Master of Science (Medical Research)

TMR Programme Book for 2021/2022 Academic Session

Mixed Mode

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INTRODUCTION TO AMDI

The preceding decade has witnessed numerous new developments with regards to medical knowledge, medical technology and healthcare. To avoid being left behind, it is imperative that we initiate steps so as to be more innovative in exploiting these new advances for the benefit of health patients, particularly in Malaysia and throughout the Asia Pacific. In realizing this aim, Malaysian government has taken the smart initiative in establishing the Advanced Medical and Dental Institute (AMDI) which will function to manifest these aspirations particularly for the benefits of the public in the northern part of Peninsular Malaysia as well as the whole of Malaysia.

The main mission of AMDI is to function as the prime catalyst in producing specialists and scientists in both the medical and dental fields, who are competent, holistic and contemporary in their practice and profession as well as capable of generating novel discoveries. To realize this aim, AMDI adopts a comprehensive approach embracing both clinical and pure sciences in training, service and research. It is envisioned that this 'cross fertilization' philosophical approach will foster a fertile and inventive environment that increases the probability of new discoveries in both dentistry and medicine. Hence, the AMDI infrastructure is designed to facilitate this cross-fertilization approach.

The operational structure of AMDI, encompassing both clinical services and administration, classifies functioning entity as a 'cluster' consisting of specialists from the various disciplines and specializations. The collaborative approach, involving both specialists and researchers, is in tandem with the aspirations of USM i.e. raising the standards of research and teaching activities. AMDI will place great emphasis on medical and dental studies at the postgraduate level. The postgraduate medical and dental studies program is supported by all then teaching faculties of all clusters The selection of program to be offered also took into consideration services yet to be provided by Malaysian Health Ministry so that there will be no overlapping of program.

With regards to academic program, AMDI will focus on postgraduate program such as Master of Medicine (Specialization), Master of Science (coursework mode) and research mode program at master's and doctorate levels. AMDI will initiate efforts to offer sub-specialization medical courses such as Master Specialization and in medical sub-categories. AMDI also plans to offer new program at Master's and doctorate levels as well as new 'sandwich' program, i.e., M. Med/PhD which is envisioned as the by products the integrative pure and clinical science approach propounded by AMDI.

WELCOMING REMARKS

Congratulations to all new candidates of MSc in Medical Research program. On behalf of the program committee, I would like to take this opportunity to welcome you to Advanced Medical and Dental Institute, USM. The main aim of this program is to prepare *'the mind'* of postgraduate students in the 'arts' of research to serve as a strong foundation for subsequent research study.

The program is divided into 50% taught courses and 50% research work. The diversification of learning methods will hopefully encourage the students to be more creative and innovative especially in their research undertaking. The taught courses that consist of various disciplines will provide a foundation for the students to gain sufficient knowledge in medical research and thus advantageous to those who wish to pursue their study in the future. These courses will be given by various experts, with the hope that students will benefit from being exposed to the research experiences of these lecturers, enabling them to acquire a broad based knowledge in life sciences and medicine.

This program also includes a module where students will be introduced to various types of professional and research skills that are important in determining the success of a researcher. The students will not just exposed with the content of specialized science-related subjects, but also the knowledge on how to develop the soft skills. Traditionally, these skills are acquired by the students on their own initiatives while doing their research, as well as through interaction with their supervisors. However, some students may not be fortunate enough to be in a position to acquire these skills.

As for the research component, the main aim of the module is to introduce to the candidates the 'arts' of doing research. To become a successful researcher, ones would need to be able to draw in money for the research project, be able to manage the research laboratory and coordinate the research staff, to obtain and analyse the data and to disseminate the research findings through publication and presentation. While preparing their proposals, candidates are required to work with their supervisors to start acquiring the technical expertise related to their research project. However, since the program is only for one year, the focus will be more on preparing the research 'mind' of the candidates rather than the acquisition of technical expertise of a laboratory technologist.

Nevertheless, a one year mixed mode MSc program will always demand hard work and sacrifice by the candidates. It is my sincere hope the candidates will rise to this challenge and be the pride of USM in general, and AMDI in particular.

Thank you.

YM PROF. DR. TUNKU KAMARUL ZAMAN TUNKU ZAINOL ABIDIN
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Universiti Sains Malaysia,
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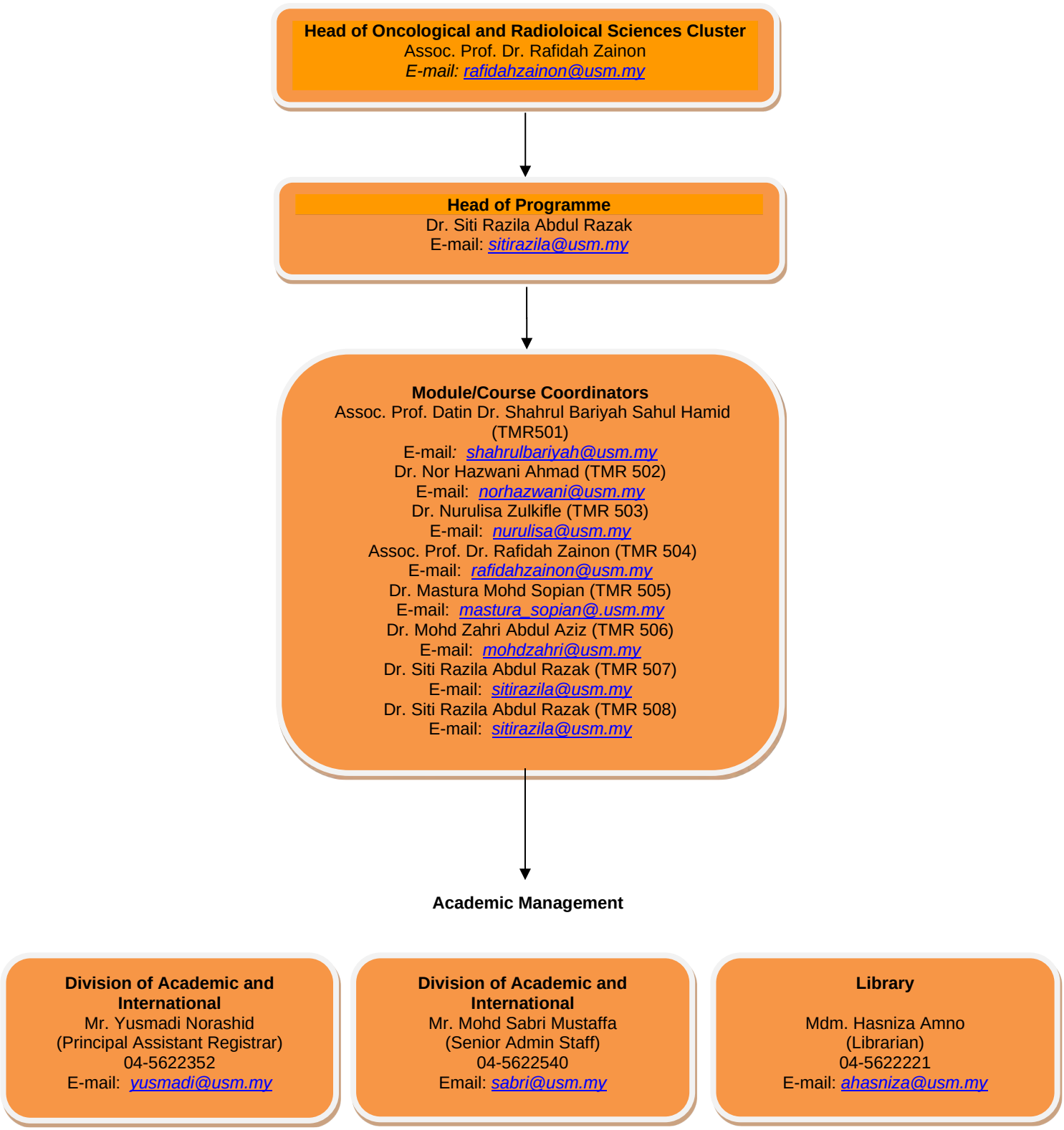
Organisation Structure of MSc (Medical Research) Programme



ACADEMIC CALENDAR - ACADEMIC SESSION 2021/2022
FOR ALL SCHOOLS (EXCEPT FOR SCHOOL OF MEDICAL SCIENCES AND SCHOOL OF DENTAL SCIENCES)

Main and Engineering Campus : Registration for New Student (03 & 04 October 2021) / **Orientation Week (05 - 08 October 2021)
Health Campus : Registration for New Student (03 October 2021) / **Orientation Week (04 - 07 October 2021)

SEM	WEEK	ACTIVITY	DATE	REMARKS
ONE	1	Teaching & Learning (T&L - 7 Weeks)	Monday, 11.10.2021 - Sunday, 17.10.2021	
	2		Monday, 18.10.2021 - Sunday, 24.10.2021	18.10.2021, Monday - Prophet Muhammad's Birthday
	3		Monday, 25.10.2021 - Sunday, 31.10.2021	
	4		Monday, 01.11.2021 - Sunday, 07.11.2021	03.11.2021, Wednesday - Deepavali**
	5		Monday, 08.11.2021 - Sunday, 14.11.2021	11 & 12.11.2021, Thursday & Friday - Sultan of Kelantan's Birthday (Kelantan)
	6		Monday, 15.11.2021 - Sunday, 21.11.2021	
	7		Monday, 22.11.2021 - Sunday, 28.11.2021	
	8	Mid Semester Break	Monday, 29.11.2021 - Sunday, 05.12.2021	
	9	Teaching & Learning (T&L - 7 Weeks)	Monday, 06.12.2021 - Sunday, 12.12.2021	
	10		Monday, 13.12.2021 - Sunday, 19.12.2021	
	11		Monday, 20.12.2021 - Sunday, 26.12.2021	25.12.2021, Saturday - Christmas
	12		Monday, 27.12.2021 - Sunday, 02.01.2022	01.01.2022, Saturday - New Year of 2022
	13		Monday, 03.01.2022 - Sunday, 09.01.2022	
	14		Monday, 10.01.2022 - Sunday, 16.01.2022	
	15		Monday, 17.01.2022 - Sunday, 23.01.2022	18.01.2022, Tuesday - Thaipusam**
	16	Revision Week	Monday, 24.01.2022 - Sunday, 30.01.2022	
	17	Examination (3 Weeks)	Monday, 31.01.2022 - Sunday, 06.02.2022	01 & 02.02.2022, Tuesday & Wednesday - Chinese New Year**
	18		Monday, 07.02.2022 - Sunday, 13.02.2022	
	19		Monday, 14.02.2022 - Sunday, 20.02.2022	
	20	Mid Semester Break / Industrial Training (4 Weeks)	Monday, 21.02.2022 - Sunday, 27.02.2022	28.02.2022, Monday - 18.03.2022, Friday - PPJJ Intensive Course
	21		Monday, 28.02.2022 - Sunday, 06.03.2022	
	22		Monday, 07.03.2022 - Sunday, 13.03.2022	
	23		Monday, 14.03.2022 - Sunday, 20.03.2022	
TWO	24/1	Teaching & Learning (T&L - 7 Weeks)	Monday, 21.03.2022 - Sunday, 27.03.2022	
	25/2		Monday, 28.03.2022 - Sunday, 03.04.2022	03.04.2022, Sunday - Awal Ramadan
	26/3		Monday, 04.04.2022 - Sunday, 10.04.2022	
	27/4		Monday, 11.04.2022 - Sunday, 17.04.2022	
	28/5		Monday, 18.04.2022 - Sunday, 24.04.2022	19.04.2022, Tuesday - Nuzul Al-Quran
	29/6		Monday, 25.04.2022 - Sunday, 01.05.2022	01 & 02.05.2022, Sunday & Monday - Labour Day
	30/7		Monday, 02.05.2022 - Sunday, 08.05.2022	02 & 03.05.2022, Monday &Tuesday - Eid-ul fitr**
	31/8	Mid Semester Break	Monday, 09.05.2022 - Sunday, 15.05.2022	15 & 16.05.2022, Sunday & Monday - Wesak Day
	32/9	Teaching & Learning (T&L - 7 Weeks)	Monday, 16.05.2022 - Sunday, 22.05.2022	
	33/10		Monday, 23.05.2022 - Sunday, 29.05.2022	
	34/11		Monday, 30.05.2022 - Sunday, 05.06.2022	30 & 31.05.2022, Monday & Tuesday - Pesta Kaamatan (Sabah) 01 & 02.06.2022, Wednesday & Thursday - Hari Gawai (Sarawak)
	35/12		Monday, 06.06.2022 - Sunday, 12.06.2022	06.06.2022, Monday - Agong's Birthday
	36/13		Monday, 13.06.2022 - Sunday, 19.06.2022	
	37/14		Monday, 20.06.2022 - Sunday, 26.06.2022	
	38/15		Monday, 27.06.2022 - Sunday, 03.07.2022	
	39/16	Revision Week	Monday, 04.07.2022 - Sunday, 10.07.2022	07.07.2022, Thursday - Penang Heritage 09.07.2022, Saturday - Penang Governer's Day 09 & 10.07.2022, Saturday & Sunday - Eid-ul adha**
	40/17	***Examination (2 Weeks) / Examination (3 Weeks)	Monday, 11.07.2022 - Sunday, 17.07.2022	11.07.2022, Monday - Eid-ul adha** (Kelantan)
	41/18		Monday, 18.07.2022 - Sunday, 24.07.2022	
	42/19		Monday, 25.07.2022 - Sunday, 31.07.2022	30.07.2022, Saturday - Awal Muharram
*KSCP / LONG VACATION	43/20	Long Vacation / Industrial Training (10/11 Weeks)	Monday, 01.08.2022 - Sunday, 07.08.2022	
	44/21		Monday, 08.08.2022 - Sunday, 14.08.2022	
	45/22		Monday, 15.08.2022 - Sunday, 21.08.2022	
	46/23		Monday, 22.08.2022 - Sunday, 28.08.2022	
	47/24	*T&L	Monday, 29.08.2022 - Sunday, 04.09.2022	31.08.2022, Wednesday - National Day
	48/25		Monday, 05.09.2022 - Sunday, 11.09.2022	
	49/26	Examination	Monday, 12.09.2022 - Sunday, 18.09.2022	16.09.2022, Friday - Malaysia Day
	50/27		Monday, 19.09.2022 - Sunday, 25.09.2022	
	51/28		Monday, 26.09.2022 - Sunday, 02.10.2022	
	52/29		Monday, 03.10.2022 - Sunday, 09.10.2022	08.10.2022, Saturday - Prophet Muhammad's Birthday

Programme Schedule

SEMESTER	DURATION
Semester I	**11 October 2021 – 20 March 2022**
Courses/modules: **TMR 501**: Genomics and Medicine **TMR 502**: Techniques in Pathology **TMR 503**: Proteomics and Medicine **TMR 504**: Professional and Research Skills Presentation and submission of Research Proposal: **TMR 507**: Research	11 October 2021 – 23 January 2022
Revision	24 – 30 January 2022
Semester Exam	31 January 2022 – 20 February 2022
Semester Break	21 February – 20 March 2022
Semester 2	21 March – 31 July 2022
Courses/modules: **TMR 505**: Clinical Research **TMR 506**: Laboratory Management **TMR 508**: Therapeutic Products and Practices **TMR 507**: Research	21 March 2022 – 3 July 2022
Revision	4 -10 July 2022
Semester Exam	11 July – 31 August 2022
Long Vacation Course (KSCP)	**1 August – 9 October 2022**
Courses/modules: **TMR 507**: Research Submission of Dissertation Viva voce	July 2022 August 2022

Curriculum Structure / Course Registration List

DESCRIPTION	CODE	MODULE (COURSE)	TYPE	UNIT
Semester I				
Lecture/practical	TMR 501	Genomics and Medicine	Core (T)	3
	TMR 502	Techniques in Pathology	Core (T)	2
	TMR 503	Proteomics and Medicine	Core (T)	3
	TMR 504	Professional and Research Skills	Core (T)	3
Research	TMR 507	Research (register once only in Sem. 1)	Core (T)	20
		Total unit to register		**31**
Semester II				
Lecture/practical	TMR 505	Clinical Research	Core (T)	3
	TMR 506	Laboratory Management	Core (T)	3
	TMR 508	Therapeutic Products and Practices	Core (T)	3
Research	*TMR 507*	*Research (auto transfer register)*	*Core (T)*	-
		Total unit to register		**9**
Long Vacation Course (KSCP) / Semester III				
Viva voce	*TMR 507*	*Research (auto transfer register)*	*Core (T)*	-
Total unit				**40**

Important Notes:
IPS Registration Guidelines for new postgraduate students:
https://ips.usm.my/images/New_Student_20212022/REGISTRATION_GUIDELINES_CWMM_MAINCAMPUS_OCT2021.pdf

Candidature matters:
https://ips.usm.my/index.php/current-student/candidature-matters/coursework-and-mixed-mode-programme

Student's Assignment

Introduction

It is becoming more apparent now that many successful research activities is a result of a multi-disciplinary approach to problem solving involving many different researchers of different expertise but with similar research goals. Given this diversity, it is only normal that differences may lead to tension between the researchers over such issues as research opportunities or ownership of knowledge. As such, the ability of the researchers to collaborate rather than compete with each is of paramount importance in ensuring the success of any research grouping.

Students' assignments are designed to be completed and submitted by the end of the semester. Candidates will be divided into groups and each group will elect a Project Leader who will then coordinate the preparation of the assignments to be undertaken by all members of the group.

For this semester, the candidates will be divided into two groups. For each module, the two groups will sit down together and decide on the selection of an assignment topic given by the lecturer or can opt to select their own topics of relevant to the modules. Each group will be required to work together as a team under the leadership of the Project Leader and to complete ONE assignment per group.

The format of the assignment

The assignments should be in an academic style, in the form of a mini review, and fully referenced. All assignments must be submitted as a hard copy of double spaced text. The length of each assignment should be approx. 2000 words, not including references (Approx. 5-6 pages of typed, double spaced text, not including figures, tables and references).

Forgery

Candidates are reminded that the assignment must be written in that their own words and "cut and paste" activity will not be tolerated. Serious action will be taken on student who is caught.

Research Notebook

Introduction

Research notebook that keeps records of the methodology and the raw data of the research work is an important element of any research project. Candidates are therefore required to keep a complete record of their research works in a notebook. The notebook must always be up-to-date and can be requested to be examined at any time. The candidates will be required to submit these notebooks at the end of the academics' year when requested by the academic Office. The research notebook must be written in sufficient details that another researcher will be able to understand the methodology and be able to repeat the experiment when needed.

The format:

1. Use only a hardcover Scientific Notebook.

The notebook must be written in ink and each page signed and dated. If you make a mistake, do not erase but marked the errors by drawing a single line across the sentence.

2. Index

The beginning of the notebook should be reserved for listing the title and the page number of each experiment.

3. Organisation of the notebook

For every new experiment, write down the summary of the goal, the objectives and the research strategy. Document any changes in your plan. The notebook must be organised by experiment only and not to be used as a daily logbook. Start each new experiment on new page number.

4. Organisation of the experiment

4.1 Title/purpose

The title must be able to describe the experiment, for example "Affinity purification of immunoglobulin G from human sera using protein G column".

4.2 Background of the experiment

Write down important information about the experiment, such as a new approach to the previous experiment in order to obtain a different result. The background should also include drawing, map etc that can later help in the elucidation and interpretation of the results.

4.3 Materials

The researcher must write down all the materials that will be used in the experiment to include solutions, reagents or equipment required. Formulation and calculation of buffers or solution should be included unless they are common ones or are included in the test kits but must document the kit name, vendor and the catalog number.

For biological reagents, documentation that must be included in a notebook must include:
-genotype for strains
-the restriction map, source, purity and concentration for nucleic acids
-base sequences/database accession number for oligonucleotides
-source (vendor) and catalog numbers.

4.4 Procedure/Methodology

Before starting the experiment, write down in details and understand the procedure/methodology to be used. However, if it is a repeat experiment, refer to the earlier experiment, such as the page number etc. For a complicated procedure, it would be helpful to include flow charts and tables to facilitate understanding and keeping track of the running of the procedure. All procedures must be referenced, unless it is a new one.

4.5 Results

The results section must include all the raw date, such as photograph of H&E staining, gel imaging print out, colony count or ELISA chart and the analyzed data. Include also results from machines that can be written to CD etc.

4.6 Conclusion/ Discussion/ Summary

This section should contain the summary and the conclusion that can be made. Include in this section the analysis as to why the experiment did work or did not work.

Module/Course Objectives

TMR 501 : Genomics and Medicine
Coordinator : Assoc. Prof. Datin Dr. Shahrul Bariyah Sahul Hamid

Topic	Contact hour/s	Objective
Introduction to Molecular Biology	2	To discuss on: • genetics including Mendelian principles • structure and functions of chromosomes and nucleic acids
Regulation of Genes	2	To discuss on: • gene transcription and translation
	2	To understand: • regulation of gene expression • epigenetics
Genomics and Discovery of New Drugs	2	To discuss on: • gene cloning
	2	• basic principles, constructions and application of genomic libraries
	2	• application of genomics in the discovery of drugs
Molecular Biology of Cancer	2	To discuss on: • tumor suppressor genes and oncogenes
	2	• cell cycle regulation, telomeres, telomerase, DNA damage and DNA repair in cancer development
	2	• mechanisms of cell death
Application of Genomics in Diagnosis and Prognosis of Diseases	2	To understand the application of: • genomics as rapid detection in diagnosis and prognosis of diseases
	2	• genomic biomarker discovery
	2	• comparative genomic hybridization

	2	• gene array technology and cancer
	2	• RNA technologies in diagnosis and prognosis of diseases
Latest Advances in Medical Genomics	8	To give a general overview of the methods and the underlying concepts of the latest advances in medical genomics including: • gene therapy • cancer vaccine • pharmacogenetics in 12ersonalized medicine • high throughput nextgen sequencing
Ethical and Social Implications of Genomic Medicine	2	To give an overview on ethical and social implications of genomic medicine
Current Issues in Medical Genomics (Seminar/Panel discussion/Forum)	2	To discuss on the current issues in medical genomics
Updates in Genomics and Medicine	2	Journal Club
TOTAL	42	

TMR 502 : Techniques in Pathology
Coordinator : Dr. Nor Hazwani Ahmad

Topic	Contact hour/s	Objective
Introduction to Medical Laboratory Techniques	2	To discuss on the different type of medical laboratories and routine process in a medical laboratory.
Principles of Techniques in Anatomic Pathology	2	To give an overview of basic principles of the various techniques used in anatomic pathology and cytology.
	3	Practical: Histopathology laboratory
Introduction to Hematology	2	To give a general overview of: • the discipline of hematology • routine process in a diagnostic hematology laboratory • basic principles of the various techniques used in haematology
	3	Practical: Hematology Laboratory
Introduction to Blood Transfusion	2	To give an overview of the discipline of blood transfusion.
	1	Visit: Blood Bank .
Introduction to Medical Immunology	2	To give a general overview of the • discipline of medical immunology • routine process in a diagnostic laboratory • basic principles of the various techniques used in immunology
	3	Practical: Medical Immunology Laboratory
Introduction to Medical Microbiology I and II	2	To give a general overview on: • discipline of medical microbiology focusing on bacteriology and virology • routine process in a diagnostic laboratory • techniques used in medical bacteriology and virology

	2	To give a general overview on: • discipline of medical microbiology focusing on parasitology and mycology • routine process in a diagnostic laboratory • techniques used in medical parasitology and mycology
	3	To give an overview of basic principles of the various techniques used in medical microbiology Practical: Techniques in Medical Microbiology
Introduction to Chemical Pathology	2	To give a general overview of the discipline of chemical pathology and routine process in a diagnostic laboratory.
Techniques in Chemical Pathology	2	To give an overview of basic principles of the various techniques used in chemical pathology.
	3	Practical: Chemical Pathology Laboratory
TOTAL	34	

TMR 503 : Proteomics and Medicine
Coordinator : Dr. Nurulisa Zulkifle

Topic	Contact hour/s	Objective
Introduction to Proteomics	1	• To define proteomics • To discuss the structure and function of proteins
Protein Electrophoresis	5	To discuss on: • principles of electrophoresis • principles, methods and applications of polyacrylamide electrophoresis • principles of isoelectric focusing (IEF)
	3	Practical: Protein electrophoresis
Expression and Purification of Protein	6	To give a general overview on: • recombinant DNA technology • protein expression in bacteria and mammalian cells • production of antibodies • purification of protein by conventional chromatography including size exclusion and immunoaffinity chromatography
	3	Practical: Expression and Purification of Protein
Principles of Protein Separation Techniques and Instrumental Analysis of Proteins	5	To discuss on: • mass spectrometry • liquid chromatography • MALDI-MS
	2	Visit: Mass spectrometry and chromatography (ABrC and Oncology Laboratory)
Structural Proteomics	2	To discuss the principles and techniques of the most common methods used in protein structure determination. • NMR spectroscopy • X-ray crystallography
Protein-protein interaction	3	To give general overview of system biology and protein-protein interaction network.

		To discuss the common method in studying protein interaction. • Affinity purification • Mass spectrometry • Yeast two-hybrid system • Phage display
Clinical Proteomics	4	To give a general overview of the following topics: • various immunological assays that can be used to manage patients (bedside applications) • immune marker • application of antibodies in medicine
Frontiers in Proteomics	2	To discuss on current development in proteomic and future applications in medicine.
Proteome Informatics	4	To discuss on: • sequence analysis • structure prediction • protein data bank
	3	Practical: Protein-based Design
Updates in Proteomics and Medicine	2	Journal Club
TOTAL	45	

TMR 504 : Professional and Research Skills
Coordinator : Assoc. Prof. Dr. Rafidah Zainon

Topic	Contact hour/s	Objective
Basic of Research	4	To give a general overview on: • introduction to library research • information retrieval using eLibrary system • introduction to the use of Endnote program
	2	To give a general overview on: • research ethics and responsibility • professional ethics • ethics of human research • research types
	1	To give a general overview of the ethics in animal research
	1	To give a general overview on Creativity, Innovation and Commercialisation including: • prototype development • patent application • funding for commercialization • engagement with industry
Research Management Skill (Seminar)	2	To give a general overview on: • management of research account • purchasing procedures • management of research equipment
Multimedia Skill	2	To cover on: • production of multimedia materials • use of multimedia in teaching • use of multimedia in preparation of presentation and publication materials
Communication skills	1	To cover on: • art of presentation • public speaking skill • preparation for oral examination • group communication skills

	4	Student presentation
Teamwork in Research (Discussion)	3	To cover on: • psychology of working in a group • leader and subordinate relationships • emotional intelligence • interpersonal relationship
Statistics	2	To give a general overview on: • introduction to medical statistics and research methodology • calculation of sample size
	2	• statistical requirement in research proposal
	2	• statistical analysis of experimental results
	2	• use of mathematical software in statistical analysis
	3	Practical: To practise on how to use the mathematical software in statistical analysis
Bioinformatics	2	To give a general overview on: • introduction to bioinformatics and medical bioinformatics • bioinformatics research facility at USM
	3	Practical: To understand the use of bioinformatics tools for drug design
Scientific & Academic Writing	5	To cover on: • topics in scientific writing
	1	• writing for short communications, journal publication, review, response to editor, etc.
	1	• data presentation in written communication
TOTAL	43	

TMR 505 : Clinical Research
Coordinator : Dr. Mastura Mohd Sopian

Topic	Contact hour/s	Objective
The Use of Clinical Tools in Medical Research	1	To brief students the objective and concept of clinical tools in medical research.
Clinical Research I – Overview on Clinical Research • Types of clinical research and design	2	To discuss on: • overview on clinical research • types of clinical research • basic clinical terms
Clinical Research II – How to manage clinical data • Data acquisition and management	2	To provide an overview on how to acquire and manage data from medical records for medical research
Clinical Research III – Clinical Data Synthesis • Data extraction of clinical records	2	To provide an overview on how to extract and synthesizing clinical data from a subject's clinical records
Clinical Research IV – Ethics in Clinical Research	2	To provide an overview of ethics in clinical research
Clinical Research IV – Good Clinical Practice	3	To provide an overview on: • Principles of ICH GCP • Clinical trial protocol

Clinical Techniques I – Medical Intervention	4	To provide an overview on: • common medical intervention including intravenous administration of fluids and drugs, blood products and and transfusion • venesection • drugs, vaccines etc.
Clinical Techniques II – Radiation Imaging & Therapy	3	To provide an overview of • common imaging, nuclear medicine and radiotherapy modalities in clinical medicine and • radioprotection/regulatory issues in the use of ionizing radiation
	2	Visit to Nuclear Medicine Dept, Radiology and Radiotherapy Department, IPPT
Clinical Techniques III – Surgical Intervention	4	To provide an overview on: • surgical principles and tissue biopsy methods • diagnostic & therapeutic endoscopy and also the equipments involved
	2	Visit to IPPT clinic for practical demonstration
Clinical Techniques in Dentistry I – Growth modification & bone tissue 20emodeling	2	To provide an overview on: • indications and contraindications of growth modifications • types of functional appliance • distraction osteogenesis • biomechanics of orthodontic tooth movements • types of orthodontic appliances
Clinical Techniques in Dentistry II – Restorative techniques and tissue interfaces	2	To provide an overview on: • conservative dentistry, endodontics and periodontics • indication for restoration, types of dental restoration and cavity preparation techniques
Clinical Techniques in Dentistry III – Implant and osteointegration	2	To provide an overview on: • indications and contraindications of implant placement • types of implant • types of implant prosthesis • osseointegration • bone grafting

Clinical Techniques in Dentistry IV – Current advances in dentistry	2	To discuss on the overview of current advances and research areas in dentistry
Impact of Medical Discoveries on Humanity (Seminar)	2	To provide an overview on the frontiers in the clinical techniques and practices.
Devices in Medical Research	2	To provide an overview of commonly used medical devices and areas of research interest
Updates in Clinical Research	2	Journal Club
TOTAL	41	

TMR 506 : Laboratory Management
Coordinator : Dr. Mohd Zahri Abdul Aziz

Topic	Contact hour/s	Objective
Introduction to Medical Laboratory Management	1	To give an introduction to the module
Quality Assurance in the Laboratory	6	To introduce briefly the concept of the following laboratory quality system for quality assurance: • Good Laboratory Practice (OECD-GLP) • ISO 9001 • ISO/IEC 17025 • ISO 15189
Managing Safety at Laboratory	7	To build critique mind on the following knowledge of safety: • Introduction to Laboratory Safety • Management of Chemical Safety • Management of Biological Safety • Management of Radiation Safety
Laboratory Management Software	4	To introduce the use of laboratory management software for daily operation: • Test Item Inventory • Test System Inventory • Consumables Inventory • Laboratory Integrated Management System (LIMS)
Standardisation of Laboratory Methodology	4	To develop criticalappraisal skills on the standardization of research method: • Selection of method • Method Specification & Limitation • Method Specific Standard Operating Procedure (SOP) • Method Critical Quality Control Points
The Interpretation of Laboratory Tests	3	To develop critical appraisal skills on the interpretation of laboratory tests. • Biological variation • The establishment and verification of reference values • Clinical performance characteristics

Management of Medical Diagnostic Testing Laboratory	3	The lectures emphasize on pre-examination procedure, examination procedure and post examination procedure in the fields: • Chemical pathology/ Immunology • Hematology • Histopathology/ Cytology • Medical microbiology/virology • Genetics
Inter-laboratory Proficiency Testing	5	To give a general overview on • Internal Quality Control Audit • Interlaboratory Comparison/ Proficiency Testing • Performance Monitoring • Laboratory Auditing (monitoring performance, compiling reports)
Management of Laboratory Equipment	4	To build critique mind in the management of laboratory equipment in the following aspects: • International Requirement of Equipment Management • Equipment Specification • Equipment Verification & Calibration • Equipment Maintenance
Current Issues in Laboratory Management (Seminar)	1	To highlight selected advancement in the area of laboratory management inclusive of instrumentation.
Visit to Accredited Laboratory e.g. ISO15189 or ISO/IEC17025 or OECD-GLP Specialised Labarotories	2	To experience the implementation of laboratory management system.
Updates in Laboratory Management	2	Journal Club
TOTAL	42	

TMR 508 : Therapeutic Products and Practices
Coordinator : Dr. Siti Razila Abdul Razak

Topic	Contact hour/s	Objective
Quality System for the Production of Medical Product	2	To give an overview on quality system including ISO 17025, GLP and GMP requirements for the production of medical products
Visit to GMP compliance company	4	To observe the requirements of GMP compliance company
The Requirements of Control Agencies for the Production of Therapeutic Materials	6	To give an overview on the requirements of control agencies related to the production of therapeutic materials such as ICH requirements.
Introduction to Conventional Therapy	1	To give an overview on conventional therapy.
Recombinant Products as Therapeutic Applications	2	To give an overview on recombinant products as therapeutic materials and the method of production.
Production and Quality Control of Vaccines and Adjuvants	6	To give an overview on production and quality control for different types of vaccines and adjuvants.
Biomaterials in Medicine and Dentistry	2	To give an overview on the use of biomaterials in medicine and dentistry
Production of Immuno pharmaceuticals	4	To discuss the application and cell culture techniques on the production of mAb, polyclonal antisera, vaccine, cytokines and growth factors

Cell Therapy Techniques	3	To discuss on the application of cells as therapeutic material including tumor cells as vaccine, stem cell therapy, activated lymphocytes for adoptive therapy
Gene Therapy Techniques	3	To give an overview on gene therapy techniques including anti-sense technology
Introduction to T/CM	1	To give an overview on: • practice of T/CM in Ministry of Health, Malaysia • complementary/alternative products
Application of T/CM Products in Medicine	2	To give an overview on the basics on the use of complementary/alternative products in medicine including homoeopathic products and herbal products
Lifestyle Medicine	4	To highlight the concept of lifestyle medicine in treating diseases in particular the role of exercise in preventing and managing the non-communicable diseases (NCD's)
AMDI Fitness Lab (Practical)	3	To practise the role of exercise in lifestyle medicine
Social and Ethical Issues	2	To give an overview on social and ethical issues related to therapeutics products and practices.
Frontiers in Product and Therapeutic Practices (Seminar)	1	To discuss the latest updates on the therapeutic products and practices.
Updates in Therapeutic Products and Practices	2	Journal Club
TOTAL	48	

Evaluation Format

There are two components for the MSc (Medical Research) programme:

1. The formal taught courses consists of 20 units.
2. The research and dissertation consists of 20 units.

SUMMARY OF ACQUIRED UNITS	
Semester 1 – taught	11
Semester 2 – taught	9
Research (1 academic year)	20
Total	**40**

Assessment for the Formal Taught Courses

The formal taught courses will be graded and recorded as Grade Point Average (GPA) and the final GPA over the two semesters will be recorded as cumulative GPA (CGPA). The marking of the answer scripts will be based on the standard mark from 0 % to 100 % for a perfect answer. This mark will be converted to the GPA based on the following system:

Mark (%)	Grade	Grade Point	Result
80 – 100	A	4.00	PASS
70 – 79	A-	3.67	
64 – 69	B+	3.33	
58 – 63	B	3.00	
52 – 57	B-	2.67	
46 – 51	C+	2.33	
40 - 45	C	2.00	FAIL
36 - 39	C-	1.67	
32 - 35	D+	1.33	
28 - 31	D	1.00	
25 - 27	D-	0.67	
0 - 24	F	0.00	

For each module, continuous assessment will contribute 40% of the final mark while the end of the semester examination will contribute the other 60%.

The breakdown of the marking scheme is as follows:

A. Continuous Assessment

TMR501

Break down	Marks
Assignment	20
Presentation	10
Seminar	10
TOTAL	40

TMR502

Break down	Marks
Report	30
Practical exercise	10
TOTAL	40

TMR503

Break down	Marks
Assignment	10
Presentation	10
Report	20
TOTAL	40

TMR504

Break down	Marks
Assignment	15
Presentation	15
Practical exercise	10
TOTAL	40

TMR505

Break down	Marks
Assignment	10
Presentation	10
Seminar	10
Report	10
TOTAL	40

TMR506

Break down	Marks
Assignment	10
Presentation	10
Seminar	10
Report	10
TOTAL	40

TMR507

Break down	Marks
Thesis/ Dissertation	50

Viva voce	30
Research Proposal	20
TOTAL	100

TMR508

Break down	Marks
Assignment	10
Presentation	10
Seminar	10
Report	10
TOTAL	40

B. Semester Examination

At the end of the module there will be a semester examination, comprising of:

i. MCQ = 20 questions
ii. Essay/Short Essay/Short Notes

The examination will be conducted within 3 hours. The MCQ and the essay will each carry 30 marks each.

C. The Final Grade

The final grade for the course/module will be based on the summation of the continuous assessment and the end-of-semester exam.

Assessment of the Research Component (TMR507 Research)

This is a partial fulfilment for the degree of MSc mixed mode. A candidate will be assessed as PASS or FAIL based on the reports submitted by the Program Chairman, the Main Supervisor, and the dissertation assessment reports by the internal examiner and the supervisor and viva voce.

Free consultation and AMDI Mixed Mode Dissertation template is available at AMDI Library website https://www.amdi.usm.my/tkic-dwthesistemp

Requirement for Graduation

REQUIREMENT FOR GRADUATION
In order to graduate, candidates must satisfy requirement 1 and 2 below:

Requirement 1:

i. A CGPA of at least 3.00.
ii. GPA of not less than 2.33 (C+) for each of the formal taught courses.
iii. Accumulated credit of 40 units.

And
Requirement 2:

A PASS for the Research course/module (viva voce and dissertation) (TMR507).

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3. Multidisciplinary Laboratory (MDL), sains@bertam, Kepala Batas
4. Centre for Knowledge, Communication and Technology (PPKT) teleconferencing

STUDENT FACILITIES

As registered USM students, you are entitled to all student facilities in AMDI or USM campus:

1. AMDI Learning Space (ALS) sains@bertam and Student Area
2. Multimedia Room/Computer Laboratory
3. Library
4. Free membership of AMDI Students Association

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