professional certification as CCNA.
Postgraduate Coordinator & Programme Coordinators

**POSTGRADUATE COORDINATOR:**

Assoc. Prof. Ts. Dr. Siti Rahayu Selamat

**PROGRAMME COORDINATORS:**

1) **Master of Computer Science (Software Engineering), MITS**
Ts. Dr. Lizawati binti Salahuddin

2) **Master of Computer Science (Database Technology), MITD**
Ts. Noor Azilah Draman@Muda

3) **Master of Computer Science (Internetworking Technology), MITI**
Ts. Dr. Syarulnaziah binti Anawar

4) **Master of Computer Science (Security Science), MITZ**
Assoc. Prof. Ts. Dr. Siti Rahayu binti Selamat

5) **Master of Computer Science (Multimedia Computing), MCSM**
Ts. Dr. Sarni Suhaila binti Rahim

6) **Master of Technology (Data Science & Analytics), MTDS**
Ts. Dr. Halizah binti Basiron

7) **Master of Software Engineering (Mobile Development), MSMD**
Ts. Dr. Abdul Karim bin Mohamad

8) **Master of Information System, MIS**
Ts. Dr. Raja Rina binti Raja Ikram
Facilities

Lab Facilities

Faculty of Information and Communication Technology (FTMK) has been equipped with the state-of-art computers and software and integrated into UTeM Network. These facilities ease the process of teaching and learning in FTMK.

Averages of 36 computers with latest software are located at each lab and studio to ensure application oriented teaching and learning is applicable for the students. Server, router, switches, wireless, digital camera, video, biometric machines are also provided for teaching and learning purposes.

Lab Staffs

The labs in FTMK are administered by the Lab Coordinator assisted by Assistant Engineers to ensure smooth teaching and learning processes. The infrastructure committee members are responsible for maintaining and managing respective clients in FTMK environment.

Loan Facilities on Lab Equipment

Students are allowed to loan the lab equipment to complete their assignments or projects on time. The equipments that are allowed to be used are wireless equipment, video camera, digital camera, biometric tool and others.

Lab Operational Hours

During Semester:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Thursday</td>
<td>8:00am to 5:00pm</td>
</tr>
<tr>
<td>Friday</td>
<td>8:00am to 12:15pm</td>
</tr>
<tr>
<td></td>
<td>2:45pm to 5:00pm</td>
</tr>
</tbody>
</table>

During Semester Break:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Thursday</td>
<td>8:00am to 5:00pm</td>
</tr>
<tr>
<td>Friday</td>
<td>8:00am to 12:15pm</td>
</tr>
<tr>
<td></td>
<td>2:45pm to 5:00pm</td>
</tr>
</tbody>
</table>

Saturday-Sunday / Public Holidays Close
<table>
<thead>
<tr>
<th>NAME OF FACILITY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Hall</td>
<td>The hall is equipped with audio-visual facility for 250 pax at a time</td>
</tr>
<tr>
<td>Lecture Rooms</td>
<td>Rooms No. 1 to Room No. 12 with each room for 60 pax</td>
</tr>
<tr>
<td>Recording Capture System (ReCap)</td>
<td>Mini Theatre for interactive learning environment for 114 pax</td>
</tr>
<tr>
<td>Collaborative Learning Lab (CLeAR)</td>
<td>A collaborative learning lab with 60 pax capacity</td>
</tr>
<tr>
<td>Mini Theatre</td>
<td>The theatre room for student animation presentation for 15 pax</td>
</tr>
<tr>
<td>Virtual Reality Studio</td>
<td>Lab for motion capture and games development</td>
</tr>
<tr>
<td>Photography / Recording Studio</td>
<td>Multimedia recording and editing studio</td>
</tr>
<tr>
<td>University-Industry Lab</td>
<td>Coordinated Malware Eradication and Remediation Project (CMERP) Satellite Lab – collaboration with Cyber Security Malaysia</td>
</tr>
<tr>
<td>Research Labs</td>
<td>Seven (7) research labs for postgraduates students based on faculty’s research clusters:</td>
</tr>
<tr>
<td></td>
<td>1. Innovative Software System &amp; Services (IS3) Lab</td>
</tr>
<tr>
<td></td>
<td>2. Information Security Forensics &amp; Computer Networking (INSFORNET) Lab</td>
</tr>
<tr>
<td></td>
<td>3. Optimization, Modelling, Analytics and Simulation (OptiMAS) Lab</td>
</tr>
<tr>
<td></td>
<td>4. Computational Intelligence and Technologies (CIT) Lab</td>
</tr>
<tr>
<td></td>
<td>5. Human Centered Computing and Information Systems Lab (HCC-ISL) Lab</td>
</tr>
<tr>
<td></td>
<td>6. Pervasive Computing &amp; Educational Technology (PET) Lab</td>
</tr>
<tr>
<td></td>
<td>7. Biomedical and Engineering (BIOCORE) Lab</td>
</tr>
</tbody>
</table>
Teaching Labs
1. Computer Game Lab
2. Software Engineering Lab 1, 2 and 3
3. Programming Lab 1, 2, 3 and 4
4. Database Lab 1, 2 and 3
5. Network Lab 1 and 2
6. CCNA & CCNP Lab
7. Fiber Optic Lab
8. Security Lab
9. System / Hardware Lab
10. Wireless Lab
11. Virtual Reality Lab
12. Multimedia Lab 1, 2, 3 and 4
13. Artificial Intelligence Lab 1, 2, 3 and 4
14. Student Workshop Lab

Other Facilities
1. Visiting Professor Rooms
2. Executive Lab
3. Administration Office – Level 2 & 3
4. FTMK Club Room (FICTS)
5. Surau or Prayer Room
6. Lobby Area
7. Parking Area for students and staffs
Lab Usage Regulation

1. Students must display their matric card at all times in the lab.
2. Students are not allowed to bring in their bags into the lab.
3. Students are not allowed to eat/drink or bring in any foods or drinks into the lab.
4. Students are not allowed to wear sandals in the lab except sandals with back straps for female students and covered sandals for male students.
5. Students are not allowed to wear t-shirt without collar in the lab. UTeM’s students’ dress code is referred.
6. All lab equipment used must be returned in its original condition.
7. Chairs must be arranged neatly after use.
8. Don’t leave used papers or litters in the lab. Please throw it into rubbish bin if it is not needed anymore.
9. All equipment must be switched off after used.
10. Students should not enter the lab without lecturers’ or tutors’ presence.
11. For after-hours lab usage, students must record their details in the lab record book and submit their matric card to Assistant Engineers in duty.
12. Students are prohibited from playing games, chatting or surfing the net for unrelated content in the lab.
13. Students are not allowed to bring out any lab equipment except with permission from the lecturers or Assistant Engineers in duty.
14. Students are not allowed to bring in laptop, CPU, monitor, mouse, CD, VCD or any computer equipment except with permission from the lecturers or Assistant Engineers in duty.
15. Users are not allowed to do any installation on computers in the lab.
16. All requests for software installation into students’ laptop will not be entertained.
17. Students must report immediately to lecturer or Assistant Engineers on duty if any lab equipment got lost or broken during their students’ usage.

18. Students must report immediately to lecturer or Assistant Engineers on duty if there is any lab equipment that is lost or broken prior to the students’ usage.

19. Research labs are for post graduates’ students ONLY. Post-graduate students can get the access by referring to their supervisor.

20. Any matters related to lab usage after teaching and learning must be directed to Lab Coordinator of FTMK.

DISCIPLINARY ACTIONS WILL BE TAKEN AGAINST ANY STUDENT WHO IS FOUND BREAKING ANY RULE LISTED ABOVE.
Duration of Studies

<table>
<thead>
<tr>
<th>Duration of studies (Full Time)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year (2 normal semesters and 1 short semesters)</td>
<td>3 years (6 normal semesters and 2 short semesters)</td>
<td></td>
</tr>
<tr>
<td>Duration of studies (Part Time)</td>
<td>2 years (4 normal semesters and 2 short semesters)</td>
<td>4 years (8 normal semesters and 4 short semesters)</td>
</tr>
</tbody>
</table>

Academic System

The university has implemented its academic system according to semester system. The semester system is widely used in local higher learning institutions in Malaysia.

While student’s achievement in courses taken is shown by grades. The relationship between marks, grades and evaluation points is shown in the following table.

<table>
<thead>
<tr>
<th>Marks</th>
<th>Letter Grades</th>
<th>Grade Points</th>
<th>Remarks</th>
<th>Credit Hours Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 - 100</td>
<td>A</td>
<td>4.0</td>
<td>Excellent</td>
<td>Yes</td>
</tr>
<tr>
<td>75 - 79</td>
<td>A–</td>
<td>3.7</td>
<td>Very Good</td>
<td>Yes</td>
</tr>
<tr>
<td>70 - 74</td>
<td>B+</td>
<td>3.3</td>
<td>Good</td>
<td>Yes</td>
</tr>
<tr>
<td>65 - 69</td>
<td>B</td>
<td>3.0</td>
<td>Pass</td>
<td>Yes</td>
</tr>
<tr>
<td>60 - 64</td>
<td>B–</td>
<td>2.7</td>
<td>Conditional Pass (Redeemable)</td>
<td>Yes</td>
</tr>
<tr>
<td>55 - 59</td>
<td>C+</td>
<td>2.3</td>
<td>Fail</td>
<td>No</td>
</tr>
<tr>
<td>50 - 54</td>
<td>C</td>
<td>2.0</td>
<td>Fail</td>
<td>No</td>
</tr>
<tr>
<td>47 - 49</td>
<td>C–</td>
<td>1.7</td>
<td>Fail</td>
<td>No</td>
</tr>
<tr>
<td>44 - 46</td>
<td>D+</td>
<td>1.3</td>
<td>Fail</td>
<td>No</td>
</tr>
<tr>
<td>40 - 43</td>
<td>D</td>
<td>1.0</td>
<td>Fail</td>
<td>No</td>
</tr>
<tr>
<td>0 - 39</td>
<td>E</td>
<td>0.0</td>
<td>Fail</td>
<td>No</td>
</tr>
</tbody>
</table>
Entry Requirements

University General Requirements:

a) Bachelor of Computer Science (honours) with good grades (minimum CGPA of 2.75 or equivalent) from UTeM or any other institutions of higher learning recognised by the Senate; OR

b) Any other qualification that are approved equivalent to a Bachelor of Computer Science (Hons) or other qualifications and experience recognized by the Senate; OR

c) Candidates with Bachelor’s degree whose CGPA is between 2.74 and 2.00, relevant work experience in the related fields will be considered. ONE (1) year relevant experience will be considered as equivalent to 0.1 CGPA;

d) Candidates with diploma qualification and minimum work experience of TEN (10) years in the relevant field of interest will be considered together with UTeM’s Accredited Prior Experiential Learning (APEL) where MQA APEL application should be made directly to the MQA and approval must first be obtained before applying to UTeM programme.

Language Requirements:

For international applicants, the following additional requirements must be fulfilled:

a) Minimum score is 520 for the Test of English as a Foreign Language (TOEFL) or minimum score is 5.0 for the International English Language Testing System (IELTS) or minimum band 3.0 for Malaysian University English Test (MUET).

b) Applicants without TOEFL/IELTS or for those who obtained a score below the requirement above are required to undergo and pass the English language programme conducted by UTeM prior to commencement of the postgraduate programme.

c) Exemption may be given to those who have undertaken regular programmes of studies and graduated from universities that use English as the medium of instruction or who has graduated from UTeM in a programme with English as the medium of instruction.
**Programme’s Specific Requirements:**

a) A Bachelor’s Degree (honours) in area focusing on numeracy skills including computing, engineering, mathematics, physical sciences and other fields that have sound statistical and computing background, with good grades (minimum CGPA of 2.75 or equivalent) from UTeM or any other institutions of higher learning recognised by Senate.

b) Candidates without a computing degree need to complete bridge/prerequisites courses prior to the enrollment into the programme.

c) Waiver to bridge/prerequisites courses may be granted if an equivalent course has already been successfully completed, or prove of relevant work experience, that are recognised by the Senate

**only apply for Master of Technology, Master of Software Engineering and Master of Information System**
MASTER OF COMPUTER SCIENCE
(SOFTWARE ENGINEERING)
MASTER OF COMPUTER SCIENCE (SOFTWARE ENGINEERING)

The Master of Computer Science (Software Engineering), for short MITS, is specifically designed to equip students with knowledge and technical skills on software engineering and software engineering management that can meet industry needs.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

**PEO1:** Practice in-depth knowledge and skills of Computer Science with specialization in Software Engineering field.

**PEO2:** Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures towards lifelong learning.

**PEO3:** Demonstrate knowledge of current issues in technology through learning and research activities using scientific methods.

**PEO4:** Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community and business.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

**PO1:** Demonstrate originality and independence in undertaking analytical and critical evaluation, and synthesis of complex information, specialized concepts, theories, methods and practice in Computer Science;

**PO2:** Apply knowledge and quantitative skills critically and collectively to manage and resolve complex problems or issues in field of software engineering;

**PO3:** Apply the practical skill in working environment related to software engineering field;

**PO4:** Communicate effectively the knowledge, skills, ideas, critique and rationale in both written and verbal forms using appropriate methods to peers, experts, and non-experts;

**PO5:** Competently use a wide range of suitable digital technologies to design and plan evaluation activities for enhancing study, research and practice;

**PO6:** Demonstrate significant autonomy, independence and leadership skills at work and class with self-advancement through continuous academic or professional development; and

**PO7:** Initiate or lead entrepreneurial projects and adhere to legal, ethical, professional and sustainable practices.
### Programme Structure

#### September Intake:

<table>
<thead>
<tr>
<th>Semester 1 (September)</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Code</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>MPSW 5013</td>
<td>Research Methodology</td>
</tr>
<tr>
<td>MPSW XXXX</td>
<td>University Course</td>
</tr>
<tr>
<td>MITP 5113</td>
<td>Algorithm Analysis and Design</td>
</tr>
<tr>
<td>MITS 5313</td>
<td>Advanced Data Communications and Network</td>
</tr>
<tr>
<td>MITP 5213</td>
<td>Advanced Software Engineering</td>
</tr>
<tr>
<td>MITP XXXX</td>
<td>Elective 1</td>
</tr>
<tr>
<td><strong>Total credit</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 2 (February)</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Code</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>MITP 5244</td>
<td>Advanced Software Project Management</td>
</tr>
<tr>
<td>MITP 5233</td>
<td>Requirements Engineering</td>
</tr>
<tr>
<td>MITP 5263</td>
<td>Software Testing</td>
</tr>
<tr>
<td>MITU 5213</td>
<td>Project 1</td>
</tr>
<tr>
<td>MITP XXXX</td>
<td>Elective 2</td>
</tr>
<tr>
<td><strong>Total credit</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 3 (Short Semester)</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Code</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>MITU 5226</td>
<td>Project 2</td>
</tr>
<tr>
<td><strong>Total credit</strong></td>
<td></td>
</tr>
</tbody>
</table>
February Intake:

<table>
<thead>
<tr>
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Elective Courses - choose TWO (2) only:

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<td>MITP 5563</td>
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<tr>
<td>MSMD 5123</td>
<td>Internet of Things Application Development</td>
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Note: Total credit hours = 40 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.
CLO2: Synthesize relevant literature to address the knowledge gaps.
CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:

MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:

MPSW 5073 Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the core concepts and principles, functions, and process in project management.

CLO2: Develop a comprehensive & viable project proposal.

CLO3: Evaluate best practices and methodology in project management.

Synopsis:

This subject focuses on the principles of project management based on Project Management Body of Knowledge (PMBOK). Students will be familiarized with the Project Management process group functions (initiating, planning, executing, controlling and closing) and project knowledge areas (integration, scope, time, cost, quality and human resources). Various tools for supporting the analysis of works in project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, work breakdown structure, managing uncertainty, building project plan, implementing and revising project plan, completing the project and contract laws. Microsoft Project (MS Project) will be introduced as project management software tools.

References:


MPSW 5033 Engineering Technology Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the principles of engineering management and technology management across different industries.

CLO2: Apply relevant issues in engineering management and technology management across different industries.
CLO3: Analysis the impact of relevant issues in the context of engineering management and technology management across different industries.

Synopsis:

The course consists of two components, i.e., Engineering Management and Technology Management. Topics in Engineering Management provide a vehicle for engineers and technical specialist to enhance their knowledge on management, organizational structure and behavior of engineering/technical organizations. Additional topics will enhance the knowledge and competencies in the management of engineering activities such as design, operations, and quality. The Technology Management part of the course will equip students with contemporary views and tools on management of technology and its impact on an organization. It emphasizes management of innovation and new product development as well as managing technology and knowledge. The interaction of technology and the law, particularly the knowledge management and intellectual property will be covered.

References:


MPSW 5053 Quality Systems Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of Quality.
CLO2: Identify Quality System Management information.
CLO3: Propose Quality System Management techniques and tools in the practice of organizations.

Synopsis:

This course presents the fundamental elements of Quality Management System including the importance of quality as a strategy for continuous improvement in business
performance. It explains the strategies for competitive quality in design and manufacture as well as in terms of customer supply chain concept of total quality aspect. Such topics include Management systems ISO, variability, Six Sigma, Taguchi method, failure mode and effect analysis (FMEA) and quality function deployment. Several quality control tools such as Pareto chart, bar chart and scatter diagram will be cover in statistical data collection, measurement and analysis. Finally, concepts of benchmarking and ISO standards with respect to control elements will be integrated with the Total Quality Management (TQM) as part of quality Management system.

References:


MITU 5213 Project 1

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Formulate the problems, objectives and scope based on complex technology solutions.
CLO2: Perform literature review and appropriate methodology to complete the project.
CLO3: Defend the proposed project solutions in written and verbal forms.

Synopsis:

This course is the first part of project that requires a student to prepare a master research proposal based on the theories and techniques of technologies learnt previously. Student is required to write three chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review and Chapter 3: Research Methodology. Besides writing the proposal, student needs to present and defend his/her proposal. Student is expected to demonstrate ability to identify and propose solutions to the identified problems.

References:

2. Cresswell, J. W., and Creswell, J.D., Research Design: Qualitative, Quantitative,
MITU 5226 Project 2

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate solutions to the proposed project.
CLO2: Verify solutions to understand the strengths, weaknesses and limitations of the project.
CLO3: Defend the contributions of the project in written and verbal forms.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of technologies learnt previously. Student must write the second fold of dissertation which consists of four chapters of dissertation i.e. Chapter 4: Analysis & Design, Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solution developed as the end product of this project. Student is required to justify the contribution of the proposed solution throughout the presentation sessions.

MITP 5113 Algorithm Analysis and Design

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify algorithm design technique and method of analysis.
CLO2: Explain algorithms efficiency in terms of the amount of resources, which are time and storage space required to execute the algorithm.
CLO3: Explain algorithm design technique based on problem type.

Synopsis:

This course introduces the students to the fundamentals principles of design and analysis of algorithms. It covers formal techniques to support the design and analysis of algorithms that emphasizes on both the underlying mathematical theory and practical considerations of efficiency. By learning a range of algorithm design techniques as Brute Force, Divide & Conquer, Decrease

References:

& Conquer, Transform and Conquer, Greedy Algorithms and Dynamic Programming, students should be able to develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviors of algorithms and the notion of tractable and intractable problems will be discussed.

References:


MITS 5313 Advanced Data Communications and Network

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate the theory of data communications related to the network models in current technologies.

CLO2: Manipulate the implementation in managing network infrastructure and services with the emerging trends and technologies.

CLO3: Relate the present research in data communications and networking in order to apply in the real environment based on the concept.

Synopsis:

This course introduces the fundamental concepts and terminology of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and ap-
ply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring the computer networks using guided or unguided media.

References:


**MITP 5244 Advanced Software Project Management**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse various methodologies to improve success of a software project.
CLO2: Display the best-practices for cross-functional teams in a software project.
CLO3: Propose a risk management plan for managing risk activities on a software project.

Synopsis:

This course involves managing a project from inception to completion and the successful attainment of the project’s objectives. The course provides the opportunity to gain the understanding, knowledge and skills necessary for performing the role of project manager in leading a cross-functional team in a certain project. It also exposes students to analyse project methodologies in managing and monitoring people, budget and schedule as well as to manage risks that might occur in a software project.

References:


MITP 5213 Advanced Software Engineering

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the concepts and develop a contemporary knowledge of software engineering.

CLO2: Explain software engineering methodology or model with the appropriate concepts in an efficient and ethical manner.

CLO3: Integrate different software engineering methodology or models for problem solving applications.

Synopsis:

This course provides students with software engineering methodology, knowledge, skills and discipline in developing application software. The course exposes student to Enterprise Architecture approach in software engineering process including software development process and technique, requirement engineering, software testing and quality, and software cost estimation. At the end of the course the student should be able to manage a software development project effectively and systematically, and produce a software product in a quality manner.

References:


MITP5233 Requirements Engineering

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse the concept of requirements engineering process in software development practice.

CLO2: Discriminate the best techniques to improve problem understanding, requirements elicitation, analysis, specification and validation.

CLO3: Prepare quality software requirements specifications through requirements engineering best practices.

Synopsis:

Requirements are a critical factor in the success or failure of software engineering projects. A large proportion of errors detected in released software can be traced back to faulty requirements or a poor understanding of the problem domain. The aim of this course is to explore the development of requirements, to provide a deeper understanding of requirements engineering process, the role and impact of requirements on software projects and the techniques and tools for improving problem understanding, requirements analysis and requirements specification.

References:


MITP 5263 Software Testing

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Recommend a suitable software testing level, types and techniques in software development.

CLO2: Perform software testing activity in software projects.

CLO3: Practice testing management ethically to assure software quality using testing techniques and tools.
Synopsis:

This course discusses software faults and techniques to reduce defects and improve software quality. Software systems are some of the most complex human artefacts ever built and some of the most critical means to ensure our safety, wellbeing, and prosperity. This course covers techniques to ensure software systems perform their function correctly. The course will discuss how tests can be derived from requirements and specifications, design artefacts, or the source code, and introduce proper testing tools used in several exercises.

References:


MITP 5253 Software Quality

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain software quality assurance, standards, metrics and measurements.

CLO2: Integrate the current scenario or issues related to software quality topics.

CLO3: Practice software quality assurance plan which include organization, procedure, documentation, standard model measurement and metrics.

Synopsis:

The course discuss on quality term as a multifaced concept which can be described from many perspectives. Then this quality issues is extended into software context where assuring software quality is critical in software development. Therefore an organization requires planned quality assurance to ensure quality embedded into the software. Software metrics are tools of measurement attributes of a system, component or process possess a given attribute are essential in software engineering. The use of process standards in the entire software development and product standards are also integral part of assuring quality.
References:


**MITP 5273 Secure Software Development**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate suitable secure software development models, methodologies and techniques to be used in the software development lifecycle.

CLO2: Prepare secure software development activities for software projects.

CLO3: Propose appropriate techniques and tools to develop secure software systems.

Synopsis:

This course discusses software faults and techniques to reduce defects and improve software quality. Software systems are some of the most complex human artefacts ever built and some of the most critical means to ensure our safety, wellbeing, and prosperity. This course covers techniques to ensure software systems perform their function correctly. The course will discuss how tests can be derived from requirements and specifications, design artefacts, or the source code, and introduce proper testing tools used in several exercises.

References:

MITP 5563 Advanced Database System Principles

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain advanced data modeling concepts, query processing and issues in designing, developing and managing database systems.

CLO2: Construct advanced data model and queries based on user requirements of a database system.

CLO3: Identify various issues in managing database systems such as security, data quality and ethics.

Synopsis:

Understanding how to analyze and model the data in the organization is fundamental to the management of databases. This course will have advanced topics component that aim at knowledge regarding the implementation of database management systems as well as insights into the development and administration of database systems in various environments. This course explores key aspects of database system analysis, design and implementation, focusing on various topics from advanced concepts in modeling, query processing, performance tuning, transaction management and other current issues.

References:


MSMD 5123 Internet of Things Application Development

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Discover convergence of technologies and emerging applications of IoT.

CLO2: Evaluate of IoT products, platforms, and applications.

CLO3: Design and develop smart IoT applications.

Synopsis:

The student will learn to develop Internet of Things (IoT) applications for various purposes on the latest cloud and mobile phone platforms. The Internet of Things allows billions of devices, sensors, cloud infrastructure and business intelligence tools to come together to enable people to make informed decisions. This helps businesses to drive more innovation and services. Graduates from this course would be in high demand as they would have acquired the right skills to develop smart applications and services to respond to industry’s needs. This course covers the concepts of the Internet of Things (IoT), its conceptual framework and how the IoT contributes to business and daily life. It will also cover the IoT architecture and gives an overview of the core technologies required for supporting IoT. It also provides knowledge on both the underlying technologies which support IoT and M2M communications, and engages the students in the creative development of simulation scenarios for innovative Internet of Things applications.

References:


MASTER OF COMPUTER SCIENCE
(DATABASE TECHNOLOGY)
MASTER OF COMPUTER SCIENCE (DATABASE TECHNOLOGY)

This programme is specifically designed to equip students with the knowledge and technical skills on technology, design and database management that can meet industry needs.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

**PEO1**: Practice in-depth knowledge and skills of Computer Science with specialization in Database Technology field.

**PEO2**: Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures towards lifelong learning.

**PEO3**: Demonstrate knowledge of current issues in technology through learning and research activities using scientific methods.

**PEO4**: Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community and business.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

**PO1:** Demonstrate originality and independence in undertaking analytical and critical evaluation, and synthesis of complex information, specialized concepts, theories, methods and practice in Computer Science;

**PO2:** Apply knowledge and quantitative skills critically and collectively to manage and resolve complex problems or issues in the field of Database Technology;

**PO3:** Apply the practical skill in working environment related to database technology field;

**PO4:** Communicate effectively the knowledge, skills, ideas, critique and rationale in both written and verbal forms using appropriate methods to peers, experts, and non-experts;

**PO5:** Competently use a wide range of suitable digital technologies to design and plan evaluation activities for enhancing study, research and practice;

**PO6:** Demonstrate significant autonomy, independence and leadership skills at work and class with self-advancement through continuous academic or professional development; and

**PO7:** Initiate or lead entrepreneurial projects and adhere to legal, ethical, professional and sustainable practices.
Programme Structure

September Intake:

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**Total credit** 19

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**Total credit** 6

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**Total credit** 18
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<td>MSMD 5213</td>
<td>Agile Project Management</td>
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**Note:** Total credit hours = 40 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.

CLO2: Synthesize relevant literature to address the knowledge gaps.

CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:

MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:

MPSW 5073 Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the core concepts and principles, functions, and process in project management.
CLO2: Develop a comprehensive & viable project proposal.
CLO3: Evaluate best practices and methodology in project management.

Synopsis:

This subject focuses on the principles of project management based on Project Management Body of Knowledge (PMBOK). Students will be familiarized with the Project Management process group functions (initiating, planning, executing, controlling and closing) and project knowledge areas (integration, scope, time, cost, quality and human resources). Various tools for supporting the analysis of works in project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, work breakdown structure, managing uncertainty, building project plan, implementing and revising project plan, completing the project and contract laws. Microsoft Project (MS Project) will be introduced as project management software tools.

References:


MPSW 5033 Engineering Technology Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the principles of engineering management and technology management across different industries.
CLO2: Apply relevant issues in engineering management and technology management across different industries.
CLO3: Analysis the impact of relevant issues in the context of engineering management and technology management across different industries.

Synopsis:

The course consists of two components, i.e., Engineering Management and Technology Management. Topics in Engineering Management provide a vehicle for engineers and technical specialist to enhance their knowledge on management, organizational structure and behavior of engineering/technical organizations. Additional topics will enhance the knowledge and competencies in the management of engineering activities such as design, operations, and quality. The Technology Management part of the course will equip students with contemporary views and tools on management of technology and its impact on an organization. It emphasizes management of innovation and new product development as well as managing technology and knowledge. The interaction of technology and the law, particularly the knowledge management and intellectual property will be covered.

References:


MPSW 5053 Quality Systems Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of Quality.
CLO2: Identify Quality System Management information.
CLO3: Propose Quality System Management techniques and tools in the practice of organizations.

Synopsis:

This course presents the fundamental elements of Quality Management System including the importance of quality as a strategy for continuous improvement in business
performance. It explains the strategies for competitive quality in design and manufacture as well as in terms of customer supply chain concept of total quality aspect. Such topics include Management systems ISO, variability, Six Sigma, Taguchi method, failure mode and effect analysis (FMEA) and quality function deployment. Several quality control tools such as Pareto chart, bar chart and scatter diagram will be cover in statistical data collection, measurement and analysis. Finally, concepts of benchmarking and ISO standards with respect to control elements will be integrated with the Total Quality Management (TQM) as part of quality Management system.

References:


MITU 5213 Project 1

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Formulate the problems, objectives and scope based on complex technology solutions.

CLO2: Perform literature review and appropriate methodology to complete the project.

CLO3: Defend the proposed project solutions in written and verbal forms.

Synopsis:

This course is the first part of project that requires a student to prepare a master research proposal based on the theories and techniques of technologies learnt previously. Student is required to write three chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review and Chapter 3: Research Methodology. Besides writing the proposal, student needs to present and defend his/her proposal. Student is expected to demonstrate ability to identify and propose solutions to the identified problems.

References:

2. Cresswell, J. W., and Creswell, J.D., Research Design: Qualitative, Quantitative,

MITU 5226 Project 2

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate solutions to the proposed project.
CLO2: Verify solutions to understand the strengths, weaknesses and limitations of the project.
CLO3: Defend the contributions of the project in written and verbal forms.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of technologies learnt previously. Student must write the second fold of dissertation which consists of four chapters of dissertation i.e. Chapter 4: Analysis & Design, Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solution developed as the end product of this project. Student is required to justify the contribution of the proposed solution throughout the presentation sessions.

References:


MITP 5113 Algorithm Analysis and Design

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify algorithm design technique and method of analysis.
CLO2: Explain algorithms efficiency in terms of the amount of resources, which are time and storage space required to execute the algorithm.
CLO3: Explain algorithm design technique based on problem type.

Synopsis:

This course introduces the students to the fundamentals principles of design and analysis of algorithms. It covers formal techniques to support the design and analysis of algorithms that emphasizes on both the underlying mathematical theory and practical considerations of efficiency. By learning a range of algorithm design techniques as Brute Force, Divide & Conquer, Decrease
& Conquer, Transform and Conquer, Greedy Algorithms and Dynamic Programming, students should be able to develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviors of algorithms and the notion of tractable and intractable problems will be discussed.

References:


MITS 5313 Advanced Data Communications and Network

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate the theory of data communications related to the network models in current technologies.

CLO2: Manipulate the implementation in managing network infrastructure and services with the emerging trends and technologies.

CLO3: Relate the present research in data communications and networking in order to apply in the real environment based on the concept.

Synopsis:

This course introduces the fundamental concepts and terminology of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and ap-
ply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring the computer networks using guided or unguided media.

References:

MITP 5364 Big Data Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Distinguish the eco system for big data.

CLO2: Demonstrate the performance of various data analytics techniques.

CLO3: Implement star schemas and data mining techniques.

Synopsis:

This course not only explores the fundamentals of big data, but also the eco system, challenges and applications of big data. Students are exposed to the framework (Hadoop), distributed data processing programming (MapReduce), programming languages/tools (e.g. R, Python) and NoSQL storage solution (e.g. Cassandra, MongoDB) and data analytics techniques (e.g. association rules, classification, clustering and text analysis).

References:
MITP 5523 Database Administration and Security

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Examine the concepts, techniques, and issues in the administration and security of the database systems, environments, and applications.

CLO2: Demonstrate the ability to apply appropriate technical and investigative techniques in solving problems related to database administration and security using recent technologies and solutions.

CLO3: Propose the application of efficient administration and security methods in databases and other areas such as network and the internet.

Synopsis:

This course covers the concepts, techniques, and issues in the administration and security of database systems, environments, and applications. Students will gain knowledge on the current database administration and security techniques and practices. They will also explore how to manage various structures in the database and conduct performance monitoring, user management as well as backup and recovery techniques. As for database security, students will learn how to secure the database from potential attacks and threats. Topics include data availability, integrity, and security, security architecture, database application security models, virtual private databases, and database auditing. In this course, students will also exercise information seeking about issues and recent technologies in database administration and data security.

References:


MITP 5353 Spatial Databases

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the trend of different topics in spatial data via independent study and research.
CLO2: Develop skills of using Spatial Analysis for solving practical problems.
CLO3: Apply the knowledge in current trend of spatial data projects.

Synopsis:
The aim of the subject is to facilitate students’ critical appreciation of current developments and concerns in spatial database and its use in business, environmental and resources managements, prediction future scenario. Students will evaluate the impact of the current developments and issues for their own work roles. The content will be a negotiated set of topics based on current developments in spatial database and spatial information development. The course also give students experience in critical reading and analyzing journal literature’s.

References:

MITP 5563 Advanced Database System Principles

Learning Outcomes:
At the end of the course, students should be able to:
CLO1: Explain advanced data modeling concepts, query processing and issues in designing, developing and managing database systems.
CLO2: Construct advanced data model and queries based on user requirements of a database system.
CLO3: Identify various issues in managing database systems such as security, data quality and ethics.

Synopsis:
Understanding how to analyze and model the data in the organization is fundamental to the management of databases. This course will have advanced topics component that aim at knowledge regarding the implementation of database management systems as well as insights into the development and administration of database systems in various environments. This course explores key aspects of database system analysis, design and implementation, focusing on various topics from advanced concepts in mod-
eling, query processing, performance tuning, transaction management and other current issues.

References:


MITP 5553 Data Warehousing and Data Mining

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Design data warehouses based on the data warehousing model and lifecycle.

CLO2: Demonstrate the performance of data warehousing and data mining techniques.

CLO3: Implement star schemas and data mining techniques.

Synopsis:

This subject focuses on two parts: data warehousing and data mining. The data warehousing portion covers the fundamentals of data warehousing, multidimensional data analysis and factors involved in the analysis, planning, design, loading, maintenance and exploitation of successful data warehouse. The data mining portion covers the fundamentals of data mining, techniques, algorithms, tools and topics in knowledge discovery.

References:


**MITP 5343 Data Integration**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Design data integration strategy using string, schema and data matching.
CLO2: Examine query processing requirements for data integration.
CLO3: Prepare data integration implementation report.

Synopsis:

Data integration problems arise whenever data from separate sources need to be combined as the basis for new applications. The availability of integrated data from multiple independent, heterogeneous data sources is crucial for many applications. The course introduces the fundamental of data integration, where issues arising in data integration, the theoretical foundations of the area, and algorithms and software systems that facilitating integration will be covered.

References:


**MITP 5253 Software Quality**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain software quality assurance, standards, metrics and measurements.
CLO2: Integrate the current scenario or issues related to software quality topics.
CLO3: Practice software quality assurance plan which include organization, procedure, documentation, standard model measurement and metrics.
Synopsis:

The course discusses on quality term as a multifaced concept which can be described from many perspectives. Then this quality issue is extended into software context where assuring software quality is critical in software development. Therefore an organization requires planned quality assurance to ensure quality embedded into the software. Software metrics are tools of measurement attributes of a system, component or process possess a given attribute are essential in software engineering. The use of process standards in the entire software development and product standards are also integral part of assuring quality.

References:


MSMD 5213 Agile Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply the concept of agile project management for any IT projects.
CLO2: Work on the principles and practices of agile project management in the IT projects.
CLO3: Follow the standard guideline to produce a project vision and the product roadmap in a collaborative team environment for the purpose of IT project completion.

Synopsis:

This subject introduces the basic concept of agile project management to the student. It covers the agile project management process which includes agile tools and techniques for today knowledge-based projects. A knowledge-based project requires the project manager to manage, optimize and facilitate knowledge as a resource throughout the duration. This subject also covers support areas such as risk management. This subject exposes the student to
the transition of a traditional project management into an agile project management.

References:
MASTER OF COMPUTER SCIENCE
(INTERNETWORKING TECHNOLOGY)
MASTER OF COMPUTER SCIENCE (INTERNETWORKING TECHNOLOGY)

This programme is specifically designed to equip students with the latest technical knowledge and advanced technology in internetworking that can meet industry needs.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

**PEO1:** Practice in-depth knowledge and skills of Computer Science with specialization in Internetworking Technology field.

**PEO2:** Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures towards lifelong learning.

**PEO3:** Demonstrate knowledge of current issues in technology through learning and research activities using scientific methods.

**PEO4:** Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community and business.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

**PO1:** Demonstrate originality and independence in undertaking analytical and critical evaluation, and synthesis of complex information, specialized concepts, theories, methods and practice in Computer Science;

**PO2:** Apply knowledge and quantitative skills critically and collectively to manage and resolve complex problems or issues in the field of Internetworking Technology;

**PO3:** Apply the practical skill in working environment related to internetworking technology field;

**PO4:** Communicate effectively the knowledge, skills, ideas, critique and rationale in both written and verbal forms using appropriate methods to peers, experts, and non-experts;

**PO5:** Competently use a wide range of suitable digital technologies to design and plan evaluation activities for enhancing study, research and practice;

**PO6:** Demonstrate significant autonomy, independence and leadership skills at work and class with self-advancement through continuous academic or professional development; and

**PO7:** Initiate or lead entrepreneurial projects and adhere to legal, ethical, professional and sustainable practices.
Programme Structure

September Intake:

<table>
<thead>
<tr>
<th>Semester 1 (September)</th>
<th>Course Code</th>
<th>Course</th>
<th>Credit</th>
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<tr>
<td></td>
<td>MPSW 5013</td>
<td>Research Methodology</td>
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<td>MPSW XXXX</td>
<td>University Course</td>
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<tr>
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<td>MITP 5113</td>
<td>Algorithm Analysis and Design</td>
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<td>Advanced Data Communications and Network</td>
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<td>Distributed Computing Systems</td>
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<td>MITS 5343</td>
<td>Advanced Network Design and Diagnostics</td>
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<td>MITS 5354</td>
<td>Internet Security</td>
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<td>MITU 5213</td>
<td>Project 1</td>
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University Courses - choose ONE (1) only:

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<td>Engineering and Technology Management</td>
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<tr>
<td>MPSW 5053</td>
<td>Quality System Management</td>
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<tr>
<td>MPSW 5063</td>
<td>Entrepreneurship</td>
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<tr>
<td>MPSW 5073</td>
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Elective Courses - choose TWO (2) only:

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<td>MITS 5333</td>
<td>Advanced High Performance Networks</td>
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<td>MITS 5363</td>
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<td>MITS 5383</td>
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Note: Total credit hours = 40 credits
Course Details

**MPSW 5013 Research Methodology**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.

CLO2: Synthesize relevant literature to address the knowledge gaps.

CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:

**MPSW 5063 Entrepreneurship**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:


MPSW 5073 Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the core concepts and principles, functions, and process in project management.
CLO2: Develop a comprehensive & viable project proposal.
CLO3: Evaluate best practices and methodology in project management.

Synopsis:

This subject focuses on the principles of project management based on Project Management Body of Knowledge (PMBOK). Students will be familiarized with the Project Management process group functions (initiating, planning, executing, controlling and closing) and project knowledge areas (integration, scope, time, cost, quality and human resources). Various tools for supporting the analysis of works in project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, work breakdown structure, managing uncertainty, building project plan, implementing and revising project plan, completing the project and contract laws. Microsoft Project (MS Project) will be introduced as project management software tools.

References:


MPSW 5033 Engineering Technology Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the principles of engineering management and technology management across different industries.
CLO2: Apply relevant issues in engineering management and technology management across different industries.
CLO3: Analysis the impact of relevant issues in the context of engineering management and technology management across different industries.

Synopsis:

The course consists of two components, i.e., Engineering Management and Technology Management. Topics in Engineering Management provide a vehicle for engineers and technical specialist to enhance their knowledge on management, organizational structure and behavior of engineering/technical organizations. Additional topics will enhance the knowledge and competencies in the management of engineering activities such as design, operations, and quality. The Technology Management part of the course will equip students with contemporary views and tools on management of technology and its impact on an organization. It emphasizes management of innovation and new product development as well as managing technology and knowledge. The interaction of technology and the law, particularly the knowledge management and intellectual property will be covered.

References:


MPSW 5053 Quality Systems Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of Quality.
CLO2: Identify Quality System Management information.
CLO3: Propose Quality System Management techniques and tools in the practice of organizations.

Synopsis:

This course presents the fundamental elements of Quality Management System including the importance of quality as a strategy for continuous improvement in business
performance. It explains the strategies for competitive quality in design and manufacture as well as in terms of customer supply chain concept of total quality aspect. Such topics include Management systems ISO, variability, Six Sigma, Taguchi method, failure mode and effect analysis (FMEA) and quality function deployment. Several quality control tools such as Pareto chart, bar chart and scatter diagram will be cover in statistical data collection, measurement and analysis. Finally, concepts of benchmarking and ISO standards with respect to control elements will be integrated with the Total Quality Management (TQM) as part of quality Management system.

References:


MITU 5213 Project 1

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Formulate the problems, objectives and scope based on complex technology solutions.

CLO2: Perform literature review and appropriate methodology to complete the project.

CLO3: Defend the proposed project solutions in written and verbal forms.

Synopsis:

This course is the first part of project that requires a student to prepare a master research proposal based on the theories and techniques of technologies learnt previously. Student is required to write three chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review and Chapter 3: Research Methodology. Besides writing the proposal, student needs to present and defend his/her proposal. Student is expected to demonstrate ability to identify and propose solutions to the identified problems.

References:

2. Cresswell, J. W., and Creswell, J.D., Research Design: Qualitative, Quantitative,
MITU 5226 Project 2

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate solutions to the proposed project.

CLO2: Verify solutions to understand the strengths, weaknesses and limitations of the project.

CLO3: Defend the contributions of the project in written and verbal forms.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of technologies learnt previously. Student must write the second fold of dissertation which consists of four chapters of dissertation i.e. Chapter 4: Analysis & Design, Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solution developed as the end product of this project. Student is required to justify the contribution of the proposed solution throughout the presentation sessions.

MITP 5113 Algorithm Analysis and Design

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify algorithm design technique and method of analysis.

CLO2: Explain algorithms efficiency in terms of the amount of resources, which are time and storage space required to execute the algorithm.

CLO3: Explain algorithm design technique based on problem type.

Synopsis:

This course introduces the students to the fundamentals principles of design and analysis of algorithms. It covers formal techniques to support the design and analysis of algorithms that emphasizes on both the underlying mathematical theory and practical considerations of efficiency. By learning a range of algorithm design techniques
as Brute Force, Divide & Conquer, Decrease & Conquer, Transform and Conquer, Greedy Algorithms and Dynamic Programming, students should be able to develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviors of algorithms and the notion of tractable and intractable problems will be discussed.

References:

MITS 5313 Advanced Data Communications and Network

Learning Outcomes:
At the end of the course, students should be able to:

CLO1: Evaluate the theory of data communications related to the network models in current technologies.

CLO2: Manipulate the implementation in managing network infrastructure and services with the emerging trends and technologies.

CLO3: Relate the present research in data communications and networking in order to apply in the real environment based on the concept.

Synopsis:
This course introduces the fundamental concepts and terminology of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and ap-
ply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring the computer networks using guided or unguided media.

References:

MITS 5354 Internet Security

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the concept, issues, and trends of internet security.

CLO2: Perform a case study about the current attack trends towards the social, ethical issues, and the related cyber laws.

CLO3: Construct the appropriate security mechanism to defense from the attacks.

Synopsis:

This course provides a study of various attack techniques at the network, transport, and application layer. Students also are exposed to the current attacks trend and the related cyber laws and ethical issues. In addition, the basics of cryptography and the applications are also introduced in the topic. This course also covers the defense mechanisms in the three layers; network, transport, and application.

References:

MITS 5213 Distributed Computing Systems

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Organize the heterogeneous main components architectures in distributed system.

CLO2: Display knowledge about the design principles of distributed system architecture.

CLO3: Propose solution on large-scale heterogeneous distributed system performances problem.

Synopsis:

This course is concerned with the principles and implementation of the software necessary to manage system resources, particularly in a distributed environment. A core knowledge of basic operating systems concepts (virtual memory, I/O, process management and communication) is assumed. The design issues and distributed system concepts are covered such as coverage of large-scale applications, fault modelling and fault tolerance, models of system execution, and technology related to distributed systems.

References:

MITS 5523 Advanced Mobile Computing

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Describe the concept and different technologies of mobile computing.
CLO2: Relate the advancement in mobile computing with the changes of all aspects of human life.
CLO3: Propose mobile computing application to solve current issues in certain area.

Synopsis:

This course introduces to students the fundamental concept of mobile computing and mobile application development. Mobile computing will be discussed from the perspectives of mobile technology, application development, and user interaction. The course will overview various mobile computing applications, technologies, and wireless communication. This course also introduced the uses of mobile application frameworks and development environments to reinforce concepts covered in lectures. Students will obtain hands-on experiences through mobile computing projects to solve any aspects of human life such as personal communication, education, business and healthcare. The course will look at some current research in mobile computing and identify potential research problems in this field.

References:


MITS 5343 Advanced Network Design And Diagnostics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Design networks project that meets
CLO2: Identify the processes and tools used in order to understand traffic flow, protocol behavior, and internetworking technologies.

CLO3: Explain the acquired understanding of tools and language during analysis and design of a network structure which can fulfill the customer requirement in terms of network performance, security, capacity, and weight.

Synopsis:

This course covers a top-down approach to network design, the concept, guidelines, practice, and diagnostics for requirement analysis and flows analysis. The technology choices, interconnection mechanism and network management, and security will be covered in logical design. Some issues on network design will be included in physical design and addressing and routing.

References:


MITS 5373 Network and Internet Programming

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate an understanding of the usage of the application programming interfaces for each of the different network protocols with emphasis on the application and transport layers.

CLO2: Form an integrated solution for Internet application problems using suitable network programming interfaces.

CLO3: Formulate and integrate appropriate network programming interfaces to solve Internet application problems in a small group environment.
Synopsis:
This course reviews concepts, techniques, and systems issues in advanced Internet application development, and explores new challenges and research issues that are critical for developing network and Internet applications, such as network monitoring, web servers, and web services. One of the important goals of the course is to look beyond the present status of the Internet and conjecture what possible future technologies and applications will evolve. The course will include a significant project component that will typically require programming skills.

References:

MITS 5323 Advanced Scalable Internetworking

Learning Outcomes:
At the end of the course, students should be able to:

CLO1: Explain in detail the network requirement and current trend technology for building the advanced scalable network.

CLO2: Design the advanced scalable network by integration remote access and reliable routing protocol.

CLO3: Demonstrate routing protocol operation, configurations, troubleshooting and network monitoring activities.

Synopsis:
This subject emphasizes the theory of building advanced scalable network. It also involves the use of internetworking architecture and network equipment. The theory and technique on routing protocol and remote access technologies will be emphasized to build a scalable internetwork. The hands-on covers the configuration of routing protocol and network monitoring tools. In addition, it exposes WAN technologies including VPN, Frame Relay, Software Defined Network (SDN).
References:


MITS 5333 Advanced High Performance Networks

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate high performance networks with guaranteed QoS, particularly in a saturated/congested networks.
CLO2: Identify the main techniques and mechanism of queue management that provide high quality of service (QoS).
CLO3: Propose solutions to the problems in poorly designed network by utilizing efficient queuing algorithm and efficient traffic control scheme.

Synopsis:

This course is an in-depth study of the theory, design and performance analysis of high-performance networks. Topics include specific high-performance network implementations and emerging technologies, including multimedia transmission, routing protocols, traffic control management, quality of service (QoS), and next generation networks. Performance analysis of networks will include simulation of basic queuing models.

References:


**MITS 5363 Internet Governance**

**Learning Outcomes:**

At the end of the course, students should be able to:

CLO1: Elaborate the concepts, architecture and application of the related Internet Governance models and technologies.

CLO2: Integrate knowledge concerning current issues, impact to society and open issues in Internet Governance.

CLO3: Identify the key elements, factors, benefit, risks and ethics that drive the successful adoption of Internet Governance and Security in a business case.

**Synopsis:**

This course focuses on the technical, security, legal, economic, development, sociocultural, and human rights aspects of Internet governance. Providing a brief introduction, a summary of major questions and debates, and a survey of different views and approaches for each issue related and offers a practical framework for analysis and discussion of Internet governance and security.

**References:**


MITS 5383 Emerging Internetworking Technology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Elaborate on the concept, architecture, and application of the related emerging technologies.
CLO2: Perform literature study on the current trends, impact to society, and open issues of the related emerging technologies.
CLO3: Identify the key attributes, factors, benefits, and risks that drive the successful adoption of emerging technologies in a business case.

Synopsis:

This course will provide state-of-art of emerging technologies in internetworking which covers topics in three main areas: smart networking technologies and application, large-scale distributed system, and next-generation wireless communication. For each topic, students will be introduced to the platform, system architecture, and principle designs. In addition, existing barriers, challenges, and opportunities of emerging internetworking technology are presented.

References:


MASTER OF COMPUTER SCIENCE
(SECURITY SCIENCE)
MASTER OF COMPUTER SCIENCE (SECURITY SCIENCE)

This programme is specifically designed to equip students with security elements in information and communication technology related to management, data and infrastructure.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

**PEO1:** Practice in-depth knowledge and skills of Computer Science with specialization in Security Science field.

**PEO2:** Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures towards lifelong learning.

**PEO3:** Demonstrate knowledge of current issues in technology through learning and research activities using scientific methods.

**PEO4:** Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community and business.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

PO1: Demonstrate originality and independence in undertaking analytical and critical evaluation, and synthesis of complex information, specialized concepts, theories, methods and practice in Computer Science;

PO2: Apply knowledge and quantitative skills critically and collectively to manage and resolve complex problems or issues in the field of Security Science;

PO3: Apply the practical skill in working environment related to security science field;

PO4: Communicate effectively the knowledge, skills, ideas, critique and rationale in both written and verbal forms using appropriate methods to peers, experts, and non-experts;

PO5: Competently use a wide range of suitable digital technologies to design and plan evaluation activities for enhancing study, research and practice;

PO6: Demonstrate significant autonomy, independence and leadership skills at work and class with self-advancement through continuous academic or professional development; and

PO7: Initiate or lead entrepreneurial projects and adhere to legal, ethical, professional and sustainable practices.
Programme Structure

September Intake:

<table>
<thead>
<tr>
<th>Semester 1 (September)</th>
<th>Course Code</th>
<th>Course</th>
<th>Credit</th>
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<tr>
<td></td>
<td>MPSW 5013</td>
<td>Research Methodology</td>
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<td>MPSW XXXX</td>
<td>University Course</td>
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<tr>
<td></td>
<td>MITP 5113</td>
<td>Algorithm Analysis and Design</td>
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<td>Advanced Data Communications and Network</td>
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<td></td>
<td>MITS 5463</td>
<td>Security Management Practices</td>
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<tr>
<td></td>
<td>MITS 5443</td>
<td>Cryptography and Data Security</td>
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<td></td>
<td>MITS 5433</td>
<td>System and Network Ethical Hacking</td>
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<td></td>
<td>MITU 5213</td>
<td>Project 1</td>
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### University Courses - choose ONE (1) only:

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<td>Engineering and Technology Management</td>
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<tr>
<td>MPSW 5053</td>
<td>Quality System Management</td>
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</tr>
<tr>
<td>MPSW 5063</td>
<td>Entrepreneurship</td>
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</tr>
<tr>
<td>MPSW 5073</td>
<td>Project Management</td>
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### Elective Courses - choose TWOR (2) only:

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<td>MITS 5423</td>
<td>Computer Forensics</td>
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<td>MITS 5453</td>
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<td>MITS 5473</td>
<td>Watermarking</td>
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<td>MITS 5223</td>
<td>Secure Software Design and Development</td>
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<tr>
<td>MITS 5493</td>
<td>Security Audit and Assessment</td>
<td>3</td>
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Note: Total credit hours = 40 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.
CLO2: Synthesize relevant literature to address the knowledge gaps.
CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:

MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:

MPSW 5073 Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the core concepts and principles, functions, and process in project management.
CLO2: Develop a comprehensive & viable project proposal.
CLO3: Evaluate best practices and methodology in project management.

Synopsis:

This subject focuses on the principles of project management based on Project Management Body of Knowledge (PMBOK). Students will be familiarized with the Project Management process group functions (initializing, planning, executing, controlling and closing) and project knowledge areas (integration, scope, time, cost, quality and human resources). Various tools for supporting the analysis of works in project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, work breakdown structure, managing uncertainty, building project plan, implementing and revising project plan, completing the project and contract laws. Microsoft Project (MS Project) will be introduced as project management software tools.

References:


MPSW 5033 Engineering Technology Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the principles of engineering management and technology management across different industries.
CLO2: Apply relevant issues in engineering management and technology management across different industries.
CLO3: Analysis the impact of relevant issues in the context of engineering management and technology management across different industries.

Synopsis:

The course consists of two components, i.e., Engineering Management and Technology Management. Topics in Engineering Management provide a vehicle for engineers and technical specialist to enhance their knowledge on management, organizational structure and behavior of engineering/technical organizations. Additional topics will enhance the knowledge and competencies in the management of engineering activities such as design, operations, and quality. The Technology Management part of the course will equip students with contemporary views and tools on management of technology and its impact on an organization. It emphasizes management of innovation and new product development as well as managing technology and knowledge. The interaction of technology and the law, particularly the knowledge management and intellectual property will be covered.

References:


MPSW 5053 Quality Systems Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of Quality.
CLO2: Identify Quality System Management information.
CLO3: Propose Quality System Management techniques and tools in the practice of organizations.

Synopsis:

This course presents the fundamental elements of Quality Management System including the importance of quality as a strategy for continuous improvement in business
performance. It explains the strategies for competitive quality in design and manufacture as well as in terms of customer supply chain concept of total quality aspect. Such topics include Management systems ISO, variability, Six Sigma, Taguchi method, failure mode and effect analysis (FMEA) and quality function deployment. Several quality control tools such as Pareto chart, bar chart and scatter diagram will be cover in statistical data collection, measurement and analysis. Finally, concepts of benchmarking and ISO standards with respect to control elements will be integrated with the Total Quality Management (TQM) as part of quality Management system.

References:


**MITU 5213 Project 1**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Formulate the problems, objectives and scope based on complex technology solutions.

CLO2: Perform literature review and appropriate methodology to complete the project.

CLO3: Defend the proposed project solutions in written and verbal forms.

Synopsis:

This course is the first part of project that requires a student to prepare a master research proposal based on the theories and techniques of technologies learnt previously. Student is required to write three chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review and Chapter 3: Research Methodology. Besides writing the proposal, student needs to present and defend his/her proposal. Student is expected to demonstrate ability to identify and propose solutions to the identified problems.

References:

2. Cresswell, J. W., and Creswell, J.D., Research Design: Qualitative, Quantitative,

MITU 5226 Project 2

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate solutions to the proposed project.
CLO2: Verify solutions to understand the strengths, weaknesses and limitations of the project.
CLO3: Defend the contributions of the project in written and verbal forms.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of technologies learnt previously. Student must write the second fold of dissertation which consists of four chapters of dissertation i.e. Chapter 4: Analysis & Design, Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solution developed as the end product of this project. Student is required to justify the contribution of the proposed solution throughout the presentation sessions.

References:


MITP 5113 Algorithm Analysis and Design

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify algorithm design technique and method of analysis.
CLO2: Explain algorithms efficiency in terms of the amount of resources, which are time and storage space required to execute the algorithm.
CLO3: Explain algorithm design technique based on problem type.

Synopsis:

This course introduces the students to the fundamentals principles of design and analysis of algorithms. It covers formal techniques to support the design and analysis of algorithms that emphasizes on both the underlying mathematical theory and practical considerations of efficiency. By learning a range of algorithm design techniques
as Brute Force, Divide & Conquer, Decrease & Conquer, Transform and Conquer, Greedy Algorithms and Dynamic Programming, students should be able to develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviors of algorithms and the notion of tractable and intractable problems will be discussed.

References:


MITS 5313 Advanced Data Communications and Network

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate the theory of data communications related to the network models in current technologies.

CLO2: Manipulate the implementation in managing network infrastructure and services with the emerging trends and technologies.

CLO3: Relate the present research in data communications and networking in order to apply in the real environment based on the concept.

Synopsis:

This course introduces the fundamental concepts and terminology of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and ap-
ply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring the computer networks using guided or unguided media.

References:

MITS 5443 Cryptography and Data Security

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the concept and components of cryptography.

CLO2: Relate the basic theory and practice of secure systems, and the types of security services needed for computer and network security.

CLO3: Demonstrate some aspect of cryptography in depth.

Synopsis:

This course explore the methods, algorithms, techniques, and tools of cryptography and data security. After studying the theoretical aspects of cryptographic algorithms and protocols, we show how these techniques can be integrated to solve particular data and communication security problems. This course material is of use to computer and communication engineers who are interested in embedding security into an information system, and thus, providing confidentiality, integrity and authenticity of the documents and the communicating parties.

References:

**MITS 5433 Systems and Network Ethical Hacking**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the fundamentals steps that a hacker performs, and common tools hackers use in conducting attacks.

CLO2: Demonstrate exploitation on system and network vulnerability as proof of concept by using appropriate hacking tools.

CLO3: Formulate the tools and methods of protecting systems and networks against hacker attacks.

Synopsis:

In this course, students will study and gain experience with the role of defending hosts and networks from attack as well as learning how the hacker uses tools to attack and penetrate networks. Students will be able to use several open software tools that will analyze host and networks for vulnerabilities and be exposed to the hacking methodology. It will immerse the student into an interactive environment where they will be shown how to scan, test, hack and secure their own systems. The lab intensive environment gives each student in-depth knowledge and practical experience with the current essential security systems. Students will begin by understanding how perimeter defenses work and then be lead into scanning and attacking their own networks in a simulation environment. Students then learn how intruders escalate privileges and what steps can be taken to secure a system from hacking threat.

References:

3. Web Academy, Hacking with Kali Linux: A Practical Guide for Beginners to Learn Ethical Hacking Including Penetration Testing, Wireless Network and CyberSe-
MITS 5463 Security Management Practices

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Assess risks in information security and implement protection and control efforts.

CLO2: Organize an information security program.

CLO3: Design the requirement of regulatory, standards and best practices and apply them in the working environment.

Synopsis:

This course covers the principles of information security management and techniques to formulate, plan, manage, implement and maintain information security strategies, policies and procedures. The course focuses on two main disciplines of information security management; first is strategic which covers theoretical view of information security management issues that range from national to international levels, and second is on organizational security management. In the latter, students are taught on issues and challenges surrounding the implementation of best security practices, process and the application of well-known information security standards as practiced by the industry.

References:


MITS 5484 Cyber Threat Intelligence

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the concept of intelligence detection against cyberthreat.
CLO2: Relate relevant approach in cyberthreat detection challenges.
CLO3: Identify suitable approach in detecting cyberthreat collaboratively.

Synopsis:

This course covers the concept and applications of intelligence techniques to various problem domains in security and abuse. The course will explore methods for detecting, evaluating the suitability of different machine learning techniques in different scenarios, and focus on guiding principles that will help achieve better security. This course also discusses threats to modern computer and network systems on how intelligence detection applies to the aforementioned threats.

References:

3. Data Science for Cyber-Security (Security Science and Technology) by Nick Heard (Editor), Niall Adams (Editor), Patrick Rubin-Delanchy (Editor) and Melissa Turcotte. World Scientific Publishing Europe Ltd. 2019.
MITS 5413 Public Key Infrastructure

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the issues related to the successful deployment of digital certificates to meet business and security requirements.

CLO2: Elaborate an insight and strategy into an effective use of PKI in the context of working policies that govern the use, administration, and management of certificates, and design the digital certificate according to the standard format.

CLO3: Demonstrate how PKI establishes digital trust and maintains that level of assurance built through a complex web of social, legal, national, international, and business interactions, and the future trend of PKI.

Synopsis:

This subject highlighted the principles of Public Key Infrastructure, Digital Signature Law and the related Cyber Laws. The course will not only cover public key algorithms in electronic communications but also the certificate authority and related arrangements as well as. This course aims to give a broader view to the Electronic Commerce transaction to the students.

References:


MITS 5423 Computer Forensics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the emerging field of computer forensics in obtaining and analyzing the evidence from computers.

CLO2: Prepare the investigation procedures for investigating the computer crime.

CLO3: Demonstrate the use of forensic tools to complete the investigating process.
Synopsis:

This subject introduces the fundamentals of computer forensic technology. Emphasis will be placed on identifying the threats to, and vulnerabilities of, computer systems and how to minimize them. The subject also focuses on identifying the victims, executing the attack, and determining various methods that used to gain access to computer systems. The theory and technique on identifying the legal and ethical issues that are involved in computer forensics and methods on investigating the crime are also explored. The hands-on covers the process of investigating the computer crime using computer forensics tools.

References:


MITS 5453 Intrusion Detection and Prevention

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the various types of intrusions and attacks on a network.
CLO2: Organize the mechanism or tools which can be used to detect and prevent the intrusions by integration of technique and technology of security management.
CLO3: Demonstrate intrusion detection system for preventing the illegal intrusion.

Synopsis:

This subject highlights the concepts of computer security in term of intrusion detection and prevention. The scope of detection mainly involves the network-based and host-based approaches. Several techniques as well as technology emphasized to form a secure network environment. In addition, the current trends with the application of machine learning and deep learning also will
be focused. The hands-on covers the configuration of intrusion detection system using detection tools.

References:


MITS 5473 Watermarking

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Manipulate the concept, theory, method and practice in Digital Watermarking for analysis and evaluation.
CLO2: Use the knowledge needed to resolve problems in digital watermarking based on techniques.
CLO3: Demonstrate practical skills of development using current and latest tools for intellectual property management and protection of multimedia.

Synopsis:

The subject explores the mechanism for protecting audio, video, image and data. It covers about knowledge and application on protecting the multimedia content and distributing multimedia products over the Internet. The theory and technique on identifying the legal and technical issues that are involved in digital watermarking is studied. Methods on the mechanism of current and latest application tools for protecting the intellectual property management and protection of multimedia are also explored.

References:


MITS 5223 Secure Software Design and Development

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain concepts related to the core software security requirements and foundational design principles.

CLO2: Propose a secured software requirement in developing secure application.

CLO3: Formulate a software using secure coding principles that can effectively protect it from vulnerabilities.

Synopsis:

Development of high-assurance software systems is a growing challenge in emerging complex systems. Secure by design is emerging as a basic principle for trustworthy computing and as a preferred way to ensure the security of networked information systems and infrastructures. This course covers the principles of security software lifecycle for increasing software trustworthiness. In addition, emphasizes on security during planning, designing, developing, acquiring, testing, deploying, maintaining, and/or managing software.

References:


MITS 5493 Security Audit and Assessment

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the concepts of computer audit and risk management.
CLO2: Perform an audit process in the computerized environment.
CLO3: Propose the appropriate response in conformity with security issues in computer security audit.

Synopsis:

This course focuses on the concept of computer security and risk management. In addition, emphasizes has given to the importance of computer audit and risk management. The enclosed topics are mainly related to security audit analysis, security monitoring, environmental security and follow up auditing in security concern. The student will be exposed to the field of risk and incident response, recovery and disaster recovery.

References:

MASTER OF COMPUTER SCIENCE (MULTIMEDIA COMPUTING)
MASTER OF COMPUTER SCIENCE (MULTIMEDIA COMPUTING)

This programme is specifically designed to equip students with security elements in information and communication technology related to management, data and infrastructure.

Programme Educational Objectives (PEO)

This program is specifically designed to equip students with the use of the latest technologies to design and develop high-level multimedia based applications that meet industry needs.

Below are the PEO for this programme:

PEO1: Practice in-depth and specialist knowledge and skills of Computer Science in Multimedia Computing to support organizational goals.

PEO2: Demonstrate higher-order thinking skills and sustained learning in adapting to a constantly changing field through professional development, research and life-long learning.

PEO3: Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures.

PEO4: Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

**PO1:** Have in-depth skills and strong mastery knowledge in Computer Science (Multimedia Computing);

**PO2:** Gain a substantial knowledge of entrepreneurship in Information and Communication Technology area;

**PO3:** Ability to consistently explore and expand contemporary knowledge in targeted discipline (Multimedia Computing);

**PO4:** Ability to gain employment for career development in related Computer Science field (Multimedia Computing);

**PO5:** Demonstrate the ability to identify, analyze and implement efficient solutions to problems with effective communication;

**PO6:** Ability to apply expertise in working environment; and

**PO7:** Demonstrate the ability to lead, manage and coordinate effectively and ethically as an individual or a team player.
Programme Structure

September Intake:

<table>
<thead>
<tr>
<th>Semester 1 (September)</th>
<th>Course Code</th>
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<th>Credit</th>
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<td></td>
<td>MPSW 5013</td>
<td>Research Methodology</td>
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<td>MITP 5113</td>
<td>Algorithm Analysis and Design</td>
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<td>Computer Architecture &amp; Compiler</td>
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<td></td>
<td>MITM 5313</td>
<td>Advanced Human Computer Interaction</td>
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<td></td>
<td>MITU 5213</td>
<td>Project 1</td>
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<td>MITP XXXX</td>
<td>Elective 3</td>
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University Core Courses - choose ONE (1) only:

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<td>MPSW 5033</td>
<td>Engineering and Technology Management</td>
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<td>MPSW 5053</td>
<td>Quality System Management</td>
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<tr>
<td>MPSW 5063</td>
<td>Entrepreneurship</td>
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<tr>
<td>MPSW 5073</td>
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Elective Courses - choose FOUR (4) only:

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<td>MITM 5323</td>
<td>Mobile Application Development</td>
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<td>MITM 5333</td>
<td>Multimedia Based Instructional Design</td>
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<tr>
<td>MITM 5413</td>
<td>Multimedia Professional Ethics</td>
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<tr>
<td>MITM 5233</td>
<td>Computer Graphics &amp; Visualization</td>
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<td>MITM 5123</td>
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<tr>
<td>MITM 5213</td>
<td>3D Modelling</td>
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Note: Total credit hours = 42 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.

CLO2: Synthesize relevant literature to address the knowledge gaps.

CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:


**MPSW 5063 Entrepreneurship**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:


**MPSW 5073 Project Management**

**Learning Outcomes:**

At the end of the course, students should be able to:

- **CLO1:** Analyze the core concepts and principles, functions, and process in project management.
- **CLO2:** Develop a comprehensive & viable project proposal.
- **CLO3:** Evaluate best practices and methodology in project management.

**Synopsis:**

This subject focuses on the principles of project management based on Project Management Body of Knowledge (PMBOK). Students will be familiarized with the Project Management process group functions (initiating, planning, executing, controlling and closing) and project knowledge areas (integration, scope, time, cost, quality and human resources). Various tools for supporting the analysis of works in project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, work breakdown structure, managing uncertainty, building project plan, implementing and revising project plan, completing the project and contract laws. Microsoft Project (MS Project) will be introduced as project management software tools.

**References:**


**MPSW 5033 Engineering Technology Management**

**Learning Outcomes:**

At the end of the course, students should be able to:

- **CLO1:** Identify the principles of engineering management and technology management across different industries.
- **CLO2:** Apply relevant issues in engineering management and technology management across different industries.
CLO3: Analysis the impact of relevant issues in the context of engineering management and technology management across different industries.

Synopsis:

The course consists of two components, i.e., Engineering Management and Technology Management. Topics in Engineering Management provide a vehicle for engineers and technical specialist to enhance their knowledge on management, organizational structure and behavior of engineering/technical organizations. Additional topics will enhance the knowledge and competencies in the management of engineering activities such as design, operations, and quality. The Technology Management part of the course will equip students with contemporary views and tools on management of technology and its impact on an organization. It emphasizes management of innovation and new product development as well as managing technology and knowledge. The interaction of technology and the law, particularly the knowledge management and intellectual property will be covered.

References:


MPSW 5053 Quality Systems Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of Quality.
CLO2: Identify Quality System Management information.
CLO3: Propose Quality System Management techniques and tools in the practice of organizations.

Synopsis:

This course presents the fundamental elements of Quality Management System including the importance of quality as a strategy for continuous improvement in business
performance. It explains the strategies for competitive quality in design and manufacture as well as in terms of customer supply chain concept of total quality aspect. Such topics include Management systems ISO, variability, Six Sigma, Taguchi method, failure mode and effect analysis (FMEA) and quality function deployment. Several quality control tools such as Pareto chart, bar chart and scatter diagram will be cover in statistical data collection, measurement and analysis. Finally, concepts of benchmarking and ISO standards with respect to control elements will be integrated with the Total Quality Management (TQM) as part of quality Management system.

References:


MITU 5213 Project 1

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Formulate the problems, objectives and scope based on complex technology solutions.

CLO2: Perform literature review and appropriate methodology to complete the project.

CLO3: Defend the proposed project solutions in written and verbal forms.

Synopsis:

This course is the first part of project that requires a student to prepare a master research proposal based on the theories and techniques of technologies learnt previously. Student is required to write three chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review and Chapter 3: Research Methodology. Besides writing the proposal, student needs to present and defend his/her proposal. Student is expected to demonstrate ability to identify and propose solutions to the identified problems.

References:

2. Cresswell, J. W., and Creswell, J.D., Research Design: Qualitative, Quantitative,
MITU 5226 Project 2

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate solutions to the proposed project.
CLO2: Verify solutions to understand the strengths, weaknesses and limitations of the project.
CLO3: Defend the contributions of the project in written and verbal forms.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of technologies learnt previously. Student must write the second fold of dissertation which consists of four chapters of dissertation i.e. Chapter 4: Analysis & Design, Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solution developed as the end product of this project. Student is required to justify the contribution of the proposed solution throughout the presentation sessions.

MITP 5113 Algorithm Analysis and Design

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify algorithm design technique and method of analysis.
CLO2: Explain algorithms efficiency in terms of the amount of resources, which are time and storage space required to execute the algorithm.
CLO3: Explain algorithm design technique based on problem type.

Synopsis:

This course introduces the students to the fundamentals principles of design and analysis of algorithms. It covers formal techniques to support the design and analysis of algorithms that emphasizes on both the underlying mathematical theory and practical considerations of efficiency. By learning a range of algorithm design techniques
as Brute Force, Divide & Conquer, Decrease & Conquer, Transform and Conquer, Greedy Algorithms and Dynamic Programming, students should be able to develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviors of algorithms and the notion of tractable and intractable problems will be discussed.

References:


MITS 5313 Advanced Data Communications and Network

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate the theory of data communications related to the network models in current technologies.

CLO2: Manipulate the implementation in managing network infrastructure and services with the emerging trends and technologies.

CLO3: Relate the present research in data communications and networking in order to apply in the real environment based on the concept.

Synopsis:

This course introduces the fundamental concepts and terminology of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and ap-
ply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring the computer networks using guided or unguided media.

References:

MITI 5213 Computational Methods

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Construct solution in computational methods through simple modelling.
CLO2: Design a concept of computational methods to support algorithms and computer programs.
CLO3: Formulate computational methods in computer science problems.

Synopsis:
This course covers on the topic of computational methods for computer science, which covers the topic on systems of equations and eigenvalues. The course also covers the interpolation, differentiation and integration. Finally, the topic on ordinary differential equations and partial differential equations are introduced as an advanced topic in this course.

References:

MITM 5313 Advanced Human Computer Interaction

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain how multi-discipline areas in HCI influence the design of interactive applications/systems.

CLO2: Follow and explain the process of designing and evaluating interactive applications/systems.

CLO3: Construct a design solution to HCI problems.

Synopsis:

This course aims to extend the students’ basic knowledge of the multi-discipline areas rooted in the HCI body of knowledge. It will equip the students with the current and advanced knowledge of the main issues, theories and methodologies, and how the knowledge should be applied. The topics covered in this course are: cognitive psychology, interaction design methodology, usability evaluation, multisensory and advanced user-interface design, human factors, ergonomics and emerging issues in HCI and interaction design. The teaching methods consist of lectures, lab activities and guided independent learning for some of the challenging topics.

References:


MITS 5113 Computer Architecture & Compiler

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain computer architecture concept including the detailed interactions in computer system and its per-
formance, and how computer architecture is influenced by the needs of compiled program.

CLO2: Revise the compiler structure and relate the impact of compiler structure on programming language design.

CLO3: Apply the knowledge of current trend in computer architecture and compiler design.

Synopsis:

This subject covers advanced topics in computer architecture, including multiprocessor and internal memory architecture. It incorporates the latest research and development on topics such as branch prediction, instruction-level parallelism, multithreading, and cache hierarchy design. It also covers the fundamental of compilers design including lexical analysis, various types of parsers, intermediate and object code generation and code optimization. The impact compiler structure on the programming language design will also be examined. The students shall have the knowledge of computer system organization.

References:


MITM 5323 Mobile Application Development

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the fundamental technologies of mobile database system and issues in creating, designing and managing the mobile database system.

CLO2: Illustrate important concept and architecture in mobile database system including Mobile Database Recovery Schemes, Querying Location Dependent Data, and Data Caching and Broadcast.
CLO3: Develop a mobile database application to provide solution to a simple open mobile database problem.

Synopsis:

The database field has experienced rapid and incessant growth since the development of centralized relational databases. This course will discuss topics that are of growing importance in both the database research community and industry. Topics covered include conceptual, logical, and physical design of mobile database systems, technologies required for mobile databases, replication requirements for mobile databases, query processing and transaction management in mobile database systems, mobile database security, mobile database recovery schemes, the relationship between mobile database applications and the World Wide Web, communication facilities, data confidentiality and current issues in mobile databases.

References:

5. Gerardus, B., Mobile Database, 3rd Edition, Emereo Pty Limited, 2018

MITM 5333 Multimedia Based Instructional Design

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate a clear understanding of the theories, philosophies, and current research driving the field of Educational Technology, Instructional Design and Web TV.

CLO2: Discuss and compare a working knowledge of the instructional design process and its application in a media development situation.

CLO3: Distinguish between the use of instructional technologies to deliver instruction and using instructional technologies to provide meaningful learning.

Synopsis:

The purpose of this course is to assist students in learning how to adapt and apply instruction design techniques to multimedia based in both face-to-face (F2F) and distance/online settings. In this subject, students will be introduced to an overview of
the field of Instructional Technology. This course focuses on helping students to develop an awareness and understanding of the theories and philosophies driving the field. In addition, this course will explore common computer-related technologies used within most learning environments. This subject will also explore the variety of interactive instructional techniques possible with computer-based instruction. The student will also learn the concepts and development process of iBook, CD or Web-based multimedia applications and produce products that integrate multimedia applications into effective e-Learning instructions. This subject also covers the principles and techniques used to design and develop content for multimedia production. Specific topics in writing include an introduction to communication, the elements of story creation and correct formats for linear and interactive scripts will be explored. At the end of the semester, the students are required to write and present a concept paper on a proposed multimedia production for a real client.

References:


MITM 5413 Multimedia Professional Ethics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Develop an in depth understanding of the nature and function of multimedia issues and values especially in Malaysia.
CLO2: Measure form and content of multimedia issues and values contributing to the development of the MSC.
CLO3: Interpret application of multimedia issues and values and regulation in current and future multimedia industry.

Synopsis:

A general introduction to multimedia issues and values and the statutory, regulatory, industry codes and ethical conventions
operating in Malaysia. Topics covered include: Broadcasting, Content and Audio-Visual Production/Screen Industries, Free Speech and Defamation, Information Equity, Internet and Online Services, Media Ownership, Print Media, Journalism and Media Ethics, Privacy, Spectrum Management, Telecommunications, Universal Service and Regional Communications. General Principles of Intellectual Property will be covered, as well as copyright issues, and relevant entertainment law. The emphasis will be on the harmonization of these issues into the present and future cyber laws in Malaysia, and the relevance and implications of media law in the MSC and Government initiatives, in accordance with the 2020 Vision.

References:


MITM 5233 Computer Graphics & Visualization

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply computer graphics concepts which are necessary to model problems in different fields such as film special effects, games development, virtual reality, and data visualization.

CLO2: Present coherent technical and scientific results both orally and in writing and have an understanding of the non-technical aspects to effectively cooperate with other specialists towards the solutions of complex technical problems.

CLO3: Design and develop software tools to create animation for a real life in certain environment such as architecture and precise engineering.
Synopsis:

This course assumes a good knowledge of fundamental methods in computer graphics and will start with the basic concepts that underline all graphics applications like computer games, movies, medicine and information visualization. It will provide the student with a sound, broad technical basis in high performance computer graphics in the areas of high quality image generation and interactive graphics. Student will be equipped for projects in specific application areas related to gaming, film special effects, virtual reality and visualization in the final stage of the program. This course will also provide a practical class on advanced computer graphics programming. It will cover major aspects of digital image generation: geometric modelling, computer animation, and rendering. The goal of the course is to provide a strong foundation for computer graphics principles, and provide a hands-on introduction to recent advanced topics, e.g., subdivision surfaces, real-time global illumination, and physically based animation.

References:


MITM 5223 Advance 3D Animation

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Elaborate and develop advance working animation using key features of modeling, lighting and rendering.

CLO2: Explain the methods of distributed rendering in scientific research and the animation industry.

CLO3: Built the relationship between current streams of 3D design and animation research.

CLO4: Explore distributed rendering on a large-scale project using a specific animation package.
**Synopsis:**

This course concentrates on the principles and common techniques to all animation. Students will get experience in a number of specific animation methods. The course will equip the students with the current and advanced knowledge of the computer animation and rigging techniques, rendering concept, shading and surface characteristics, image resolution and visual effect techniques. They will also learn lighting and rendering techniques, High Dynamic Range Image (HDRI) as well as implement the principle of animations in the projects. The teaching methods consist of lectures, activities and guided independent learning for some of the challenging topics.

**References:**


---

**MITM 5113 Advanced Web Programming**

**Learning Outcomes:**

At the end of the course, students should be able to:

CLO1: Explain and integrate knowledge of advanced web design techniques and technologies.

CLO2: Using and apply important components and necessary tools in developing web application.

CLO3: Develop web applications with backend databases and PHP.

**Synopsis:**

This advanced hands-on course will teach you to effectively plan, design, program, maintain, administer, and troubleshoot dynamic websites, web servers and web-based database systems using the latest technology including Ajax, JQuery Apache Server and PHP. It emphasis 4 components in developing web applications which are; Client Site Technologies: HTML5, CSS3 and Ajax; Server Site Technologies: JQuery and PHP; Database Server: MySQL; and Web Servers : Apache.

**References:**


MITM 5123 Advanced Audio and Video Technology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Conceive advance knowledge in digital audio and video technology.
CLO2: Demonstrate advanced skills in using audio video software for video editing and audio analysis that meets industrial standards.
CLO3: Adapt best practices when developing audio and video application.

Synopsis:

This course provides students with the knowledge and advanced skills they required to understand and produce a high quality video that meet the industrial standards using fundamental audio video concepts and tools. Students will also be introduced to applied speech and audio processing techniques. The course is also structured to equip students with the foundation to start research work in fields related to audio and video technology.

References:

MASTER OF TECHNOLOGY
(DATA SCIENCE & ANALYTICS)
MASTER OF TECHNOLOGY (DATA SCIENCE AND ANALYTICS)

The Master of Technology (Data Science and Analytics), for short MTDS, is aimed at recent graduates and industry practitioners from various academic disciplines with strong analytical and computing skills or experiences. The programme is designed to equip students with fundamental and applied knowledge, technical skills, and current technologies in Data Science and Analytics area. These include the fundamental principles of data science, the capability to analyse a diversity of big data, the skills of using data science tools and the capability to apply the data analytics techniques to various domains, as well as the capability to present the analytics results to intended audience. The programme’s delivery modes are through lectures, lab sessions, and industrial projects, that emphasize on state-of-the-practice techniques, tools and technology, and recognised methodology through university-industry collaborations.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

PEO1: Practice in-depth and specialist knowledge, technology and skills of Science and Analytics, and related disciplines to in solving emerging challenges.

PEO2: Demonstrate business acumen in solving complex problems and sustain intellectual curiosity through life-long learning.

PEO3: Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures.

PEO4: Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

PO1: Ability to integrate Data Science and Analytics knowledge for excellent practice as a Data Scientist and Data Analyst.

PO2: Apply knowledge, technology and skills of Data Science and Analytics to provide potential hidden information, knowledge and insights for data-driven and well-informed decision making.

PO3: Apply critical and creative thinking and conduct systematic investigations into complex Big Data, analytics and decisions problems to generate innovative solutions and extend knowledge in Data Science and Analytics.

PO4: Effectively communicate, orally and in writing, Data Science and Analytics solutions to peers, superiors, clients and experts and participate in multidisciplinary teams either as a competent leader or a group member.

PO5: Apply independent and life-long learning skills to keep up with latest relevant knowledge and cutting edge technologies in Data Science and Analytics, and build up further professional and information management skills.

PO6: Work and function effectively in community and multidisciplinary teams either as a leader or a group member, demonstrate respect for cultural diversity and contribute to their organization and society.

PO7: Prepare, publish and present technical materials to a diverse audience, applying ethics, values, attitude and professionalism.

PO8: Demonstrate entrepreneurial and management skills.
Programme Structure

September Intake:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>MPSW 5013</td>
<td>Research Methodology</td>
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<tr>
<td>MPSW 5063</td>
<td>Entrepreneurship</td>
<td>3</td>
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<tr>
<td>MTDS 5113</td>
<td>Fundamental of Data Science</td>
<td>3</td>
</tr>
<tr>
<td>MTDS 5123</td>
<td>Big Data Management</td>
<td>3</td>
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<tr>
<td>MTDS 5133</td>
<td>Applied Statistical Methods</td>
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<td>Project 1</td>
<td>4</td>
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<tr>
<td>MTDS 5163</td>
<td>Big Data Analytics and Visualization</td>
<td>3</td>
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<td>MTDS 5163</td>
<td>Modelling and Decision Making</td>
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<td>MTDS XXXX</td>
<td>Elective 1</td>
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<td>Project 2</td>
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**Total credit** 6
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<td>MTDS 5163</td>
<td>Modelling and Decision Making</td>
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<td>Entrepreneurship</td>
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Elective courses - choose TWO (2) only:

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<td>Special Topics in Applied Data Science</td>
<td>3</td>
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<tr>
<td>MTDS 5223</td>
<td>Manufacturing Analytics</td>
<td>3</td>
</tr>
<tr>
<td>MTDS 5233</td>
<td>Social Media Analytics</td>
<td>3</td>
</tr>
<tr>
<td>MTDS 5243</td>
<td>Geospatial Analytics</td>
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<tr>
<td>MTDS 5253</td>
<td>Healthcare Analytics</td>
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<td>MTDS 5263</td>
<td>Tourism Analytics</td>
<td>3</td>
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<tr>
<td>MTDS 5273</td>
<td>Customer and Financial Analytics</td>
<td>3</td>
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Note: Total credit hours = 40 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.

CLO2: Synthesize relevant literature to address the knowledge gaps.

CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:


MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:

MTDS 5113 Fundamentals of Data Science

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Describe what Data Science is and analyze the skill sets needed to be a data scientist.

CLO2: Identify the Data Analytic Life-cycle and how its components interact.

CLO3: Construct computer program to carry out basic statistical modeling and analysis.

Synopsis:

The course provides an introduction to data science, which is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions. This course provides an overview of today’s Big Data environment, the rationale and opportunity for a new approach to analytics, the roles required, including the Data Scientist, and representative examples of big data analytics in industry. This course introduces students to the fundamental principles of data science that underlie the algorithms, processes, methods, and data-analytic thinking. It also introduces students to algorithms and tools based on these principles, and frameworks to support problem-focused data-analytics thinking. The course ends by examining students understanding on integration and synthesis of concepts and their application to solving problems.

References:


MTDS 5123 Big Data Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: To distinguish the requirements of traditional data management and big data management.

CLO2: To compare the characteristics of big data solutions in the market.

CLO3: To build a big data management application using selected big data solutions.

Synopsis:

In this course, students are exposed to the concepts and principles of big data management, and technologies for BDM. Topics covered shall include the types, characteristics, storage systems of Big data, data modelling for big data, big data quality management, and introduction to BDM tools and technologies (NoSQL, Hadoop, In-database, PLSQL, HBase). At the end of the course, students should be able to design a plan for BDM that is able to support Big Data Analytics and discoveries of actionable hidden knowledge, for effective and timely business decisions.

References:


MTDS 5133 Applied Statistical Methods

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse solutions for real life statistical problems.

CLO2: Manipulate solutions for statistical problems using statistical software.

CLO3: Integrate solution plan to application problems based on available data.

Synopsis:

This course covers the discovery and exploration of complex multivariate relationships among variables. They are Predictive Models, which include generalized linear models (such multiple regression, logistic regression, Poisson regression, model adequacy and survival analysis), discriminant function analysis (both linear and quadratic),
time series modelling, Latent Variable Models such as factor analysis (principal components, exploratory and confirmatory factor analysis), correspondence analysis, and multidimensional scaling (metric and non-metric). It also introduces other longitudinal methods that can handle data with difficult correlations over time.

References:


MTDS 5143 Applied Machine Learning

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate different machine learning techniques in terms of their applicability to different Machine Learning problems.

CLO2: Manipulate appropriate tools to apply suitable machine learning techniques to the data set given to solve the problem.

CLO3: Formulate a systematic approach to conduct scientific experimental investigations and assessment.

Synopsis:

Machine learning is a rapidly growing field at the intersection of computer science and statistics, which concerns about finding patterns in real data. The learning evolved from the study of pattern recognition and computational learning theory in artificial intelligence to explore the construction of algorithms for making prediction on data. This course aims to provide practical skills in applying machine learning algorithms on real applications. It emphasises on the implementation and evaluation of machine learning systems. The main focus will be placed on applying machine learning model for problem solving more than the fundamental understanding of learning algorithm. Students
will be exposed to the tasks on design, implementation, training and evaluation of a machine learning systems. Topics of discussion include: introduction to machine learning; real-world data; feature engineering; classification techniques; predicting continuous target variables; model evaluation, parameter tuning; clustering analysis; association analysis; ensemble learning; reinforcement learning; deep learning; and scaling machine learning workflows.

References:


MTDS 5153 Big Data Analytics and Visualization

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the concepts, fundamentals and methodologies of big data analytics.
CLO2: Interpret massive volumes of unstructured data using data analytics software.
CLO3: Construct big data analytics and visualization strategy in a proper and meaningful way using appropriate techniques.

Synopsis:

This course consists of two parts: Big Data Analytics and Data Visualization. In the first part, the course brings together several key information technologies used in manipulating, storing, and analyzing big data especially unstructured data. The unstructured data are text, images, videos, audio/speech. R or Python or other tools will be used as the tool for analysing the unstructured data. In the second part of this course, data visualization is covered to enables multi-level analysis of data. The fundamental concepts in data visualization will be covered, including the various types of data visualization according to input types, different approaches in determining good data visual-
ization techniques and methods, good practices for amplifying cognition, revealing better insights and unveiling underlying structure. Students will also learn how to develop interactive visualizations and applications, use various data exploratory functions and how to present the data.

References:


MTDS 5163 Modelling and Decision Making

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Diagnose knowledge of modelling and prescriptive analytics with data science for data-driven and evidence-based decision making.

CLO2: Choose appropriate and relevant modelling and prescriptive analytics technique using Big data input to solve complex decision problems.

CLO3: Demonstrate prescriptive models and solutions using appropriate software tools and analysis of Big data, and communicate the results.
Synopsis:

In Data Science, prescriptive analytics is the final frontier of analytics, which entails the application of mathematical modelling, simulation, optimization and computational intelligence to suggest decision options, taking advantage of the results from the earlier analytic stages of descriptive and predictive analytics. Prescriptive analytics optimizes decision making and able to suggest or prescribe what actions to take in order to maximize output, given constraints and key objectives, and shows the implication of each decision option. In this course, students are exposed to operations research modelling, and meta-heuristics and soft computing based optimizations, and showed how to exploit them to solve real-world decision problems. The course covers the arts of decision making, decision making and modelling process, decision analysis and method of decision science which involves the application of selected operations research and optimization (hard and soft) techniques, to strategic and managerial decision problems. The focus is to impart analytical systems level thinking and problem solving skills in complex decision making contexts. At the end of the course students will have exposure and deep understanding on how organizational decisions are made in the present of Big data, what appropriate and relevant modelling and analytics solutions should be provided to support well-informed, in-time and effective decision making.

References:


MTDS 5213 Special Topics in Applied Data Science

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze emerging technologies in data science.

CLO2: Integrate new data science concepts and skills by adhering to professional ethics.

CLO3: Communicate data science results to various stakeholders.
Synopsis:

The course provides a comprehensive examination of data science as it is applied to real organizations and processes. Students will be introduced to real-world examples and have the opportunity to learn from industry case studies on organizations that have successfully applied data science to their advantage. This course will also provide the students with an understanding of the use of emerging technologies in data science. Communicating data science results to various stakeholders is also emphasized in this course. The course ends by examining current legal structures in Malaysia and related international legal practices, as they apply to Big Data. Ethical issues are discussed such that students able to develop insights for identifying when data science processes could lead to breaches in legal or ethical parameters, whenever such issues are encountered in their professional lives. Discussions on ethics are important as data science practices are moving forward faster than legal and organizational structures can keep pace.

References:


MTDS 5223 Manufacturing Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Illustrate analytics use cases in manufacturing systems.
CLO2: Formulate analytics models for manufacturing systems.
CLO3: Manipulate appropriate tools to implement analytics model for manufacturing use cases.

Synopsis:

Manufacturing analytics aims to analyse the production data to generate added value. The analytics models are purpose-built to
improve decision-making and boost production performance. Manufacturers take advantage of the actionable insights to reduce process flaws, increase performance, save time and cost. This course aims to provide a general overview of implementing analytics in manufacturing domain. It emphases on practical issues and application of advanced analytics on manufacturing challenges. The main focus will be placed on designing the manufacturing use cases using analytics tools toward actionable intelligence. Topics of discussion include: introduction to manufacturing analytics; the return of investments in manufacturing analytics; product design analysis; the manufacturing process; automation and computer-aided manufacturing; IoT-enabled manufacturing system; manufacturing performance management, performances analysis method, and production scheduling system; and the human side of analytics in manufacturing industry.

References:


MTDS 5233 Social Media Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the fundamentals and concepts of social media data mining.
CLO2: Choose appropriate solution steps for social media data analysis based on text mining methods.
CLO3: Construct computer program based on appropriate text mining methods for practical uses in social media analytics.

Synopsis:

This course will introduce social media content analytics. Text data mining, especially data from social media has been gaining attention as the available volume of online social media information grows at a rate that
is by far higher than our human capacity to handle and process such a huge volume of data from the web. Topics that will be covered in this course includes overview of social media data mining, practices of social media data mining, retrieving twitter data, mining twitter data, text mining fundamentals, blog summarization, analysing Facebook data and content analysis.

References:


MTDS 5243 Geospatial Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse geospatial analytics approaches on various geospatial data.
CLO2: Integrate required knowledge and skills to solve real-world geospatial analytics problems.
CLO3: Construct multi-step workflows in variety of geospatial analytics applications.

Synopsis:

Geospatial analytics offers revolutionary approaches in discovering how and why location matters in problem solving and decision-making. This course elaborates the acquisition, processing, analysis and interpretation of objects, areas and phenomena by utilising geospatial analysis for various domains, such as environmental sustainability, urban planning, agriculture and natural resources. It aims to provide knowledge and skill in geospatial analysis particularly by making use of remotely sensed data captured from sensors mounted on airborne and space borne platforms. In order to understand an object, area or phenomenon, students will be integrating knowledge and skills in image processing that involves the use of fundamental and advanced algorithms, analysing, visualizing and interpret-
ing of geospatial data for problem solving and decision making.

References:


MTDS 5253 Healthcare Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Construct solution in healthcare analytics through simple modelling and simulation.

CLO2: Evaluate a concept of healthcare analytics to support the data sciences analysis and design.

CLO3: Formulate the healthcare analytics in solving problems data science problems.

Synopsis:

This course covers the transformation of big data by creating enormous opportunities for companies, researchers and other related area in healthcare to improve patient outcomes. Healthcare analytics powers data-driven transformations that combine strategy, big data and advanced analytics, and implementation processes to change the way healthcare companies especially think, decide, and act. The four areas within healthcare are considered as a case study; claims and cost data (retail purchases e.g. data captured in running stores), pharmaceutical and research and development (R & D) data, clinical data (collected from electronic medical records (EHRs)), and patient behaviour and sentiment data (patient behaviours and preferences). By the end of this course, stu-
students are able to design, analyse and implement the healthcare analytics concepts in data sciences.

References:


**MTDS 5263 Tourism Analytics**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Evaluate each one of the concepts in tourism analytics.
CLO2: Reproduce solutions for tourism application problems using analytics software.
CLO3: Solve tourism application problems using appropriate analytics method.

Synopsis:

The course includes introduction to analytics in tourism design, predicting tourist demand using Big Data, travel demand modelling with behavioural data, methods of measuring human senses and the touristic experience, implications of quantified traveller for smart tourism development, tourism intelligence and visual media analytics for destination management organizations and a few more topics that are relevant.

References:

MTDS 5273 Customer and Financial Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate analytics use cases in customer behaviour and financial systems.

CLO2: Determine analytics models for customer behaviour and financial systems.

CLO3: Organise appropriate tools to implement analytics model for customer behaviour and financial use cases.

Synopsis:

Customer analytics is a process by which data from customer behaviour is used to help make key business decisions via market segmentation and predictive analytics. This information is used by businesses for direct marketing, site selection, and customer relationship management. Marketing provides services in order to satisfy customers. With that, the productive system is considered from its beginning at the production level, to the end of the cycle at the consumer. Customer analytics plays a very important role in the prediction of customer behaviour today. Financial analytics explores how financial statement data and non-financial metrics can be linked to financial performance. In this course, students will learn how data is used to assess what drives financial performance and to forecast future financial scenarios.

References:

**MTPU 5314 Project 1**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the problems, objectives and scope based on current trends of technologies.

CLO2: Construct comprehensive literature review and appropriate procedures to complete the project.

CLO3: Justify the suitable key answers to clarify the contribution in application domain.

Synopsis:

This course is the first part of project that contains the results based on the theories and techniques of current technologies learnt previously. Besides writing the proposal, student is required to write four chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review, Chapter 3: Research Methodology and Chapter 4: Analysis & Design. In addition, student must accomplish the project design and justify the proposed solution during presentation.

References:


**MTPU 5326 Project 2**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Formulate the solutions with significance contribution to the application domain.

CLO2: Evaluate the proposed solutions to understand the strengths, weaknesses and limitations of the study.

CLO3: Defend the proposed solution by articulating the series of processes to achieve the end results of the domain business requirements.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of knowledge and technologies learnt previously. Student must write the second fold of dissertation
which consists of three chapters of dissertation i.e. Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solutions developed as the end product of this project. Student is required to justify the contribution of the proposed solutions throughout the presentation and demonstration sessions.

References:
MASTER OF SOFTWARE ENGINEERING
(MOBILE DEVELOPMENT)
MASTER OF SOFTWARE ENGINEERING (MOBILE DEVELOPMENT)

The goal of this programme is to produce expert developers and designers of mobile applications within the ICT practitioner and related disciplines, which can strengthen their role and become the leader that instil innovative and entrepreneurial values on the global stage by applying suitable mobile application development's principles and techniques.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

**PEO1:** Practice in-depth and specialist knowledge, technology and skills of Mobile Development, and related disciplines to effectively support complex organizational decision making.

**PEO2:** Demonstrate business acumen in solving complex problems and sustain intellectual curiosity through life-long learning.

**PEO3:** Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures.

**PEO4:** Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

**PO1:** Integrate software and application development knowledge for effective and excellent practice as a mobile application developer and designer.

**PO2:** Apply knowledge, technology and skills of software and app developer to provide knowledge to design and develop innovative and quality mobile applications.

**PO3:** Apply critical and creative thinking and conduct systematic investigations into complex mobile application development and decisions problems to generate innovative solutions and extend knowledge in software and app development.

**PO4:** Ability to effectively communicate, verbally and in writing, software and application development solutions to peers, superiors, clients and experts and participate in multidisciplinary teams either as a competent leader or a group member.

**PO5:** Ability to apply independent and lifelong learning skills to keep up with latest relevant knowledge and cutting-edge technologies in mobile application development, and build up further professional and information management skills.

**PO6:** Work and function effectively in community and multidisciplinary teams either as a leader or a group member, demonstrate respect for cultural diversity and contribute to their organization and society.

**PO7:** Prepare, publish and present technical materials to a diverse audience, applying ethics, values, attitude and professionalism.

**PO8:** Demonstrate entrepreneurial and management skills.
# Programme Structure

## September Intake:

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<th>Credit</th>
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Elective courses - choose TWO (2) only:

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<td>MSMD 5243</td>
<td>Mobile Security and Privacy</td>
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Note: Total credit hours = 40 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of ‘Research’, ‘Research Activities’ and ‘Types of Research’.
CLO2: Identify the problem area for research and focusing on a specific topic.
CLO3: Develop a cohesive and robust research proposal on a chosen topic.
CLO4: Implement/select research methodology techniques and tools within the Research Proposal.
CLO5: Develop an awareness of important ethical and societal issues and carries out his or her research at the highest ethical standards.

Synopsis:

The course is designed to introduce students to the principles and good practices of Research and Development (R & D). Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research program at postgraduate level. At the end of the course, students are expected to submit a research proposal on the topic of their interest.

References:

MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of ‘Entrepreneurship’, ‘Marketing’ and ‘Business Plan’.

CLO2: Identify commercially viable ideas, projects, prototypes products & compelling Intellectual Property (IP) for commercialisation.

CLO3: Develop a cohesive and robust business plan on a chosen topic.

CLO4: Identify the constrains and interactions within the technological, business, global and social environments.

CLO5: Develop an awareness of important ethical and societal issues and carries out his or her business plan at the highest ethical standards.

Synopsis:

This course is designed for ambitious new competences, engineers and scientists in creating acquiring and existing business, or working in industries serving the entrepreneurs, or post-grads interested in acquiring and developing their talent as well as familiarising with the concepts, issues, and techniques of new venture creation. It addresses challenging issues on high technology venturing, intellectual property and intellectual property development, the installation of innovative organisation, the effective control of the innovation, and the management of the supply chain. A key element of the Entrepreneurship program is the development of business plan by teams aiming to create new ventures. Topics include development of successful ideas, developing a profitable business models, writing a business plan, market opportunities for high-tech products enabled by technology, technology and innovation, intellectual property rights, inventions inventors and invention ownership, strategic control for new ventures and venture legal aspects.

References:


**MSMD 5113 Native Mobile Development I**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate understanding of the concept and fundamentals of native mobile application and development.

CLO2: Develop an application using android native language.

CLO3: Integrate the application with existing API services available on the internet and devices hardwares.

Synopsis:

This course will offer a comprehensive preliminary to native mobile application development using java. Topics that will be included in this course includes decentralized data storage plus centralizing data via web service call, multi-threaded programming in native as well as incorporating existing API service available on the internet such as Google API and Firebase API. In addition, students are exposed to integrate the application with available hardware available on devices such as sensors and GPS.

References:


**MSMD 5123 Internet of Things Development**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Discover convergence of technologies and emerging applications of IoT.

CLO2: Evaluate of IoT products, platforms, and applications.

CLO3: Design and develop smart IoT applications.

Synopsis:

In this course, students will learn to develop Internet of Things (IoT) applications for various purposes on the latest cloud and mobile phone platforms. The Internet of Things allows billions of devices, sensors, cloud infrastructure and business intelligence tools...
to come together to enable people to make informed decisions. This helps businesses to drive more innovation and services. Graduates from this course would be in high demand as they would have acquired the right skills to develop smart applications and services to respond to industry’s needs. This subject covers the concepts of the Internet of Things (IoT), its conceptual framework and how the IoT contributes to business and daily life. It will also cover the IoT architecture and gives an overview of the core technologies required for supporting IoT. It also provides knowledge on both the underlying technologies which support IoT and M2M communications, and engages the students in the creative development of simulation scenarios for innovative Internet of Things applications.

References:

1. Anand Tamboli, Build Your Own IoT Platform: Develop a Fully Flexible and Scalable Internet of Things Platform in 24 Hours, APress, 2019.

MSMD 5133 User Experience Design & User Interface Practice

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse successful practices in emerging interface design.
CLO2: Identify suitable design to ensure a good user experience.
CLO3: Design effective prototypes and wireframes using an iterative methodology

Synopsis:

This course introduces the students to advanced practices and tools of the User Experience (UX) / User Interface (UI) design for mobile applications. It covers history of user experience, information design, elements of user experience, wireframing, mockup, prototype and guidelines in guiding students to build a mobile application through individual and group work. Using current technologies and tools, students will create a basic mobile application by applying mobile interface guidelines. As a whole, the course
will expose students to state-of-the-art, advanced UX/UI tools and techniques and prepare them to design good and realistic interface.

References:


**MSMD 5143 Mobile Analytic**

**Learning Outcomes:**

At the end of the course, students should be able to:

CLO1: Analyze the relationship between mobile testing and mobile analytics.

CLO2: Discuss the role of mobile analytics in improving software and app quality.

CLO3: Demonstrate the application of mobile analytics tool in a sample mobile app case.

**Synopsis:**

This course introduces the students to analytics incorporated into a mobile app described as in-app analytics. It explains how mobile analytics complement mobile apps testing to help in improving software quality. Using current technologies and tools, students will apply mobile analytics on a sample mobile app to analyze how the app is being used and its performance for the end users. The course will also expose the students to the issues and challenges of mobile analytics as well as how the data collected can be analyzed using data mining for the purpose of descriptive, predictive and prescriptive analysis.

References:

4. Feras Alhlou, Shiraz Asif & Eric Fettman, Google Analytics Breakthrough: From
**MSMD 5153 Mobile Testing**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate understanding of the concept and fundamentals of testing and mobile application testing.

CLO2: Comparing and contrasting testing types to appropriate contexts and scenarios for the audiences of interest as well as their strengths and weaknesses.

CLO3: Construct the test case, analyze the results, and report the findings effectively.

Synopsis:

This course gives exposure to the students about the mobile application testing concept and focus on process to develop and implement types of mobile testing such as hardware testing, software or application testing. Topics include how to plan and conduct mobile application testing, and how to report results from the testing. In this course, students will be guide to use mobile application testing tools.

**References:**


**MSMD 5163 Mobile Back-End**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the emerging elements in mobile backend development.

CLO2: Construct program for backend application.

CLO3: Propose a high-level system design by using appropriate system architecture.
Synopsis:

This course introduces the students to practices and tools of the mobile backend development. It covers creating an API for mobile, server to server connection, cloud technology, mobile app backend services, performance and security. Using current technologies and tools, students will create a basic mobile backend application. As a whole, the course will expose students to state-of-the-art, tools and techniques to develop mobile backend application.

References:


MSMD 5213 Agile Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply the concept of agile project management for any IT projects.
CLO2: Work on the principles and practices of agile project management in the IT projects.
CLO3: Follow the standard guideline to produce a project vision and the product roadmap in a collaborative team environment for the purpose of IT project completion.

Synopsis:

This subject introduces the basic concept of agile project management to the student. It covers the agile project management process which includes agile tools and techniques for today knowledge-based projects. A knowledge-based project requires the project manager to manage, optimize and facilitate knowledge as a resource throughout the duration. This subject also covers support areas such as risk management. This subject exposes the student to the transition of a traditional project management into an agile project management.

References:

1. Jeff Cohn, Scrum Mastery + Agile Leadership: The Essential and Definitive Guide to Scrum and Agile Project
MSMD 5223 Mobile App Architecture

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Classify and distinguish the basic platforms and technology trends of handheld devices.

CLO2: Recognise and differentiate the mobile architecture components and its functionalities.

CLO3: Demonstrate the ability to design mobile application architecture based on requirements gathered.

Synopsis:

This course covers the theoretical and technical knowledge and skills necessary to design the mobile application architecture. The components of the architecture, the platforms and infrastructure are discussed and elaborated. The concepts of client user interface and data transfer are also covered in this subject.

References:

MSMD 5233 Native Mobile Development II

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate the process of creating iOS apps and programming best practices.

CLO2: Compare well-written code from poorly-written code.

CLO3: Explain iOS API features and examine app functionality into properly designed components.

Synopsis:

This course will provide the knowledge of iOS development concepts as well as iOS programming (i.e. Swift) and the Apple toolset through the creation of iOS native applications as reflected in the design of iOS platform (i.e. iPhone, iPad, iTunes), the Model-View-Controller (MVC) paradigm and various high and low-level iOS's frameworks. It also provides basic concepts about designing intuitive and usable interfaces. The course includes live demos and extensive individual lab work.

References:


2. Etash Kalra, From Zero to iOS Hero: Swift Development for Kids and Teens, Independently Published,


MSMD 5243 Mobile Security and Privacy

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Discover and understand the concept of security and privacy for mobile application development.

CLO2: Form a coherent design strategy for usable, friendly security in mobile applications whilst minimising the risk to users.

CLO3: Develop a safeguarding application of a mobile.

Synopsis:

Mobile phones have had a very significant impact on individuals and businesses over
the past ten years and their influence continues to grow. Their technologies are being incorporated into a variety of other mobile systems. For both the development of new functionality and the emergence of new security threats, these mobile platforms are the center of attention, hence, ensuring and maintaining the mobile security and privacy is importance to the developers. This course provides an understanding of security and privacy requirements before building a secure mobile application. It also provides the knowledge to understand the mobile security and privacy risks of a mobile device and ways to protect it. Further, the subjects provide the skill to the students to be able to design and develop a safeguarding mobile application.

References:

4. Kevin Mitnick, Mikko Hypponen & Robert Vamosi, The Art of Invisibil-

MTPU 5314 Project 1

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the problems, objectives and scope based on current trends of technologies.
CLO2: Construct comprehensive literature review and appropriate procedures to complete the project.
CLO3: Justify the suitable key answers to clarify the contribution in application domain.

Synopsis:

This course is the first part of project that contains the results based on the theories and techniques of current technologies learnt previously. Besides writing the proposal, student is required to write four chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review, Chapter 3: Research Methodology and Chapter 4: Analysis & Design. In addition, student must
accomplish the project design and justify the proposed solution during presentation.

References:

MTPU 5326 Project 2

Learning Outcomes:
At the end of the course, students should be able to:

CLO1: Formulate the solutions with significance contribution to the application domain.

CLO2: Evaluate the proposed solutions to understand the strengths, weaknesses and limitations of the study.

CLO3: Defend the proposed solution by articulating the series of processes to achieve the end results of the domain business requirements.

Synopsis:
This course is the second part of project that show the ability of student in applying the theories and techniques of knowledge and technologies learnt previously. Student must write the second fold of dissertation which consists of three chapters of dissertation i.e. Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solutions developed as the end product of this project. Student is required to justify the contribution of the proposed solutions throughout the presentation and demonstration sessions.

References:
MASTER OF INFORMATION SYSTEM
MASTER OF INFORMATION SYSTEM

Master of Information Systems program is offered for developing high-level information systems. Graduates will be equipped with the latest knowledge and skills in the field of management and implementation of information systems specializing in the fields of study chosen.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 5 years of graduation.

Below are the PEO for this programme:

PEO1: Having important knowledge in the field of Information Technology including thinking skills that can be shown in the context of its use.

PEO2: Adapting the technology changes through research or continuing education activities.

PEO3: Understand and appreciate the emergence of effective skills, cooperation and leadership roles in their careers.

PEO4: Identify and able to demonstrate ethical behaviors in conducting professional activities.
Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These are related to the Knowledge (K), Skills (S), and Attitude (A) that students acquire throughout the programme.

Below is the list of PO for this programme:

**PO1:** Synthesize knowledge and contribute to original research that broadens the frontier of knowledge in the relevant industry.

**PO2:** Adapt practical skills leading to innovative ideas in the relevant industry and able to communicate effectively.

**PO3:** Provide expert advice to society in the relevant industry.

**PO4:** Conduct research independently and adhere to legal, ethical and professional codes of practice.

**PO5:** Display leadership and entrepreneurship qualities through communicating and working effectively with peers and stakeholders.

**PO6:** Appraise problems in the relevant field critically using scientific skills and

**PO7:** Carry out continuous self-learning to acquire knowledge and skills.
Programme Structure

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**Total credit** 15

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**Total credit** 9

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**Total credit** 16
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**Note:** Total credit hours = 40 credits
Course Details

MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of ‘Research’, ‘Research Activities’ and ‘Types of Research’.

CLO2: Identify the problem area for research and focusing on a specific topic.

CLO3: Develop a cohesive and robust research proposal on a chosen topic.

CLO4: Implement/select research methodology techniques and tools within the Research Proposal.

CLO5: Develop an awareness of important ethical and societal issues and carries out his or her research at the highest ethical standards.

Synopsis:

The course is designed to introduce students to the principles and good practices of Research and Development (R & D). Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research program at postgraduate level. At the end of the course, students are expected to submit a research proposal on the topic of their interest.

References:


MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the conceptual understanding of ‘Entrepreneurship, ‘Marketing’ and ‘Business Plan’.

CLO2: Identify commercially viable ideas, projects, prototypes products & compelling Intellectual Property (IP) for commercialisation.

CLO3: Develop a cohesive and robust business plan on a chosen topic.

CLO4: Identify the constrains and interactions within the technological, business, global and social environments.

CLO5: Develop an awareness of important ethical and societal issues and carries out his or her business plan at the highest ethical standards.

Synopsis:

This course is designed for ambitious new competences, engineers and scientists in creating acquiring and existing business, or working in industries serving the entrepreneurs, or post-grads interested in acquiring and developing their talent as well as familiarising with the concepts, issues, and techniques of new venture creation. It addresses challenging issues on high technology venturing, intellectual property and intellectual property development, the installation of innovative organisation, the effective control of the innovation, and the management of the supply chain. A key element of the Entrepreneurship program is the development of business plan by teams aiming to create new ventures. Topics include development of successful ideas, developing a profitable business models, writing a business plan, market opportunities for high-tech products enabled by technology, technology and innovation, intellectual property rights, inventions inventors and invention ownership, strategic control for new ventures and venture legal aspects.

References:

MISP 5013 Information System Development

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze technical requirements for system development.
CLO2: Develop an information system.
CLO3: Manage the information system.

Synopsis:

Systems development is one of the most challenging activities in the computing industry. In this subject, students will be introduced to the fundamental concepts of information systems, their use in business and the impact on the world. This subject is suitable for students who have no background in computers or information systems and systems development. It emphasises on the technical components such as hardware, software, network, and security. Students will also learn how information systems can be used to improve business related to globalization, intellectual privacy and future trends of information systems.

References:

1. Mohammed Seyam, Agile methodologies in Information system development: how to be agile, without losing the disciplines of being traditional, Lambert, 2010.


MISP 5023 Data Center Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain in detail the key themes and principles of data center management and be able to apply these principles in designing solutions to managing data center effectively.

CLO2: Demonstrate how to apply the principles of data center management in a variety of contexts.

CLO3: Analyse the interrelationship between the various elements of man-
Aging data center and its role in protecting data center.

Synopsis:

A data center is a facility used to house computer systems and associated components, such as telecommunications, computer servers, operating systems and storage systems to upkeep crucial data/information. In this course students will learn to manage telecommunication infrastructure, computer servers’ management, storage system management. These include batch programs run, backup and restore procedure, redundant or backup power supplies, data communications connections, environmental controls (e.g., air conditioning, fire suppression) and various security devices.

References:


MISP 5033 Data Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the requirements for data analytics system for an organizational requirements.

CLO2: Demonstrate necessary data analytics tools or functions for big data.

CLO3: Formulate an effective strategy to implement a successful data analytics project.

Synopsis:

This course will discuss data analytics techniques, which is very crucial to transform organisations. As organisations become more dependent on increasingly accurate information, Data Analytics system could provide the necessary information derived the massive information that is readily available today. But Systems are always as good as they are designed for. It is therefore very important that Data Analytics systems are properly designed and implemented for the intended use. This course aims to cover both aspects
of the understanding and the design and implementation of data analytics systems.

References:


**MISP 5043 Business Information System**

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze fundamental business process and their integrative nature.

CLO2: Discuss the role of enterprise systems in supporting business process.

CLO3: Demonstrate the integrative nature of an enterprise system in a sample organization case.

Synopsis:

This course is a reflection on how real world business processes are managed and executed in a practical and accessible format. The aim is to establish a fundamental understanding of how business operates and the enterprise system they use to accomplish their task. It deals with the key processes that are common in most companies and illustrates how enterprise systems enable companies to execute those processes quickly and efficiently. The course is divided in two parts. The first part will focus on foundational concepts which include the integrated business processes and basic concepts in financial and management accounting. The second part will discuss the organizational data associated with the business process and subsequently examines each process in detail.

References:


4. Jane P. Laudon, Kenneth C. Laudon, Management Information Systems Man-
MISP 5053 Database Systems Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse and adapt database concepts, particularly the concepts of relational databases.

CLO2: Design database using top-down and bottom-up techniques.

CLO3: Compare the use of the Structured Query Language - DDL, DML and DCL.

Synopsis:

In many business information systems, database approaches are fundamental. In order to embrace Knowledge Management and Business Intelligence (BI), Customer Relationship Management (CRM), ERP packages (e.g., SAP), e-commerce and on-line transaction processing understanding on the need for data integration and enterprise-wide data management is crucial. Business managers and information systems professionals require understanding on managing databases systems to design, build and maintain effective information systems for today’s business organizations. The objective of this course is to provide the prospective business or information systems professional with fundamental concepts and skills in data modeling (conceptual, logical and physical), as well as in designing, building and managing the data layer to support business applications. In addition to data modeling, some proficiency with Structured Query Language (SQL) will be provided. Although object-oriented, and other database approaches will be discussed, the course focuses primarily on the use of state-of-the-art of relational databases.

References:


MISP 5063 IS Project Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Describe and apply a systematic activities and scopes that involved in managing IS project.

CLO2: Produce IS development project charter in order to organize IS development project effectively.

CLO3: Analyse project requirements and choose appropriate software development model (approaches) in managing IS project.

Synopsis:

IS Project Management refers to activities responsible for planning, coordinating, measuring, monitoring, controlling, and documenting all the development tasks, either during or after the project. Within IS development management, quality can be understood as the efficient, effective and comfortable usage, by part of a group of users, of a software system for a set of valid functionalities and under some given conditions. In order to provide a better IS project, software maintenance shall take into consideration for this subject. The main aim of this course is related on management and quality of software and is meant to provide students with the methodic skills to control and plan the IS development activities, to obtain with a systematic, disciplined and quantifiable approach solutions that finally could ensure the success of the project.

References:


MISP 5073 Project Paper

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Conduct the research findings and output that has the research value.

CLO2: Present and defend the proposal.
CLO3: Organize information to produce a formal piece of writing and aims at presenting and discussing the result of depth study.

Synopsis:

This course harnessing the knowledge, skills and attitudes acquired in the programme and applying them to solve information systems-related research problems, create new knowledge or develop new information system products or services is an essential part of the programme. In this respect, each student is mentored by a staff member in an information systems project lead to comprehensive project paper. The project can be in any information systems.

References:

MISP 5093 Special Topics In Information System

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the knowledge and understanding of theoretical concepts, issues, challenges, and trends of selected topic in Information and Communication Technology.

CLO2: Analyze the state-of-the-art of the selected topic in terms of technological implementation and trade off, societal impact and market perspectives.

CLO3: Apply the knowledge in current trend of information system.

Synopsis:

This course covers different current topics in Information system. It provides students an opportunity to explore and appreciate the emerging computer technologies, industry-specific information and communication technology. Students will analyze the current developments, issues, challenges and opportunities in this area. The content and format of this subject will vary depending on the topic being selected by the faculty and the instructor with emphasis on current information system trends and developments.

References:
4. Robert Stackowiak, Art Licht, Venu Mantha and Louis Nagode, Big Data and The

MISP 5103 Configuration Management and Maintenance

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain in detail the key themes and principles of configuration management and maintenance and be able to apply these principles in designing solutions to manage configuration and maintenance effectively.

CLO2: Demonstrate how to apply the principles of configuration management and maintenance in a variety of contexts.

CLO3: Analyse the interrelationship between the various elements of configuration management and maintenance and its role in information systems.

Synopsis:

This course covers the principles of configuration management and maintenance and is suitable for those who are looking for an in-depth understanding of information system in medium to large organisations. Concentrate on configuration management and maintenance that are used in information system. The needs of configuration management and maintenance have been spurred by the pervasive use of computer-based applications such as information systems, databases, and the Internet.

References:


**MISP 5113 Information Security and Governance**

**Learning Outcomes:**

At the end of the course, students should be able to:

CLO1: Explain in detail the key themes and principles of information security and be able to apply these principles in designing solutions to managing security risks effectively.

CLO2: Demonstrate how to apply the principles of information security in a variety of contexts.

CLO3: Demonstrate the interrelationship between the various elements of information security and its role in protecting organizations.

**Synopsis:**

The course covers the principles of applied information security management and is suitable for those who are looking for an in-depth understanding of security management in medium to large organizations.

Concentrate on information security that are used in protecting both the information present in computer storage as well as information traveling over computer networks. Interest in information security has been spurred by the pervasive use of computer-based applications such as information systems, databases, and the Internet. Information security has also emerged as a national goal in Malaysia and in other countries with national defense and homeland security implications. Information security is enabled through securing data, computers, and networks.

**References:**

MISP 5123 Healthcare Information System

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain in detail the key themes and principles of healthcare information system and be able to apply these principles in designing solutions to healthcare system effectively.

CLO2: Demonstrate how to apply the principles of healthcare information system in a variety of contexts.

CLO3: Analyse of the interrelationship between the various elements of managing healthcare information system and its role in improving healthcare services.

Synopsis:

This course aims to provide a broad understanding of Information Systems (IS) focused from a management perspective, within the healthcare environment. The module addresses the role of IS and technology in providing the necessary infrastructure needed to support organisations and workers in healthcare decision-making. The course is divided into three main areas: the business context, managing IS and implementing IS in healthcare system. Theoretical concepts introduced in the course include information systems theory, the organisation and environment, information systems modelling, planning and strategy, systems development, evaluation, technical foundations and data protection, standardisation and security of patient electronic medical records.

References:

CONTACT US

For further information, please browse through our websites:

- UTeM: [https://www.utm.edu.my/](https://www.utm.edu.my/)

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