Transforming Higher Education
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BACHELOR OF HEALTH SCIENCES AND BACHELOR OF SCIENCE 2021/2022

UNIVERSITI SAINS MALAYSIA

APEX™

SCHOOL OF HEALTH SCIENCES

BACHELOR OF HEALTH SCIENCE AND BACHELOR OF SCIENCE

2021/2022

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BACHELOR IN
Audiology/Biomedical Science/ Dietetics/Environmental and Occupational Health/Medical Radiation/Nutrition **(HONOURS)**

BACHELOR OF HEALTH SCIENCE
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BACHELOR OF SCIENCE IN
Forensic Science **(HONOURS)**

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Academic Session 2021/2022

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ACADEMIC CALENDAR - ACADEMIC SESSION 2021/2022

FOR ALL SCHOOLS (EXCEPT FOR SCHOOLS OF MEDICAL SCIENCES AND SCHOOL OF DENTAL SCIENCES)

***Registration for New Students (03 October 2021) / **Orientation Week (04 -07 October 2021)**

SEM	WEEK	ACTIVITY	DATE	REMARKS
ONE	1	Teaching & Learning (T&L 7 Weeks)	Sunday, 10.10.2021 - Thursday, 14.10.2021	
	2		Sunday, 17.10.2021 - Thursday, 21.10.2021	19.10.2021, Tuesday-Prophet Muhammad's Birthday
	3		Sunday, 24.10.2021 - Thursday, 28.10.2021	
	4		Sunday, 31.10.2021 - Thursday, 04.11.2021	04.11.2021, Thursday-Deepavali**
	5		Sunday, 07.11.2021 - Thursday, 11.11.2021	11 & 12.11.2021, Thursday & Friday - Sultan of Kelantan's Birthday (Kelantan)
	6		Sunday, 14.11.2021 - Thursday, 18.11.2021	
	7		Sunday, 21.11.2021 - Thursday, 25.11.2021	
	8	Mid Semester Break	Sunday, 28.11.2021 - Thursday, 02.12.2021	
	9	Teaching & Learning (T&L - 7 Weeks)	Sunday, 05.12.2021 - Thursday, 09.12.2021	
	10		Sunday, 12.12.2021 - Thursday, 16.12.2021	
	11		Sunday, 19.12.2021 - Thursday, 23.12.2021	25.12.2021, Saturday-Christmas
	12		Sunday, 26.12.2021 - Thursday, 30.12.2021	
	13		Sunday, 02.01.2022 - Thursday, 06.01.2022	
	14		Sunday, 09.01.2022 - Thursday, 13.01.2022	
	15		Sunday, 16.01.2022 - Thursday, 20.01.2022	
	16	Revision Week	Sunday, 23.01.2022 - Thursday, 27.01.2022	
	17	Examinations (3 Weeks)	Sunday, 30.01.2022 - Thursday, 03.02.2022	01 & 02.02.2022, Tuesday & Wednesday-Chinese New Year**
	18		Sunday, 06.02.2022 - Thursday, 10.02.2022	
	19		Sunday, 13.02.2022 - Thursday, 17.02.2022	
	20	Mid Semester Break/ Industrial Training (4 Weeks)	Sunday, 20.02.2022 - Thursday, 24.02.2022	
	21		Sunday, 27.02.2022 - Thursday, 03.03.2022	
	22		Sunday, 06.03.2022 - Thursday, 10.03.2022	
	23		Sunday, 13.03.2022 - Thursday, 17.03.2022	
TWO	24/1	Teaching & Learning (T&L - 7 Weeks)	Sunday, 20.03.2022 - Thursday, 24.03.2022	
	25/2		Sunday, 27.03.2022 - Thursday, 31.03.2022	
	26/3		Sunday, 03.04.2022 - Thursday, 07.04.2022	03.04.2022, Sunday-Awal Ramadan
	27/4		Sunday, 10.04.2022 - Thursday, 14.04.2022	
	28/5		Sunday, 17.04.2022 - Thursday, 21.04.2022	19.04.2022, Tuesday-Nuzul Al-Quran
	29/6		Sunday, 24.04.2022 - Thursday, 28.04.2022	
	30/7		Sunday, 01.05.2022 - Thursday, 05.05.2022	01 & 02.05.2022, Sunday & Monday-Labour Day 03 & 04.05.2022, Tuesday & Wednesday- Hari Raya Aidilfitri**
	31/8	Mid Semester Break	Sunday, 08.05.2022 - Thursday, 12.05.2022	
	32/9	Teaching & Learning (T&L - 7 Weeks)	Sunday, 15.05.2022 - Thursday, 19.05.2022	15 & 16.05.2022, Sunday & Monday-Wesak Day
	33/10		Sunday, 22.05.2022 - Thursday, 26.05.2022	
	34/11		Sunday, 29.05.2022 - Thursday, 02.06.2022	
	35/12		Sunday, 05.06.2022 - Thursday, 09.06.2022	04.06.2022, Saturday-Agong's Birthday
	36/13		Sunday, 12.06.2022 - Thursday, 16.06.2022	
	37/14		Sunday, 19.06.2022 - Thursday, 23.06.2022	
	38/15		Sunday, 26.06.2022 - Thursday, 30.06.2022	
	39/16	Revision Week	Sunday, 03.07.2022 - Thursday, 07.07.2022	
	40/17	Examinations (3 Weeks)	Sunday, 10.07.2022 - Thursday, 14.07.2022	10 & 11.07.2022, Sunday & Monday-Hari Raya Aidiladha**
	41/18		Sunday, 17.07.2022 - Thursday, 21.07.2022	
	42/19		Sunday, 24.07.2022 - Thursday, 28.07.2022	
*KSCP / LONG VACATION	43/20	Long Vacation/ Industrial Training (10/11 Weeks)	Sunday, 31.07.2022 - Thursday, 04.08.2022	30.07.2022, Saturday-Awal Muharram
	44/21		Sunday, 07.08.2022 - Thursday, 11.08.2022	
	45/22		Sunday, 14.08.2022 - Thursday, 18.08.2022	
	46/23		Sunday, 21.08.2022 - Thursday, 25.08.2022	
	47/24	*T&LP	Sunday, 28.08.2022 - Thursday, 01.09.2022	31.08.2022, Wednesday-National Day
	48/25		Sunday, 04.09.2022 - Thursday, 08.09.2022	
	49/26	*Examination	Sunday, 11.09.2022 - Thursday, 15.09.2022	16.09.2022, Friday-Malaysia Day
	50/27		Sunday, 18.09.2022 - Thursday, 22.09.2022	
	51/28		Sunday, 25.09.2022 - Thursday, 29.09.2022	
	52/29		Sunday, 02.10.2022 - Thursday, 06.10.2022	08.10.2022, Saturday-Prophet Muhammad's Birthday

**This Academic Calendar is subject to change

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1.0 INTRODUCTION

Background

The treatment and prevention of diseases have long been the foundation of conventional thoughts in matters of health. These thoughts have undergone changes, albeit slowly, towards the concept of a more holistic management of health, based not only on the biology of diseases but also incorporating aspects of sociological sciences, behaviour and the environment. This concept of health takes cognizance of not only the patients' welfare but the welfare of the families and society as a whole. Rapid advancement in technology has helped to hasten these transitions in concepts, methodologies and the way health services are disbursed. These facts are taken into account during the development of programmes at the School of Health Sciences established at the Health Campus in Kelantan on the 1st November 1999. The School's main objective is to holistically expand the various disciplines in Health Sciences. Included within the ambit of Health Sciences are areas of specialties like Biomedicine, Nursing, Environmental and Occupational Health, Dietetics, Nutrition, Forensic Science, Medical Radiation, Exercise and Sports Science, Audiology and Speech Pathology teaching both at bachelor and postgraduate levels.

Philosophy

School of Health Sciences holds on to a philosophy that education drives the progress and development of humankind. The school is committed to fulfil the aspiration by providing holistic education to produce graduates with integrity as well as the capability to pursue their own goals and directions in life, in addition to contributing to the development and progress of Malaysia as an industrialised and civilised nation.

Mission

To achieve and maintain excellence in health sciences by

- Producing graduates with a high level of intellectual inquiry and professionalism.
- Developing graduates with a strong sense of ethics and commitment to humanity.
- Transforming knowledge into an instrument for sustainable development and wellness of society.

Vision

We are committed to be a centre of excellence in health sciences towards the wellness of society through intellectual inquiry, creativity, innovation and dissemination of knowledge.

2.0 ACADEMIC SYSTEM AND GENERAL INFORMATION

2.1 Course Registration Activity

Registration of courses is an important activity during the period of study at the university. It is the first step for the students to sit for the examination at the end of each semester. Signing up for the right courses each semester will help to facilitate the graduation process based on the stipulated duration of study.

2.1.1 Course Registration Secretariat for the Bachelor's Degree and Diploma Programmes

Student Data and Records Unit
Academic Management Division
Registry
Level 1, Chancellory Building

Tel. No.	:	04-653 2925/2924/2923
Fax No.	:	04-657 4641
E-Mail	:	sdrp@usm.my
Website	:	http://bpa.usm.my/index.php/ms/

2.1.2 Course Registration Platform

1. E-Registration

E-Registration is a platform for online course registration. The registration is done directly through the Campus Online portal**.** Course registration exercise for both semesters begins after the release of Official examination results of every semester.

The online registration for Long Vacation Semester (KSCP) begins officially after the release of the 2nd semester examination result.

The date of the E-Registration will be announced to the students via email during the revision week of every semester and details of the activity will be displayed in the USM's official website.

All courses are allowed to be registered through E-Registration, except for co-curriculum courses. The registration of co-curriculum courses is managed by the Director of the Centre for Co-Curriculum Programme at the Main Campus or the Coordinator of the Co-Curriculum Programme at the Engineering Campus and the Coordinator of the Co-Curriculum Programme at the Health Campus.

Students are required to preregister their co-curriculum courses before the actual E-Registration activity. They are allowed to follow the respective course once the preregistration is approved. The list of the co-curriculum courses taken will be included in their course registration data.

Access to *E-Daftar* System

a. *E-Daftar* System can be accessed through the Campus Online portal **(https://campusonline.usm.my)**.

b. Students need to use their USM E-mail ID and password to access their profile page, which includes the *E-Daftar* menu.

c. Students need to print the course registration confirmation slip upon completion of the registration process or after updating the course registration list (add/ drop) within the *E-Daftar* period.

2. Course Registration Activity at the School

Registration activities conducted at the Schools/Centres are applicable to students who are academically active and under Probation (P1/P2) status. Students who encounter difficulties in registering their courses during the E-Registration period are allowed to register the courses at their respective school/centre during the official period of course registration.

The official period for registration begins on the first day of the new semester until 3rd week. Registration during 4th - 6th week of the official academic calendar is considered as late registration. Hence, a penalty of RM50.00 per registration will be imposed unless justifications for the late registration are provided by the students. The Examination and Graduation Unit, Academic Management Section (Registrar Department) will manage students' late registration.

2.1.3 Course Registration General Information

1. Several information/document can be referred by the students pertaining to the registration activity:

   a. The website of the respective School, for the updated information of the courses offered or course registration procedure.

b. List the courses to be registered and number of units (unit value) for each course (refer to Students Handbook for Study Programme).

Academic Status	PNG	Minimum Units	Maximum Units
Active	2.00 & Above	9	25
P1	1.99 & Below	9	12
P2		9	10

c. Students with arrears are not allowed to register any courses. You may only register courses after paying off your arrears.

2. Type of course codes during registration:

T = Core courses
E = Elective courses
M= Minor courses
U = University courses

} Grade and number of units obtained from these courses are considered for graduation

Two (2) other course codes are:
Y = audit courses
Z = prerequisite courses

} Grade and number of units obtained are not considered for graduation

3. Academic Advisor's advice and approval are necessary.

4. Students are not allowed to register or re-sit any course with grade 'C' and above.

5. Medical, Dentistry and Pharmacy students are not allowed to register or resit any course with grade 'B-' and above.

2.1.4 Information/Document Given to All Students through Campus Online Portal (https://campusonline.usm.my)

1. The information of Academic Advisor.

2. Academic information such as academic status, GPA value, CGPA value and year of study.

3. Cangred and Course Registration Form.

4. List of courses offered by all Schools/Centres.

5. Teaching and Learning Timetable for all Schools/Centres/Units from the three campuses.

6. List of pre-registered courses which have been added into the students' course registration record (if any).

7. Reminders about the University course registration policies/general requisites.

2.1.5 Registration of Language and Co-Curricular Courses

1. Registration of Language courses through *E-Daftar* is allowed.

   a. However, if any problem arises, registration for language courses can still be carried out/updated during the official period of OCR at the office of the School of Languages, Literacies and Translation.

   b. All approval/registration/dropping/adding of language courses is under the responsibility and administration of the School of Languages, Literacies and Translation.

   c. Any problems related to the registration of language courses can be referred to the School of Languages, Literacies and Translation. The contact details are as follows:

General Office	: 04-653 4542	for Main Campus students
Malay Language Programme Chairperson	: 04-653 3974	
English Language Programme Chairperson	: 04-653 3406	
Foreign Language Programme Chairperson	: 04-653 3396	
Engineering Campus Programme Chairperson	: 04-599 5400/5430	
	: 04-599 5402/5407	
Health Campus Programme Chairperson	: 09-767 1262	

2. Registration of **co-curricular courses through *E-Daftar*** is not allowed.

   a. Registration for co-curricular courses is either done through pre-registration before the semester begins or during the first/second week of the semester. Co-curricular courses will be included in the students' course registration account prior to the *E-Daftar* activity, if their pre-registration application is successful.

b. All approval/registration/dropping/adding of co-curricular courses is under the responsibility and administration of:
Director of the Centre for Co-Curricular Programme, Main Campus (04-653 5242/5248)

Deputy Director of the Centre for Co-Curricular Programme, Engineering Campus (04-599 5097/6308)

Deputy Director of the Centre for Co-Curricular Programme, Health Campus (09-767 2371/6625)

3. **Dropping of Language and Co-Curricular courses, if necessary, must be made within the first week**. After the first week, a fine of RM50.00 will be imposed for each course.

2.1.6 Registration of 'Audit' Courses (Y code)

Registration for the 'Audit' course (Y code) **is not allowed on the *E-Daftar***. It can be done during the official period of OCR at the School or Centre involved.

Students who are interested must complete the course registration form which can be printed from the Campus Online Portal or obtained directly from the School. Approval from the lecturers of the courses and the Dean/ Deputy Dean (Academic) of the respective school is required.

Registration of 'Audit' courses (Y code) is not included in the calculation of the total registered workload units. Grades obtained from 'Audit' course are not considered in the calculation of CGPA and total units for graduation.

2.1.7 Registration of Prerequisite Courses (Z code)

Registration of Prerequisite courses (Z code) is included in the total registered workload (units). Grades obtained from the Prerequisite courses are not considered in the calculation of CGPA and units for graduation.

2.1.8 Late Course Registration and Late Course Addition

Late course registration and addition are only allowed during the first and up to the third week with the approval from the Dean. Application to add a course after the third week will not be considered, except for special cases approved by the University. RM50.00 fine will be imposed on students if reasons given for late registration are not accepted by the University or School

2.1.9 Dropping of Courses

Dropping of courses is allowed until the **end of the sixth week**.

For this purpose, students must meet the requirements set by the University as follows:

1. Students who intend to drop any course are required to fill in the dropping of course form. The form needs to be signed by the lecturer of the course involved and the Dean/Deputy Dean (Academic, Career International Affairs) of the School. The form has to be submitted to the general office of the School/Centre which offers that particular course.

2. Students who wish to drop language course must obtain the signature and stamp of the Dean/Deputy Dean (Academic, Career and International Affairs) of the School of Languages, Literacies and Translation.

3. Students who wish to drop the Co-Curricular courses must obtain the approval of the Director/Coordinator of the Co-Curricular Programme.

4. The option for dropping courses cannot be misused. Lecturers have the right not to approve the course that the student wishes to drop if the student is not serious, such as poor attendance record at lectures, tutorials and practical, as well as poor performance in coursework. The student will be barred from sitting for the examination and will be given grade 'X' and is not allowed to repeat the course during the *Courses during the Long Vacation* (KSCP) period.

2.1.10 Course Registration Confirmation Slip

The course registration confirmation slip that has been printed/obtained after registering the course should be checked carefully to ensure there are no errors, especially the code type of the registered courses.

Any data errors for course registration must be corrected immediately whether during the period of *E-Daftar* (for students with active status only) or during the registration period at the Schools.

2.1.11 Revising and Updating Data/Information/ of Students' Personal and Academic Records

Students may check their personal and academic information through the Campus Online portal.

Students are advised to regularly check the information displayed on this website.

1. Student may update their correspondence address, telephone number and personal email through Campus Online portal.

2. The office of the Student Data and Records Unit must be notified of any application for updating the personal data such as the spelling of names, identification card number, passport number and address (permanent address and correspondence address).

3. The office of the Student Data and Records Unit must be notified of any application for correction of academic data such as information on major, minor, MUET result and the course code (besides data on the examination results).

2.1.12 Academic Advisor

Each School will appoint an Academic Advisor for each student. Academic Advisors will advise their students under their responsibility on academic matters.

2.2 Interpretation of Unit/Credit/Course

2.2.1 Unit

Each course is given a value, which is called a **UNIT**. The unit is determined by the scope of its syllabus and the workload for the students. In general, a unit is defined as follows:

Type of Course	Definition of Unit
Theory	1 unit is equivalent to 1 contact hour per week for 13 – 14 weeks in one semester
Practical/Laboratory/ Language Proficiency	1 unit is equivalent to 1.5 contact hours per week for 13 – 14 hours in one semester
Industrial Training/ Teaching Practice	1 unit is equivalent to 2 weeks of training

Based on the requirements of Malaysian Qualifications Framework (MQF):

One unit is equivalent to 40 hours of student learning time

[1 unit = 40 hours of Student Learning Time (SLT)]

2.2.2 Accumulated Credit Unit

Units registered and passed are known as credits. To graduate, students must accumulate the total number of credits stipulated for the programme concerned.

2.3 Examination System

Examinations are held at the end of every semester. Students have to sit for the examination of the courses they have registered for except for courses with 100% coursework. Students are required to settle all due fees and fulfil the standing requirements for lectures/tutorials/practical and other requirements before being allowed to sit for the examination of the courses they have registered for. Course evaluation will be based on the two components of coursework and final examinations. Coursework evaluation includes tests, essays, projects, assignments and participation in tutorials.

2.3.1 Duration of Examination

Evaluated Courses	Examination Duration
2 units	1 hour for coursework of more than 40%
2 units	2 hours for coursework of 40% and below
3 units or more	2 hours for coursework of more than 40%
3 units or more	3 hours for coursework of 40% and below

2.3.2 Barring from Examination

Students will be barred from sitting for the final examination if they do not fulfil at least 70% of the course requirements, such as absence from lectures and tutorials, and have not completed/fulfilled the required components of coursework. A grade 'X' would be awarded for a course for which a student is barred. Students will not be allowed to repeat the course during the *Courses During the Long Vacation* (KSCP) period.

2.3.3 Grade Point Average System

Students' academic achievement for registered courses will be graded as follows:

Alphabetic Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Grade Points	4.00	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	0.67	0

Students who obtained a grade 'C-' and below for a particular course would be given a chance to improve their grades by repeating the course during the KSCP (see below) or normal semester. Students who obtained a grade 'C' and above for a particular course are not allowed to repeat the course whether during KSCP or normal semester.

The achievement of students in any semester is based on Grade Point Average (GPA) achieved from all the registered courses in a particular semester. GPA is the indicator to determine the academic performance of students in any semester.

CGPA is the Cumulative Grade Point Average accumulated by a student from one semester to another during the years of study.

The formula to compute GPA and CGPA is as follows:

$$\text{Grade Point Average} = \frac{\sum_{i=1}^{n} U_i M_i}{\sum_{i=1}^{n} U_i}$$

where:

n	=	Number of courses taken
U_i	=	Course units for course i
M_i	=	Grade point for course i

Example of calculation for GPA and CGPA:

	Course	Unit	Grade Point (GP)	Grade (G)	Total GP
Semester I	ABC XX1	4	3.00	B	12.00
	ABC XX2	4	2.33	C+	9.32
	BCD XX3	3	1.67	C-	5.01
	CDE XX4	4	2.00	C	8.00
	EFG XX5	3	1.33	D+	3.99
	EFG XX6	2	2.67	B-	5.34
		20			43.66

$$GPA = \frac{43.66}{20} = 2.18$$

	Course	Unit	Grade Point (GP)	Grade (G)	Total GP
Semester II	ABC XX7	3	1.00	D	3.00
	ABB XX8	4	2.33	C+	9.32
	BBC XX9	4	2.00	C	8.00
	BCB X10	4	2.67	B-	10.68
	XYZ XX1	3	3.33	B+	9.99
		18			40.99

$$GPA = \frac{40.99}{18} = 2.28$$

$$CGPA = \frac{\text{Total Accumulated GP}}{\text{Total Accumulated Unit}} = \frac{43.66 + 40.99}{20 + 18} = \frac{84.65}{38} = 2.23$$

From the above examples, the CGPA is calculated as the total grade point accumulated for all the registered courses and divided by the total number of the registered units.

2.3.4 Courses During the Long Vacation *(Kursus Semasa Cuti Panjang)* (KSCP)

KSCP is offered to students who have taken a course earlier and obtained a grade of 'C-', 'D+', 'D', 'D-', 'F' and 'DK' only. Students who obtained a grade 'X' or 'F*' are not allowed to take the course during KSCP.

The purpose of KSCP is to:

1. Give an opportunity to students who are facing time constraints for graduation.

2. Assist students who need to accumulate a few more credits for graduation.

3. Assist probationary students to enhance their academic status.

4. Assist students who need to repeat a prerequisite course, which is not offered in the following semester.

However, this opportunity is only given to students who are taking courses that they have attempted before and achieved a grade as stipulated above, provided that the course is being offered. Priority is given to final year students. Usually, formal lectures are not held, and teaching is via tutorials.

The duration of KSCP is 3 weeks, i.e. 2 weeks of tutorial and 1 week of examination, all held during the long vacation. The KSCP schedule is available on the University's Academic Calendar.

<u>The Implementation of KSCP</u>

1. Students are allowed to register for a maximum of 3 courses and the total number of units registered must not exceed 10.

2. Marks/grades for coursework are taken from the highest marks/the best grades obtained in a particular course in the normal semester before KSCP. The final overall grade is determined as follows:

   Final Grade = The best coursework marks or grade +
   Marks or grade for KSCP examination

3. GPA calculation involves the **LATEST** grades (obtained in KSCP) and also involves courses taken in the second semester and those repeated in KSCP. If the GPA during KSCP as calculated above is 2.00 or better, the academic status will be active, even though the academic status for the second semester was probation status. However, if the GPA for KSCP (as calculated above) is 1.99 or below, the academic status will remain as probation status for the second semester.

4. Graduating students (those who have fulfilled the graduation requirements) in the second semester are not allowed to register for KSCP.

2.3.5 Academic Status

Active Status: Any student who achieves a GPA of 2.00 and above for any examination in a semester will be recognised as ACTIVE and be allowed to pursue his/her studies for the following semester.

Probation Status: A probation status is given to any student who achieves a GPA of 1.99 and below. A student who is under probation status for three consecutive semesters (P1, P2, FO) will not be allowed to pursue his/her studies at the university. On the other hand, if the CGPA is 2.00 and above, the student concerned will be allowed to pursue his/her studies and will remain at P2 status.

2.3.6 Penalty for not attending the examination

Students who do not attend the examination for any of the courses they have registered for must provide their reasons in writing to the Principal Assistant Registrar, Examination and Graduation Unit, Academic Management Division within 48 hours (for full time students) and 48 hours (for Distance Learning Education programme students) after the examination being held. The reasons provided will be considered by the Examination Board of the School/Centre and endorsed by the University Examination Board as below:

1. For reasons accepted by the University Examination Board, student will be granted DK grade (with permission). DK grade will be granted to the students if they submit Medical Certificates (from hospital/government clinic or panel clinic/USM clinic) or submit any reason that can be accepted by the University Examination Board. DK grade will be exempted from the GPA/CGPA calculations of the student.

2. Candidate who fail to sit for the examination without any reason will be granted F* grade.

2.3.7 Termination of Candidature

Without any prejudice to the above regulations, **the University Examination Council has the absolute right to terminate any student's studies if he/she does not fulfil the accumulated minimum credits.**

The University Examination Council has the right to terminate any student's studies due to certain reasons (a student who has not registered for the courses, has not attended the examination without valid reasons), as well as medical reasons can be disqualified from pursuing his/her studies.

2.3.8 Examination Results

Full results (with grade) will be announced by the University through the Campus Online portal (campusonline.usm.my) after the School Examination Council meeting which is approximately one month after the final examination.

Students can print their official semester results document namely 'SEMGRED' through the Campus Online portal (campusonline.usm.my) on the same day/date of the results announcement.

2.3.9 Re-checking of Examination Result

Students can apply for the rechecking of their examination result for the course/s taken during the semester. The application form can be obtained from USM official website or at the Academic Management Division, Registry Department of each campus. The appeal form must be submitted along with a copy of the official receipt / e-payment statement amounting to RM25.00 for each examination paper. The appeal period is two (2) weeks after the official result is announced.

Rechecking process is only to ensure that all answers in the scripts have been marked and consistently graded and the calculation of marks awarded are correct. The answer script of the course will not be reevaluated.

The school will confirm any changes in the students' examination results. If there is any changes in the grades or marks, students can request for a refund of RM25.00. The Examination and Graduation Unit will make amendments to the results of the course and students can check their updated status in the respective Campus Online portals.

2.4 Unit Exemption

2.4.1 Unit Exemption

Unit exemption is defined as the total number of units given to students who are pursuing their studies in USM that are exempted from the graduation requirements. Students only need to accumulate the remaining units for graduation purposes. Only passes or course grades accumulated or acquired in USM will be included in the calculation of the Cumulative Grade Point Average (CGPA) for graduation purposes.

2.4.2 Regulations and Implementation of Unit Exemption

1. Diploma holders from recognised Public and Private Institutions of Higher Learning:

    a. Unit exemption can only be given to courses taken at diploma level. However, unit exemption are not permitted for *Mata Pelajaran Umum* (MPU) courses such as Language, Ethnic Relations and TITAS courses taken at the diploma level.

    b. Courses for unit exemption may be combined (in two or more combinations) in order to obtain exemption of one course at degree level. However if the School would like to approve only one course at the diploma level for unit exemption of one course at degree level, the course at diploma level must be equivalent to the degree course and have the same number of or more units.

    c. Courses taken during employment (in service) for diploma holders cannot be considered for unit exemption.

    d. The minimum achievement at diploma level that can be considered for unit exemption is a minimum grade 'C' or 2.0 or equivalent.

    e. The total number of semesters exempted should not exceed two semesters.

    f. **In order to obtain unit exemption for industrial training**, a student must have continuous work experience for at least two years in the area. If a student has undergone industrial training during the period of diploma level study, the student must have work experience for at least one year. The students are also required to produce a report on the level

and type of work performed. Industrial training unit exemption cannot be considered for semester exemption as the industrial training is carried out during the long vacation in USM.

2. <u>USM Supervised IPTS (Private Institutions of Higher Learning) /External Diploma Graduates</u>:

   a. Students from USM supervised IPTS/External Diploma graduates are given unit exemption as stipulated by the specific programme of study. **Normally, unit exemption in this category is given as a block according to the agreement** between USM (through the School that offers the programme) with the IPTS.

   b. **Students from recognised local or foreign IPTA** (Public Institutions of Higher Learning)/IPTS who are studying at the Bachelor's Degree level may apply to study in this university and if successful, may be considered for unit exemption, subject to the following conditions:

      [1] Courses taken in the previous IPT are equivalent (at least 80% of the course must be the same) to the courses offered in USM.

      [2] Students taking courses at Advanced Diploma level in IPT that are recognised to be equivalent to the Bachelor's Degree course in USM may be considered for unit exemption as in Section 2.5.

      [3] The total maximum unit exemption allowed should not exceed 30% of the total unit requirement for graduation.

2.4.3 Total Number of Exempted Semesters

Semester exemption is based on the total units exempted as below:

Total Units Exempted	Total Semesters Exempted
8 and below	None
9 – 32	1
33 to 1/3 of the total units for graduation	2

2.4.4 Application Procedure for Unit Exemption

Any student who would like to apply for unit exemption is required to complete the Unit Exemption Application Form which can be obtained from the Examination and Graduation Section or the respective Schools.

The form must be approved by the Dean of the School prior to submission to the Examination and Graduation Section for consideration and approval.

2.5 Credit Transfer

Credit transfer is defined as the recognition of the total number of credits obtained by USM students taking courses in other IPTAs (Public Institution of Higher Learning) within the period of study at USM, and is combined with credits obtained at USM to fulfil the unit requirements for his/her programme of study. The transferred examination results or grades obtained in courses taken at other IPTAs will be taken into consideration in the Cumulative Grade Point Average (CGPA) calculation.

1. <u>Category of Students Who Can Be Considered for Credit Transfer</u>

USM full-time Bachelor Degree level students who would like to attend specific Bachelor Degree level courses at other IPTAs.

USM full-time diploma level students who would like to attend specific diploma level courses at other IPTAs.

2. <u>Specific Conditions</u>

a. <u>Basic and Core Courses</u>

Credit transfer can only be considered for credits obtained from other courses in other IPTAs that are equivalent (at least 80% of the content is the same) with the courses offered by the programme.

Courses that can be transferred are only courses that have the same number of units or more. For equivalent courses but with less number of units, credit transfers can be approved by combining a few courses. Credits transferred are the same as the course units offered in USM. Average grade of the combined courses will be taken into account in the CGPA calculation.

b. Elective or Option Courses

Students may take any appropriate courses in other IPTAs subject to permission from the School as well as the approval of the IPTAs.

The transferred credits are credits obtained from courses at other IPTAs. No course equivalence condition is required.

c. Minor Courses

For credit transfer of minor courses, the School should adhere to either conditions (i) or (ii), and take into account the programme requirement.

3. General Conditions

a. The total maximum units transferred should not exceed one third of the total number of units for the programme.

b. Credit transfer from other IPTAs can be considered only once for each IPTA.

c. The examination results obtained by a student who has taken courses at other IPTAs will be taken into account for graduation purposes. Grades obtained for each course will be combined with the grades obtained at USM for CGPA calculation.

d. Students who have applied and are approved for credit transfer are not allowed to cancel the approval after the examination result is obtained.

e. Students are required to register for courses at other IPTAs with not less than the total minimum units as well as not exceeding the maximum units as stipulated in their programme of study. However, for specific cases (e.g. students on an extended semester and only require a few units for graduation), the Dean may allow such students to register less than the minimum units and the semester will not be considered for the residential requirement. In this case, the CGPA calculation will be similar to that requirement of the KSCP.

f. USM students attending courses at other IPTAs who have failed in any courses will be allowed to re-sit the examinations of the courses if there is such a provision in that IPTA.

g. If the method of calculation of examination marks in the other IPTAs is not the same as in USM, grade conversions will be carried out according to the existing scales.

h. USM students who have registered for courses at other IPTAs but have decided to return to study in USM must adhere to the existing course registration conditions of USM.

2.5.1 Application Procedure for Attending Courses/Credit Transfer

USM students who would like to apply to attend courses/credit transfer at other IPTAs should apply using the Credit Transfer Application Form.

The application form should be submitted for the Dean's approval for the programme of study at least three months before the application is submitted to other IPTAs for consideration.

2.6 Academic Integrity

"Integrity without knowledge is weak and useless. Knowledge without integrity is dangerous and dreadful." - Samuel Johnson

Academic honesty in academic is important because it is the main pillar in ensuring that manners and ethics with regards to higher education integrity are preserved.

Universiti Sains Malaysia encourages its students to respect and ensure that any matter relating to academic integrity are well-preserved. Universiti Sains Malaysia always encourages its students to ensure that manners, ethics and integrity would be essential in academics while focusing on their studies in Universiti Sains Malaysia.

The following are practices or acts that are considered as conducts of lack of integrity in academics:

1. Cheating

   Cheating in the context of academic include copying during examination, usage of information without authorization or in dishonest manner. There are numerous ways and methods of cheating which include among others:

   a. Copying answers from others during test or exam.

   b. Any suspicious action that can be described as cheating or an attempt to cheat in an exam.

c. Using unauthorized materials or devices without authorization such as hand-written notes or any smart electronic device during test or exam.

d. Asking or allowing another student to take test or exam on behalf and vice-versa.

e. Sharing answers in assignments or projects.

f. Purposely tampering the marks/grade given in any course work, and then re-submit it for remarking/regrading.

g. Give command, to force, persuade, deceive or threaten others to conduct research, writing, programming or any task for such a student's personal gain.

h. Submitting any identical or similar work in more than one course without consulting or prior permission from the lecturers concerned.

2. Plagiarism

The reputation of an academic institution depends on the ability to achieve and sustain academic excellence through the exercise of academic integrity. Academic integrity is based on honesty, trust, fairness, respect, and responsibility, which form the basis of academic work.

One aspect of the loss of academic integrity is due to plagiarism, which is the act of presenting published and unpublished ideas, writings, works or inventions of others in written or other medium, as one's own original intellectual endeavours without any clear acknowledgement of or reference to the author of the source.

POLICY ON PLAGIARISM OF UNIVERSITI SAINS MALAYSIA

University Sains Malaysia Policy on Plagiarism describes the University's strong commitment to uphold academic integrity in relation to plagiarism. It will come into effect when there is an infringement of academic conduct relating to plagiarism.

This policy acts as a guideline to educate and prevent plagiarism and can be used as the guideline if the University's staff and students violate any rules and regulations of the University.

The policy applies to all students, former students, staff and former staff which include fellows, post-doctorates, visiting scholars, as well as academic, non-academic, research, contract and temporary staff who study, serve or having served, or have graduated from the University.

Plagiarism is defined as the act of presenting, quoting, copying, paraphrasing or passing off of ideas, images, processes, works, data, own words or those of other people or sources without proper acknowledgement, reference or quotation of the original source(s). The acts of plagiarism include, but are not limited to, the following:

a. Quoting verbatim (word-for-word replication of) works of other people.

b. Paraphrasing another person's work by changing some of the words, or the order of the words, without due acknowledgement of the source(s).

c. Submitting another person's work in whole or part as one's own.

d. Auto-plagiarising or self-plagiarising (one's own work or previous work) that has already been submitted for assessment or for any other academic award and pass it as a new creation without citing the original content.

e. Insufficient or misleading referencing of the source(s) that would enable the reader to check whether any particular work has indeed been cited accurately and/or fairly and thus to identify the original writer's particular contribution in the work submitted.

The University will take action of every report and offences relating to plagiarism and if the student is found guilty, the student can be charged by the university according to the Students Disciplinary Rules.

3. Fabrication

Fabrication refers to a process of invention, adaptation or copying with the intention of cheating. This is an act of deceiving other people. Fabrication is somewhat related to matters which have been 'created' or altered.

Invention or task outcome or academic work without acknowledgement, alteration, falsification or misleading use of data, information or citation in any academic work constitutes fabrication. Fabricated information neither represent the student's own effort nor the truth concerning a particular investigation or study, and thus violating the principle of truth in knowledge. Some examples are:

a. Creating or exchanging data or results, or using someone else's results, in an experiment, assignment or research.

b. Citing sources that are not actually used or referred to.

c. Listing with intent, incorrect or fictitious references.

d. Forging signatures of authorization in any academic record or other university documents.

e. Developing a set of false data.

4. Collusion

Collusion refers to the cooperation in committing or to commit or to do work with negative intentions. Some examples of collusion include:

a. Paying, bribing or allowing someone else to do an assignment, test/exam, project or research for you.

b. Doing or assisting others in an assignment, test/exam, project or research for something in return.

c. Permitting your work to be submitted as the work of others.

d. Providing material, information or sources to others knowing that such aids could be used in any dishonest act.

5. Other violations relating to academic integrity

a. Late to lecture, tutorial, class or other forms of teaching modes relating to their courses.

b. Sending or submitting late any assignment relating to their courses.

c. Hire someone else to do the assignment or thesis.

d. Carrying out business by providing service to write assignment or thesis of the students.

e. Any other violations that USM deemed as violating academic integrity.

2.6.1 Consequences of Violating Academic Integrity

Students are responsible in protecting and upholding academic integrity in USM.

If in any specific event a student or students would encounter any incident that denotes academic dishonesty, the student(s) need to submit a report to the relevant lecturer. The lecturer is then responsible to investigate and substantiate the violation and report the matter to the Dean of the School.

1. If any violation of academic integrity is considered as not of a serious nature, the Dean of the School may take administrative action on the students.

2. However, if the violation is deemed serious by the School, this matter shall be brought to the attention of the Secretariat of University Student Disciplinary Committee (Academic Cases) at Legal Office, Level 2, Building E42, Chancellory II, Universiti Sains Malaysia for further disciplinary action as specified in the disciplinary procedures

3. If a student is caught in copying or cheating during examination, the Investigation Committee of ***Copying/Cheating in Examination*** will pursue the matter according to the University's procedures. If the investigation found that there is a case, the student(s) will be brought to the Student's Disciplinary Committee of the University. In this matter, the rule on conduct during examination shall be applied.

4. Rule 48 of Universiti Sains Malaysia (Discipline of Students) provides that a student who commits a disciplinary offence and is found guilty of the offence shall be liable to any one or any appropriate combination of two or more of the following punishments as follows:

    a. a warning;

    b. a fine not exceeding Ringgit Malaysia Two Hundred (RM200.00);

    c. exclusion from any specific part or parts of the University for a specified period;

    d. suspension from being a student of the University for a specified period;

    e. expulsion from the University.

2.7 USM Mentor Programme

The Mentor Programme acts as a support-aid that involves staff undergoing special training as consultants and guides to the USM community who would like to share their feelings and any psychosocial issues that could affect their social activities. This programme helps individuals to manage psychosocial issues in a more effective manner, which will eventually improve their well-being in order to achieve a better quality of life.

Objectives

1. To serve as a co-operation and mutual assistance mechanism for dealing with stress, psychosocial problems and many more in order to ensure the well-being of the USM community.

2. To inculcate the spirit of unity and the concept of helping one another by appointing a well-trained mentor as a social agent who promotes a caring society for USM.

3. To produce more volunteers to assist those who need help.

4. To prevent damage in any psychosocial aspect before they reach a critical stage.

2.8 Student Exchange Programme

2.8.1 Study Abroad Scheme

The student exchange programme is an opportunity for USM students to study for one or two semesters abroad at any USM partner institutions. Ideally, students are encouraged to participate in the exchange programme within their third to fifth semester (3 year degree programme) and within the third to seventh semester (4 year degree programme).

USM students who wish to follow the SBLN programme must discuss their academic plans with the Dean or Deputy Dean of their respective Schools and also with the International Mobility & Collaboration Centre (IMCC) (to ensure that credits obtained from the external higher education institution can be transferred as part of the credit accumulation for graduation).

Any student who follows the SBLN programme and violates any disciplinary act in the external higher education institution, can be penalised in accordance with the University (Discipline of Students) Rules if the matter is referred to USM.

For further information, please visit www.imcc.usm.my or contact the International Mobility and Collaboration Centre (IMCC) at +604 – 653 2777/2774.

2.8.2 Student Exchange Programme in Local Higher Education Institutions (RPPIPT)

This is a programme that allows students of Higher Learning Institutions to do an exchange programme for a semester among the higher institutions themselves. Students can choose any relevant courses and apply for credit transfers.

USM students who want to participate in RPPIPT have to discuss their academic plans with the Dean or Deputy Dean of their respective Schools and the Division of Academic and International (to ensure that credits obtained from the higher education institution in Malaysia can be transferred as part of the credit accumulation for graduation).

Any student who participates in RPPIPT and violates any of the institution's displinary rules can be penalised according to the University (Discipline of Students) Rules if the matter is referred to USM.

For further information, please contact the Academic & International Division at +604 – 653 2430.

2.9 Ownership of Students' Dissertation/Research Project/Thesis and University's Intellectual Property

The copyright of a dissertation/research project/thesis belongs to the student. However, as a condition for the conferment of a degree, the student gives this right unconditionally, directly but not exclusively, and free of royalties to the university to use the contents of the work/thesis for teaching, research and promotion purposes. In addition, the student gives non-exclusive rights to the University to keep, use, reproduce, display and distribute copies of the original thesis with the rights to publish for future research and the archives.

3.0 UNIVERSITY COURSE REQUIREMENTS

3.1 Summary of University Course Requirements

Students are required to take 15-22 credits for the following University courses/options for University needs:

<table>
<tr><th colspan="2" rowspan="2">UNIVERSITY COURSE REQUIREMENTS</th><th colspan="2">CREDIT TOTAL</th></tr>
<tr><th>Local Students</th><th>International Students</th></tr>
<tr><td colspan="2">General Studies (MPU)</td><td></td><td></td></tr>
<tr><td>U1</td><td colspan="2">Local Students
▪ HFF225 (Philosophy and Current Issues) (2 credits)
▪ HFE224 (Appreciation of Ethics and Civilisations) (2 credits)
▪ LKM400 (Bahasa Malaysia IV) (2 credits)
International Students of Science and Technology
▪ HFF225 (Philosophy and Current Issues) (2 credits)
▪ LKM100 (Bahasa Malaysia I) (2 credits)</td><td rowspan="2">6</td><td rowspan="2">4</td></tr>
<tr><td></td><td>International Students of Arts
(program with Malay Language as the medium of instruction)
▪ HFF225 (Philosophy and Current Issues) (2 credits)
▪ LKM100 (Bahasa Malaysia I) (Z)
▪ LKM200 (Bahasa Malaysia 2) (U) (2 credits)</td><td>International Students of Arts
(program with English Language as the medium of instruction)
▪ HFF225 (Philosophy and Current Issues) (2 credits)
▪ LKM100 (Bahasa Malaysia I) (U) (2 credits)</td></tr>
<tr><td>U2 (Local students)
AND
U3 (International students)</td><td colspan="2">Local Students
▪ WUS101 (Core Entrepreneurship) (2 credits)
▪ English Language Courses (4 credits)
International Students
▪ SEA205E (Malaysian Studies) (4 credits)
▪ English Language Courses (4 credits)</td><td>6</td><td>8</td></tr>
<tr><td>U4</td><td colspan="2">Co-curricular courses*</td><td>2</td><td>2</td></tr>
<tr><td>Options</td><td colspan="2">Skill courses/Foreign Language Courses/ Other courses offered by other schools. Students have to choose any of the following:
▪ Co-curricular courses
▪ Skill courses/Foreign Language Courses/ Other courses offered by other schools</td><td>1-8</td><td>1-8</td></tr>
<tr><td></td><td colspan="2">CREDIT TOTAL</td><td>15-22</td><td>15-22</td></tr>
</table>

* Students from the School of Educational Studies are required to choose a uniform body co-curricular package.
* Students from the School of Dental Sciences are required to take co-curricular courses that consist of three (3) credits. Further information can be obtained from the Academic Office, School of Dental Sciences.

3.2 General Studies Components (MPU) (14 credits)

General studies is one of the strategies and initiatives planned for the purpose of Shift 1, which is Holistic, Entrepreneurial and Balanced Graduates. Malaysia Education Blueprint 2015-2025 (Higher Education) or PPPM (PT) outlines 10 shifts to achieve the aspirations of the nation's higher education system and student aspirations.

General studies are divided into four groups as follows:

1. U1: appreciation of philosophy, values and history;
2. U2: the mastery of soft skills;
3. U3: expansion of the knowledge of Malaysia and its history; and
4. U4: practical community management skills such as community service and co-curriculum.

A. U1 Group

Local Students

All Malaysian students are required to take and pass the following courses. In order to graduate, the minimum passing grade required is Grade C.

(i) HFF225 (Philosophy and Current Issues) (2 credits)

The course synopsis is as follows:

This course covers the relation between philosophy and the National Education Philosophy and Rukun Negara. Philosophy is used as a tool to refine the culture of thought in life through the art and methods of thinking as well as through our understanding of the concept of the human person. Key topics in philosophy, namely epistemology, metaphysics, and ethics, are discussed in the context of current issues. Emphasis is given to philosophy as the basis for inter-cultural dialogue and fostering common values. At the end of this course, students will be able to see the disciplines of knowledge as a comprehensive and integrated body of knowledge.

(ii) HFE224 (Appreciation of Ethics and Civilisations) (2 credits)

The course synopsis is as follows:

This course prepares students to appreciate the ethics and civilisation that existed in the multiple ethnic society in Malaysia to strengthen their critical and analytical thinking in handling a more challenging life. The content of this course focuses on appreciating ethics and civilisation according to the Malaysian mould. Students will be exposed to the dynamics of the concept of ethics and civilisation that gave strength to the formation of a Malaysian nation based on the timeline of its historical evolution from the precolonial to the postcolonial era. Understanding the formation of the ethical and civilisation is discussed to increase their civil ethical appreciation towards strengthening the concept of national and Malaysian nation. Civilisation in the Malaysian mould needs to be analysed and debated in academic activity with reference to the Federal Constitution as the base for integration and a vehicle for ethics and civilisation. The development of national unity is too much influenced by globalisation and the development of information technology and complex communication. Therefore, the appreciation of ethics and civilisation has given rise to social responsible behaviour and moved at the level of individual, community, society and nation. Therefore, the change that is happening in the society and direct economic development has brought in new challenges to the strengthening of ethics and civilisation in Malaysia. Finally, High Impact Educational Practices is carried out during teaching and learning to learn the course in depth.

(iii) LKM400/2 (Bahasa Malaysia IV)

In order to graduate, the minimum passing grade required is Grade C. Entry requirements for Bahasa Malaysia are as follows:

No	Qualification	Grade	Entry Level	Type	Credit	Status
1	(a) SPM/MCE/SC (or equivalent qualification) (b) STPM/HSC (or equivalent qualification)	1 - 6 P/S	LKM400	U	2	Graduation Requirement

Note:

To obtain credits for Bahasa Malaysia courses, a minimum of grade C is required. Students may seek advice from the School of Languages, Literacies and Translation if they have a different Bahasa Malaysia qualification from the above.

International Students

All international students are required to take and pass the following courses. In order to graduate, the minimum passing grade required is Grade C.

(i) HFF225 (Philosophy and Current Issues) (2 credits)

The course synopsis is as follows:

This course covers the relation between philosophy and the National Education Philosophy and Rukun Negara. Philosophy is used as a tool to refine the culture of thought in life through the art and methods of thinking as well as through our understanding of the concept of the human person. Key topics in philosophy, namely epistemology, metaphysics, and ethics, are discussed in the context of current issues. Emphasis is given to philosophy as the basis for inter-cultural dialogue and fostering common values. At the end of this course, students will be able to see the disciplines of knowledge as a comprehensive and integrated body of knowledge.

(ii) Malay Language Course (2 credits)

All international students are required to take and pass the Malay Language course. In order to graduate, the minimum passing grade required is Grade C. Malay Language course requirements by academic program are as follows:

(i) International students pursuing Bachelor's Degree in Arts (*program with Malay Language as the medium of instruction)* are required to take the following courses:

Code	Type	Credit
LKM100	Z	2
LKM200	U	2

(ii) International students pursuing Bachelor's Degree in Arts (*program with English Language as the medium of instruction*) are required to take the following course:

Code	Type	Credit
LKM100	U	2

(iii) International students pursuing Bachelor's Degrees in Science and Technology are required to take the following course:

Code	Type	Credit
LKM100	U	2

B. U2 or U3 Group

Local Students

WUS101 (Core Entrepreneurship) (2 credits)

All students are required to take and pass the WUS101/2 (Core Entrepreneurship) course. In order to graduate, the minimum passing grade required is Grade C. The following is the synopsis of the course:

This course provides basic exposure to students on entrepreneurship and business fields, with emphasis on the implementation of the learning aspects while experiencing the process of executing business projects in campus. The main learning outcome is the assimilation of culture and entrepreneurship work ethics in their everyday life. This initiative is made to open the minds and arouse the spirit of entrepreneurship among target groups that possess the potential to become successful entrepreneurs.

For more information, please refer to the Centre for Co-Curricular Programme website.

International Students

SEA205E (Malaysian Studies) (4 credits)

All international students are required to take and pass the SEA205E/4 (Malaysian Studies) course. In order to graduate, the minimum passing grade required is Grade C. The following is the synopsis of the course:

This course discusses Malaysia from the perspectives of history, politics, social, cultural and economics. It looks at the relations between the country's history and its politics, the formation of a plural society that has since become its important characteristics, as well as issues related to development in Malaysia. Students will also be exposed to contemporary issues in Malaysia such as the marginalized groups, popular culture, issues related to health and wellbeing, as well as looking at Malaysia from the global context.

Local and International Students

All Bachelor's degree students must take four (4) units from the English Language courses to fulfil the University requirement for graduation.

(a) Entry Requirements for English Language Courses (for students with MUET)

The following table shows the entry requirements for the English language courses offered by the School of Languages, Literacies and Translation.

Number	MUET qualification/ Pre-requisite course	Grade	English Language Course	Course Type
1	MUET **or**;	Bands 2/3	LMT100 (2 credits)	Pre-requisite/ Type Z
	Discretion of the Dean of PPBLT			
2	MUET **or**;	Band 4	LSP300 (2 credits)	Compulsory/ Type U
	LMT100 **or**;	A - C		
	Discretion of the Dean of PPBLT			
3	MUET **or**;	Band 5	LSP 401/402/403/404 (2 credits)	Compulsory/ Type U
	LSP300 **or**;	A - C		
	Discretion of the Dean of PPBLT			
4	MUET **or**;	Band 6	LHP 451/452/453/454/455/ 456/457/458/459 * all LHP courses are 2 credits except for LHP457 which is 4 credits	Compulsory/Option/ Type U
	LSP401/402/403/404 **or**;	A - C		
	Discretion of the Dean of PPBLT			

(b) Entry Requirements for English Language Courses (for students with TOEFL or IELTS)

The following table shows the entry requirements for the English language courses offered by the School of Languages, Literacies and Translation.

No.	TOEFL (Internet Based Test)	IELTS	English Language Course	Course Type
1.	35 - 59	5.0 – 5.5	LMT100 (2 credits)	Pre-requisite / Type Z
2.	60 – 93	6.0 – 6.5	LSP 300 (2 credits)	Compulsory/ Type U
3.	94 - 109	7.0 – 7.5	LSP 401/402/403/404 (2 credits)	Compulsory/ Type U
4.	110 - 120	8.0 – 9.0	LHP Series * all LHP courses are 2 credits except for LHP457 which is 4 credits	Compulsory/ Option/ Type U

Note:

- Students are required to refer to the list of English language courses required by their respective schools.

- Students may seek advice from the School of Languages, Literacies and Translation if they have a different English language qualification from the above.

- In order to obtain units in English Language courses, students have to pass with a minimum grade 'C'.

- Students with a Score of 260 – 300 (Band 6) in MUET must accumulate the 4 credits of English from the courses in the advanced level (LHP451/452/453/454/455/456/457/458/459). They can also take foreign language courses to replace their English language credits but students must first obtain written consent from the Dean of the School of Languages, Literacies and Translation. (Please use the form that can be obtained from the School of Languages, Literacies and Translation).

- Students with a score less than 180 (Band 4) in MUET CAN re-sit MUET to improve their score to Band 4 OR take LMT100 course and pass with a minimum grade C before they can register for the LSP300 course.

(c) English Language Course

English courses offered as university courses are as follows:

No	Code/Unit	Course Title	School (If Applicable)
1	LMT100/2	Preparatory English	Students from all schools
2	LSP300/2	Academic English	Students from all schools
3	LSP401/2	General English	School of Language, Literacies and Translation School of Educational Studies (Literature) School of the Arts School of Humanities School of Social Sciences
4	LSP402/2	Scientific and Medical English	School of Biological Sciences School of Physics School of Chemical Science School of Mathematical Sciences School of Industrial Technology School of Educational Studies (Science) School of Medical Sciences School of Health Sciences and Dentistry School of Pharmaceutical Sciences
5	LSP403/2	Business and Communication English	School of Management School of Communication
6	LSP404/2	Technical and Engineering English	School of Computer Sciences School of Housing, Building and Planning School of Engineering

C. U4 Group

All students are required to register for a co-curricular course in order to complete the minimum requirement of two (2) credit hours in the MPU

structure. Students who choose to take packaged co-curricular courses are required to complete all levels of the package. Students can choose the courses offered by the Core group as follows:

(i) Core of Volunteerism (6 - 10 credits)

All courses offered under this core are the uniformed courses offered in the following packages:

PALAPES Army	PALAPES Navy	PALAPES Air Force	SUKSIS (Students' Police Volunteers)
WTD103/3	WTL103/3	WTU103/3	WPD101/2
WTD203/3	WTL203/3	WTU203/3	WPD201/2
WTD304/4	WTL304/4	WTU304/4	WPD301/2

SISPA (Siswa Siswi Pertahanan Awam Malaysia)	St John Ambulance	Red Crescent Emergency Aid Team
WPA103/2	WJA102/2	WBM102/2
WPA203/2	WJA202/2	WBM202/2
WPA303/2	WJA302/2	WBM302/2

For more information, please refer to the Centre for Co-Curricular Programme website.

(ii) Core of Sports (1 - 3 credits)

The courses offered are as follows:

Packaged Courses (3 Credits, 3 Semesters) (Students are required to complete all levels)	
Karate	**Taekwondo**
WSC108/1	WSC115/1
WSC208/1	WSC215/1
WSC308/1	WSC315/1
Non Packaged Courses (1 Credit)	
WSC105/1 –Volley Ball	WSC124/1 - Sepak Takraw
WSC106/1 - Golf	WSC 125/1- Futsal
WSC110/1 - Archery	WSC 126/1 - Netball
WSC111/1 - Table Tennis	WSC127/1 - Event Management 1
WSC112/1 - Swimming	WSC227/1 - Event Management 2
WSC113/1 - Aerobics	WSC128/1 - Petanque
WSC114/1 - Squash	WSC130/1 - Orienteering
WSC116/1 - Tennis	WSC131/1 - Woodball
WSC119/1 - Badminton	

For more information, please refer to the Centre for Co-Curricular Programme website.

(iii) Core of Culture (1 – 6 credits)

The courses offered are as follows:

Packaged Courses (6 Credits, 3 Academic Sessions) (Students are required to complete all levels)	
Jazz Band	**Seni Silat Cekak Malaysia**
WCC108/2	WCC123/2
WCC208/2	WCC223/2
WCC308/2	WCC323/2
Non Packaged Courses (1 Credit)	
WCC105/1 - Gamelan	WCC117/1 - Modern Theatre
WCC107/1 - Guitar	WCC118/1 - Malay Shadow Play
WCC109/1 - Choir	WCC119/1 - Qigong Exercises
WCC115/1 - Modern Dance	WCC124/1 - Musical Kompang
WCC116/1 - Traditional Dance	WCC129/1 - Latin Dance

For more information, please refer to the Centre for Co-Curricular Programme website.

(iv) Core of Innovation and Initiative (1 - 2 credits)

The courses offered are as follows:

Non Packaged Courses (1 Credit)	
WCC103/1 - Painting	WCC128/1 - Embroidery and Beads Sequin Art
WCC110/1 - Handcrafting	WCC130/1 - Digital SLR Photography Art
WCC120/1 - Canting Batik	WCC 131/1 - Editing Digital Photography Art
WCC121/1 - Calligraphic Art	WCC132/1 - The Art of Ceramic
WCC122/1 - Cullinary Arts	WCC133/1 - Decoupage Arts
WCC125/1 - Traditional of Kite Art	
Non Packaged Courses (2 Credits)	
WMU102/2 - Makers@USM Level 1	WMU112/2 – Artificial Intelligence Literacy

For more information, please refer to the Centre for Co-Curricular Programme website.

(v) Core of Community Service (4 credits)

The courses offered are as follows:

Packaged Courses (4 Credits) (Students are required to complete all levels)	
WKM102/2 - Community Service 1	WKM202/2 - Community Service 2
Non Packaged Courses (2 Credits)	
WSK102/2 - Volunteerism Science	

For more information, please refer to the Centre for Co-Curricular Programme website.

(vi) Core of Public Speaking (2 credits)

The courses offered are as follows:

Non Packaged Courses (2 Credits)
WEC102/2 - Public Speaking in Malay Language
WEC103E/2 - Public Speaking in English Language

For more information, please refer to the Centre for Co-Curricular Programme website.

(vii) Core of Sustainability (2 credits)

The courses offered are as follows:

Non Packaged Courses (2 Credits)
WSU101/2 - Sustainability of Issues, Challenges and Prospects

For more information, please refer to the Centre for Co-Curricular Programme website.

3.3 Options (1 – 8 credits)

A. Co-curricular course

Students who have enrolled in co-curricular courses in excess of two (2) credits under the U4 General Subjects requirement are not required to attend the co-curriculum course under the Option courses. Students only need to register for skill courses or Foreign Language courses subject to the graduation requirements of their respective program of study.

The details of the list of co-curricular courses offered are in the U4 General Subjects section as stated above.

B. Skill / Foreign Language Courses / Courses offered by other schools

Students can choose the following courses as an option:

(i) WSU 101 (Sustainability: Issues, Challenges & Prospects) (2 credits)

The following is the synopsis of the course:

This course introduces and exposes the concept of sustainable development to students. The course aims to ensure future generation capabilities to meet their needs in the future are not affected, especially in the era of challenging globalization and the rapid development of information technology at present. Sustainable development models and case studies are also discussed.

For more information, please refer to the Centre for Co-Curricular Programme website.

(ii) HTV201 (Thinking Techniques) (2 credits)

The following is the synopsis of the course:

This course introduces students to various creative thinking such as styles and thinking tools that can broaden understanding of creativity and improve problem solving skills. Students are trained to select and apply the best techniques to solve specific problems. So this course helps students to learn to think effectively in order to make the most effective decisions in both their studies and daily life.

(iii) SHE101 (Ethnic Relations) (2 credits)

The following is the synopsis of the course:

This course is an introduction to ethnic relations in Malaysia. This course is designed with 3 main objectives: (1) to introduce students to the basic concepts and the practices of social accord in Malaysia, (2) to reinforce basic understanding of challenges and problems in a multi-ethnic society, and (3) to provide an understanding and awareness in managing the complexity of ethnic relations in Malaysia. At the end of this course, it is hoped that students will be able to identify and apply the skills to issues associated with ethnic relations in Malaysia.

(iv) Other options / skill courses as recommended or required by the respective schools (if any)

(v) English language course

The following courses may be taken as a university course to fulfil the compulsory English language requirements (for students with Band 6 in MUET) or as a skill / option course:

No	Code/Kredit	Course Title
1.	LHP451/2	Effective Reading
2.	LHP452/2	Business Writing
3.	LHP453/2	Creative Writing
4.	LHP454/2	Academic Writing
5.	LHP455/2	English Pronunciation Skills
6.	LHP456/2	Spoken English
7.	LHP457/4	Public Speaking and Speech Writing
8.	LHP458/2	English for Translation *(Offered during Semester II only)*
9.	LHP459/2	English for Interpretation *(Offered during Semester I only)*

(vi) Foreign Language Courses

The foreign language courses offered by the School of Languages, Literacies and Translation can be taken by students as option or compulsory courses to fulfil the number of units required for graduation. Students are not allowed to register for more than one foreign language course per semester. They must complete at least two levels of a foreign language course before they are allowed to register for another foreign language course. However, students are not required to complete all four levels of one particular foreign language course. The foreign language courses offered are as follows:

Arabic	Chinese	Japanese	German	Spanish
LAA100/2	LAC100/2	LAJ100/2	LAG100/2	LAE100/2
LAA200/2	LAC200/2	LAJ200/2	LAG200/2	LAE200/2
LAA300/2	LAC300/2	LAJ300/2	LAG300/2	LAE300/2
LAA400/2	LAC400/2	LAJ400/2	LAG400/2	LAE400/2

French	Thai	Tamil	Korean
LAP100/2	LAS100/2	LAT100/2	LAK100/2
LAP200/2	LAS200/2	LAT200/2	LAK200/2
LAP300/2	LAS300/2	LAT300/2	LAK300/2
LAP400/2	LAS400/2		

4.0 COURSES AND PROGRAMMES OFFERED IN SCHOOL OF HEALTH SCIENCES

4.1 Foundation Courses

Foundation courses cover the basic knowledge and skills essential for various health related disciplines and are intended to prepare the students to undertake more advance courses later on. The total number of units required for graduation varies according to the respective programmes.

	Code/Unit	Course
1.	GTU101/3	Structure and Function of Human I
2.	GTU103/3	Fundamental of Health Informatics
3.	GTU104/3	Structure and Function of Human II
4.	GTU107/4	Human Anatomy and Physiology
5.	GTU105/3	Psychology and Behavioural Science
6.	GTU106/3	Biochemistry and Basic Genetics
7.	GTU202/3	Health and Society
8.	GTU301/3	Ethics and Law for the Health Professionals
9.	GTU302/3	Biostatistics
10.	GTU304/3	Research Methodology

4.2 Core Courses

The core courses are the major component of the programme of studies and reflect the specialisation and expertise of each programme.

4.3 Electives Courses

Elective courses provide students with knowledge which not only complement the core courses but also enhance and broaden their foundation of knowledge. Majority of elective courses are coded as GEG but there are also courses from various programmes offered as elective. Students are advised to discuss with his/her academic advisors prior to course registration.

4.4 Unit Requirements for Graduation

Programme	Core Courses	Elective Courses	University Courses	Total
Bachelor in				
Audiology (Honours)	119	9	15	143
Biomedical Science (Honours)	114	7	15	136
Dietetics (Honours)	114	7	15	136
Environmental & Occupational Health (Honours)	114	6	15	135
Medical Radiation (Honours)	111	10	15	136
Nutrition (Honours)	107	14	15	136
Bachelor of Health Science				
(Honours) Exercise & Sports Science	70	32	18	120
Bachelor of Science in				
Forensic Science (Honours)	124	6	15	145

4.5 Graduation Requirements

a) Satisfy all credit requirements for the Academic Programme i.e total credits and the required number of credits for each component in the programme [Core, Elective, University and Optional (if appropriate) courses].

b) Obtain a minimum grade points of 2.00 (Grade C) and above for all Core courses.

c) Obtain a final CGPA of 2.00 and above for the whole programme.

d) Obtain a minimum grade C or grade point 2.00 for the language courses (Bahasa Malaysia and English), Philosophy and Current Issues, as well as the Appreciation of Ethics and Civilisations courses.

5.0 PROGRAMMES

5.1 Bachelor in Audiology (Honours)

Programme Aim

The Audiology programme is designed to produce audiologists who are knowledgeable and competent in the field of audiology to fulfil the needs of public and private sectors.

Programme Learning Outcomes

Upon completion of the programme, graduates should be able to:

PLO1 : Acquire basic and advanced knowledge in the field of audiology.
PLO2 : Perform appropriate audiological assessments and management using evidence - based practice.
PLO3 : Demonstrate complex problem solving, decision making, clinical reasoning and reflection skills.
PLO4 : Demonstrate effective communication skills in delivering information.
PLO5 : Demonstrate interpersonal skills and social responsibility, as well as teamwork with a variety of related professions and communities involving different religions, cultures and environments.
PLO6 : Demonstrate high professionalism and ethics in adhering to standards of audiology practice and healthcare legislation.
PLO7 : Apply lifelong learning skills in the career development.
PLO8 : Demonstrate entrepreneurial skills and systematic management practices in the field of audiology.
PLO9 : Demonstrate leadership and social skills.
PLO10 : Demonstrate information and communication technology (ICT) skills in the use of various digital applications in the field of audiology.
PLO11 : Demonstrate skills in interpreting numerical, visual and graphical data to convey information, findings and results in the field of audiology.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
119	**9**	**15**	**143**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU101	Structure and Function of Human I	3
2	GTU104	Structure and Function of Human II	3
3	GTA106	Anatomy and Physiology for Hearing and Speech I	2
4	GTA107	Psychoacoustics	2
5	GTA109	Anatomy and Physiology for Hearing and Speech II	2
6	GTA110	Basic Audiology Techniques	3
7	GTP100	Basic Linguistics	3
8	GTP104	Developmental Psychology for Speech and Hearing	3
9	GTP109	Language Development	3
10	GTP110	Clinical Bases for Audiology and Speech Pathology	2
11	GTA203	Advanced Audiology Techniques	3
12	GTA205	Neurology for Hearing and Speech	2
13	GTA208	Pediatric Audiology	4
14	GTA209	Audiology Clinic I	3
15	GTA210	Otology	3
16	GTA211	Hearing Screening	2
17	GTA212	Basic Hearing Amplification Technology	3
18	GTA213	Electrophysiological Tests	3
19	GTP211	Pediatric for Hearing and Speech	3
20	GTP212	Abnormal Psychology	2
21	GTP217	Introduction to Communication Disorders	3
22	GTP218	Acoustic and Phonetics	3
23	GTU302	Biostatistics	3
24	GTU304	Research Methodology	3
25	GTA305	Advanced Hearing Amplification Technology	3
26	GTA307	Audiology Clinic II	3
27	GTA308	Evaluation of Balance System	2
28	GTA309	Audiology Clinic III	4
29	GTA310	Basic Medical Management for Audiologist and Speech Pathologist	2
30	GTA311	Audiological Rehabilitation	4
31	GTP311	Counselling for Communication Disorders	3
32	GTP316	Learning Disabilities	3
33	GTA401	Research Project	6
34	GTA406	Noise and Hearing	2
35	GTA407	Audiology Clinic IV	5
36	GTA408	Audiology Clinical Placement	6
37	GTA410	Ethics and Professionalism in Audiology	2
38	GTA411	Audiology Clinic V	5
39	GTA413	Practice Management and Seminar in Audiology	3
Total Credit Hours for Core Courses			**119**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	LKM400 Malay Language IV	2	WUS101 Core Entrepreneurship	2
	LSP300 Academic English	2	Co-curriculum	1
	Co-curriculum	1		
Core Courses	GTU101 Structure and Function of Human I	3	GTU104 Structure and Function of Human II	3
	GTA106 Anatomy and Physiology for Hearing and Speech I	2	GTP 104 Developmental Psychology for Speech and Hearing	3
	GTP100 Basic Linguistics	3	GTP110 Clinical Bases for Audiology and Speech Pathology	2
	GTP109 Language Development	3	GTA109 Anatomy and Physiology for Hearing and Speech II	2
			GTA107 Psychoacoustics	2
			GTA110 Basic Audiology Techniques	3
Elective Courses	Elective course	3	Elective course	3
Total		**19**		**21**

Component	Semester 3		Semester 4	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	HFF225 Philosophy and Current Issues	2	HFE224 Appreciation of Ethics and Civilisations	2
	LSP402 Scientific and Medical English	2	Co-curriculum	1
Core Courses	GTP217 Introduction to Communication Disorders	3	GTA208 Pediatric Audiology	4
	GTP218 Acoustic and Phonetics	3	GTA209 Audiology Clinic I	3
	GTP211 Pediatric for Hearing and Speech	3	GTA210 Otology	3
	GTP212 Abnormal Psychology	2	GTA211 Hearing Screening	2
	GTA203 Advanced Audiology Techniques	3	GTA212 Basic Hearing Amplification Technology	3
	GTA205 Neurology for Hearing and Speech	2	GTA213 Electrophysiological Tests	3
Elective Courses				
Total		**20**		**21**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTP311 Counselling for Communication Disorders	3	GTU302 Biostatistics	3
	GTU304 Research Methodology	3	GTP316 Learning Disabilities	3
	GTA305 Advanced Hearing Amplification Technology	3	GTA309 Audiology Clinic III	4
	GTA307 Audiology Clinic II	3	GTA310 Basic Medical Management for Audiologist and Speech Pathologist	2
	GTA308 Evaluation of Balance System	2	GTA311 Audiological Rehabilitation	4
Elective Courses	Elective course	3		
Total		**17**		**16**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTA401 Research Project	(3/6)	GTA401 Research Project	(3/6)
	GTA406 Noise and Hearing	2	GTA410 Ethics and Professionalism in Audiology	2
	GTA407 Audiology Clinic IV	5	GTA411 Audiology Clinic V	5
	GTA408 Audiology Clinical Placement	6	GTA413 Practice Management and Seminar in Audiology	3
Elective Courses				
Total		**16**		**13**

5.2 Bachelor in Biomedical Science (Honours)

Programme Aims

The Biomedicine programme is designed to enable students to explore the aspects of laboratory diagnosis, disease prevention and research in Biomedical Sciences.

Programme Learning Outcomes

Upon completion of the programme, graduates should be able to:

PLO1 : Apply theoretical, conceptual and practical knowledge in biomedical sciences.
PLO2 : Perform medical laboratory procedure or research, validate findings and conduct research under supervision in biomedical and research laboratories.
PLO3 : Utilise scientific thinking as well as critical and creative thinking in identifying and solving problems in biomedical and research laboratories, and subsequently apply the research knowledge towards effective services.
PLO4 : Present information and findings clearly, and communicate effectively with stakeholders.
PLO5 : Demonstrate social and teamwork skills, as well as responsible and sensitive towards community and health issues.
PLO6 : Adhere to safety requirements and regulations, legislative and ethical principles, as well as code of conduct in biomedical and research laboratories.
PLO7 : Apply skills and principles of lifelong learning in academic and career development, as well as utilise information management system to enhance practice in biomedical and research laboratories.
PLO8 : Practice quality management system and Good Laboratory Practice (GLP), as well as demonstrate entrepreneurial skills in biomedical and research laboratories.
PLO9 : Demonstrate leadership quality and social skills in biomedical or research laboratories, and able to work together with healthcare professional team.
PLO10 : Demonstrate ICT skill in utilising various digital application involving technology and data to enhance practice in biomedical and research laboratories.
PLO11 : Demonstrate skill in utilising and interpretating numerical, visual and graphic data to present the information, findings, and results in the field of biomedical science.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
114	**7**	**15**	**136**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU101	Structure and Function of Human I	3
2	GTU103	Fundamental of Health Informatics	3
3	GTU104	Structure and Function of Human II	3
4	GTU105	Psychology and Behavioral Science	3
5	GTU106	Biochemistry and Basic Genetics	3
6	GTB105	Human Biochemistry	3
7	GTB106	Laboratory Science	3
8	GTB110	Basic Microbiology	3
9	GTB204	Molecular Biology Techniques	3
10	GTB218	Immunology II	3
11	GTB219	Pharmacology I	3
12	GTB221	Basic Hematology	3
13	GTB222	Pathology	4
14	GTB224	Immunology I	3
15	GTB225	Epidemiology	3
16	GTB226	Cell Biology Techniques	3
17	GTU301	Ethics and Law for Healthcare Professionals	3
18	GTU302	Biostatistics	3
19	GTU304	Research Methodology	3
20	GTB316	Transfusion Science and Blood Banking	3
21	GTB317	Laboratory and Clinical Hematology	3
22	GTB318	Pharmacology II	3
23	GTB319	Toxicology	3
24	GTB320	Medical Virology and Mycology	3
5	GTB322	Medical Bacteriology	3
26	GTB323	Medical Parasitology	4
27	GTB324	Clinical Biochemistry	4
28	GTB325	Clinical Diagnostic Laboratory Management	4
29	GTB408	Biomedical Practicum	9
30	GTB411	Research Project	8
31	GTB413	Industrial Training	9

NOTE:
For 3U1I Programme, three courses (GTB408, GTB411 and GTB413) will be replaced with GTB414 and GTB415 with total credit hours of 26.

32	GTB414	Industrial Attachment	18
33	GTB415	Industrial Research Project	8
		Total Credit Hours for Core Courses	**114**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	Credit Hour	Course	Credit Hour
University Courses	LKM400 Malay Language IV	2	WUS101 Core Entrepreneurship	2
	Co-curriculum	1	LSP300 Academic English	2
Core Courses	GTU101 Structure and Function of Human I	3	GTU104 Structure and Function of Human II	3
			GTB105 Human Biochemistry	3
	GTU105 Psychology and Behavioural Science	3	GTB110 Basic Microbiology	3
	GTU106 Biochemistry and Basic Genetics	3	GTU103 Fundamental of Health Informatics	3
	GTB106 Laboratory Science	3		
Elective Courses	Elective course	2	Elective course	2
Total		**17**		**18**

Component	Semester 3		Semester 4	
	Course	Credit Hour	Course	Credit Hour
University Courses	HFF225 Philosophy and Current Issues	2	HFE224 Appreciation of Ethics and Civilisations	2
	Co-curriculum	1	Co-curriculum	1
	LSP402 Scientific and Medical English	2		
Core Courses	GTB204 Molecular Biology Techniques	3	GTB218 Immunology II	3
	GTB224 Immunology I	3	GTB219 Pharmacology I	3
	GTB221 Basic Hematology	3	GTB222 Pathology	4
			GTB225 Epidemiology	3
			GTB226 Cell Biology Techniques	3
Elective Courses	Elective course	3		
Total		**17**		**19**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTB317 Laboratory and Clinical Hematology	3	GTB316 Transfusion Science and Blood Banking	3
	GTB318 Pharmacology II	3	GTB319 Toxicology	3
	GTB322 Medical Bacteriology	3	GTB320 Medical Virology and Mycology	3
	GTB323 Medical Parasitology	4	GTB324 Clinical Biochemistry	4
	GTU301 Ethics and Law for Healthcare Professionals	3	GTB325 Clinical Diagnostic Laboratory Management	4
	GTU304 Research Methodology	3	GTU302 Biostatistics	3
Elective Courses				
Total		**19**		**20**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTB408 Biomedical Practicum	9	GTB413 Industrial Training	9
	GTB411 Research Project	(4/8)	GTB411 Research Project	(4/8)
Elective Courses				
Total		**13**		**13**

For 3U1I programme

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTB414 Industrial Attachment	(9/18)	GTB414 Industrial Attachment	(9/18)
	GTB415 Industrial Research Project	(4/8)	GTB415 Industrial Research Project	(4/8)
Elective Courses				
Total		**13**		**13**

5.3 Bachelor in Dietetics (Honours)

Programme Aims

The Dietetics programme provides theoretical and clinical training experiences which covers all aspects of dietary intervention, nutrition care process, disease management and menu planning of therapeutic diet to meet nutritional requirements of individuals and groups.

Programme Learning Outcomes

Upon completion of the programme, graduates should be able to:

PLO1 : Describe, interpret and apply knowledge of food, nutrition, clinical and social sciences in nutrition care process.

PLO2 : Acquire technical skills in dietetics field in the nutrition care process involving individuals and community and implement sanitation and safety procedures in food service management systems.

PLO3 : Apply skills for identifying and solving problems critically as well as research in dietetics field based on scientific evidence.

PLO4 : Apply effective verbal and written communication skills with patients as well as family members/guardian, friends, health care professionals and stake holders at large in the dietetics contexts as well as providing dietary and healthy lifestyle education for health care professionals and community.

PLO5 : Demonstrate interpersonal skills and sensitivity and responsibility towards community, culture, religion and environment as well as cooperate with other health care professionals.

PLO6 : Demonstrate moral values and attitude, empathy as well as sensitivity towards culture in delivering counselling to patients and adhere to rules, ethical principles and professional code of conduct in dietetics.

PLO7 : Apply lifelong learning skills in academic and dietetics career development.

PLO8 : Apply entrepreneurship mind and management skills in menu planning, procurement of raw materials and equipment for hospital or health facility food service organization as well as in real-world perspective in employment sector.

PLO9 : Demonstrate leadership, interpersonal and social skills in dietetics practice field.

PLO10 : Demonstrate information technology and communication skills in utilising various technology and information based digital applications for enhancing quality of dietetics practice.

PLO11 : Demonstrate skills in using and interpreting numerical data, visual and graphic for delivering information, findings and decision in dietetics field coherently.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
114	**7**	**15**	**136**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU103	Fundamental of Health Informatics	3
2	GTU105	Psychology and Behavioural Science	3
3	GTU107	Human Anatomy and Physiology	4
4	GTN107	Food Science	2
5	GTN104	Principles of Nutrition	3
6	GTN105	Principles of Food Preparation	3
7	GTN108	Nutritional Immunology	2
8	GTN208	Nutritional Biochemistry	3
9	GTN215	Nutrition for Health and Fitness	3
10	GTN222	Assessment of Nutritional Status	3
11	GTN223	Community Nutrition and Dietetics	4
12	GTN218	Nutrition in the Life Cycle	3
13	GTN219	Nutritional Anthropology	2
14	GTN221	Nutrition and Disease	3
15	GTD213	Principles of Medical Nutrition Therapy I	3
16	GTS209	Sports Nutrition	3
17	GTB219	Pharmacology I	3
18	GTU302	Biostatistics	3
19	GTU304	Research Methodology	3
20	GTN311	Food Service Management	3
21	GTN323	Nutrition and Genetics	2
22	GTN321	Food Safety and Microbiology	3
23	GTN322	Nutrition Education and Promotion	3
24	GTD321	Therapeutic Diet Preparation	3
25	GTD323	Principles of Medical Nutrition Therapy II	3
26	GTD331	Principles of Medical Nutrition Therapy III	3
27	GTD328	Dietetics Skills	3
28	GTD329	Research Project in Dietetics I	2
29	GTD330	Dietetics Counselling and Communication	3
30	GTD332	Research Project in Dietetics II	4
31	GTD414	Clinical Dietetics Practicum I	10
32	GTD412	Clinical Dietetics Practicum II	12
33	GTD413	Food Service and Industry Practicum	4
Total Credit Hours for Core Courses			**114**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	LKM400 Malay Language IV	2	LSP300 Academic English	2
	Co-curriculum	1	WUS101 Core Entrepreneurship	2
Core Courses	GTU107 Human Anatomy and Physiology	4	GTU105 Psychology and Behavioural Science	3
	GTU103 Fundamental of Health Informatics	3	GTN108 Nutritional Immunology	2
	GTN107 Food Science	2	GTN105 Principles of Food Preparation	3
	GTN104 Principles of Nutrition	3	GTS209 Sports Science	3
Elective Courses	Elective course	3	Elective course	2
			Elective course	2
Total		**18**		**19**

Component	Semester 3		Semester 4	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	HFF225 Philosophy and Current Issues	2	HFE224 Appreciation of Ethics and Civilisations	2
	LSP402 Scientific and Medical English	2		
	Co-curriculum	1		
Core Courses	GTN208 Nutritional Biochemistry	3	GTN222 Assessment of Nutritional Status	3
	GTN218 Nutrition in the Life Cycle	3	GTD213 Principles of Medical Nutrition Therapy I	3
	GTN215 Nutrition for Health and Fitness	3	GTN221 Nutrition and Disease	3
	GTN219 Nutritional Anthropology	2	GTN223 Community Nutrition and Dietetics	4
	GTU302 Biostatistics	3	GTB219 Pharmacology I	3
			GTU304 Research Methodology	3
Elective Courses				
Total		**19**		**21**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses			Co-curriculum	1
Core Courses	GTD321 Therapeutic Diet Preparation	3	GTD330 Dietetics Counselling and Communication	3
	GTD323 Principles of Medical Nutrition Therapy II	3	GTD331 Principles of Medical Nutrition Therapy III	3
	GTD328 Dietetics Skills	3	GTD332 Research Project in Dietetics II	4
	GTN321 Food Safety and Microbiology	3	GTN311 Food Service Management	3
	GTN322 Nutrition Education and Promotion	3		
	GTN323 Nutrition and Genetics	2		
	GTD329 Research Project in Dietetics I	2		
Elective Courses				
Total		**19**		**14**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTD413 Food Service and Industry Practicum	4	GTD412 Clinical Dietetics Practicum II	12
	GTD414 Clinical Dietetics Practicum I	10		
Elective Courses				
Total		**14**		**12**

5.4 Bachelor in Environmental and Occupational Health (Honours)

Programme Aims

The Environmental and Occupational Health programme is designed to equip the students with theoretical knowledge, practical skills and industrial training experience in environmental and occupational health.

Programme Learning Outcome

Upon completion of the programme, graduates should be able to:

PLO1 : Describe, evaluate, and apply core knowledge and display the ability to assess any issues involving environmental and occupational, safety, and health problems.

PLO2 : Interpret, implement, demonstrate technical skills, and educate persons with recommended preventive and corrective measures in environmental and occupational, safety, and health programme and strategies.

PLO3 : Apply critical and creative thinking in acquiring information and solving issues in environmental and occupational, safety and health and apply scientific knowledge in research towards effective services.

PLO4 : Apply communication skills effectively in verbal and written forms in any professional working environment.

PLO5 : Demonstrate professional, managerial, interpersonal, and social skills in order to fulfil the organization's goals and able to solve environmental and occupational, safety, and health problems as a team.

PLO6 : Demonstrate good attitudes and adhere to the legal, ethical principles and the professional code of conduct in environmental and occupational, safety and health, application, and services.

PLO7 : Apply skills and principles of lifelong learning in academic and career development.

PLO8 : Apply broad business and real-world perspectives in the workplace and demonstrate entrepreneurial skills to facilitate the community in need.

PLO9 : Demonstrate leadership and collaborate with other environmental and occupational, safety and health professionals.

PLO10 : Utilise information and communication technology (ICT) skills with a good information management system to enhance environmental and occupational, safety, and health practices.

PLO11 : Conduct research and apply numerical and evidence-based scientific principles in identity, analyze, interpret, and discussing ideas of improvement related to environmental and occupational, safety, and health.

Course Components

Core Courses	Elective Courses	University Courses	Total Credit Units
114	**6**	**15**	**135**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU107	Anatomy and Human Physiology	4
2	GTK141	Chemistry	4
3	GTU105	Psychology and Behavioural Science	3
4	GTB106	Laboratory Science	3
5	GTK101	Introduction to Environmental and Occupational Health	3
6	GTK105	Occupational Safety	3
7	GTK106	Occupational Health	3
8	GTK143	Waste Management	3
9	GTK205	Supply and Quality of Drinking Water	3
10	GTK206	Industrial Hygiene	3
11	GTK207	Food Hygiene and Safety	3
12	GTK210	Occupational Diseases	3
13	GTK211	Occupational Safety and Health Laws	3
14	GTB225	Epidemiology	3
15	GTK241	Fire Safety and Design	3
16	GTK242	Risk Management	3
17	GTU302	Biostatistics	3
18	GTU304	Research Methodology	3
19	GTK312	Ergonomic	3
20	GTK313	Pest and Vector Control	3
21	GTK314	Communicable Disease Control	3
22	GTK315	Occupational Safety and Health Management	3
23	GTK316	Environmental Management	3
24	GTK317	Emergency Response and Planning	3
25	GTK318	Environmental Health Legislation	3
26	GTK320	Environmental and Occupational Toxicology	2
27	GTK321	Research Project	6
28	GTK343	Engineering Fundamental and Process Safety	3
29	GTK441	Environmental and Occupational Safety and Health Internship	26
Total Credit Hours for Core Courses			**114**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	LKM400 Malay Language IV	2	WUS101 Core Entrepreneurship	2
	Co-curriculum	1	LSP300 Academic English	2
			Co-curriculum	1
Core Courses	GTU107 Anatomy and Human Physiology	4	GTU105 Psychology and Behavioural Science	3
	GTB106 Laboratory Science	3	GTK105 Occupational Safety	3
	GTK141 Chemistry	4	GTK106 Occupational Health	3
	GTK101 Introduction to Environmental and Occupational Health	3	GTK143 Waste Management	3
Elective Courses			Elective course	3
Total		**17**		**20**

Component	Semester 3		Semester 4	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	HFF225 Philosophy and Current Issues	2	LSP402 Scientific and Medical English	2
			HFE224 Appreciation of Ethics and Civilisations	2
Core Courses	GTU304 Research Methodology	3	GTU302 Biostatistics	3
	GTK207 Food Hygiene and Safety	3	GTB225 Epidemiology	3
	GTK210 Occupational Diseases	3	GTK206 Industrial Hygiene	3
	GTK241 Fire Safety and Design	3	GTK205 Supply and Quality of Drinking Water	3
	GTK312 Ergonomics	3	GTK318 Environmental Health Legislation	2
	GTK242 Risk Management	3		
Elective Courses				
Total		**20**		**18**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses	Co-curriculum	1		
Core Courses	GTK211 Occupational Safety and Health Laws	3	GTK314 Communicable Disease Control	3
	GTK 313 Pest and Vector Control	3	GTK315 Occupational Safety and Health Management	3
	GTK 317 Emergency Response and Planning	3	GTK316 Environmental Management	3
	GTK320 Environmental and Occupational Toxicology	3	GTK343 Engineering Fundamental and Process Safety	3
	GTK321 Research Project	(3/6)	GTK321 Research Project	(3/6)
Elective Courses	GTK341 EOSH in Project Management	3		
Total		**19**		**15**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTK441 Environmental and Occupational Safety and Health Internship	(13/26)	GTK441 Environmental and Occupational Safety and Health Internship	(13/26)
Elective Courses				
Total		**13**		**13**

5.5 Bachelor of Health Science (Honours) Exercise and Sports Science

Programme Aims

The Exercise and Sports Science programme provides theoretical and practical training experience to enable graduates to function as the experts in the field required by the public and private sectors.

Programme Learning Outcomes

Upon completion of the programme, graduates should be able to:

PLO1 : Apply theoretical knowledge in exercise and sports sciences.
PLO2 : Perform practicals, procedures and research related to exercise and sports science following a robust system of standards and quality assurance.
PLO3 : Utilise critical and creative thinking skills as well as scientific thinking to identify and solve problems.
PLO4 : Communicate effectively in verbal and written forms to deliver information, findings and results within exercise and sports science context with clients, peers and stakeholders.
PLO5 : Demonstrate skills and social responsibilities, teamwork and sensitive in coordinating daily activities of exercise and sports science practice with various professions and community involving different religions, culture and environments.
PLO6 : Demonstrate high level of moral and personal values as well as ethical and professionalism in adhering to ethical principles, code of conduct, law and regulations in exercise and sports science practices.
PLO7 : Utilise skills in information management system and lifelong learning in academic and career development.
PLO8 : Apply managerial and entrepreneurial skills in everyday activities and planning by considering the actual scenarios and from different perspectives.
PLO9 : Utilise knowledge and understanding in leadership for effective leadership in an effort to contribute to the advancement of exercise and sports science.
PLO10 : Demonstrate technological and communication (ICT) skills in the use of various digital applications that involve technology and data to acquire, process and support the exercise and sports science professions.
PLO11 : Demonstrate skills in using and interpreting numerical, visual and graphical data to convey information, findings and results in exercise and sports science.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
70	32	18	120

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU103	Fundamental of Health Informatics	3
2	GTU105	Psychology and Behavioural Science	3
3	GTS101	Introduction to Exercise and Sports Science	2
4	GTS102	Sociology and Philosophy of Sports	3
5	GTS105	Sports Psychology	3
6	GTS107	Physiology and Anatomy of Movement	4
7	GTN104	Principles of Nutrition	3
8	GTU202	Health and Society	3
9	GTS205	Exercise Physiology	3
10	GTS206	Sports Training Methodology	3
11	GTS208	Kinanthropometry, Tests and Measurements for Sports Science	3
12	GTS209	Sports Nutrition	3
13	GTS210	Sports Biomechanics and Kinesiology	3
14	GTS211	Motor Learning	3
15	GTU301	Ethics and Law for Healthcare Professionals	3
16	GTU302	Biostatistics	3
17	GTU304	Research Methodology	3
18	GTS317	Sports Management	3
19	GTS322	Research Project	10
20	GTS411	Industrial Training	6
Total Credit Hours for Core Courses			**70**

Suggested Scheme of Study

Component		Semester 1		Semester 2	
		Course	**Credit Hour**		**Course**
University Courses		LKM400 Malay Language IV	2	WUS101 Core Entrepreneurship	2
		Co-curriculum	1	LSP300 Academic English	2
				Co-curriculum	1
Core Courses		GTU103 Fundamental of Health Informatics	3	GTS107 Physiology and Anatomy of Movement	4
		GTU105 Psychology and Behavioural Science	3	GTS105 Sports Psychology	3
		GTS101 Introduction to Exercise and Sports Science	2	GTU202 Health and Society	3
		GTS102 Sociology and Philosophy of Sports	3		
Elective Courses	**Package 1** (Exercise and Sport Physiology)	GTS202 First Aid and Cardiopulmonary Resuscitation	2	GTS106 Skills and Practices in Team Sports	3
		OR		***OR***	
	Package 2 (Coaching Science)	GTS202 First Aid and Cardiopulmonary Resuscitation	2	GTS106 Skills and Practices in Team Sports	3
Total			**16**		**18**

Component		Semester 3		Semester 4	
		Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses		Co-curriculum	1	Co-curriculum	1
		HFF225 Philosophy and Current Issues	2	LAA100 Arabic Language I	2
		LSP402 Scientific and Medical English	2	HFE224 Appreciation of Ethics and Civilisations	2
Core Courses		GTS205 Exercise Physiology	3	GTU301 Ethics and Law for Healthcare Professionals	3
		GTS206 Sports Training Methodology	3	GTS209 Sports Nutrition	3
		GTS208 Kinanthropometry, Tests and Measurements for Sports Science	3	GTS210 Sports Biomechanics and Kinesiology	3
		GTN104 Principles of Nutrition	3	GTS211 Motor Learning	3
Elective Courses	**Package 1** (Exercise and Sport Physiology)	GTU106 Biochemistry and Basic Genetics	3	GTS212 Applied Sports Physiology	3
	OR			***OR***	
	Package 2 (Coaching Science)	GTS204 Skills and Practices in Individual Sport	3	GTS214 Applied Sports Psychology	3
Total			**20**		**20**

Component		Semester 5		Semester 6	
		Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses					
Core Courses		GTU302 Biostatistics	3	GTS317 Sports Management	3
		GTU304 Research Methodology	3	GTS322 Research Project	(5/10)
		GTS322 Research Project	(5/10)		
Elective Courses	**Package 1** (Exercise and Sport Physiology)	GTS312 Sports Injuries and Rehabilitation	3	GTS320 Sports Psychophysiology	3
		GTS316 Adapted Physical Activity	3	GTS323 Fitness Testing and Exercise Prescription	3
		GTB224 Immunology I	3	GTS324 Therapeutic Exercises	3
				GTS325 Contemporary Issues in Sports Science Practices	3
		OR		***OR***	
	Package 2 (Coaching Science)	GTS315 Coaching Science and Sports Performance Analysis	3	GTS318 Physical Activity, Growth and Development	3
		GTS316 Adapted Physical Activity	3	GTS320 Sports Psychophysiology	3
		GTS321 Coaching Psychology	3	GTS323 Fitness Testing and Exercise Prescription	3
				GTS325 Contemporary Issues in Sports Science Practices	3
Total			**20**		**20**

Component	Semester 7	
	Course	**Credit Hour**
University Courses		
Core Course	GTS411 Industrial Training	6
Total		**6**

5.6 Bachelor in Medical Radiation (Honours)

Programme Aims

The Medical Radiation programme provides theoretical and practical training experiences, which will allow students to understand, able to explain and utilise ionising and non-ionising radiation in the diagnosis and treatment of patients.

Programme Learning Outcome

Upon completion of the programme, graduates should be able to:

PLO1 : Apply comprehensive knowledge in medical imaging (including nuclear medicine), radioterapy and radiation protection.

PLO2 : Demonstrate competent technical skills in medical imaging and radiotherapy, particularly in performing procedures, patient assessment, quality assurance, quality control and research, as well as able to seek, adapt and provide solutions to address challenges in medical radiation practices.

PLO3 : Demonstrate critical and lateral thinking skills by using relevant techniques in identifying problems and providing solutions in medical imaging and radiotherapy.

PLO4 : Apply communication skills effectively in verbal and written forms with patients, family members, peers, healthcare professionals and the stakeholders in medical imaging and radiotherapy practices.

PLO5 : Demonstrate social and interpersonal skills while collaborate with healthcare professionals, including demonstrate sensitivities and responsibilities toward the community, culture, religion and environment.

PLO6 : Adhere to legislative and ethical principles, the professional codes of conduct in medical imaging and radiotherapy including the radiation safety requirements and regulations.

PLO7 : Apply the principles and skills of lifelong learning and information management in medical imaging and radiotherapy for academic and career development and able to coordinate daily activities in medical radiation practices.

PLO8 : Demonstrate self-motivation to apply entrepreneurial and managerial skills in everyday activities, workplace and real world for career development.

PLO9 : Demonstrate effective leadership, interpersonal and social skills as an individual and a healthcare team.

PLO10 : Utilise ICT and information management system to enhance their medical imaging and radiotherapy practices.

PLO11 : Present information and findings in medical imaging and radiation therapy coherently.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
111	**10**	**15**	**136**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU103	Fundamental of Health Informatics	3
2	GTU105	Psychology and Behavioural Science	3
3	GTU107	Human Anatomy and Physiology	4
4	GTX104	Introduction to Medical Radiation	4
5	GTX105	Medical Radiation Physics I	4
6	GTX106	Mathematics of Radiation Science I	3
7	GTX107	Mathematics of Radiation Science II	4
8	GTX213	Basic Science of Nuclear Medicine	3
9	GTX215	Medical Radiation Physics II	4
10	GTX218	Radiation Protection and Safety I	4
11	GTX219	Basis of Radiation Dosimetry	4
12	GTX220	Diagnostic Radiology Imaging	4
13	GTX221	Nuclear Medicine Imaging	4
14	GTX222	Basic Sciences in Diagnostic Radiology	4
15	GTU301	Ethics and Law for Healthcare Professionals	3
16	GTU302	Biostatistics	3
17	GTU304	Research Methodology	3
18	GTX307	Radiation Protection and Safety II	3
19	GTX326	Principles of Radiotherapy	4
20	GTX327	Brachytherapy	3
21	GTX328	Diagnostic Radiology Imaging Techniques	4
22	GTX329	Quality Assurance in Diagnostic Radiology	4
23	GTX330	Nuclear Medicine Imaging Techniques	4
24	GTX331	Quality Assurance in Nuclear Medicine and Radiotherapy	4
25	GTX411	Radiotherapy Techniques	4
26	GTX415	Research Project	8
27	GTX416	Professional Training	4
28	GTX417	Radiotherapy Treatment Planning Techniques	4
29	GTX418	Dose Calculations and Treatment Planning in Radiotherapy	4
Total Credit Hours for Core Courses			**111**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	LKM400 Malay Language IV	2	WUS101 Core Entrepreneurship	2
	Co-curriculum	1	LSP300 Academic English	2
			Co-curriculum	1
Core Courses	GTU103 Fundamental of Health Informatics	3	GTU105 Psychology and Behavioral Science	3
	GTU107 Human Anatomy and Physiology	4	GTX105 Medical Radiation Physics I	4
	GTX104 Introduction to Medical Radiation	4	GTX107 Mathematics of Radiation Science II	4
	GTX106 Mathematics of Radiation Science I	3		
Elective Courses			Elective course	2
Total		**17**		**18**

Component	Semester 3		Semester 4	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	HFF225 Philosophy and Current Issues	2	Co-curriculum	1
	LSP402 Scientific and Medical English	2	HFE224 Appreciation of Ethics and Civilisations	2
Core Courses	GTX215 Medical Radiation Physics II	4	GTX219 Basis of Radiation Dosimetry	4
	GTX213 Basic Science of Nuclear Medicine	3	GTX220 Diagnostic Radiology Imaging	4
	GTX222 Basic Sciences in Diagnostic Radiology	4	GTX221 Nuclear Medicine Imaging	4
	GTX218 Radiation Protection and Safety I	4		
Elective Courses			Elective course	**2**
			Elective course	3
Total		**19**		**20**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTU304 Research Methodology	3	GTU301 Ethics and Law for Healthcare Professionals	3
	GTX307 Radiation Protection and Safety II	3	GTU302 Biostatistics	3
	GTX326 Principles of Radiotherapy	4	GTX327 Brachytherapy	3
	GTX328 Diagnostic Radiology Imaging Techniques	4	GTX330 Nuclear Medicine Imaging Techniques	4
	GTX329 Quality Assurance in Diagnostic Radiology	4	GTX331 Quality Assurance in Nuclear Medicine and Radiotherapy	4
Elective Courses				
Total		**18**		**17**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTX418 Dose Calculations and Treatment Planning in Radiotherapy	4	GTX415 Research Project	(6/8)
	GTX417 Radiotherapy Treatment Planning Techniques	4	GTX411 Radiotherapy Techniques	4
	GTX415 Research Project	(2/8)		
	GTX416 Professional Training	4		
Elective Courses			Elective course	3
Total		**14**		**13**

5.7 Bachelor in Nutrition (Honours)

Programme Aims

The Nutrition programme aims to deliver knowledge in the basic human nutrition, which covers aspects of nutritional well-being of population, prevention and control of nutrition related diseases through promotion and education, training, monitoring of nutritional status and nutrition interventions to produce versatile graduates.

Programme Learning Outcome

Upon completion of the programme, graduates should be able to:

PLO1 : Apply knowledge of food, nutrition and health science in the nutrition field.
PLO2 : Apply practical, procedures and research skills in the field of nutrition competently.
PLO3 : Utilise relevant skills in identifying, interpreting and solving problems associated with nutrition, critically and scientifically.
PLO4 : Utilise communication skills in verbal and written communication effectively, with clients, and stake holders in the nutrition contexts.
PLO5 : Demonstrate interpersonal skills, social responsibility and teamwork with other related professions and community across different culture, religion and environment.
PLO6 : Demonstrate moral values and attitude in adhering to rules, ethical principles and professional code of conduct in nutrition setting, standard and quality control.
PLO7 : Apply lifelong learning skills in academic and nutrition career development.
PLO8 : Apply entrepreneurship mind and management skills in nutritional planning in real-world perspective.
PLO9 : Demonstrate leadership skills effectively and contribute to advancement in nutrition field.
PLO10 : Demonstrate information technology and communication skills in utilising various technology and information based digital applications to support nutrition profession.
PLO11 : Demonstrate skills in using and interpreting numerical data, visual and graphic for delivering information, findings and decision in nutrition field coherently.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
107	**14**	**15**	**136**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU103	Fundamental of Health Informatics	3
2	GTU105	Psychology and Behavioural Science	3
3	GTU107	Human Anatomy and Physiology	4
4	GTN104	Principles of Nutrition	3
5	GTN105	Principles of Food Preparation	3
6	GTN106	Food Analysis	3
7	GTN107	Food Science	2
8	GTN108	Nutritional Immunology	2
9	GTU202	Health and Society	3
10	GTN208	Nutritional Biochemistry	3
11	GTN215	Nutrition for Health and Fitness	3
12	GTN218	Nutrition in the Life Cycle	3
13	GTN219	Nutritional Anthropology	2
14	GTN221	Nutrition and Disease	3
15	GTN222	Assessment of Nutritional Status	3
16	GTN223	Community Nutrition and Dietetics	4
17	GTB225	Epidemiology	3
18	GTD213	Principles of Medical Nutrition Therapy I	3
19	GTU302	Biostatistics	3
20	GTU304	Research Methodology	3
21	GTN304	Nutrition Research Project I	4
22	GTN311	Food Service Management	3
23	GTN321	Food Safety and Microbiology	3
24	GTN322	Nutrition Education and Promotion	3
25	GTN323	Nutrition and Genetics	2
26	GTD330	Dietetics Counselling and Communication	3
27	GTN410	Nutrition Research Project II	8
28	GTN411	Contemporary Issues in Nutrition	2
29	GTN412	Nutrition Policy and Food Security	2
30	GTN413	Nutrition Industrial Training	18
Total Credit Hours for Core Courses			**107**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	Credit Hour	Course	Credit Hour
University Courses	LKM400 Malay Language IV	2	LSP300 Academic English	2
			WUS101 Core Entrepreneurship	2
Core Courses	GTU103 Fundamental of Health Informatics	3	GTU105 Psychology and Behavioural Science	3
	GTU107 Human Anatomy and Physiology	4	GTN105 Principles of Food Preparation	3
	GTN104 Principles of Nutrition	3	GTN106 Food Analysis	3
	GTN107 Food Science	2	GTN108 Nutritional Immunology	2
			GTB225 Epidemiology	3
Elective Courses	Elective course	3		
Total		**17**		**18**

Component	Semester 3		Semester 4	
	Course	Credit Hour	Course	Credit Hour
University Courses	HFF225 Philosophy and Current Issues	2	HFE224 Appreciation of Ethics and Civilisations	2
	LSP402 Scientific and Medical English	2	Co-curriculum	1
Core Courses	GTU202 Health and Society	3	GTN221 Nutrition and Disease	3
	GTN208 Nutritional Biochemistry	3	GTN222 Assessment of Nutritional Status	3
	GTN215 Nutrition for Health and Fitness	3	GTN223 Community Nutrition and Dietetics	4
	GTN218 Nutrition in the Life Cycle	3	GTD213 Principles of Medical Nutrition Therapy I	3
	GTN219 Nutritional Anthropology	2		
Elective Courses			Elective course	3
Total		**18**		**19**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses	Co-curriculum	1		
Core Courses	GTU302 Biostatistics	3	GTU304 Research Methodology	3
	GTN321 Food Safety and Microbiology	3	GTN304 Nutrition Research Project I	4
	GTN322 Nutrition Education and Promotion	3	GTN311 Food Service Management	3
	GTN323 Nutrition and Genetics	2	GTD330 Dietetics Counselling and Communication	3
Elective Courses	Elective course	3	Elective course	2
			Elective course	3
Total		**15**		**18**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses	Co-curriculum	1		
Core Courses	GTN411 Contemporary Issues in Nutrition	2	GTN413 Nutrition Industrial Training	18
	GTN412 Nutrition Policy and Food Security	2		
	GTN410 Nutrition Research Project II	8		
Elective Courses				
Total		**13**		**18**

5.8 Bachelor of Science in Forensic Science (Honours)

Programme Aims

The Forensic Science programme is designed to provide the necessary theoretical knowledge, practical skills and meaningful field experience needed in forensic science via lectures, practical, field trips, fire scene simulation, forensic practicum training at various government agencies.

Programme Learning Outcome

Upon completion of the programme, graduates should be able to:

PLO1 : Apply theoretical knowledge in forensic science.
PLO2 : Perform practical, procedure and research related to forensic science competently.
PLO3 : Utilise skills to identify, interpret, evaluate, apply, adapt, and solve problems critically and scientifically in forensic science practices.
PLO4 : Utilise communication skills effectively in two languages in verbal and written forms with clients, peers, and the stakeholders within forensic science context.
PLO5 : Demonstrate interpersonal skills and social responsibilities, as well as teamwork with various related profession and communities involving different religions, culture, and environments.
PLO6 : Demonstrate high level of personal moral and values, as well as intact ethical and professionalism in adhering to ethical principles, code of conduct, law, and regulations in forensic science practices according to solid standard requirements and quality control.
PLO7 : Sensitive in coordinating daily activities of forensic science practice and utilise lifelong learning skills in academic and career development.
PLO8 : Apply managerial skills and entrepreneurial mind in everyday activities and planning by considering the actual scenario and from different perspectives.
PLO9 : Utilise knowledge and understanding in leadership for effective leadership in the effort to contribute to the advancement of forensic science.
PLO10 : Demonstrate information and communication technology (ICT) skills in utilising various digital applications involving technology and data to obtain, process, and support forensic science profession.
PLO11 : Demonstrate skills in utilising and interpreting numerical, visual, and graphical data to deliver information, findings, and outcome in the field of forensic science.

Curriculum Components

Core Courses	Elective Courses	University Courses	Total Credit Units
124	**6**	**15**	**145**

List of Core Courses

No.	Course Code	Course	Credit Hour
1	GTU105	Psychology and Behavioural Science	3
2	GTU106	Biochemistry and Basic Genetics	3
3	GTU107	Human Anatomy and Physiology	4
4	GTF110	Physical Chemistry	4
5	GTF112	Inorganic Chemistry	4
6	GTF113	Analytical Chemistry I	4
7	GTF114	Analytical Chemistry II	4
8	GTF115	Organic Chemistry I	4
9	GTF200	Criminalistics	3
10	GTF204	Forensic Psychology	3
11	GTF210	Material Chemistry	3
12	GTF214	Pollution and Environmental Chemistry	3
13	GTF216	Analytical Chemistry III	4
14	GTF217	Organic Chemistry II	4
15	GTF218	Organic Chemistry III	4
16	GTF219	Physical Evidence	3
17	GTF220	Forensic Serology	2
18	GTB204	Molecular Biology Techniques	3
19	GTU302	Biostatistics	3
20	GTU304	Research Methodology	3
21	GTF305	Forensic Toxicology and Chemistry of Drugs	4
22	GTF306	Fire Investigation	3
23	GTF309	Forensic DNA Analysis	3
24	GTF313	Food Chemistry	3
25	GTF315	Biological Evidence	3
26	GTF316	Natural Products Chemistry	3
27	GTF317	Introduction to Criminology	3
28	GTF318	Forensic Anthropology and Odontology	3
29	GTF319	Law, Evidence Presentation and Quality Assurance	2
30	GTF400	Forensic Medicine	3
31	GTF402	Ballistics and Explosives Chemistry	4
32	GTF407	Forensic Practicum	8
33	GTF408	Forensic Documents Examination	2
34	GTF409	Statistics for Forensic Science	2
35	GTF410	Forensic Digital Evidence	2
36	GTF411	Research Project	8
Total Credit Hours for Core Courses			**124**

Suggested Scheme of Study

Component	Semester 1		Semester 2	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	LKM400 Malay Language IV	2	WUS101 Core Entrepreneurship	2
	Co-curriculum	1	LSP300 Academic English	2
Core Courses	GTU106 Biochemistry and Basic Genetics	3	GTU105 Psychology and Behavioural Science	3
	GTU107 Human Anatomy and Physiology	4	GTF110 Physical Chemistry	4
	GTF112 Inorganic Chemistry	4	GTF114 Analytical Chemistry II	4
	GTF113 Analytical Chemistry I	4	GTF115 Organic Chemistry I	4
Elective Courses	Elective course	2	Elective course	2
Total		**20**		**21**

Component	Semester 3		Semester 4	
	Course	**Credit Hour**	**Course**	**Credit Hour**
University Courses	HFF225 Philosophy and Current Issues	2	Co-curriculum	1
	LSP402 Scientific and Medical English	2	HFE224 Appreciation of Ethics and Civilisations	2
Core Courses	GTF200 Criminalistics	3	GTF210 Material Chemistry	3
	GTF204 Forensic Psychology	3	GTF214 Pollution and Environmental Chemistry	3
	GTF216 Analytical Chemistry III	4	GTF218 Organic Chemistry III	4
	GTF217 Organic Chemistry II	4	GTF219 Physical Evidence	3
			GTF220 Forensic Serology	2
Elective Courses			Elective course	2
Total		**18**		**20**

Component	Semester 5		Semester 6	
	Course	Credit Hour	Course	Credit Hour
University Courses			Co-curriculum	1
Core Courses	GTB204 Molecular Biology Techniques	3	GTU302 Biostatistics	3
	GTF306 Fire Investigation	3	GTU304 Research Methodology	3
	GTF315 Biological Evidence	3	GTF305 Forensic Toxicology and Chemistry of Drugs	4
	GTF316 Natural Products Chemistry	3	GTF309 Forensic DNA Analysis	3
	GTF317 Introduction to Criminology	3	GTF313 Food Chemistry	3
	GTF318 Forensic Anthropology and Odontology	3	GTF319 Law, Evidence Presentation and Quality Assurance	2
Elective Courses				
Total		**18**		**19**

Component	Semester 7		Semester 8	
	Course	Credit Hour	Course	Credit Hour
University Courses				
Core Courses	GTF400 Forensic Medicine	3	GTF402 Ballistics and Explosives Chemistry	4
	GTF409 Statistics for Forensic Science	2	GTF407 Forensic Practicum	8
	GTF410 Forensic Digital Evidence	2	GTF408 Forensic Documents Examination	2
	GTF411 Research Project	8		
Elective Courses				
Total		**15**		**14**

6.0 COURSE SYNOPSIS

6.1 FOUNDATION COURSES

GTU101 Structure and Function of Human I

This course introduces students to basic anatomy and physiology of humans. It covers the anatomical and physiological aspects of the various human organ systems, which includes cell and tissue, skeletal system, muscular system, cardiovascular system, nervous system and special senses such as vision, hearing, smell and taste. It also includes basic teaching and dynamic transfer of knowledge that emphasis on human health. The course will be conducted via face to face (F2F) and online lectures, practicals and discussion. Students' knowledge and understanding will be assessed through tests and final exam, practical skill will be assessed via practical test/OSPE, while their cognitive skill will be assessed through authentic assignments on application of anatomy and physiology knowledge.

List of text/reference books:

1. G.J. Tortora and B.H. Derrickson, Principles of Anatomy & Physiology, (16th Ed.). New York: John Wiley & Sons Inc, 2020.
2. E.N. Marieb and K.N. Hoehn, Human Anatomy & Physiology, (11th Ed.). San Francisco: Benjamin Cummings Publishing Co, 2018.
3. K.E. Barrett, S.M. Barman, S. Boitano and H.L. Brooks, Ganong's Review of Medical Physiology, (26th Ed.). United States: McGraw Hill Lange, 2019.
4. Online Examination of Human Anatomy and Physiology (https://www.getbodysmart.com)

GTU103 Fundamental of Health Informatics

The course introduces students to basic knowledge and application of information & communication technology (ICT) in health domains. It covers fundamentals of computer system, communication, data management and processing, health informatics and ICT issues. The course also trains students to enhance their personal, digital and numeracy skills. The course will be taught using online lecture, guided practical video and group discussions via multiple online learning and meeting platforms. Students will be assessed through tests, performance-based project and hands-on test. Integrating ICT knowledge and data analytical tools in creative and innovative projects will transform student ICT know-how for a better quality of life and their career development in future.

List of text/reference books:

1. Laudon K., Laudon J., Essentials of Management Information Systems, 10th Edition., Prentice Hall, 2012.
2. Ralph M. S. and George W. R., Fundamentals of Information Systems, 9th Edition, Cengage Learning, 2018.
3. Ramona N. and Nancy S., Health Informatics, 3rd Edition, Elsevier, 2020.
4. Joos I., Nelson R. and Smith M. J., Introduction to Computers for Healthcare Professionals (5th Ed.), Jones and Bartlett Publishers, 2010.

5. Ralph M. S. and George W. R. Fundamentals of Information Systems, 8th Edition, Cengage Learning, 2016.
6. Shelly, G. B., & Vermaat, M. E. Discovering Computers, Complete: Your Interactive Guide to the Digital World: Cengage Learning, 2011.

GTU104 Structure and Function of Human II

This course introduces students to basic anatomy and physiology of humans. It covers anatomical and physiological of the respiratory, renal, gastrointestinal, endocrine and reproductive systems as well as the skin. It also includes basic teaching and dynamic transfer of knowledge that emphasis on human health. The course is conducted via lecture, practical and discussions. Students' knowledge will be assessed through tests, practical tests/OSPE and final exam, while their thinking skill will be assessed through assignments.

List of text/reference books:

1. Tortora, G.J. and Derrickson, B.H., Principles of Anatomy and Physiology (15th Ed.). New York: John Wiley & Sons Inc, 2017.
2. Marieb, E.N. and Hoehn K.N., Human Anatomy & Physiology (11th Ed.). San Francisco: Benjamin Cummings Publishing Co, 2018.
3. Young, B. and Heath, J.W., Wheater's Functional Histology: A Text and Color Atlas (6th Ed.). Edinburgh: Churchill Livingstone, 2013.
4. Barrett, K.E., Barman, S.M., Boitano, S. and Brooks, H.L. Ganong's Review of Medical Physiology (26th Ed.). United States: McGraw Hill Lange, 2019.

GTU105 Psychology and Behavioural Science

This course introduces students to the basic theories and principles in the field of psychology through cognitive, biology, behavior, humanistic and psychoanalytic approaches. Knowledge concerning intelligence, memory, emotion, personality dan stress are discussed. This course will be taught via lecture and discussion. Students will be assessed through test, assignments and final examination.

List of text/reference books:

1. Feldman, R.S., Understanding Psychology (14th Ed.). McGraw-Hill, 2019.
2. Rathus, S.A., Psych: Introductory Psychology. Cengage, 2020.
3. Coon D., Introduction to Psychology (10th Ed.). San Francisco: Wadsworth, 2015.

GTU106 Biochemistry and Basic Genetics

This course introduces students to basic principles in biochemistry and genetics which represent the fundamentals in a subject of virtually all the biological systems found in our biodiversity. It covers the structures and functions of cellular organelles and biomolecules, and their chemical bonds. The basic genetics introduces the structures and functions of DNA and RNA as the genetic materials, replication, transcription, translation, Mendel' Law and other traits of inheritance as well as population genetics. This course is conducted through face-to-face and online lectures, tutorials, practicals and assignment. The students are evaluated through tests, assignment, practical reports and final examination.

List of text/reference books:

1. Snape, A, Papachristodoulou, D, Elliott, WH, and Elliott, DC, Biochemistry and Molecular Biology, 6th edition. Oxford University Press, UK, 2018.
2. Mckee, T and McKee, JR, Biochemistry: the molecular basis of life, 7th edition. Oxford University Press, USA, 2019.
3. Rodwell, V, Bender, DA, Botham, KM, Kennelly, PJ, and Weil, PA, Harper's Illustrated Biochemistry, 31st edition McGraw-Hill Education / Medical, 2018.

GTU107 Human Anatomy and Physiology

This course introduces students to the human anatomy and physiology in health and medical field. It covers the anatomy and physiology of human systems and its functioning aimed at ensuring healthy lives and promote healthy well-being. The course will use student centered teaching and learning approaches: lectures, tutorials, learning visits and e-learning. Students will be assessed through assignments, presentations and final examination.

List of text/reference books:

1. Peate I and Nair M., Fundamentals of Anatomy and Physiology For Nursing and Healthcare Students (2nd Ed.). Wiley Blackwell, 2016.
2. Amerman E.C., Human Anatomy & Physiology, Pearson, 2016.
3. Waugh A. and Grant A., Ross and Wilson Anatomy and Physiology in Health and Illness, (11th Ed.). Churshill Livingstone Elsevier, 2010.

GTU202 Health and Society

Employing the Social Science perspective, this course introduces to students' basic concepts of health and illness with emphasis on the importance of the social determinants of health such as culture, health literacy, social class, poverty, family, gender, health system and how these factors influence disease prevention and treatment. The discussions of these social determinants will be located in the context of social wellbeing and sustainable development in the society. This course will be delivered via lectures, tutorials and discussions. Students will be assessed through assignment, presentation, discussion, and final examination

List of text/reference books:

1. Weiss, Gregory L. and Lynne E. Lonnquist, The Sociology of Health, Healing, and Illness (8th. Ed.) Pearson Education Inc. New Jersey, 2016.
2. White K., Introduction to the Sociology of Health and Ilness (3rd Revised Edition). London: Sage Publication Ltd, 2017.
3. Scrambler, G., Sociology as Applied to Medicine (6th. Ed.). London, UK :Saunders Elsevier, 2008.

GTU301 Ethics and Law for Healthcare Professionals

This course emphasizes the relationship of morality, ethics and law. Students will be exposed to the importance of ethics in everyday life as well as in professional infrastructure. Basic concepts of morality, human rights, confidentiality, consent and the relationship between professional experts and clients will also be discussed in detail. Students will be exposed to the theory of ethics as well as examples of cases in order to

understand the subject further. Students will be assessed through quiz, essay writing, presentation and final examination.

List of text/reference books:

1. Beauchamp, T.L., Walters, L., Kahn, J. P., & Mastroianni, A. C. Contemporary Issues in Bioethics (9th Ed) Wadsworth: USA, 2020.
2. Eckenwiler, L.A., & Cohn, F. G. The Ethics of Bioethics – Mapping the Moral Landscape, The John, Hopkins University press; 2007.
3. Vaughn, L. Bioethics: Principle, Issues, and Cases (4th ed). Oxford University Press, 2019.

GTU302 Biostatistics

This course introduces to students the basic knowledge of biostatistics in medicine and health fields. It also covers the fundamental application of statistical tools in health data collection, qualitative data analysis, quantitative data analysis and interpretation of results in light of enhancing digital and numeracy skills among the students. The course will be conducted through face to face and online lectures and other student centered learning activities, based on the simulated data related with current health issues in Malaysia and around the globe. This could enhance students' awareness on the importance of health and maintain sustainability of keeping updated with health issues by utilising correct data analysis and interpretation. The students will be assessed through continuous assessments, assignments on solving health related problem, report, discussion based on research articles, and final examination.

List of text/reference books:

1. Wan Muhammad Amir., Basaruddin Ahmad, Sarimah Abdullah, Nor Azleda Aleng, Statistical Analysis using SPSS for health sciences, Universiti Sains Malaysia, 2017.
2. Daniel, W.W., Cross, C.L. Biostatistics: A Foundation for Analysis in the Health Sciences (11th Ed.), John Wiley & Sons, 2018.
3. Rosner, B., Fundamental of Biostatistics (8^{th} Ed), Cengage learning, 2016.
4. Field, A., Discovering statistic using IBM SPSS statistics, (5^{th} Ed), SAGE Edge, 2018.

GTU304 Research Methodology

This course introduces students to various important concepts and aspects in research methodology in health sciences. It encompasses the characteristics, types and approaches in research usually employed by researchers. Students will learn how to identify problems to study, develop hypotheses and research questions, specify variables and check for the validity and reliability of studies as well as to design research proposals. Students will be exposed to broad range of designs used in research from laboratory and field experiments, surveys, focus groups and in-depth interviewing. The process of scientific enquiry, including critical evaluation of research proposal, data analysis and research report writing will be given greater emphasis. Students will be assessed through research proposal preparation, presentation, test, assignment and final examination.

List of text/reference books:

1. Ranjit Kumar, Research Methodology: A Step By Step Guide For Beginner (5th Ed). London. SAGE Publications Ltd, 2019.
2. Liamputtong P., Research Methods in Health: Foundations for Evidence-Based Practive (3rd ed), Australia. Oxford University Press, 2017.
3. Holloway, I., Qualitative Research in Nursing and Healthcare. West Sussex. Wiley Blackwell, 2017.

6.2 CORE COURSES LEVEL 1

GTA106 Anatomy and Physiology for Hearing and Speech I

This course introduces students to the terminologies related to body orientation, cell structures, primary tissues and organisation of the human organ systems. It also covers the applied anatomy and physiology of the respiratory, phonatory, articulation and swallowing systems which involved in the speech mechanism. This course will be conducted via lectures, tutorials, practical sessions and problem based learning (PBL). The students will be assessed through test, quiz, practical examination (OSPE), presentation and final examination.

List of text/reference books:

1. Fuller D.R., Pimentel J.T. & Peregoy B.M., Applied Anatomy & Physiology for Speech-Language Pathology & Audiology. Lippincott Williams & Wilkins, 2012.
2. Seikel J.A., King D.W. & Drumright D.G., Anatomy and Physiology for Speech, Language, and Hearing (4th Ed.), Delmar Cengage Learning, 2010.
3. Booth K.A. & Wyman T.D., Anatomy, Physiology, and Pathophysiology for Allied Health (2nd Ed.), McGraw-Hill, 2009.

GTA107 Psychoacoustics

This course introduces students to important elements of psychoacoustics such as auditory response area, concept of hearing threshold, concept of loudness, pitch, masking, temporal and space perception. It also covers the effects of auditory disorders on the psychoacoustics functions. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Johnson, K., Acoustic and Auditory Phonetics (3rd Ed.): Wiley-Blackwell, 2011.
2. Warren, R. M., Auditory Perception: An Analysis and Synthesis (3rd Ed.): Cambridge University Press, 2008.
3. Howard, D. & Angus, J., Acoustics and Psychoacoustics (4th Ed.), Focal Press, 2009.
4. Gelfand, S. A., Hearing: An Introduction to Psychological and Physiological Acoustics (5th Ed.): Informa Healthcare, 2009.
5. Schnupp, J., Nelken, I., & King, A., Auditory Neuroscience: Making Sense of Sound: The MIT Press, 2012.

GTA109 Anatomy and Physiology for Hearing and Speech II

This course introduces students to important elements of psychoacoustics such as auditory response area, concept of hearing threshold, concept of loudness, pitch, masking, temporal and space perception. It also covers the effects of auditory disorders on the psychoacoustics functions. This course will be conducted via lectures, tutorials and practical sessions. The students will be assessed through test, quiz, practical examination (OSPE), presentation and final examination.

List of text/reference books:

1. Fuller D.R., Pimentel J.T. & Peregoy B.M., Applied Anatomy & Physiology for Speech-Language Pathology & Audiology. Lippincott Williams & Wilkins, 2012
2. Seikel J.A., King D.W. & Drumright D.G., Anatomy and Physiology for Speech, Language, and Hearing (4th Ed), Delmar Cengage Learning, 2010.
3. Booth K.A. & Wyman T.D., Anatomy, Physiology, and Pathophysiology for Allied Health (2nd Ed.). McGraw-Hill, 2009.
4. Clark, W. F., & Ohlemiller, K., Anatomy and Physiology of Hearing for Audiologist. Singular Publishing Group, 2004.
5. Linda M Luxon, Textbook of audiological medicine: Clinical aspects of Hearing and Balance, 2003.

GTA110 Basic Audiology Techniques

This course introduces students to fundamental sound characteristics and basic components of audiological instruments. Students will also learn the basic of audiological diagnostic procedures such as history taking, otoscopic examination, pure tone audiometry, tympanometry and speech audiometry. This course also covers introduction to the audiology diagnostic and auditory system disorders. This course will be conducted via lectures, tutorials, practical sessions and case study. Students will be assessed through test, assignment, practical report and final examination.

List of text/reference books:

1. Gelfand, S. A., Essentials of Audiology, United States of America: Thieme, 2009.
2. Katz, J., Medwetsky, L., Burkard, R., & Hood, L. (Eds.), Handbook of Clinical Audiology, United States of America: Lippincott Williams & Wilkins, 2009.
3. Kramer, S., & Guthrie, L., Audiology Workbook, San Diego: Plural Publishing Inc., 2008.
4. Roeser, R. J., Valente, M., & Hosford-Dunn, H., Audiology Diagnosis, United States of America: Thieme, 2007.
5. Hunter, L., & Shahnaz, N., Acoustic Immittance Measures Basic and Advanced Practice, San Diego: Plural Publishing Inc., 2012.

GTB105 Human Biochemistry

This course introduces students to the aspects of human biochemistry. It covers fundamental knowledge and principles in protein, carbohydrate and lipid metabolism, hormones and their action mechanisms, water and electrolyte balance, acid and base balance, types, functions and mechanisms of macro and micro minerals. The elements of occupational health and safety of working in a laboratory are integrated into the course during practical sessions in which students are trained for proper way to use and maintain laboratory equipment such as micropipette, centrifuge, spectrophotometer and other common laboratory analytical equipment. This course also emphasizes on critical thinking and skills to seek, adapt and provide solutions to address challenges in medical laboratory practices. It covers the element for SDG 3 that is to ensure healthy life. This course is conducted through F2F and online lectures, practical classes, discussion and tutorials. The students are evaluated through tests, assignment, laboratory reports and final examination.

List of text/reference books:

1. Handouts and power point slides.
2. Snape, A, Papachristodoulou, D, Elliott, WH, and Elliott, DC, Biochemistry and Molecular Biology, 6th edition. Oxford University Press, UK, 2018.
3. Mckee, T and McKee, JR, Biochemistry: the molecular basis of life, 7th edition. Oxford University Press, USA, 2019.
4. Rodwell, V, Bender, DA, Botham, KM, Kennelly, PJ, and Weil, PA, Harper's Illustrated Biochemistry, 31st edition McGraw-Hill Education / Medical, 2018.

GTB106 Laboratory Science

This course introduces aspect of laboratory safety, management and maintenance of laboratory equipment which covers professional attitude and ethics, safety methods of disposal, storage and maintenance of dangerous chemicals. Students will also be trained in using and maintenance of laboratory equipment. This course is conducted through lectures, tutorials and practical. The students are evaluated through tests, practical tests, laboratory reports and final examination.

List of text/reference books:

1. Related journal articles.
2. Mary Louise Turgeon, Linné & Ringsrud's. Clinical Laboratory Science: Concepts, Procedures and Clinical Applications, Seventh edition, St. Louis, Missouri : Elsevier Inc., 2016.
3. Barbara H. Estridge and Anna P. Reynolds. Basic Clinical Laboratory Techniques, 6th Edition, Clifton Park, NY: Delmar Cengage Learning, 2012.
4. Mary Louise Turgeon, Clinical Laboratory Science: the Basics and Routine Techniques, 6th Edition, Maryland Heights: Elsevier Mosby, 2012.

GTB110 Basic Microbiology

This course introduces students to fundamental principles in microbiology which covers bacteria, viruses, fungus and parasites. It covers microbial diversity, genetic, physiology, biochemistry, reproduction, host-microorganism interaction and basic clinical microbiology which is important in the management of infection control in hospital setting. The course will be conducted via integrative teaching and learning approach, which comprised of F2F and online lectures and seminar, as well as practical sessions. Students' knowledge will be assessed through tests and final examination, while their soft skills such as communication skill and team work will be assessed through presentations.

List of text/reference books:

1. Black, J.G., Microbiology, Principles and Explorations. 10th ed. John Wiley Publication, 2017.
2. Prescott, L.M., Harley, J.P. and Klein, D.A., Microbiology. 7th ed. McGraw Hill, USA, 2008.
3. Nester, E.W., Anderson, D.G., Roberts, C.E. and Nester, M.T., Microbiology, A Human Perspective, 9th ed. McGraw Hill, USA, 2019.
4. Willey, J.M., Sherwood, L.M. and Woolverton, C.J., Prescott's Microbiology. 10th ed. McGraw Hill, USA, 2017.

5. Brooks, G.F., Carroll, K.C., Butel, J.S. and Morse, S.A., Jawetz, Melnick and Adelberg's Medical Microbiology, 28th ed. Connecticut:Prentice-Hall International Inc., 2019.

GTF110 Physical Chemistry

This course introduces students to the basic theories and principles in physical chemistry, including gas and gas kinetic theory, molecule collision, and gas transportation phenomenon. This course also introduces chemical kinetics and thermodynamics including efficiency of heat engine and renewable energy. This course will be taught via lecture, tutorials, and discussion. Students will be assessed through test, discussion, assignments, and final examination.

List of text/reference books:

1. P. W. Atkins, J. De Paula and J. Keeler. Atkins' Physical Chemistry (11th Edition.). Oxford University Press. 2018.
2. C. Vallance. Introduction to Chemical Kinetic. Morgan & Claypool. 2017.
3. R.B. Bird and W.E. Stewart. Introductory to Transport Phenomena. Wiley. 2014.

GTF112 Inorganic Chemistry

This course introduces students to the basic theories and principles in inorganic chemistry, including stoichiometry, periodic table, atomic electron, chemical bonds, structure, properties, and application of solids, as well as nuclear chemistry. This course also integrates the impact of toxic elements towards nature and ways to mitigate problems. This course will be taught via lecture, tutorial and practical. Students will be assessed through test, presentation, practical reports, assignments, and final examination.

List of text/reference books:

1. C.E. Housecroft and A.G. Sharpe, Inorganic Chemistry, (5th Edition). Pearson Education Limited. 2018.
2. J.P. Gardner. Understanding the Periodic Table. Mason Crest Publishers. 2017.
3. J.H. Nelson and K.C. Kemp. Laboratory Experiments (14th Edition). Pearson education, Inc. 2019.

GTF113 Analytical Chemistry I

This course introduces students to the principles and techniques in analytical chemistry, including concentration expression in solutions and water, chemical equilibrium, gravimetry analysis, acid-base equilibrium and titration, precipitation titration as well as complexometry titration. This course will be taught via lecture, tutorial and practical. Students will be assessed through test, assignment, practical reports, quiz, and final examination.

List of text/reference books:

1. D.A. Skoog, D. M. West, F. J. Holler and S. R. Crouch, Fundamentals of Analytical Chemistry (10th Ed.). Cengage Learning, Inc., 2021.
2. G.D. Christian, P.K. Dasgupta and K.A. Schug. Analytical Chemistry (7th Edition). Wiley, 2013.
3. T.E. Brown, J.H Nelson & K.C. Kemp. Laboratory experiments (14th Edition). Pearson Education, Inc., 2019.

GTF114 Analytical Chemistry II

This course introduces students to the principles and techniques in analytical chemistry, including electrochemistry, potentiometry, polarography, voltammetry, separation techniques, gas chromatography and high-performance liquid chromatography in health, forensic and industrial testing, including statistical principal in analytical chemistry. This course will be taught via lecture, discussion, PBL and practical. Students will be assessed through test, assignment, practical reports, quiz, and final examination.

List of text/reference books:

1. D.A. Skoog, F.J. Holler and S.R. Crouch. Principle of Instrumental Analysis (10th Edition). Cengage Learning, 2021.
2. M.F. Vitha. Chromatography: Principles and Instrumentation, John Wiley and Sons, 2017.
3. W.R. Browne. Electrochemistry. Oxford University Press, 2018.

GTF115 Organic Chemistry I

This course introduces students to the fundamental concepts of organic chemistry, characteristics and chemical reactions for organic compounds including alkane, alkene, alkene, and alkyl halide. This course also discusses renewable energy source to replace hydrocarbon. This course will be taught via lecture, tutorial and practical. Students will be assessed through tests, assignment, practical reports, project paper and final examination.

List of text/reference books:

1. L.G. Wade. Organic Chemistry (8th Edition), Pearson Prentice Hall, 2013.
2. T.W.G. Solomons, C.B. Fryhle and S.A Snyder. Organic Chemistry (12th Edition). Wiley, 2016.
3. J.G Smith and J.G. Smith. Organic Chemistry (6th Edition). McGraw Hill, 2020.

GTK101 Introduction to Environmental and Occupational Health

This course enlightens the area of environmental health, occupational health, environmental safety, and occupational safety. This course will discuss the importance of responsibility and civil liberties of an individual towards the environment. Students are also explained the concepts of environmental health, occupational health, environmental safety and occupational safety. The current issue of natural disasters and the importance of preserving environmental and occupational health are also highlighted.

List of text/reference books:

1. OSHAcademy. Introduction to Occupational, Safety and Health. Beaverton. Oregon. 2019.
2. Anne Marie Zimeri. Introduction to Environmental Health: A Global Perspective (2nd Ed.). Congnella Academic Publishing. San Diego. 2017.
3. Friss, R.L. Essentials of Environmental Health (2nd edition). Jones and Bartlett. Sudbury, Massachusetts. 2012.
4. Sue Reed, Dino Pisaniello & Geza BenkePrinciples of Occupational Health and Hygiene: An Introduction. Australian Institute of Occupational Hygienists. 2019.

5. Pedro M. ArezesJoão S. BaptistaMónica P. BarrosoPaula CarneiroPatrício CordeiroNélson CostaRui B. MeloA. Sérgio MiguelGonçalo Perestrelo. Occupational and Environmental Safety and Health. SpringerLink. Switzerland. 2019.
6. Chandrappa, Ramesha, Das & Diganta B. Environmental Health: Theory and Practice. Springer International Publishing. Switzerland. 2021.

GTK105 Occupational Safety

This course introduces student to various safety hazards at workplaces. Measures required to minimise risks of work injury due to these hazards will be discussed. Content of this course is streamlined with content of module IV of the Safety and Health Officer course as regulated by the Department of Occupational Safety and Health (DOSH). This course will be conducted in the form of lectures, tutorials and field trips. Introduction to hazards, risk assessment and improvement measures are important basic concepts need to be understood by students in the context of job safety that takes into account the safety of employees, visitors and people who work in or the working environment. Aspects of Sustainability also highlighted through component of "Death Rate, Transport system and Human Right". Students will be tested with tests, quizzes, final exams, assignments and presentations.

List of text/reference books:

1. Akta Keselamatan dan Kesihatan Pekerjaan 1994 dan Peraturan-Peraturan. Undang-Undang Malaysia, ILBS, 2005.
2. Akta Kilang dan Jentera 1967 dan Peraturan-Peraturan. Undang-undang Malaysia, ILBS, 2005.
3. Lingard, H. & Rowlinson, S.M. Occupational Health and Safety in Construction Project Management, Taylor & Francis, 2005.
4. Manuele, F.A. On the Practice of Safety (3rd Ed). Wiley-IEEE, 2003.
5. Reese, C.D. Occupational Safety and Health Management: A Practical Approach, CRC Press, 2003.
6. Geoff Wells. Hazard Identification and Risk Assessment. Institution of Chemical Engineers. 1996.

GTK106 Occupational Health

This course introduces students to the information of occupational health. Information about types of hazard, which can cause danger and affect health, screening method, assessment at workplace, monitoring of health risk and management will be introduced. Course content is streamlined with content of module III of the Safety and Health Officer course as regulated by the Department of Occupational Safety and Health (DOSH), Ministry of Human Resources. This course will be conducted via lectures and fieldwork. Students will be assessed through test, practical report, report, assignment, seminar and final examination.

List of text/reference books:

1. Garis Panduan dan Tatamalan Industri yang dikeluarkan oleh Jabatan Keselamatan dan Kesihatan Malaysia.Website JKKP Malaysia.
2. Sue, R. Dino P., Geza, B. Principles of Occupational Health and Hygiene. 3rd edition. Allen & Unwin. 2019.

3. David L.G., Occupational Safety and Health for Tenchnologies, Engineers and Managers. 9th edition. Pearson 2019.
4. Tony, B. Health and Safety: Risk Management. Routlegde. 2015.
5. Robert, H.F. Occupational Health and Safety for the 21st century. 1st edition. Jones & Bartlett Learning. 2015.
6. Charles, D.R.Occupational Health and Safety Management: A Practical Approach. 3rd edition. CRC Press. 2019.

GTK141 Chemistry

This course introduces students to various topics on basic knowledge of chemistry including atom, molecules, ions, gases theory, reactions in aqueous solutions, chemical kinetics, entropy, free energy, acid base equilibrium, periodic table, nuclear chemistry, electrochemistry and industrial chemistry. This basic chemistry will help students to better understand a process in the industry and prevent an accident from happening. The course will be conducted via lectures, tutorials and student centred learning activities. Students will be assessed via test, assignments and final examination.

List of text/reference books:

1. Winterton, N. Chemistry for Sustainable Technologies 2nd Edition. Royal Society of Chemistry, 2021.
2. Chang R. Chemistry (10th Ed.). Pearson Education, 2015.
3. Chang R. General Chemistry: The Essential Concept (4th Ed.). McGraw Hill, 2013.
4. Baner R., Birk J. and Mark P.S. A Conceptual Introduction to Chemistry (2nd Ed.). McGraw Hill, 2010.

GTK143 Waste Management

This course explains about waste classification and its characteristics as well as explains the legal requirements in managing solid, schedule, and radioactive wastes. Analytical techniques, methods of handling, labelling, packaging, storage, transportation, and proper disposal of waste are also discussed. This course will be delivered through lectures and other face-to-face learning. Students will be assessed through assignments, quizzes, tests, presentations, and final examinations.

List of text/reference books:

1. Akta Kualiti Alam Sekitar 2974. International Law Books Series. 2007.
2. Hester, R. E. & Harisson, R. M. Environmental Health Impact of Solid Waste Management Activities. Cambridge: Royal Society of Chemistry. 2002.
3. Blackman, W. C. Basic Hazardous Waste Management (3rd edition). CRC Press. 2001.
4. Mostafa Saleh, H. E. & Abdel Rahman, R.O. Management of Hazardous Wastes. InTech. 2016.
5. Pariatamby, A. & Tanaka, M. Municipal Solid Waste Management in Asia and the Pacific Islands: Challenges and Strategic Solutions. Springer-Verlag Singapore. 2014.
6. Pichtel, J. Waste Management Practices: Municipal, Hazardous, and Industrial. CRC Press. 2005.

GTN104 Principles of Nutrition
This course introduces students to the structure and role of major macro and micro-nutrients in human health. It also covers function, requirement, effect of deficiency/excess and source of each nutrients. This course will be taught via lectures. Students will be assessed through test, report, assignment and final exam.

List of text/reference books:

1. McGuire M & Beerman K. Nutritional Sciences: From Fundamentals to Food, 3rd Ed.. Thomson Woodsworth, 2012.
2. Gibney M, Vorster H & Kok F. Introduction to Human Nutrition, 2st Ed.. Blackwell Sciences Limited, 2009.
3. Mahan LK & Arlin M, Krause's Food, Nutrition and Diet Therapy, Philadelphia : Elsevier Science, 13th Ed., 2012.

GTN105 Principles of Food Preparation
This course will introduce students to basic cooking of various foods such as meat, chicken, fish, vegetables, cereals and bakery products. It covers new technique in food preparation such as microwave oven. The aspects of cleanliness, sanitation and safeties during food preparation are also included. This course will be taught via lecture, practical and discussion session. Students will be assessed through test, practical report, presentation, assignment and final examination.

List of text/reference books:

1. Amy Brown, Understanding Food: Principles & Preparation, 6th Ed: Thomson Wardsworth Pub., 2019.
2. Wayne Gisslen and J. Gerard Smith, Professional Cooking, 7th Ed: John Wiley & Sons Inc, New Jersey, 2016.

GTN106 Food Analysis
This course introduces students to sampling methods, sample preparation prior to analysis and principle involves in determining nutrient content in foods. Students will perform various tasks such as proximate, calorie and fibre analysis in foods. This course will be taught via lectures, blended online learning and practical sessions. Students will be assessed through test, work quality, practical reports and final exam.

List of text/reference books:

1. Susan Neilsen, Food Analysis, 5th Ed. Springer, New York, USA, 2017.
2. Pomeranz Yeshajahu & Clifton E. Meloan (2006). (Ebook, 2013). Food Analysis: Theory and practice. 3rd Ed. Aspen Publishers, New York, USA.

GTN107 Food Science
This course will introduce students to fundamental of food science and various physicochemical properties in food. This course will be taught via lecture and discussion sessions. Students will be assessed through test, assignment and final exam.

List of text/reference books:

1. Amy Brown, Understanding Food: Principles & Preparation. 6th Ed., Thomson Wardsworth Pub, 2019.
2. Vaclavik, Vicky and Christian, Elizabeth E., Essentials of Food Science, 4th Ed, Spronger, New York, 2014.
3. Robert L. Shewfelt, Alicia Orta-Ramirez and Andrew D. Clarke. 2016. 2nd Ed., CRC Press Taylor and Francis Group, Boca Raton

GTN108 Nutritional Immunology

This course introduces students to the fundamental concepts of nutritional immunology, in which the effects of diet and specific nutrients of interest that includes the roles of macronutrients, micronutrients and the gut microbiota on human immune system will be discussed. This course will be taught via lecture. Students will be assessed through tests, assignment, quiz and final examination.

List of text/reference books:

1. Maggini S., Pierre A, Calder P.C. Immune function and micronutrient requirements change over the life course. Nutrients 2018; 10:1531.
2. Lanham-New S.A., MacDonald I.A, Roche H.M. Nutrition and Metabolism (2nd Eds), Wiley-Blackwell Publisher 2010.
3. Calder P.C., Jackson A.A. Undernutrition, infection and immune function. Nutr Res Rev 2000; 13: 3-29.
4. Hughes D.A., Darlington, L.G., Bendich A. Diet and Human Immune Function (Eds), Springer Publisher, 2004.

GTS101 Introduction to Exercise and Sports Science

This course introduces students to the general knowledge in exercise and sports science field. It also introduces students to the application of exercise and sport science in facilitating athletes and non-athletes in improving fitness and health of individual. This course will be taught via lectures and practical. Students will be assessed through test, assignment, presentation and final examination.

List of text/reference books:

1. Griffin, M., Watkins P., Wilkinson, N. Sport and Exercise Science: An Introduction. London & New York: Routledge, Taylor & Francis Group, 2015.
2. Lumpkin, A., Introduction to Physical Education, Exercise Science, and Sport.10th edition. New York: McGraw-Hill Education, 2016.
3. Potteiger, J., ACSM's Introduction to Exercise Science. 3rd edition. Philadelphia, PA: LWW, 2017.

GTS102 Sociology and Philosophy of Sports

This course introduces students to the basic sociological and philosophical concepts related to sport. It also discusses the sociological and philosophical implications of ancient and modern developments which influence human health. This course will be taught through lectures and discussions. Students will be assessed through test, assignments and final exam.

List of text/reference books:

1. Coakley, J, Sports in Society: Issues and Controversies. 11th edition. McGraw-Hill, 2015.
2. Barry D McPherson, James E Curtis, & John W Loy., The Social Significance of Sport: An introduction to the Sociology of Sport. Human Kinetics Publishers, 1989.

GTS105 Sports Psychology

This course introduces students to the theories and concept in sports psychology field. This course also covers the skills and strategy to enhance mental and emotional ability and health of an athlete. This course will be taught via lectures and practicals. Students will be assessed through test, assignment, practical report, presentation and final exam.

List of text/reference books:

1. Anderson, M.B. (Ed.), Sport Psychology in Practice. Champaign, IL: Human Kinetics, 2005.
3. Anshel, M.H., Sport Psychology: From Theory to Practice. US: Benjamin Cummings, 2003.
4. Beauchamp, M. R. & Eys, M. A., Group Dynamics in Exercise and Sport Psychology. Hoboken: Taylor and Francis, 2014.
5. Cox, R.H., Sport Psychology: Concepts and Applications. 7th edition. New York, 2012.

GTS107 Physiology and Anatomy of Movement

This course introduces students to basic anatomy and physiology. It covers the topics on skeletal muscle, nervous system, gastrointestinal system, endocrine system, reproductive system, cardiovascular system, respiratory system, and renal system. This course will also cover health aspects of each systems. This course will be conducted via lectures, practical and discussions. The students will be assessed through test, practical tests, practical report, and final examination.

List of text/reference books:

1. Netter, F. H., Atlas of Human Anatomy. 6th edition. CIBA-GEIGY, 2014.
2. Guyton, A.C. & Hall, I.E., Textbook of Medical Physiology. 13th edition. Elsevier: Saunders, 2016.
3. Standring, S., Gray's Anatomy - The Anatomical Basis of Clinical Practice. 41st edition. Churchill Livingstone, 2015.
4. Fox, S., Human Physiology. 14th edition. McGraw-Hill Science, 2015.

GTX104 Introduction to Medical Radiation

This course introduces fundamental of ionising and non-ionising radiations and its application in medicine. Modern atomic concept, radioactivity, radiation classification, radiation source, radiation production, radiation properties and its effect on biological tissues will be discussed. Innovation and safety of ionising and non-ionising radiations for diagnostic and therapy also discussed.

List of text/reference books:

1. Ervin B. Podgoršak, Radiation Physics for Medical Physicists, 3rd edition, Springer, 2016.
2. Maqbool, M, An Introduction to Medical Physics, Springer, 2017.
3. Robert Splinter, Handbook of Physics in Medicine and Biology, CRC Press, 2010.

GTX105 Medical Radiation Physics I

This course combines topics in physics education that are relevant to medical radiation. Students will also be exposed briefly to the recent advancements related to the topics. The course will be conducted via lectures, tutorials, and discussions. Students will be assessed through quiz, test, assignment, presentation, and final examination.

List of text/reference books:

1. Jearl Walker, Halliday and Resnick, Fundamental of Physics, 10th edition, Wiley, 2014.
2. Frederick Bueche and Eugene Hecht, Schaum's Outline of College Physics, 11th Edition, McGrawHill Education , 2012.
3. Martin Zinke-Almang, Physics for Life Sciences, Nelson Education Ltd., 2009.

GTX106 Mathematics of Radiation Science I

This course discusses advanced mathematics and calculus. It focuses on functions and graphs, calculus, differentiation, differentiation techniques and applications, integration, integration techniques and applications, vector, matrices, linear equation system, analytical geometry and complex numbers. This course will be conducted via F2F and online lectures. Students will be assessed through quiz, test, assignments and final examination.

List of text/reference books:

1. Lay, D. C., Linear Algebra and Its Applications, 4th Ed. Pearson Higher Education, 2011.
2. Larson, R., Hostetler, R. and Edwards, B. H., Calculus with Analytic Geometry: Multivariable Calculus, (7th Ed.), Houghton Mifflin Company College Division, 2002.
3. Anton, H., Calculus, Combined, Student Resource, (10th Ed.), John Wiley and Sons, 2012.
4. Woods, F. S., Bailey, F. H., Analytic Geometry and Calculus, Ginn and Company, 2017.

GTX107 Mathematics of Radiation Science II

This course introduces students to the knowledge of differential equations and simple mathematical modeling problems for the first and second order differential equations. Students will be introduced to the simple modeling problems using available software such as the spread of a disease for health example problem and spring vibration for mechanical example problem. This course will be conducted via F2F, online lectures and tutorials that integrates fundamental knowledge from this course to solve simple mathematical modeling problems. The students will be assessed through assignments, tests, quizzes, practical exercises and final examination.

List of text/reference books:

1. Dennis G. Zill. A First Course in Differential Equation With Modelling Applications (11th ed). Brooks/Cole, Cengage Learning. 2018.
2. William F. Trench. Elementary Differential Equation With Boundary Value Problems. Brooks/Cole Thomson Learing. 2013.
3. Haberman, Richard. Applied Partial Differntial Equation with Fourier Series and Boundary Value Problems (5th ed.) Upper Saddle River, NJ: Pearson Education., 2012.

6.3 CORE COURSES LEVEL 2

GTA203 Advanced Audiology Techniques
This course introduces students to the auditory lesion, pure tone audiometry clinical masking, high frequency tympanometry, acoustic reflex and speech audiometry. It also covers the introduction to the results integration of the mentioned tests, non-organic hearing loss (NOHL) and the site of lesion tests. This course will be conducted via lectures, tutorials, practical and problem-based learning. Students will be assessed through test, quiz, assignment, practical report and final examination.

List of text/reference books:

1. Gelfand, S. A., Essentials of Audiology, United States of America: Thieme, 2009.
2. Katz, J., Medwetsky, L., Burkard, R., & Hood, L. (Eds.), Handbook of Clinical Audiology, United States of America: Lippincott Williams & Wilkins, 2009.
3. Kramer, S., & Guthrie, L., Audiology Workbook, San Diego: Plural Publishing Inc., 2008.
4. Roeser, R. J., Valente, M., & Hosford-Dunn, H., Audiology Diagnosis, United States of America: Thieme, 2007.
5. Hunter, L., & Shahnaz, N., Acoustic Immittance Measures Basic and Advanced Practice, San Diego: Plural Publishing Inc., 2012.

GTA205 Neurology for Hearing and Speech
This course introduces students to basic principles of neurology, central nervous system and peripheral system related to hearing and speech. It also covers the related neurological diseases, basic clinical examinations and the management of patient. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Berlin, C. I. (ed.), Neurotransmission and Hearing Loss: Basic Science, Diagnosis, and Management, San Diego: Singular Publishing Group, Inc., 1997.
2. Musiek, F. E., Baran, J. A., and Pinheiro, M. L., Neuroaudiology: Case studies. San Diego: Singular Publishing Group, Inc., 1994.
3. Berlin, C. I., The Brain and Sensory Plasticity: Language Acquisition and Hearing, San Diego: Singular Pub-lishing Group, Inc., 2003.
4. Ray, J., Review of Neurology - A Workbook for Speech and Hearing Students. St. Louis: Mosby-Year Book, Inc., 2003.
5. Mohamed Hamid, Aristides Sismanis, Medical otology and neurotology: A clinical guide to auditory and vestibular disorders New York: Thieme, 2006.

GTA208 Pediatric Audiology
This course introduces students to the importance of listening, medical evaluation and management, hearing test protocols, rehabilitation and education management of children with hearing loss. It also includes acoustic speech signal and speech perception assessment of infants and children as well as hearing tests such as Behavioural Observation Audiometry (BOA), Visual Reinforcement Audiometry (VRA) and Play Audiometry are also emphasised. This course will be conducted through lectures,

tutorials, practical and case study. Students will be assessed through test, assignment, presentation, practical report and final examination.

List of text/reference books:

1. Madell, J. R., &Flexer, C. (Eds.), Pediatric Audiology: Diagnosis, Technology and Management (2nd Ed.), New York: Thieme, 2014.
2. Madell, J. R., &Flexer, C. (Eds.), Pediatric Audiology Casebook, New York: Thieme, 2011.
3. Northern, J. L., & Downs, M. P., Hearing in Children (5th Ed.), San Diego: Plural Publishing Inc., 2002.
4. Smaldino, J.J., &Flexer, C. (Eds.), Handbook of acoustic accessibility: Best practices for listening, learning and literacy in the classroom. New York: Thieme, 2012.

GTA209 Audiology Clinic I

This course introduces students to the audiology clinical practice. It includes preparation of the students to the clinic and clinical practicum. Students will be taught about clinical communication, advanced audiology technique, reflective practice and review of the audiology tests and its integration during the first half of the semester. In the second half of the semester, students will be supervised by experienced audiologist on weekly basis. Students are expected to observe the clinical session and conduct tests on cooperative patients. This course will be conducted via lectures, tutorials, problem-based learning (PBL) and practical sessions. Students will be assessed through practical report, test, report (reflective journal) and final examination.

List of text/reference books:

1. Katz, J. (Ed.), Handbook of Clinical Audiology (7th Ed.), Philadelphia, USA: Lippincott Williams & Wilkins, 2015.
2. Taylor, B., Reflective Practice for Health Care Professionals: A Practical Guide (3rd Ed.), Open University Press, 2010.
3. Stach, B. A., Clinical Audiology: An Introduction (2nd Ed.), Singular Publishing, 2010.
4. Goldfarb, R., &Serpanos, Y. C., Professional Writing in Speech-language Pathology and Audiology Workbook, San Diego: Plural Publishing Inc., 2011.

GTA210 Otology

This course introduces students to principles of clinical otology, pathologies related to hearing and balance system, otological and audiological examinations, other disorders related ear, nose and throat as well basic management of patients with otological disorders. It also covers the relationship between ear pathologies and otological and audiological test results. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Browning, G. G., Clinical Otology and Audiology (2nd Ed.), Oxford: Butterworth Heinemann, 1998.
2. Berlin, C. I., and Keats, B. J. B., Genetics and Hearing Loss, San Diego: Singular Publishing Group, Inc., 2000.
3. Canalis, R. F. (ed.), and Lambert, P. R. H. (ed.), Ear: Comprehensive Otology, Maryland: Lippincott Williams & Wilkins, 2000.
4. Rockeinstein, M. J., Comprehensive Review of Otolaryngology, Philadephia: Elsevier, Inc., 2004.

GTA211 Hearing Screening

This course introduces students to the concepts of hearing screening including its principle, objectives and methods of screening tests of all stages of life. It also covers the sensitivity and specificity, advantages and disadvantages of various hearing screening tests. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Hall, J. W., New Handbook of Auditory Evoked Responses, Boston: Pearson, 2007.
2. Katz, J., Burkard, R., Hood, L., &Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.
3. Seewald, R., & Tharpe, A. M., Comprehensive Handbook of Pediatric Audiology, San Diego: Plural Publishing Inc., 2010.
4. Madell, J. R., &Flexer, C. (Eds.), Pediatric Audiology: Diagnosis, Technology, and Management, United States of America: Thieme, 2008.

GTA212 Basic Hearing Amplification Technology

This course introduces students to the concepts, types, components, system, prescription and electroacoustic measurement of hearing aids, and earmolds, ear shells, and coupling systems. It also covers the importance of bilateral fitting, patient education and counselling for hearing aids wearers. This course will be conducted via lectures, tutorials and practical. Students will be assessed through tests, assignment, presentation and final examination.

List of text/reference books:

1. Dillon, H., Hearing Aids (2nd Ed.), Hong Kong: Thieme, 2012.
2. Ricketts, T., Bentler, R., & Mueller, H. G. (Eds.), Modern Hearing Aids Function, Features, and Advanced Algorithms, San Diego: Plural Publishing Inc., 2014.
3. Mueller, H. G., Ricketts, T., &Bentler, R. (Eds.), Modern Hearing Aids Pre-Fitting Testing and Selection Considerations, San Diego: Plural Publishing Inc., 2012.
4. Bentler, R., Mueller, H. G., & Todd Ricketts (Eds.), Modern Hearing Aids Verification, Outcome Measures, and Follow-Up, San Diego: Plural Publishing Inc., 2013.

GTA213 Electrophysiological Tests

This course introduces students to different types of electrophysiological tests, basic test parameters, procedures to perform the tests and factors that can affect the electrophysiological test results. It also covers the relationship between the test results and ear pathologies. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Hall, J. W., New Handbook of Auditory Evoked Responses, Boston, Mass: Pearson, 2007.
2. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.

GTB204 Molecular Biology Techniques

This course introduces students to the fundamental principles of molecular biology for prokaryote and eukaryotes. The topics will discuss all aspects in fundamental of molecular genetics, chemical bonding, genetic microbe, modification enzymes, digestion enzyme, cloning genotype vehicle, genes manipulation methods, molecular cloning, protein/gene sequencing, PCR and post-PCR technique, microarray, proteins interaction, Western/Northern/Far-Western analysis, protein-DNA interaction, yeast two hybrid system, transgenic technology and the controversial CRISPR technology. Practical skills will be enhanced through the exposure to gene libraries constructions, PCR and DNA electrophoresis, SDS-PAGE and proteomics as well as bioinformatics assignment via cloning simulation project. The components in this course will help the students to understand processes involved in the production of DNA recombinant technology which are important in the development of drug and vaccine for the medical and health. The course will be conducted via integrative teaching and learning approach, which are comprised of F2F and online lectures, seminar, and practical sessions. Students' knowledge will be assessed through tests, assignments, practical report, practical test and final examination. In addition, the student's will be asked to apply their digital skills using ICT and information management system in the given assignment, while their soft skills such as communication skill and team work will be assessed through presentations.

List of text/reference books:

1. Bruce Alberts, Karen Hopkin, Alexander D. Johnson, David Morgan, Martin Raff, Keith Roberts, Peter Walter. Essential Cell Biology (5th Edition). W. W. Norton & Company. 2019.
2. David Clark, Nanette Pazdernik, Michelle McGehee. Molecular Biology, (3rd Edition). Academic Cell. 2018.
3. Sue Carson Heather Miller Melissa Srougi D. Scott Witherow. Molecular Biology Techniques (4th Edition). Elsevier, 2019.
4. Bruce Alberts. Molecular Biology of the Cell (6th edition). Garland Publishing. 2015.

GTB218 Immunology II

This course introduces students to advanced concepts of immunology. It will focus on the fundamental events that control immune cell activation and the function of the immune system in infection and immunological disorders including autoimmune diseases, allergy, immunodeficiency, HIV infection, tumour and transplantation. The role of immune system at the mucosal surface, endocrine system and in bone metabolism will also be discussed. The students will be exposed to the principles of immunological assays including immunoprecipitation, agglutination, ELISA, lymphocyte isolation and flow cytometry as well as the production and application of monoclonal and polyclonal antibodies in research and diagnosis. In addition, students will be exposed to epitope mapping and epitope prediction which are important in vaccine design and therapeutic antibody development. The course will be taught via lecture, practical and interactive discussion. Students' knowledge will be assessed through tests, reports, OSPE, and final examination, while their communication skills will be assessed through small group discussions.

List of text/reference books:

1. Abbas A.K., Lichtman A.H. and Pillai S.., Basic Immunology (6th Ed.), Elsevier, 2019.
2. Delves P.J., Martin S.J., Burton D.R. and Roitt I.M. Roitt's Essential Immunology (13th Ed.), Wiley-Blackwell, 2017.
3. Murphy K. and Weaver C. Janeway's Immunobiology (9th Ed.), Garland Publishing Inc, 2016
4. Punt J. Stranford S. Jones P. and Owen J. Kuby Immunology **(**8th Ed.). W.H. Freeman & Co, 2018.
5. Levinson, W., Review of Medical Microbiology & Immunology (14th Ed.), McGraw Hill, 2016.

GTB219 Pharmacology I

This course introduces students to fundamental knowledge and principles of pharmacology, uses, and effects of drugs to human health and quality of life to pursue good health and well-being. It covers fundamental aspects such as pharmacokinetics, pharmacodynamics, cellular pharmacology, biochemistry, physiology, quantitative pharmacology and systemic pharmacology (autonomic and central nervous system, cardiovascular, respiratory, gastrointestinal, endocrine, antimicrobials and anti-inflammatory). This course will be conducted through integrated teaching and learning approaches, which are comprised of face-to-face and blended online lectures as well as practical approaches. Students' knowledge will be assessed through tests, assignments, practical reports, and final examination while their soft skills such as communication skill will be assessed through presentation.

List of text/reference books:

1. Tripathy, K.D., Essentials of Medical Pharmacology (8th Ed.). New Delhi: Jaypee Brothers Medical Pub., 2018.
2. Whalen, K. Radhakrishnan, R. Carinda, F, Lippincott Illustrated Reviews: Pharmacology (Lippincott Illustrated Reviews Series) (7th Ed.). North America: Lippincott Williams & Wilkins, 2018.

3. Katzung, B.G., Basic and Clinical Pharmacology (14th Ed.). New York: McGraw-Hill Education, 2017.
4. Hitner, H. & Nagle, B., Pharmacology: An introduction (7th Ed.). New York: McGraw-Hill Education, 2015.
5. Rang, H.P., Ritter, J.M. & Flower, R.J., Henderson, G., Rang & Dale's Pharmacology. (8th Ed.). Philadelphia: Churchill Livingstone, 2015.

GTB221 Basic Hematology

This course introduces students to the concept and knowledge of fundamental principles in hematology. It covers topics pertaining structure and function of blood cells, haematopoiesis, introduction to anaemia and haemostasis. The course will be conducted via integrated teaching and learning approach, which comprise of face to face and online lectures, practical, and presentations on problem solving. Students' knowledge will be assessed through tests, practical skills (SPOT/OSPE), and final examination, while their soft skills such as communication skill and thinking skill will be assessed through practical report and presentations. At the end of the course, the students will be equipped with the concepts and knowledge for the best practices in discipline of basic hematology.

List of text/reference books:

1. Ronald H., Edward J.B., Leslie E.S., Jeffrey I.W., Helen E.H., John A., Mohamed E.S. and Syed A.A. Hematology: Basic Principles and Practice (7th Edition). Elsevier, 2018
2. Kenneth K., Marshall L., Josef P., Marcel L., Linda B. and David C.L. Williams Hematology (10th Edition). McGraw-Hill Education, 2021.
3. Victor A.H. and David P.S. Hoffbrand's Essential Haematology (8th Edition). Wiley Blackwell, 2020.
4. Gary M., Gavin, K. and Andrew B. Haematology (3rd Edition). Oxford University Press, 2021.

GTB222 Pathology

This course introduces the fundamental classification of lesions. Students will be taught on the diagnostic and research tests used in pathology with emphasize on digital pathology and the best practices of tissue processing. This course will be conducted through face-to-face and online lectures, practical, tutorials and discussions. Students' knowledge will be evaluated through tests, assignment, laboratory reports, video and final examination.

List of text/reference books:

1. Hubert R.J., and VanMeter, K.C. Gould's Pathophysiology for the Health Professions (6th Ed.) Elsevier, 2018.
2. Kumar V., Abbas, A.K., Aster, J.C., Robbins Essential Pathology, Elsevier, 2020.
3. Underwood, J.C.E. and Cross S.S., Underwood's Pathology (5th Ed.), Elsevier, 2018.
4. Klatt, E.C. Robbins and Cotrans Atlas of Pathology (3rd Revised Ed.) 2014.

GTB224 Immunology I

This course introduces the fundamental knowledge of immunology. It covers cells and tissues of the immune system, lymphocyte development, the structure and function of immunoglobulin, antigen and antigenicity, cytokines and complements, the role of B lymphocyte and T lymphocyte in the specific immune system, the importance of vaccination (immunization) and its impact on human health, the use of antigen-antibody interactions in research and diagnosis of immunologically mediated diseases will also be discussed. The course will be taught via lecture, seminar and interactive discussion. Students' knowledge will be assessed through tests, assignments, and final examination, while their soft skills such as communication skill and team work will be assessed through presentations and small group discussions.

List of text/reference books:

1. Abbas A.K., Lichtman A.H. and Pillai S.., Basic Immunology (6th Ed.), Elsevier, 2019.
2. Delves P.J., Martin S.J., Burton D.R. and Roitt I.M. Roitt's Essential Immunology (13th Ed.), Wiley-Blackwell, 2017.
3. Murphy K. and Weaver C. Janeway's Immunobiology (9th Ed.), Garland Publishing Inc, 2016.
4. Punt J. Stranford S. Jones P. and Owen J. Kuby Immunology **(**8th Ed.). W.H. Freeman & Co, 2018.
5. Levinson, W., Review of Medical Microbiology & Immunology (14th Ed.), McGraw Hill, 2016.

GTB225 Epidemiology

This course aims to provide students a comprehensive introduction to the principles and methods of epidemiology which covers the causes of disease and how epidemiology can be used for the prevention of disease. It also covers health promotion, including environmental and occupational health. This course will be taught through lectures and tutorials. Students' knowledge will be assessed through quiz, test and final examination, while their soft skills such as scientific thinking and delivery of ideas will be assessed through tutorial exercises and assignment.

List of text/reference books:

1. Ray M. Merrill. Introduction to Epidemiology (6th Ed.), Jones & Bartlett Learning, 2013.
2. Robert H. Friis and Thomas A. Sellers, Epidemiology for public health practice (5th Ed.), Jones & Bartlett Learning, 2014.
3. Webb, P. and Bain, C. Essential epidemiology: an introduction for students and health professionals (2nd Ed.), Cambridge University Press, 2011.
4. Ann Aschengrau, George R Seage III. Essentials of epidemiology in public health, 2020.

GTB226 Cell Biology Techniques

This course introduces students to the fundamental knowledge in cell biology and cell culture techniques. It covers the skills and instrumentation related to somatic cell, cancer cell and stem cell culture which can be applied in cell biology related research. The course will be conducted via lecture and practical. The students will be assessed through tests, assignments, practical reports and final examination.

List of text/reference books:

1. Gerald K. Janet I. & Wallace M., Cell and Molecular bBiology: Concepts and Experiments (8th Ed.), John Wiley & Sons, Inc, 2016.
2. Rodrigues G & Roelen B. Concepts and Applications of Stem Cell Biology: A Guide for Students (Learning Materials in Biosciences) 1st Edition, Springer, 2020
3. Capes-Davis A. & Freshney I. Freshney's Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, 8th edition, Wiley-Blackwell, 2021
4. Robert Lanza et al., Essentials of Stem Cells Biology, Amsterdam: Elsevier Academic, 2006.

GTD213 Principles of Medical Nutrition Therapy I

This course will provide education for students to understand the need for food modification in terms of nutrient composition, texture and food presentation according to health conditions. Students will learn about the principle of medical nutrition therapy of malnutrition, endocrine, cardiovascular, gastrointestinal diseases, and food allergy and intolerance. Each topic will discuss about the theoretical and practical aspects of medical nutrition therapy for improving nutritional status of the patients with various diseases. Students will be assessed through test, assignment, presentation and final examination.

List of text/reference books:

1. Mahan, L.K. et al., Krause's Food, Nutrition & Diet Therapy (14th Ed.), Saunders Co., 2017.
2. Shaw, V., Clinical Paediatric Dietetics (4th Ed.), John Wiley & Sons, Ltd., 2015.
3. Whitney, W., Understanding Normal & Clinical Nutrition (11th Ed.), Australia, Wadsworth, 2017
4. Nelms, M.H., Medical Nutrition Therapy A Case Study Approach (5th Ed), Thomson Wadsworth, 2016

GTF200 Criminalistics

This course introduces students a basic element of scientific investigation for crime scene reconstruction. Starting with evidence collection and preservation, analyse and reconstruct crime scene based on the individuals and class characteristic identification. Students will be exposed to various physical evidence such as impression evidence, trace evidence, biological evidence, firearm, explosives, and questioned documents. The students will also learn the principle of photography and microscopy and uses of invisible radiation in crime detection. This course will be conducted via lecture, tutorial and practical and assessed by tests, assignments, practical reports, quiz, and final examination.

List of text/reference books:

1. M.M. Houck and J. A. Siegel. Fundamentals of Forensic Sciences. Elsevier Academic Press, 2015.
2. R. Sutton, T.J. Keith and M. Christopher. Crime Scene Management: Scene Specific Methods. John Wiley & Sons, 2016.
3. J.E. Girard. Criminalistics. Jones & Bartlett Learning, 2017.

GTF204 Forensic Psychology

This course introduces students to the field of forensic psychology and the role of forensic psychologist. Discussion will be concentrated on criminal characteristics and behaviours, criminal profiling, mental illness and crime, law, and court. This course will be taught via lecture and discussion. Students will be assessed through test, assignments, seminar, and final examination.

List of text/reference books:

1. C.R. Bartol and A.M. Bartol. Introduction to Forensic Psychology: Research and Application (5th Edition). SAGE Publications Inc., 2019.
2. D. Canter. Criminal Psychology (2nd Edition). Routledge, 2017.
3. D.A. Crighton and G.J. Towl. Forensic Psychology (2nd Edition). Wiley & Sons, 2015.

GTF210 Material Chemistry

This course introduces students to the characteristics of materials, processing and the uses of metals, alloys, polymers, ceramics, and composites, as well as their sustainability uses. It also covers the importance of material chemistry to ensure the quality of life, and its knowledge in forensic application and research. This course will be taught via lecture, tutorials and discussion. Students will be assessed through tests, discussion, assignment, project paper and final examination.

List of text/reference books:

1. W.D. Callister. Material Science and Engineering: An Introduction (10th Edition). John Wiley & Sons Inc., 2018.
2. H.R. Allcock. Introduction to Materials Chemistry (2nd Edition). Wiley, 2019.
3. I. Schwenke. Chemistry of New Materials. Scitus Academic LLC, 2018.

GTF214 Pollution and Environmental Chemistry

This course introduces student regarding pollutant agents and environmental chemistry which covers introduction to component of environment as general, environmental quality act and water quality standard, nutrient and eutrophication, heavy metals, dissolved oxygen (DO), biology oxygen demand (BOD), chemical oxygen demand (COD), meteorology of air pollution, water pollution, water and air chemical pollutants, distribution of air pollutant and environmental forensics. The impact of pollution towards water source and climate change are also discussed. This course will be taught via lecture, tutorials, and discussion. Students will be assessed through tests, assignments, reports, presentation, and final examination.

List of text/reference books:

1. S.E. Manahan. Environmental Chemistry (10th Edition). CRC Press, 2017.
2. M. Mustafa. Environmental Law in Malaysia (4th Edition). Kluwer Law International BV, 2019.
3. I.G. Petrisor. Environmental Forensics Fundamentals: A Practical Guide. CRC Press, 2014.

GTF216 Analytical Chemistry III

This course introduces students to the principles and various spectrochemistry techniques including optical spectrometry, molecular absorption spectrometry, molecular fluorescence spectroscopy, atomic spectroscopy, infra-red spectroscopy, Raman spectroscopy, mass spectrometry and nuclear magnetic resonance spectroscopy. This course also discusses innovation concept and product development and improvement. This course will be taught via lecture, discussion, PBL and practical. Students will be assessed through tests, practical reports, project, and final examination.

List of text/reference books:

1. D.A. Skoog, D.M. West, F.J. Holler and S.R. Crouch. Fundamentals of Analytical Chemistry (10th Edition). Thomson Brooks/ Cole, 2021.
2. G.D. Christian. Analytical Chemistry (7th Edition). John Wiley & Sons, 2013.
3. D.L. Pavia and G.M. Lampman. Introduction to Spectroscopy (5th Edition). Cengage Learning Inc, 2014.

GTF217 Organic Chemistry II

This course introduces students to the structure, physical properties and chemical reactions for organic compounds including alcohol and phenol, ether, epoxide and sulfide, conjugated compounds, aromatic compounds, ketone, and aldehyde. This course also discusses the challenges due to overconsumption of energy sources, especially organic compounds. This course will be taught via lectures, tutorials, discussions, PBL and practical. Students will be assessed through tests, assignments, practical reports, quizzes, and final examination.

List of text/reference books:

1. L.G. Wade. Organic Chemistry (8th Edition), Pearson Prentice Hall, 2013.
2. T.W.G. Solomons, C.B. Fryhle and S.A Snyder. Organic Chemistry (12th Edition). Wiley, 2016.
3. J.G Smith and J.G. Smith. Organic Chemistry (6th Edition). McGraw Hill, 2020.

GTF218 Organic Chemistry III

This course introduces students to the structure, physical properties and chemical reactions for organic compounds including amine, carboxylic acid, carboxylic acid derivatives, and carbonyl compounds. Carbohydrate and nucleic acid, lipid, and fat, as well as peptide, amino acid and protein are discussed and related to healthy lifestyle. This course will be taught via lecture, tutorial, discussion, and practical. Students will be assessed through test, assignment, practical reports and final examination.

List of text/reference books:

1. L.G. Wade. Organic Chemistry (8th Edition), Pearson Prentice Hall, 2013.
2. T.W.G. Solomons, C.B. Fryhle and S.A Snyder. Organic Chemistry (12th Edition). Wiley, 2016.
3. J.G Smith and J.G. Smith. Organic Chemistry (6th Edition). McGraw Hill, 2020.

GTF219 Physical Evidence

This course introduces students to characterisation of different kinds of physical evidence using physicochemical properties. The evidence includes paint, glass, soil, fibres, and lamp filaments. Comparison microscopy for examination of physical evidence, experimental techniques for the restoration of erased numbers on different metal surfaces form part of the curriculum. Introduction to the use of lasers and electron microscopy in the examination of physical evidence of materials; and specialized photographic techniques including macrophotography, photomicrography and invisible radiation photography are also included. This course will be taught via lecture, practical and discussion. Students will be assessed through tests, assignments, practical reports, practical test, and final examination.

List of text/reference books:

1. R. Saferstein. Criminalistics: An Introduction to Forensic Science (12th Edition). Pearson, 2017.
2. S. Bell. Forensic Science: An Introduction to Scientific and Investigative Techniques (5th Edition). Routledge, 2019.
3. A. Bertino and P. Bertino. Forensic Science: Fundamentals & Investigations (3rd Edition). Cengage Learning, Inc., 2020.

GTF220 Forensic Serology

This course introduces students to the concept of antigens and antibodies and various blood-proteins and enzymes present in the blood and body fluid. It also provides knowledge on immunity, disease susceptibility, group the body fluids from crime scenes and its associate health hazards, to identify and individualise the samples as well as the HLA system and its application to identify individuals. The course also covers the methods in identification of patterns and effects of blood value as evidence. This course will be taught via lecture, practical and PBL. Students will be assessed through test, assignments, practical reports, practical test, and final examination.

List of text/reference books:

1. J.L. Bidwell, C. Navarrete and W.F. Bodmer. Histocompatibility Testing. Imperial College Press, 2000.
2. R. Saferstein and A.B. Hall. Forensic Science Handbook (3rd Edition). CRC Press, 2020.
3. P.D. Issitt and D.J. Anstee. Applied Blood Group Serology (4th Edition). AABB Press, 2019.

GTK205 Supply and Quality of Drinking Water

This course introduces students to matters related to supply and quality of drinking water. Source of water supply, water, water supply and quality issues, water treatment and water sampling will be discussed. In addition, the descriptions of water pollution, category and classification of water pollution, as well as water quality impacts are also highlighted. Students will learn the process of physical and chemical processes that react in the water as well as change process of in the context of human impact on water quality. The concept of supply management and water quality will also be discussed.

List of text/reference books:

1. World Health Organization. Guidelines for Drinking Water (6th Ed.), American Water Works Association, New York. 2006
2. James Edzwald. Water Quality & Treatment: A Handbook of Drinking Water, (6th Ed.), American Water Works. New York. 2006.
3. Harry E. Hickey. Water Supply Systems and Evaluation Methods. Volume 1: Water Supply Concepts. University of Maryland. Michingan. 2008.

GTK206 Industrial Hygiene

This course introduces the important principle and concept of industrial hygiene; anticipation, recognition and evaluation of the levels of contaminants in workplace, for control and prevention of ill health. The course is delivered through lectures, tutorials, practical and fieldwork. Students are tested through assignment, reports, presentation, tests and final examination.

List of text/reference books:

1. Nims, D. Basic of Industrial Hygiene. John Wiley & Sons, Inc. Canada. 1999.
2. Plog, B. A. & Quinlan, P. J. Fundamentals of Industrial Hygiene. 6th Ed National Safety Council Press
3. Gardiner, K. & Harrington, J. M. Occupational Hygiene. 3rd Ed. Blackwell Publishing, 2005

GTK207 Food Hygiene and Safety

This course emphasises on knowledge and skills needed to protect the health of public on food safety and hygiene. This course includes an introduction to activities of food safety and quality, matters related to foodborne illness, hazard in food processing, personal hygiene and regional food supply, procedures for food handling, prevention of food contamination and food legislations in Malaysia. This course also discusses on guidelines related to food safety and quality as well as food safety management tools such as such as Good Hygiene Practice (GHP), Good Manufacturing Practice (GMP), risk assessment and Hazard Analysis Critical Control Points system (HACCP) as well as food borne disease investigation. The course will be conducted via lecture, practical and fieldwork. Students will be evaluated through assignments, reports, discussion, tests and final examination.

List of text/reference books:

1. Lawley, R., Curtis, L. and Davis, J. The Food Safety Hazard Guidebook. Ed. ke-2. Cambridge. RSC Pub. 2012.
2. Marriott, N. G., Schilling M. W. and Gravani, R. B. Principles of Food Sanitation. Ed. ke-6. New York: Springer. 2018.
3. Paster, T. and Vaccaro M. The HACCP Food Safety Employee Manual. New Jersey: John Wiley & Sons. 2013.
4. Meggitt, C., Food Hygiene and Safety, Oxford: Heinemann Education Publishers, 2003.
5. Alli, I., Food Quality Assurance: Principles and Practices. Boca Raton: CRC Press, 2004.
6. McSwane, D., Rue, N. R., Linton, R. & Williams, A. G. Essentials of Food Safety and Sanitation (5th Ed.), USA: Pearson Prentice Hall, 2007.
7. Schmidt, R.H and Rodrick, G.E. Food Safety Handbook. New Jersey: Wiley-Interscience. 2003.

GTK210 Occupational Diseases

This course will discuss classifications, factors, symptoms, investigations, diagnosis, management, prevention and monitoring of occupational diseases. Relationship of factor and implication to water, energy, health, agriculture, biodiversity, environmental climate change, management from disaster, effect to production, consumption, population and poverty will be explained during teaching and learning.

List of text/reference books:

1. Semua Garis Panduan dan Tata Amalan Industri yang boleh dirujuk di laman web Jabatan Keselamatan dan Kesihatan Pekerjaan Malaysia.
2. Pekeliling Perbendaharaan WP 6.3/2013 Skim Ex-Gratia.
3. Barry S. Levy, David H. Wegman, Sherry L. Baron and Rosemary K. Sokas. Occupational and Environmental Health. 7th ed. 2017.
4. Charles D. Reese. Occupational Health and Safety Management : A Practical Approach. 5th ed. 2017.
5. Joseph La Dou, Robert Harrison. Current Occupational and Environmental Medicine. 5th ed.2014.

GTK211 Occupational Safety and Health Laws

This course focuses on laws related to occupational safety and health in Malaysia. Problems encountered in the enforcement of these laws will be discussed. This course will be conducted via lectures, case study and tutorial. Students will be assessed through assignment, presentation, production, tests and final examination.

List of text/reference books:

1. Akta Keselamatan dan Kesihatan Pekerjaan 1994 dan Peraturan-Peraturan. Undang-Undang Malaysia. ILBS, 2005.
2. Akta Kilang dan Jentera 1967 dan Peraturan-Peraturan. Undang-undang Malaysia, ILBS, 2005.
3. Akta Keselamatan Sosial Pekerja 1969.
4. Akta Pampasan Pekerja 1952.

5. Akta Kerja 1955.
6. Akta Perkhidmatan Bomba 1988 dan Peraturan-peraturannya.
7. Akta Petroleum (Langkah-langkah Keselamatan) 1984.
8. Akta Bekalan Gas 1993.
9. Wu Min Aun.. The Malaysian Legal System, 2nd Ed. Longman, Kuala Lumpur. 2000.
10. Wan Arfah Hamzah Ramy Bulan. An introduction to Malaysian Legal System. Penerbit Fajar Bakti. 2003.
11. James, Philip S. Introduction to English Law. London, Butterworth. 1989.
12. Smith A.T.H. Glanville Williams: Learning the Law. 12th Ed. London: Sweet & Maxwell. 2002.

GTK241 Fire Safety and Design

This course discusses the relevant theory and application of fire safety knowledge, especially the engineering design in implementing controls to increase fire safety in the workplace environment. This course also explains the preventive measures against fire hazards in structures through the appropriate design of passive and active fire protection through Disaster Risk Management concept. Emphasizing this aspect is important to ensure that the entire structures are built to reduce the risk of fire through prevention, detection extinguishment (including spread), hence ensuring the safety and health of occupants. Project and report will be made to impart skills in identifying, analyzing and proposing solutions to fire safety issues and will be presented as a group presentation. Overall, the course is delivered via lectures, problem-based learning, and practice. Students are tested through quizzes, test, project, discussion, presentation, project paperwork, seminar, and final exam.

List of text/reference books:

1. Kirk's Fire Investigation (8th Edition) (Brady Fire) 8th Edition, 2017.
2. D. P. Nolan, Handbook of Fire & Explosion Protection Engineering Principles for Oil, Gas, Chemical, and Related Facilities, 3rd ed. Waltham: Elsevier, 2014.
3. A. B. Hamzah, Guide to Fire Protection in Malaysia, 2nd ed. Kuala Lumpur: The Institution of Fire Engineers (UK) Malaysia Branch (IFEM), 2011.
4. Uniform Building By-Laws. MCD Publishers. 2018.
5. National Fire Protection Association (NFPA) Standards.

GTK242 Risk Management

Risk is inherent and uncertainties that need to be managed. A comprehensive approach to risk management allows entities to consider the potential impact of all types of risks upon Personnel, Environment, Asset, Reputation, and Sustainability. This include disaster risk management. This course introduces the fundamentals and concepts of risk management, risk assessment tools, various types of the risk matrix, understanding risk appetite, and development of risk management programs through various available standards, guidelines, and industry best practices, hence ensuring sustainability on good health and wellbeing and Sustainable Cities & Communities. The student shall be assessed via quiz, test, assignments, project, presentations and final examination.

List of text/reference books:

1. Popov G, Lyon BK, Hollcroft B. Risk Assessment, A practical guide to assessing Operational Risks. Hoboken, New Jersey: John Wiley & Sons, Inc.; 2016.
2. Hopkin P. Fundamentals of Risk Management, Understanding, evaluating and implementing effective risk management. 5th ed., editor. London: Kogan Page Limited; 2018.
3. CCPS. Bow Ties in Risk Management. Hoboken, New Jersey: John Wiley & Sons, Inc.; 2018.
4. DOSH. Guidelines for Hazard Identification, Risk Assessment and Risk Control (HIRARC). Putrajaya, Malaysia: Department of Safety and Health; 2008.
5. ISO - The International Organization for Standardization. ISO 31000 - Risk management - Principles and guidelines. ISO 31000.

GTN208 Nutritional Biochemistry

This course introduces students to metabolism and homeostasis of several key nutrients of macronutrients and micronutrients such as vitamins and minerals, body fluid and electrolyte balance, inter-interaction between nutrients, the relationships between nutrients metabolism and nutrient metabolism related to human body's physiological state and human health as well as the occurrence risks of nutritional-related chronic diseases. This course will be taught via lecture and discussion. Students will be assessed through tests, quiz, assignment, presentation dan final examination.

List of text/reference books:

1. Bender DA., Introduction to Nutrition and Metabolism (5th Ed.), CRC Press, 2014.
2. Gropper SS, Smith JL, Groff JL., Advanced nutrition and human nutrition (6th Ed.), Wadsworth Cengage Learning, Belmont, CA, 2013.
3. Kohlmeier M., Nutrient metabolism, Academic Press, London, 2003.
4. Shills ME, Shike M, Ross AC, Caballero B and Cousins RJ., Modern nutrition in health and disease (10th Ed.), Lippincott Williams and Wilkins, 2006.
5. Lanham-New SA. Macdonald IA, Roche HM., Nutrition and metabolism (2nd Ed.), Blackwell Science Publishing, 2010.
6. Mann J, Truswell SA., Essentials of human nutrition (2nd Ed.), Oxford University Press, 2002.

GTN215 Nutrition for Health and Fitness

This course introduces students to the role of nutrition in enhancing one's health, fitness and sport performance. It also covers health promotion especially the role of energy and nutrients as the key to all exercise and sports activities. Body composition and weight control will be discussed in relation to losing or gaining weight through diet and exercise. This course will be taught via face to face and online lectures. Students' knowledge and scientific thinking will be assessed through test, online quiz and final exam. While their soft skills such as delivery of ideas will be assessed through assignment as performance-based assessment.

List of text/reference books:

1. Melvin H Williams, Nutrition for Health, Fitness & Sport (10th Ed.), McGraw-Hill, 2013.
2. Paul Insel, Don Ross, Kimberley McMahon and Melissa Bernstein. Discovering Nutrition (5th Ed.), Jones & Bartlett Learning, 2016.
3. Judy A. Driskell, Ira Wolinsky, Nutritional Concerns in Recreation, Exercise, and Sport, Boca Raton, 2009.

GTN218 Nutrition in the Life Cycle

This course explores how individual, family, community and societal factors influence nutritional needs and dietary intake from infancy through older adulthood. Implications for nutrition care and community-level programs to ensure sustainability of good health and well-being are discussed. Peer-oriented learning integrated with face to face (F2F) and virtual lectures will be the mode of teaching and learning (T&L) delivery of this course. Students will acquire digital literacy and teamwork skills through interaction with their peers (peragogi) in creating digital contents using innovative application and collaborative social media presentation (cybergogy) assignment. Other assessments include an online quiz and a final exam.

List of text/reference books:

1. Brown, J. E., Nutrition through the life cycle. Cengage Learning, 2016.
2. Sharlin, J., & Edelstein, S., Essentials of life cycle nutrition. Jones & Bartlett Publishers, 2010.

GTN219 Nutritional Anthropology

This course introduces students to the study of human nutrition from the perspective of anthropology raging from the aspects of biological, ecological and social influence of diet and human nutrition, referring to how diet affects human behavior and culture, and how culture affects human behavior and nutrition. It also covers a review of cross-cultural diversity in terms of diet, nutritional status and life advice system, as well as differences in the factors of human existence is the result of the evolution of the pre-history to modern times and provide some basis that can be used to assess the reliability and reasonableness of the policy and dietary recommendations are featured in daily modern life. This course will be conducted via lectures and discussion session. Students will be assessed through test, report, presentation and final examination.

List of text/reference books:

1. Bryant CA, DeWalt KM, Courtney A, and Schwartz J. The Cultural Feast : An Introduction to Food and Society. 2nd Edition. Belmont, CA: Wadsworth/Thomson Learning, 2009.
2. Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals**.** NY: Penguin, 2007.
3. Pamela Goyan Kittler and Kathryn P. Sucher. Food and Culture. 4th edition. Belmont, CA: Wadsworth / Thomson Learning, 2011.

GTN221 Nutrition and Disease

This course will introduce students to the terms used in medical field, and the underlying causes, predisposing factors and pathophysiology changes during diseases of different system of our body. It also covers effect of diseases on the nutritional status of the patient and patients` quality of life, and relationship of the pathophysiological changes with nutrition prevention/intervention. This course will be taught via lecture. Students will be assessed through final exam, test, and assignment.

List of text/reference books:

1. Kumar V., Abbas A., Aster J, Robbins Basic Pathology (10th edition). Elsevier, 2017.
2. Hall, J.E., Guyton and Hall Textbook of Medical Physiology (13th edition). Philadelphia, PA Elsevier, 2016.
3. Mahan ,L.K. et albKrause`s Food, Nutrition & Diet Therapy (14th edition). Saunders Co., 2017.

GTN222 Assessment of Nutritional Status

This course introduces students to the nutritional evaluation in the individual and population, in which aspects of the food and nutrient intake calculations, anthropometric measurement, dietary evaluation, biochemical evaluation and clinical assessment. This course will be taught via lectures, practical sessions and discussion. Students will be assessed through practical reports, practical test (OSPE), assignment, group field study report and final exam.

List of text/reference books:

1. Lee, R.D. and Nieman, D.C., Nutritional Assessment, New York: McGraw-Hill, 2007.
2. Jelliffe, O.D., The Assessment of Nutritional Status in the Community, Geneva: WHO, 2007.
3. Sauberlich HE, Laboratory Tests for the Assessment of Nutritional Status (2nd Ed.), CRC Press, 1999.
4. Tee E. Siong et al., Nutrition Composition of Malaysian Food (4th Ed.), Kuala Lumpur: Malaysian Food Composistion Database Programme, 1997.
5. Bendich, A. and Deckelbaum, R.J. (ed.), Primary & Secondary Preventive Nutrition, Totowa (N.J., USA); Humana Press, 2001.

GTN223 Community Nutrition and Dietetics

This course provides students with the knowledge, skills, tools, and evidence-based best practices needed to promote health and prevent non-communicable diseases in the community. Project-Based Learning (PBL) integrated with face to face and virtual lectures will be the teaching and learning (T&L) mode of delivery of this course. The community engagement project exposes the students with experiential-based learning in which students are expected to design, execute and assess appropriate nutrition promotion activities in collaboration with potential stakeholders to enhance the nutritional status and quality of life in the community. Students will acquire digital literacy skills through video and infographic creation tasks.

List of text/reference books:

1. Nnakwe, N., Navigate 2 eBook Access for Community Nutrition: Planning Health Promotion and Disease Prevention. Jones & Bartlett Learning, 2018.
2. Freedman, M. R., Community Nutrition in Action: An Entrepreneurial Approach. Journal of Nutrition Education and Behavior, 52(6), 663, 2020.

GTS205 Exercise Physiology

This course introduces students to the effects of exercise on physiological support systems as well as its practical aspects. This course also emphasizes on the benefits of exercise on health with regards to each of the systems. This course will be taught via lectures, tutorials, and practicals. Students will be assessed through test, assignment, practical report and final exam.

List of text/reference books:

1. Sharon A. Plowman & Denise L. Smith, Exercise Physiology for Health, Fitness, and Performance. Wolters Kluwer, 2017.
2. Scott K. Powers & Edward T. Howley, Exercise Physiology: Theory and Application to Fitness and Performance. 10th edition. McGraw-Hill Education, 2018.

GTS206 Sports Training Methodology

This course introduces students to the principle of structured training based on scientific method. This course also introduces students to the planning in practice and analysis of athlete's achievement in sports. This course will be taught via lectures and practical. Students will be assessed through test, assignment, presentation and final examination.

List of text/reference books:

1. Bompa T.O, Buzzichelli, C.A., Periodization. Theory and Methodology of Training. 6th edition. York University, 2019.
2. Krasilchikov O., Basics of Sports Training Methodology. SSS Publications, New Delhi, 2014.
3. Matveyez. L., Fundamentals of Sports Training. Moscow: Fizkultura I Sport, 1977.

GTS208 Kinanthropometry, Tests and Measurements for Sports Science

This course introduces student to the concepts of kinanthropometry to evaluate physical condition in athletes. This course also introduces students to important tests and measurements in determining individual / athletes' fitness for health. This course will be taught via lectures and practicals. Students will be assessed through test, assignment, practical report and final examination.

List of text/reference books:

1. Morrow, Jr., J. R., Mood, D., Disch, J., Kang, M., Measurement and Evaluation in Human Performance. 5th edition. Champaign, IL: Human Kinetics, 2016.
2. Tanner, R., Gore, C., Physiological Test for Elite Athletes. 2nd edition. Australian Sports Commission, Champaign, IL: Human Kinetics, 2013.

GTS209 Sports Nutrition

This course introduces students to nutritional requirement for sports people in various disciplines, nutritional requirement to different sport event and ergogenic aid to enhance sport performance. Students will learn about nutritional planning in pre-, during and post-performance/training, so that they can give advice to the athletes about nutritional status. This course also exposes students to proper nutrition for health, ideal body weight and avoiding eating disorders. This course will be taught via lectures and tutorials. Students will be assessed through tests, assignments, discussion and final examination.

List of text/reference books:

1. Fink, H. H., & Mikesky, A. E., Practical Applications in Sports Nutrition. Jones & Bartlett Learning, 2017.
2. Insel, P., Ross, D., McMahon, K., & Bernstein, M., Nutrition. Jones & Bartlett Learning, 2016.
3. McArdle, W.D., Katch, F.I., Katch, V.L., Exercise Physiology: Energy, Nutrition, and Human Performance. Philadelphia, PA: Williams & Wilkins, 2016.
4. Dunford, M., & Doyle, J. A., Nutrition for Sport and Exercise. Cengage Learning, 2014.

GTS210 Sports Biomechanics and Kinesiology

This course introduces the interdisciplinary knowledge about the anatomy of the skeletal muscle and neuro-muscular structure integrated with biomechanics principles. The knowledge will help the students to understand the functions and limitations of the body systems, comprehend the types and causes of movements in sports and analyze body motion. The course will focus on the development techniques of human motion analysis from the aspect of structure and function as well as the applied biomechanics principles involved in human movement. Examples of healthy and pathological movements and application of sports skills will be used. The course will be taught via lectures, discussions and practical. Students will be assessed through tests, practical reports, assignments, presentations and final examination.

List of text/reference books:

1. Watkins, J., Fundamental Biomechanics of Sport and Exercise. London & New York: Routledge, Taylor & Francis Group, 2014.
2. Hall, S.J., Basic Biomechanics. 6th edition. New York: McGraw-Hill, 2012.
3. Kerr A., Introductory Biomechanics. Churchill Livingstone, 2010.
4. Hamilton, N. and Luttgens, K., Kinesiology: Scientific Basis of Human Motion. 11th edition. New York: McGraw-Hill, 2008.

GTS211 Motor Learning

This course introduces student to basic concepts and theories of motor learning. This course also introduces students to research studies that utilise an interdisciplinary approach of perceptual-motor process and psychological mechanism of motor learning in sports. This course will be taught via lectures, tutorials, and practicals. Students will be assessed through test, practical reports, assignments, presentation and final examination.

List of text/reference books:

1. Magill, R.A., Motor Learning: Concepts and Applications.11th edition. Columbus, OH: McGraw-Hill, 2016.
2. Coker, C.A., Motor Learning and Control for Practitioners. 2nd Edition. New York: McGraw-Hill, 2015.
3. Schmidt, R., Motor Control and Learning: A Behavioral Emphasis. 5th Edition. Champaign, IL: Human Kinetics, 2014.

GTX213 Basic Science of Nuclear Medicine

This course introduces students to the fundamental principles in nuclear medicine. Students will obtain basic knowledge of radioactivity, radioactive decays, radionuclide production methods and types of radiopharmaceuticals. It also covers radiation detection and radiation monitoring statistics in nuclear medicine. This course will be conducted via F2F and online lectures and tutorials and student centered learning like discussion. The students will be assessed through test, assignment on problem solving, presentation, practical exercise and final examination.

List of text/reference books:

1. Chandra, R., Nuclear Medicine Physics: The Basics (8th Ed.), Wolters Kluwer Health, 2018.
2. Bushberg JT, Seibert JA, Leidholdt EM, Boone JM, The Essential Physics of Medical Imaging (3rd Ed.), Lippincott Williams & Wilkins, 2012.
3. Saha, G.B., Fundamentals of Nuclear Pharmacy (6th Ed.), Springer, 2010.
4. Cherry, S.R., Sorenson, J.A. and Phelps, M.E., Physics in Nuclear Medicine (4th ed.), Elsevier, 2012
5. Saha, G.B., Physics and Radiobiology of Nuclear Medicine (3rd Ed.), Springer-Verlag, 2006.

GTX215 Medical Radiation Physics II

This course introduces students to the physics of electricity and magnetism. Students will also be exposed briefly to the recent advancements in medical radiation related to the topics. The course will be conducted via lectures, tutorials, and discussions. Students will be assessed through quiz, test, assignment, presentation, and final examination.

List of text/reference books:

1. Jearl Walker, Halliday and Resnick, Fundamental of Physics, 10th edition, Wiley, 2014.
2. Frederick Bueche and Eugene Hecht, Schaum's Outline of College Physics, 11th Edition, McGrawHill Education , 2012.
3. Martin Zinke-Almang, Physics for Life Sciences, Nelson Education Ltd., 2009.

GTX218 Radiation Protection and Safety I

This course is aimed to theoretically expose the students to the fundamental of biological effects of ionising radiations as well as basic knowledges on radiation protection. Students also will be taught through lectures and demonstrations regarding radiation detection and measurement by using available radiation detectors. This course will discuss the regulatory acts regarding the use of radiation and radiation safety in Malaysia especially the Atomic Energy Licensing Act (1984). This course also giving the inputs to the students regarding Radiation Protection Program as recommended by the Atomic Energy Licensing Board (AELB). The course will be conducted via lectures, tutorials and discussions. Students will be assessed based on tests, assignments, practical report, presentation and final examination.

List of text/reference books:

1. Ismail Bahari, Mohd Yusof Ismail, Managing Radiation Safety, Atomic Energy Licensing Board (AELB), McGraw-Hill, 2007.
2. Abd Aziz Mohd Ramli, Idris Besar, Radiation Safety 3rd Edition, Malaysian Nuclear Agency, 2008.
3. Eric J Hall and Amato J. Giaccia, Radiobiology for the Radiologist. 8th Edition, Wolters Kluwer, 2018.
4. The Government of Malaysia, Atomic Energy Licensing Act 1984 (Act 304).
5. Glenn F knoll, Radiation Detection and Measurement 3rd Edition, Elsevier Science, 2000.

GTX219 Basis of Radiation Dosimetry

This is an introductory course for the student to the basic principles of radiation dosimetry which including basic radiation physics, production of x-ray, interaction of radiation, radiation dosimeter and radiation dose measurement.

List of text/reference books:

1. F. Khan, The Physics of radiation therapy (5th Edition), Lippincott Williams & Wilkins, 2014.
2. C. Washington and D. Leaver, Principles and Practice of Radiation Therapy, (4th Edition), Mosby, 2016.
3. R. Stanton and D.Stinson, Applied Physics for Radiation Oncology, (Revised edition), Medical Physics Publishing, 2009.

GTX220 Diagnostic Radiology Imaging

This course will introduce students to mammography, fluoroscopy, interventional fluoroscopy, CT scanners and MRI in detecting anatomical and pathological structures including quality assurance and radiation protection programs. Courses are conducted through lectures / tutorials / SCL. Assessment of students through tests, tutorial exercises, reports, presentations and final examinations.

List of text/reference books:

1. Carlton, R.R., Adler, A.M., Vesna Balac, Randy Griswold, Lisa Kang, Sharon Barrow Lakia, Mathew Matthew Marquess, Principles of Radiographic Imaging: An Art and A Science (6th Ed.), New York: Thomson Delmar Learning, 2020.

2. Bushberg JT, Seibert JA, Leidholdt EM, Boone JM, The essential physics of medical imaging (3rd Ed.), Lippincott Williams & Wilkins, 2012.
3. James N. Johnston & Terri L. Fauber, Essentials of Radiographic Physics and Imaging, St. Louis, Elsevier/Mosby Inc., 2012

GTX221 Nuclear Medicine Imaging

This course introduces students to the in-vivo radiation detection and the major components of imaging equipment including gamma camera, SPECT/CT and PET scanner. Image formation in nuclear medicine imaging with the performance parameters for gamma camera, SPECT/CT and PET scanner and quality assurance will be discussed. The course will be conducted via F2F and online lectures and tutorials. The students will be assessed through test, assignment on problem solving, presentation, practical exercise and final examination.

List of text/reference books:

1. Chandra, R., Nuclear Medicine Physics: The Basics (8th Ed.), Wolters Kluwer Health, 2018.
2. Gilmore, D. and Waterstram-Rich, K.M., Nuclear Medicine and PET/CT: Technology and Techniques (8th Ed.)., Elsevier, 2017.
3. Cherry, S.R., Sorenson, J.A. and Phelps, M.E., Physics in Nuclear Medicine (4th ed.), Elsevier, 2012.
4. Prekeges, J., Nuclear Medicine Instrumentation (2nd Ed.), Jones & Bartlett Learning, 2013.
5. Saha, G.B., Physics and Radiobiology of Nuclear Medicine (3rd Ed.), Springer-Verlag, 2010.

GTX222 Basic Sciences in Diagnostic Radiology

This course is about production of x-rays, x-ray interactions with matter, grids, intensifying screen, radiographic films, computed and digital radiography and radiation monitoring. It will be implemented through lectures / tutorials / SCL and evaluated in terms of tutorial training, test, simulation and final examination.

List of text/reference books:

1. Carlton, R.R., Adler, A.M., Vesna Balac, Randy Griswold, Lisa Kang, Sharon Barrow Lakia, Mathew Matthew Marquess, Principles of Radiographic Imaging: An Art and A Science (6th Ed.), New York: Thomson Delmar Learning, 2020.
2. Bushberg JT, Seibert JA, Leidholdt EM, Boone JM, The essential physics of medical imaging (3rd Ed.), Lippincott Williams & Wilkins, 2012.
3. James N. Johnston & Terri L. Fauber, Essentials of Radiographic Physics and Imaging, St. Louis, Elsevier/Mosby Inc., 2012.

6.4 CORE COURSES LEVEL 3

GTA305 Advanced Hearing Amplification Technology

This course introduces students to the electroacoustic measurement, compression systems, directional microphone, advanced signal processing schemes, prescription and outcome measurement of hearing aids, and special issues in hearing aids for children. It also covers the assistive listening devices (ALDs), Contralateral Routing of Signal (CROS), bone conduction hearing aids, bone anchored hearing aids (BAHA), cochlear implant, middle ear implant, and auditory brainstem implant. Physiology, components, medical and surgical aspects, selection of candidates, programming, rehabilitation, outcome and predictive factors cochlear implants are also emphasized. This course will be conducted via lectures, tutorials, practical and problem-based learning (PBL). Students will be assessed through test, quiz, presentation, practical report and final examination.

List of text/reference books:

1. Dillon, H., Hearing Aids (2nd Ed.), Thieme, 2012.
2. Ricketts, T., Bentler, R., & Mueller, H. G., Modern Hearing Aids Function, Features, and Advanced Algorithms, San Diego: Plural Publishing Inc., 2014.
3. Mueller, H. G., Ricketts, T., & Bentler, R., Modern Hearing Aids Pre-Fitting Testing and Selection Considerations, San Diego: Plural Publishing Inc., 2012.
4. Bentler, R., Mueller, H. G., & Ricketts, T., Modern Hearing Aids Verification, Outcome Measures, and Follow-Up, San Diego: Plural Publishing Inc., 2013.
5. Ruckenstein, M., Cochlear Implants and Other Implantable Hearing Devices, San Diego: Plural Publishing Inc., 2012.

GTA307 Audiology Clinic II

This course is a continuation of the course of Audiology Clinic I. In this course, students will conduct a clinical practicum at the USM Audiology Clinic and supervised by an experienced audiologist. Students will perform patient history taking and basic audiology tests. In addition, students are also trained in giving feedback to patients. This course is taught through clinical supervision, discussion and PBL. Students will be assessed through supervisor's evaluation (practicum), report, practical report, presentation, log book and final exam (written exam and clinical exam, that is, Objective Structured Clinical Examination). To pass this course, each student must pass the final exam with at least a C + grade.

List of text/reference books:

1. Valente, M. & Valente, L. M., Adult Audiology Casebook, New York: Thieme, 2015.
2. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.
3. Welling, D.R., & Ukstins, C.A., Fundamentals of Audiology for the Speech-language Pathologist. Burlington: Jones & Bartlett Learning, 2015.
4. Hall, J. W., Introduction to Audiology, Boston: Pearson, 2014.
5. Madell, J. R. & Flexer, C., Pediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.), New York: Thieme, 2014.

GTA308 Evaluation of Balance System

This course introduces students to the function of balance and vestibular system, related diseases and their pathophysiology, importance of nystagmus in clinical diagnosis, neuro-otological and vestibular evaluations as well as the management of patients with balance and vestibular disorders. This course also covers the relationship between the vestibular test results and the related ear pathologies. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Hamid, M. & Sismanis, A., Medical Otology and Neurotology: A Clinical Guide to Auditory and Vestibular Disorders, New York: Thieme, 2006.
2. Luxon, L. M., Furman, J. M., Martini, A. & Stephens, D., Textbook of Audiological Medicine: Clinical Aspects of Hearing and Balance, CRC Press, 2003.
3. Furman, J. M. & Cass, S. P., Vestibular Disorders: A Case-study Approach, New York: Oxford University Press, 2003.

GTA309 Audiology Clinic III

This course is a continuation of the course of Audiology Clinics I and ll. In this course, students will conduct a clinical practicum at the USM Audiology Clinic and supervised by an experienced audiologist. Students will perform patient history taking, basic audiology tests and aural rehabilitation. In addition, students are also trained in giving feedback to patients. This course is taught through clinical supervision and discussion. Students will be assessed through supervisor's evaluation (practical), report, presentation, log book and final exam (written exam and clinical exam, that is, Objective Structured Clinical Examination). To pass this course, each student must pass the final exam with at least a C + grade.

List of text/reference books:

1. Valente, M. & Valente, L. M., Adult Audiology Casebook, New York: Thieme, 2015.
2. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.
3. Welling, D.R., & Ukstins, C.A., Fundamentals of Audiology for the Speech-language Pathologist. Burlington: Jones & Bartlett Learning, 2015.
4. Hall, J. W., Introduction to Audiology, Boston: Pearson, 2014.
5. Madell, J. R. & Flexer, C., Pediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.), New York: Thieme, 2014.

GTA310 Basic Medical Management for Audiologist and Speech Pathologist

This course introduces students to the aspects of basic human anatomy and physiology and basic clinical examination that covers the respiratory, cardiovascular and neurology systems, and special senses (smell, vision and sensation). It also introduces basic laboratory and radiological investigations and basic treatment options such as pharmacology, operation, physiotherapy and occupational therapy as well as basic emergency procedures. This course will be conducted via lectures, tutorials and practical sessions. The students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Barbara Herlihy, B., The Human Body in Health and Illness (3rd Ed.), Philadelphia: W.B. Saunders Company, 2006.
2. Marieb, E. N., Anatomy & Physiology Coloring Workbook: A Complete Study Guide, (9th Ed.), San Francisco: Pearson Benjamin Cummings, 2008.
3. Sembulingam K. & Sembulingam, P. Essentials of Medical Physiology (3rd Ed.). India: Jaypee Brothers Medical Publishers, 2004.
4. Tortora, G. J. & Derrickson, B. H., Principles of Anatomy and Physiology (12th Ed.), New York: John Wiley & Sons Inc., 2009.

GTA311 Audiological Rehabilitation

This course introduces students to the importance of audiological rehabilitation, roles of the involved professionals, auditory and visual aspects in communication, psychosocial aspects of hearing loss, and rehabilitation techniques for children and adults with hearing loss, tinnitus and vestibular disorders. It also covers important issues such as the effects of hearing loss on language development and the communication modes for individuals with pre-lingual and post-lingual hearing loss. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Johnson, C. E., Introduction to Auditory Rehabilitation: A Contemporary Issues Approach, Allyn & Bacon, 2011.
2. Wolfe, J., & Schafer, E., Programming Cochlear Implants (Core Clincal Concepts in Audiology), San Diego: Plural Publishing Inc., 2010.
3. Seewald, R., & Tharpe, A. M. Comprehensive Handbook of Pediatric Audiology, San Diego: Plural Publishing Inc., 2010.
4. Herdman, S. J., Vestibular Rehabilitation (3rd Ed.), F. A. Davis Company, 2007.
5. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.

GTB316 Transfusion Science and Blood Banking

This course introduces students to the concept and knowledge of transfusion science and blood banking. It covers topics of human blood group systems, blood donation, preparation and types of blood component, pretransfusion testing, laboratory management and complication of blood transfusion. The course will be conducted via integrated teaching and learning approach, which comprise of F2F and online lectures,

flipped-classroom and practical. Students' knowledge will be assessed through test, practical skills (SPOT/OSPE), and final examination, while their soft skills such as communication skill and problem solving skill will be assessed through practical report and presentations. An assignment will be given to the students to assess interpersonal skills in science transfusion & blood banking by utilising digital skill. At the end of the course, the students will be equipped with the concepts and knowledge for the best practices in discipline of transfusion medicine and blood banking.

List of text/reference books:

1. Blaney K. D. & Howard P. R., Basic & Applied Concepts of Blood Banking and Transfusion Practices (4th Ed.), Elsevier Saunders, 2016.
2. Gretchen J., Zundel W. & Gockel-Blessing E., Clinical Laboratory Blood Banking and Transfusion Medicine Practices (1st Ed.), Pearson, 2014.
3. Harmening D. M., Modern Blood Banking and Transfusion Practices (7th Ed.), F.A. Davis Company, 2019.
4. Knight, R., Transfusion & Transplant Science (Fundamentals of Biomedical Science), Oxford University Press, 2018.

GTB317 Laboratory and Clinical Hematology

This course introduces students to the concept and knowledge of clinical and laboratory hematology. It covers topics on hematological diseases, genetics of hematological malignancies, laboratory investigations, laboratory management and instrumentations. Integrated teaching and learning approach is executed through F2F and online lectures, discussion, practical and seminar. Students will be assessed through tests, final examination, practical report, practical test and presentation.

List of text/reference books:

1. Hoffbrand, A. V. & David P. Steensma, D. V., Hoffbrand's Essential Haematology (8th edition). Wiley, 2019.
2. Turgeon, M. L., Clinical Hematology Theory and Procedures (6th Ed.), Jones & Barlett Learning, 2018.
3. Keohane, E. M., Otto, C. N., Walenga J. M., · Rodak's Hematology - E-Book: Clinical Principles and Applications (6th edition), Elsevier, 2019.
4. Ciesla, B., Hematology in Practice (3rd Ed.) F. A Davis Company, 2018.
5. Bain, B. J. & Bates, I., Laffan, M. A. & Lewis, S. M., Dacie & Lewis Practical Haematology (12th Ed.), Churchill Livingstone Elservier, 2017.

GTB318 Pharmacology II

This course introduces students to the concept of advanced pharmacology and application in health. It covers pharmacokinetics, pharmacodynamics, pharmacogenetics, quantitative pharmacology, systemic pharmacology and the introduction to pharmacology. The final topic, including research on drug discovery, post-market surveillance, and also on best practice and safety in drug usage. The course will be conducted via F2F and online lectures, as well as other student-centred learning activities, including, where possible, practical, discussions and field trips. Students will be evaluated through tests to identify

problems and solutions based on critical and lateral thinking, assignment related to current pharmacology health issue around the globe, practical reports, presentation based on current research articles and final examination.

List of text/reference books:

1. Ritter, J. M., Flower, R. J., Henderson, G., Loke, Y. K., MacEwan, D, & Rang H. P., Rang & Dale's Pharmacology (9th Ed.), Churchill Livingstone, 2019.
2. Whalen, K., Lippincott's Illustrated Reviews: Pharmacology (7th Ed.), Lippincott Williams & Wilkins, 2018.
3. Katzung, B., Basic and Clinical Pharmacology (14th Ed.), McGraw-Hill Education/Medical, 2017.
4. Rosenbaum, S. E., Basic Pharmacokinetics and Pharmacodynamics: An Integrated Textbook and Computer Simulations (2nd Ed.), John Wiley & Sons Inc., 2016.

GTB319 Toxicology

This course covers the fundamental concept of toxicology, including the effects of dose, tissue responses to toxic agents, the excretion of toxic substances, toxic reaction compounds, toxic substances such as solvent, food additives, herbicides and pesticides, detergents and materials other materials, the size of the levels of toxicity testing, in vitro and in vivo, toxicokinetic, toxicity to human target organs, carcinogen, mutagen teratogen and the mechanism of toxicity, and treatment. Students are exposed to toxic substances and exposures common to genotoxicity and issues when using chemicals that are harmful. In addition, students will be strengthened the principles and practical techniques used in laboratory tests, such as acute and chronic toxicity, carcinogenicity and the detection of trace elements, the isolation and testing of compounds and the spectroscopy, and chromatography. The exposure of actual environment in toxicology services are integrated into the course during practical sessions. This course is conducted through F2F and online lectures, practical classes, assignment and presentation. The students are evaluated through tests, assignment, laboratory reports and final examination.

List of text/reference books:

1. Tripathy, K. D., Essentials of Medical Pharmacology (7th Ed.), New Delhi: Jaypee Brothers, 2016.
2. Klaassen, C. & Watkins J. B., Casarett and Doull's Essentials of Toxicology (3rd Ed.), McGraw-Hill Education/Medical, 2015.
3. Harvey, R. A., Clark, M. A., Finkel, R., Ray, J. A. & Whalen, K., Lippincott's Illustrated Reviews (5th Ed.), Philadelphia: Lippincott Williams & Wilkins, 2011.
4. Katzung, B. G., Masters, S. B. & Trevor, A. J., Basic and Clinical Pharmacology (12th Ed.), New York: McGraw-Hill Professional Publishing, 2012.

GTB320 Medical Virology and Mycology

This course introduces to the concept of medical virology and mycology covers morphological characteristic, pathogenesis, sign/symptoms, diagnostic test, types of treatment, control and prevention measures. The use of biological database in health and research will be introduced. The course will be conducted via F2F/online lectures, practical and discussion. Students are assessed through practical reports, tests, seminar as authentic assessments, presentation on related current issues, assignment on problem solving and final examination.

List of text/reference books:

1. Peter, M.H. & David, M.K. Fields VIROLOGY Volume 1: Emerging Viruses (7th Edition). Wolters Kluwer 2020.
2. Phoebe, L., Molecular and Cellular Virology of Viruses. CRC Press, Taylor & Francis Group, 2019.
3. Wang-Shick Ryu. Molecular Virology of Human Pathogenic Viruses. Academic Press, 2017.
4. Jane, F., Vincent R.R., Glenn, F.F. & Anne, M.S. with Lynn, W.E. Principle of Virology (4th Edition), ASM Press, 2015.
5. Leonard, C. N., Virology: Molecular Biology and Pathogenesis (1st Edition), ASM Press 2010.
6. David, M., Geoffrey, D.R., & Anthony P.J.T. 21st Century Guidebook to Fungi (2nd Edition). Cambridge University Press, 2020.

GTB322 Medical Bacteriology

This course will introduce students to a more detailed knowledge of the general characteristics of medically important bacteria. It will cover fundamental aspects such as the impact of the organism on human health, its role in disease, epidemiology, resources, reservoirs and transmission of the bacteria in relation to disease, pathogenesis and clinical signs of disease. Students are also exposed to the correct method of collection and transport of clinical specimens, principles, processes and techniques in detecting, isolating and identifying disease-causing bacteria. Merit and demerit some techniques and tests (staining, culture, serology, molecular) are also emphasized. Methods of control, prevention and treatment are also discussed. This course will be conducted through lectures, practicals and tutorials. Students will be assessed through tests, OSPE (practical tests), presentations and final examinations.

List of text/reference books:

1. Cheesbrough, M., District Laboratory Practice in Tropical Countries (2nd Ed.), Cambridge University press, 2006.
2. Microbiology for the healthcare profesional (2nd ED). Karin C.VanMeter, Robert J.Hubert. Elsevier Health Science. 2015.
3. Medical microbiology (7th ED). Murray, Rosenthal, Pfaller. Elsevier-Health SCience Division. 2015.

GTB323 Medical Parasitology

This course covers the classifications and nomenclatures of protozoa, helminths and arthropods that affect human health and quality of life. In addition, the theory and best practice of integrated routine and molecular diagnosis of various medically important parasites will be discussed. The morphology, life cycle, epidemiology, pathogenesis, prevention and control of various parasites will be taught. Medically important parasites in Malaysia will be given more emphasis. The structure, function and administration of a typical parasitology laboratory will be introduced. Community engagement disseminating fundamental knowledge on parasitology using innovative ICT tools by students in collaboration with schools will be organised. The course will be conducted via F2F and online lecture, tutorial and practical. The students will be evaluated through tests, practical reports and practical test as authentic assessments, assignment and presentation on problem solving as performance- and challenge-based assessments and final examination.

List of text/reference books:

1. Mahmud, R., Lim, Y. A. I. & Amir, A., Medical Parasitology, Springer International Publishing, 2017.
2. Walochnik, J. & Duchene, M., Medical Parasitology, Springer-Verlag Wien, 2016.
3. Garcia, L. S., Diagnostic Medical Parasitology, (6th Ed.), ASM Press, 2016.
4. https://www.cdc.gov/
5. https://www.waavp.org/

GTB324 Clinical Biochemistry

This course introduces students from the pathophysiological biochemistry to the interpretation and understanding of health and human disease. Students will be exposed to the theoretical knowledge with practical skills to help with the diagnosis and treatment of diseases such as endocrine function, liver function, renal and kidney function, and the diagnosis of inherited and acquired metabolic disorders in order to improve quality of life. Demonstrations and practical works ensure competent laboratory practice and provide insight into the basic analytical skills and techniques used in transformation of current clinical biochemistry laboratory. This course also provides an overview of the integrated analytical instrumentation and analytical methods used, and safety issues associated with best practice in a clinical biochemistry laboratory. The effect of pre-analytical, analytical and post-analytical factors on biochemical data, the establishment and use of reference ranges and the importance of quality control in clinical laboratory administration are also introduced to provide at least some exposure to critical thought on data analysis of scientific/clinical research. The course will be conducted via face to face (F2F) and online lecture, tutorial and practical. The students will be assessed through test, Objective Structured Clinical Examination (OSPE), assignment on problem solving and evidence-based reviews, presentation, and final examination.

List of text/reference books:

1. Michael, M., Rajeev, S. & Kevin, D. Clinical Biochemistry: An Illustrated Colour Text (6th Ed.), Elsevier, 2018.
2. Michael L. Bishop, Edward P. Fody & Larry E. Schoeff. Clinical Chemistry: Principles, Techniques, Correlations. Wolters Kluwer. 2018.
3. Lillian A. Mundt, Kristy Shanahan. Graff's Textbook of Urinalysis and Body Fluids. Fourth Edition. Lippincott Williams & Wilkins. 2015.
4. Burtis, C. A. & Ashwood, E. R., Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics (7th Ed.), Saunders, 2014.
5. Ranjna Chawla. Practical Clinical Biochemistry: Methods and Interpretations. Fourth Edition. Jaypee Brothers medical Pub.2014.

GTB325 Clinical Diagnostic Laboratory Management

The course introduces students to the concept and advance knowledge of total quality management (TQM) in clinical diagnostic laboratory. TQM in clinical diagnostic laboratory emphasized the deployment of quality assurance principles and ensuring best practice adhere to the ethical principle, professionalism, and good laboratory practice (GLP) through the development and implementation of quality assurance plans and phases. This course also covers topics on the concept of sustainability, occupational safety and health, the quality systems, ISO 9001 and MS ISO 15189, in relation to the management of clinical diagnostic laboratory. The course will be conducted via blended learning approach, which comprise of lectures, tutorials, seminars, online learning activities and management attachment in various clinical diagnostic laboratory. The students will be assessed through online individual and collaboration assignment on problem solving, critical thinking and decision-making, written online test, online small group mini project discussions, online seminar presentations as contemporary assessment to enhance students communication skills and interpersonal skills and final examination.

List of text/reference books:

1. Centre for Global Sustainability Studies. USM Policy on Sustainability 2014. USM, 2014.
2. Cooper, G. & Gillions, T., Producing Reliable Test Results in the Medical Laboratory, Bio-Rad Laboratories Inc, 2007.
3. Safwar Zaman., Quality Control in Laboratory, Intech Open, 2018.
4. Department of Standards Malaysia. MS ISO/IEC 17025:2017, General Requirements for the Competence of Testing and Calibration Laboratories, Cyberjaya: Department of Standards Malaysia, 2017.
5. Department of Standards Malaysia. MS ISO 15189:2014, Medical Laboratories – Requirements for Quality and Competence, Cyberjaya: Department of Standards Malaysia, 2014.

GTD321 Therapeutic Diet Preparation

This course gives practical education regarding therapeutic diet preparation for various health problems. Therapeutic diet preparation is essential for meeting nutritional needs and improving overall well-being of an individual. Lectures on therapeutic food preparation will be given before the practical session. Students are required to order raw materials, prepare therapeutic diet based on medical condition of patient and write a report based on the case given. Practical test will be done to assess the ability of the students to prepare meals based on medical condition of patient.

List of text/reference books:

1. Shahar, S., Safil, N. S., Manaf, Z. A. & Haron, H., Atlas of Food Exchanges & Portion Sizes (3rd Ed.), Kuala Lumpur: MDC, 2015.
2. Sakinah, H., Komposisi Makronutrien 100 Makanan Kelantan. Pusat Pengajian Sains Kesihatan, 2010.
3. Mahan, L. K. & Raymond, J. L., Krause's Food, Nutrition & Diet Therapy (14th Ed.), Saunders Co., 2017.

GTD323 Principles of Medical Nutrition Therapy II

This course will enable the students to understand the standard nutrition care process and medical nutrition therapy for renal, hepatobiliary, rheumatoid, pediatric, intelectual, learning and developmental disabilities and neurology cases. Students will be taught on how to prepare a menu plan based on principle of medical nutrition therapy including the use of milk formula/ specialized pediatric formula. Each topic will discuss about the theoretical and practical aspects of the medical nutrition therapy that must delivered to the patients with various diseases.

List of text/reference books:

1. Kane, K. & Prelack, K., Advance Medical Nutrition Therapy, Jones and Bartlett Learning, 2019.
2. Mahan, L.K. & Raymond J.L, Krause's Food & The Nutrition Care Process, 14th Edition, Elsevier, 2017.
3. Rolfes, S.R, Pinna, K & Whitney, E., Understanding Normal & Clinical Nutrition, 11th Edition, Cengage Learning, 2018.
4. Kleinman, R.E & Greer, F.R., Pediatric Nutrition 7th Edition, American Academy of Pediatrics, 2014.
5. Medical Nutrition Therapy (MNT), Malaysian Dietitians' Association (MDA).
6. Clinical Practice Guidelines (CPG), Ministry of Health Malaysia (MOH).

GTD328 Dietetics Skill

This course provided education for the students about important skills as a dietitian for improving nutritional status and well-being of patients such as assessment of health status for addressing nutritional needs of the patients, medical and dietary data collection, documentation, dietetics counselling and interviewing techniques. The course will also emphasize on the aspects of competency and quality in dietetic, evidence-based practice, nutrition care process (NCP), enteral and parenteral nutritional support, medical nutrition therapy record documentation, presentation and writing skills.

List of text/reference books:

1. Bauer, K. D & Liou, D., Nutrition Counseling and Education Skill Development, Wadsworth Publisher Co., 2016.
2. Mahan, L. K. & Raymond, J. L., Krause's Food, Nutrition & Diet Therapy (14th Ed.), Saunders Co., 2017.
3. Nelms, M. Et al, Nutrition Therapy & Pathophysiology, 2nd Edition, Wadsworth Publisher Co, 2011.

GTD329 Research Project in Dietetics I

This course provides the opportunity to the student to prepare dietetics related research project proposal under the supervision of lecturer. Besides preparing the research project proposal, this course exposes the students to reference management software and techniques related to research proposal writing. This course will be conducted by supervision of research proposal preparation and discussion. Students will be assessed through research proposal, presentation and discussion.

List of text/reference books:

1. Guideline for The Preparation of Final Year Research Project Dissertation. School of Health Sciences Universiti Sains Malaysia, 2015.
2. Thomas D.R. and Hodges I.D., Designing and Managing Your Research Project: Core Skills for Social and Health Research. London. SAGE Publications Ltd, 2013.
3. Abdul Aziz Al Safi I., Kamarul Imran M., Muhamed Rusli A., Nor Azwany Y. and Wan Mohd Zahiruddin W.M. Research Methodology in Health Sciences (2nd Ed.), PPSP Publication, 2015 Publications, 2015.

GTD330 Dietetics Counselling and Communication

This course will introduce the students to the field of dietetics and career in dietetics. Among the important role of dietitian is the counselling skills, dietetics counselling and interviewing techniques will be exposed and taught to the students. The course will also emphasize on the aspects of successful nutritional education intervention for public health and for patients, patient educational tools and ethics in dietetics field will be discussed. Students will be assessed through simulation, presentation, assignment and final examination.

List of text/reference books:

1. Beto, J & Holli, B., Nutrition Education and Counseling Skills: A Guide for Professionals, 7th Edition, Lippincott Williams & Wilkins, 2017.
2. Mahan, L.K. et al, Krause's Food, Nutrition & Diet Therapy,14th Edition, Saunders Co, 2017.
3. Bauer, K.D & Liou, D., Nutrition Counseling and Education Skill Development, Wadsworth Publisher Co, 2016.
4. Gable, J. & Herrmann, T., Counselling Skills for Dietitians, 3rd Edition, Willey Blackwell, 2016.
5. Snetselaar, L., Nutrition Counseling Skills for The Nutrition Care process, 4th Edition, Jones & Bartlett Learning, 2008.

GTD331 Principles of Medical Nutrition Therapy III

This course will enable students to understand the standard nutrition care process and medical nutrition therapy for diseases related to respiratory, hepatobiliary, and neurology system, surgical, burn and critically ill patients. Students also will be exposed to the various types of nutrition support to improve the quality of nutritional status and the clinical condition of the patients. Each topic will discuss the theoretical and practical aspects of medical nutrition therapy that has to be given to patients with various diseases. This course will be taught via lecture and discussion. Students will be assessed through test, assignment, presentation, discussion, dan final examination.

List of text/reference books:

1. Mahan, L.K. et al, Krause's Food, Nutrition & Diet Therapy, 14th Edition, Saunders Co, 2017.
2. Nelms, M. & Sucher K, Nutrition Therapy & Pathophysiology, 4th nd Edition, Cengage Learning, 2020.
3. Whitney, W., Understanding Normal & Clinical Nutrition, 11th Edition, Australia, Wadsworth, 2017.
4. Nelms, M.H, Medical Nutrition Therapy A Case Study Approach : 5th Edition Thomson Wadsworth , 2016.
5. Gail A. Cresci, Nutrition Support for the Critically Ill Patience A guide to Practice. 2nd Ed. CRC Press Taylor & Francis Group, 2015.
6. Malaysian Dietitian Asc. (MDA) Medical Nutrition Therapy
7. Clinical Practice Guidelines, Ministry of Health Malaysia

GTD332 Research Project in Dietetics II

This course provides the opportunity to the student to carry out food, nutrition, clinical and social sciences in nutrition care process related research project under the supervision of lecturer. Besides doing the research project, this course also exposes the students to techniques related to thesis writing. This course is conducted by supervision of research work in the lab, discussion and fieldwork. Students are evaluated through thesis, presentation and discussion.

List of text/reference books:

1. School of Health Sciences Universiti Sains Malaysia, Guidelines for the Preparation of Final Year Research Project Dissertation, 2015.
2. Thomas D.R. and Hodges I.D., Designing and Managing Your Research Project: Core Skills for Social and Health Research. London. SAGE Publications Ltd, 2013.
3. Abdul Aziz Al Safi I., Kamarul Imran M., Muhamed Rusli A., Nor Azwany Y. and Wan Mohd Zahiruddin W.M. Research Methodology in Health Sciences (2nd Ed.), PPSP Publication, 2015 Publications, 2015.

GTF305 Forensic Toxicology and Chemistry of Drugs

This course introduces students to fundamental concept of toxicology, forensic toxicology, poison, multiple poisoned material, chemistry and appearance of poisoned material, multiple procedures, best practices, conventional and innovative techniques, and equipment's employed to extract, identify, and profile the poisoned material from biological and autopsy specimens. Classification and identification of drugs that commonly abused, modes of action linking to human health, as well as the techniques to identify and detect them will also be emphasized. This course also discusses the effects of toxic substances to human and environment as well as other emerging issues in forensic toxicology. This course will be taught via lecture, discussion, PBL and practical. Students will be assessed through tests, assignments, practical reports, practical test, and final examination.

List of text/reference books:

1. B.S. Levine and S. Kerrigan. Principles of Forensic Toxicology (5th Edition). Springer, 2020.
2. R.J. Flanagan, E. Cuypers, H.H. Maurer and R. Whelpton. Fundamentals of Analytical Toxicology: Clinical and Forensic Science (2nd Edition). Wiley, 2020.
3. A. Negrusz and G. Cooper. Clarke Analytical Forensic Toxicology (2nd Edition). Pharmaceutical Press, 2013.

GTF306 Fire Investigation

This course introduces students to the basics and the causative factors of fire, including the different types of material evidence often encountered in structure fires. The methodology and current best practice for fire scene evidence collection and packaging as well as the fire debris analysis to determine the cause and origin of fire including safety measures during investigation. This course also convey knowledge about the general risks encountered in fire incidents and the safety measures' to be followed for community well-beings. This course will be taught via lecture, fire demonstration and fire investigation. Students will be assessed through tests, practical reports, discussion, presentation, and final examination.

List of text/reference books:

1. NFPA 921: Guide for Fire and Explosion Investigations. National Fire Protection Agency, 2019.
2. J.D. DeHaan, P.L. Kirk and J.D. Icove. Kirk's Fire Investigation (8th Edition). Pearson, 2017.
3. J.I. David, J.D. DeHaan and G.A. Haynes. Forensic Fire Scene Reconstruction (4th Edition). Pearson, 2012.

GTF309 Forensic DNA Analysis

This course introduces students to the fundamental knowledge associated to various forensic DNA analysis as well as the problems associated in each technology involving DNA analysis and ways of troubleshooting to solve the problems. Students will be trained to use innovative apparatus and latest software invented for DNA analysis and interpret the result accordingly to solve forensic cases which involved DNA analysis and lead to better understanding on the importance of DNA technology in the field of forensic

sciences. This course also discusses the importance of identifying biodiversity in animals and plants through DNA analysis for conservation of species biodiversity. This course will be taught via lecture and practical. Students will be assessed through tests, presentation, practical reports, practical test, and final examination.

List of text/reference books:

1. M.M. Houck and J.A. Siegel. Fundamentals of Forensic Science (3rd Edition). Elsevier, 2015
2. J.M. Butler. Advanced Topics in Forensic DNA Typing: Methodology. Academic Press, 2011
3. J.M. Butler. Fundamentals of Forensic DNA Typing. Academic Press, 2009.

GTF313 Food Chemistry

This course introduces students to the classification and structure of carbohydrates, proteins, oils, and fats. It also covers food flavour and food additives, food forensics and the importance of quality control in food, consequence of food fraud to quality of life and food security issues. This course will be taught via lecture and discussion. Students will be assessed through tests, presentation, project proposal and final examination.

List of text/reference books:

1. S. Otles. Methods of Analysis of Food Components and Additives (2nd Edition). CRC Press, 2012.
2. H-D. Belitz, W. Grosch and P. Schieberle. Food Chemistry. Springer, 2009.
3. S. Damodaran, K.L. Parkin and O.R. Fennema. Fennema's Food Chemistry (5th Edition). CRC Press, 2017.
4. C.C. Akoh and D.B. Min. Food Lipids: Chemistry, Nutrition, and Biotechnology. CRC Press, 2008.

GTF315 Biological Evidence

This course introduces the students to the multiple biological evidence types of both plant and animal origin that are found at the crime scenes, the methods of observing, describing and collecting them, their salient morphological features useful for identification and the procedures and best practices used in the laboratory to investigate this evidence. The evidence types focused include pollen grains, diatoms, wood, hairs and natural fibres, damages in cloth and necrophagous insects. Emerging areas in forensic biology such as diverse wildlife and marine forensics and bioterrorism are also included. This course will be taught via lecture, discussion and practical. Students will be assessed through tests, assignments, practical reports, practical test, and final examination.

List of text/reference books:

1. A. Gunn. Essentials of Forensic Biology (3rdEdition). Wiley, 2019.
2. L. Richard. Forensic Biology (2nd Edition). CRC Press, 2015.
3. J.H. Byrd and J.L. Castner. Forensic Entomology: The Utility of Arthropods in Legal Investigations (2nd Edition). CRC Press, 2009.

GTF316 Natural Products Chemistry

This course introduces students to biosynthesis of natural secondary metabolites, synthetic pathway of natural products such as acetate, shikimate, mevalonate, and alkaloid. It also discusses the development and synthetic works of natural product and its analogues as well as current developments and future directions in the field of natural products to promote sustainable use of ecosystems. This course will be taught via lecture and discussion. Students will be assessed through tests, discussion, project proposal and final examination.

List of text/reference books:

1. S.D. Sarker and L. Nahar. Chemistry for Pharmacy Students: General Organic and Natural Product Chemistry (2nd Edition). John Wiley & Sons, 2019.
2. S.P. Stanforth. Natural Product Chemistry at a Glance. Blackwell Publishing, 2006.
3. J.M. Hornback. Organic Chemistry (2nd Edition). Thomson Brooks/Cole, 2006.

GTF317 Introduction to Criminology

This course introduces students to basic concepts and theories in criminology. This knowledge would enable students to understand issues and problems of specific crime clusters for example youth, environment, media, technology, and others. It also explores equality, human rights and security related to the population and poverty. This course will be taught via lecture, case study, eLearning, and discussion. Students will be assessed through test, assignments, reports, discussion, and final examination.

List of text/reference books:

1. A. Walsh and C. Jorgensen. Criminology: The Essentials (3rd Edition). Sage Publications, 2017.
2. L.E. Daigle and L.R. Muftic. Victimology: A Comprehensive Approach (2nd Edition). Sage Publications, 2019.
3. R. White. Transnational Environmental Crime: Toward an Eco-global Criminology. Routledge, 2018.
4. H. Jailani. Jenayah bawa padah 20 kes berprofil tinggi. Kuala Lumpur: Berita Publishing Sdn. Bhd, 2011.
5. G. Linthini, D.J. Maria Magdalina, K. Mohammad Rahim, M.S. Nadiah Syariani, M.S. Geshina Ayu, L. Mazlan and N. Abd Aziz. Commercial Crime: the crime, criminals and Malaysian Laws. Kubang Kerian: School of Health Sciences, USM, 2015.
6. Penal Code (Act 574).

GTF318 Forensic Anthropology and Odontology

This course introduces the students the fundamentals of Forensic Anthropology and Odontology to estimate age, sex, race, and personal identification from the skeletal and from dental remains. Students will also be exposed to the anthropometric and anthroposcopic techniques useful techniques for assessing the age, sex, race from skeletal remains and bitemark analysis for identifying an individual. Disaster victim identification and risk management, dental record management to determine an identity will also be

discussed. This course will be taught via lecture, practical and discussion. Students will be assessed through tests, assignments, practical reports, practical test, and final examination.

List of text/reference books:

1. A.M. Christensen. Forensic Anthropology: Current Methods and Practice (2nd Edition). Academic Press, 2019.
2. A.M. Christensen. A Laboratory Manual for Forensic Anthropology. Elsevier Inc., 2018.
3. H.M. Garvin and N.R. Langley. Case Studies in Forensic Anthropology: Bonified Skeletons. CRC Press, 2019.

GTF319 Law, Evidence Presentation and Quality Assurance

This course introduces the laws and evidence presentation in forensic science. Students will be exposed to general principles in criminal and civil laws, as well as the legal rules regarding the search and seizure of physical evidence, standards of reliability and relevance of scientific evidence in court, the scientific interpretations and presentation of physical evidence. The roles played by forensic scientists in litigation procedure are discussed and guidelines for professionalism and conduct in expert witnessing are explained. Importance in establishing and maintaining responsible and professional forensic science services through quality assurance to ensure the public justice and harmony will also be discussed. Student will be taught via lecture and discussion. Students are evaluated through discussion, simulation, assignments, and final examination.

List of text/reference books:

1. K.M. Pyrek. Forensic Science Under Siege: The Challenges of Forensic Laboratories and the Medico-legal Investigation System. Elsevier Academic Press, 2007.
2. M.M. Houck. Professional Issues in Forensic Science. Elsevier Academic Press, 2015.
3. P.D. Barnett. Ethics in Forensic Science: Professional Standard for the Practice of Criminalistics. CRC Press, 2001.

GTK312 Ergonomic

This course introduces students to the theory and application of ergonomic and body mechanics at workplace in order to prevent workers from injuries. The content of the course will focus on the role of occupational health and safety officers in monitoring the application of proper ergonomics, body mechanics, possible injuries for specific task and the preventive or rehabilitation of workers at workplace. The students will be able to understand the specific work process, injuries preventive measure and rehabilitation intervention as well return to work program if there are any injuries sustain by the workers. The course is delivered through lectures and case discussions. Students will be assessed through performance in presentation, report, test, assignment and final exam.

List of text/reference books:

1. Guidelines on Ergonomics Risk Assessment at Workplace. Department of Occupational Safety and Health. Ministry of Human Resources Malaysia. 2017.
2. Stack T, Ostrom LT and Wilhelmsen CA. Occupational Ergonomics: A Practical Approach . John Wiiley & Sons. Inc. 2016.
3. Graveling R. Ergonomics and musculoskeletal disorders (MSDs) in the workplace : A forensic and epidemiological analysis. CRC Press. 2019.
4. Arezes PM and Ergonomics and human factors in safety management. CRC Press. 2016.
5. Thatcher A & Yeow PHP. Ergonomics abd Human Factors for a Sustaianble Future. Palgrave Macmilillan. 2018.
6. Guidelines for Manual Handling at Workplace. Department of Occupational Safety and Health. Ministry of Human Resources Malaysia.2018.

GTK313 Pest and Vector Control

This course explains the knowledge, concepts and vector and pest control skills. This course covers the introduction of vectors and pests, vector-borne diseases and pest, cases or epidemiological investigations based on aetiology, virus reservoir, transmission, incubation time, duration of infection, susceptibility and endurance, clinical diagnosis, treatment principles, environmental sampling, methods/preventive and control measures of vector and pest disease control, enforcement and prosecution aspects under the act/regulation in relation to public health legislation, risk assessment and risk communication. This course will be taught through lectures and practical exercises. Students will be assessed through practical reports, assignments, presentations, tests and final examination.

List of text/reference books:

1. Marcello Nicoletti. Insect-Borne Diseases in the 21st Century. Elsevier Science Publishing Co Inc, 2020.
2. Stephen K. Wikel, Serap Aksoy and George Dimopoulos (Eds.). Arthropod Vector: Controller of Disease Transmission, Volume 2. Vector Saliva-Host Pathogen Interactions, 1st Edition. Academic Press, 2017.
3. Bennett, G. W., Owens, J. M. & Corrigan, R. M., Truman's Scientific Guide to Pest Management Operations (7th Ed.), Purdue University, 2010.
4. Van Emden, H. F. & Service, M.C., Pest and Vector Control, Cambridge University Press, 2004.
5. Rozendall, J. A., Vector Control: Methods for Use by Individuals and Communities, WHO, 1997.
6. Pratt, H. D. & Moore C. G., Mosquitoes of Public Health Importance and Their Control, CDC, 1993.
7. Destruction of Disease Bearing Insects Act 1975.

GTK314 Communicable Disease Control

This course explains the knowledge and skills required in protecting the health of the public on matters related to disease control. This course covers epidemiology of infectious and non-infectious diseases, case management or epidemiology of infectious diseases based on infectious agents, incubation periods and infections, transmission of disease, cause of infection, signs and symptoms of disease, disease diagnosis and detection. In addition, case management and environmental sampling management, preventive and control measures of infectious and non-infectious diseases, enforcement and prosecution aspects under the public health legislation, risk assessment and risk communication are described in depth. This course will be taught through lectures and practical exercise. Students will be evaluated through tests, practical reports, presentations, assignments and final exams.

List of text/reference books:

1. Jeremy Hawker, Norman Begg, Ralf Reintjes, Karl Ekdahl, Obaghe Edeghere, Jim E. Van Steenbergen. Communicable Disease Control and Health Protection Handbook, 4th edition. Wiley-Blackwell, 2018.
2. Anil K.S. Communicable Diseases of the Developing World, 1st edition. Springer International Publishing, 2018.
3. John E. Bennett , Raphael Dolin, Martin J. Blaser. Mandell, Douglas and Bennett's Infectious Disease Essentials. Elsevier, 2016.
4. 4. Webber, R. Communicable diseases: a global perspective, 5th edition. CABI Publishing, 2016.
5. M'ikanatha, John, K.I. Concepts and Methods in Infectious Diseases Surveillance. John Wiley & Sons, 2015.
6. Noah, N.D, Norman, D. Controlling Communicable Diseases. Maidenhead, England. 2006.
7. Hill, S.A. Emerging Infectious Diseases. Pearson Benjamin Cummings, 2006.
8. Webber, R., Communicable Diseases: Epidemiology and Control, Wallingford: CABI Publishing, 1996.
9. Noah, N. D. & Norman, D., Controlling Communicable Diseases, Maidenhead, 2006.
10. Jeremy, H., Norman, B., Lain, B., Ralfm R. & Julius, W., Communicable Disease Control Handbook (2nd Ed.), BlackWell Publishing, 2001.
11. Prevention and Control of Infectious Diseases Act 1988.

GTK315 Occupational Safety and Health Management

This course will introduce the system of occupational safety and health management practice in Malaysia as ISO 45001, ILO-OSH 2001 and MS 1722 to cultivate a caring attitude and self-regulate the workers and employers to create a work environment that is safe and healthy. This course will also include documentation, training, performance assessment and audit methodology. The course content is aligned with course content Module I Occupational Safety and Health Officer appointed by the Department of Occupational Safety and Health, Ministry of Human Resources, Malaysia. Aspects of Sustainability also highlighted through component of "Death rate, Human Right and Disaster Management". Students will be tested with tests, quizzes, final exams, assignments and presentations.

List of text/reference books:

1. Lingard, H. & Rowlinson, S.M. Occupational Health and Safety in Construction Project Management. Taylor & Francis. 2005.
2. Manuele, F.A. On the Practice of Safety (3 Ed). Wiley-IEEE. 2003.
3. Reese, C.D. Occupational Safety and Health Management; A Practical Approach. CRC Press. 2003.
4. Akta Keselamatan dan Kesihatan Pekerjaan 1994 dan Peraturan-Peraturan. Undang-Undang Malaysia. ILBS. 2005.
5. Akta Kilang dan Jentera 1967 dan Peraturan-Peraturan. Undang-undang Malaysia. ILBS 2005.
6. Geoff Wells. Hazard Identification and Risk Assessment. Instituition of Chemical Engineers. 1996.

GTK316 Environmental Management

Students are introduced to important aspects in managing the environment. This course introduces the ISO 14001 environmental management system adopted. Students are explained the requirements of the standard and are trained to provide documentation and conduct internal audits. The methods of implementing Environmental Impact Assessment, Social Impact Assessment and integrated environmental management will also be explained.

List of text/reference books:

1. Elzbieta Broniewicz. Environmental Management in Practice. IntechOpen Limited. 2011.
2. International Organization for Standardization. Introduction to ISO 14001:2015. ISO Central Secretariat. Switzerland. 2015.
3. Barrow, C.J. Environmental Management and Development. Routledge Taylor & Francis Group. 2005.
4. Mushtaq, Basharat, Bandh, Suhaib A., Shafi & Sana. Environmental Management; Environmental Issues, Awareness and Abatement. Springer Nature. 2020.
5. Singh, Raj Mohan, Shukla, Prabhakar, Singh & Prachi. Environmental Processes and Management. Springer Nature. 2020.
6. Frances Alston & Brian K. Perkins. Strategic Environmental Performance; Obtaining and Sustaining Compliance. Routledge Taylor & Francis Group. 2020.

GTK317 Emergency Response and Planning

This course explains about major accidents and disasters that have occurred or potentially occurred in Malaysia, the Southeast Asian region and the world that can affect human life and the environment. Students are also introduced to the concept of disaster prevention and the formation of the Emergency Action Plan (ERP) and the Emergency Response Team (ERT). This course is delivered through lectures, tutorials and practical. Aspects of Sustainability also highlighted through component of "Death Rate, Transport system and Human Right". Students will be tested with tests, quizzes, final exams, assignments and presentations.

List of text/reference books:

1. Leigh, J. P., Markowitz, S., Fahe, M. & Landrigen, P. Costs of Occupational Injuries and Illnesses (4th Ed.), University of Michigan Press, 2003.
2. Parcell, P., Disaster Prep 101: The Ultimate Guided Emergency Readiness, Info Quest, 2004.
3. Erickson, P. A. Emergency Response Planning for Corporate and Municipal Managers, Academic Press, 1999.
4. Akta Keselamatan dan Kesihatan Pekerjaan 1994 dan Peraturan-Peraturan. Undang-Undang Malaysia. ILBS. 2005.
5. Akta Kilang dan Jentera 1967 dan Peraturan-Peraturan. Undang-undang Malaysia. ILBS 2005.

GTK318 Environmental Health Legislation

This course introduces environmental health related laws in Malaysia. These include provisions to protect and preserve the environment from pollution, which cover air, water and soil quality, and resource sustainability. This course will be taught via f2f and online lectures. Students are assessed through assignment, presentation, media review and examination.

List of text/reference books:

1. Environmental Quality Act (Act 127) & Regulations and Orders, ILBS, 2019.
2. Food Act 1983 (Act 281) dan Regulations, ILBS, 2019.
3. Prevention and Control of Infectious Diseases Act 1988 (Act 342). ILBS, 2021.
4. Destruction of Disease-Bearing Insects Act 1975 (Act 154). ILBS, 2018.

GTK320 Environmental and Occupational Toxicology

This course will focus on understanding the effects of toxicants from the environment and occupational setting that can harm the human being. This course also describes the target organ toxicity (hematotoxicity, neurotoxicity, hepatotoxicity, nephrotoxicity, neurotoxicity, dermatotoxicity, pulmunotoxicity and reproductive organ toxicity) and chronic toxicity effects (carcinogenesis, mutagenesis and teratogenesis). The classification of environmental and occupational toxicants will be discussed. Dose-response relationship and characterization are also being focused. The course will help to create awareness and knowledge on the toxicological effect of a compound that can affect the user or a community. Students are given the task to discuss for alternative methods to reduce production of toxic waste from multiple sources to the environment. The course will be conducted via lecture, practical, and discussion. Students will be evaluated through assignments, discussion, tests, practical report and final examination.

List of text/reference books:

1. Paul I. Toxicity and Risk: Context, Principles and Practice. CRC Press. Routledge, London. 2019.
2. Curtis D. Klaassen, C. D & Watkins III, J. B. Casarett & Doull's Essentials of Toxicology, Third Edition. Mc Graw Hills, Europe. 2015.
3. Clements, W. H., Community Ecotoxicology, John Wiley & Son, 2002.
4. Stanley, E. M., Toxicological Chemistry and Biochemistry, Lewis Publication, 2003.

5. Williams, P.L., James, R.C. & Roberts, S.M. Principles of Toxicology: Environmental and Industrial Applications. John Wiley & Sons, Inc. 2000.

GTK321 Research Project

This course aims to increase knowledge and research skills in occupational health and safety and environmental health fields. The research conducted aims to strengthen the understanding of the impact of environmental contaminants and occupational hazards on health and the environment. The research findings will be shared via scientific writing and presentation.

List of text/reference books:

1. Daniel, W. W. and Cross, C. L., Biostatistics: A Foundation for Analysis in the Health Sciences (11th ed.), New Jersey: Wiley. 2019.
2. Kumar, R., Research Methodology: A Step by Step Guide for Beginners (5th Ed.), SAGE Publications Ltd., 2018.
3. McClean, S., Bray, I., de Viggiani, N., Bird, E. and Pilkington, P., Research Methods for Public Health. SAGE Publications Ltd., 2019.
4. Stewart, A., Basic Statistics and Epidemiology: A Practical Guide (4th Ed.), Florida: CRC Press Taylor & Francis Group. 2016.

GTK343 Engineering Fundamental and Process Safety

This course introduces students to engineering fundamentals and process safety. Engineering physics and concept used in industry shall expose student to the capability of understanding key engineering concept in workplace especially in energy and production industry. As part of Industry, Innovation, & Infrastructure initiatives student shall be introduced to the 14 elements of process safety management where process safety fundamentals are covered and students will emerge with a better understanding of the key principles of process safety and its management in preventing and reducing the impact of disaster through disaster risk management. This course is delivered through lectures and others face to face learning in order to ensure students gain a better understanding of each topic. Students are tested through assignments, quizzes, exams, mini project and final exam.

List of text/reference books:

1. Center for Chemical Process Safety, Guidelines for Auditing Process Safety Management Systems. 2011.
2. I. American Institute of Chemical Engineers, Introduction to process safety for undergraduates and engineers. 2016.
3. CCPS, Guideline for Process Safety Documentation. New York: American Institute of Chemical Engineer, 1995.
4. CCPS, Guidelines for Implementing Process Safety Management, 2nd ed. Hoboken, New Jersey: John Wiley, 2016.
5. J. Daalmans, “Human Behavior in Hazardous Situations Best Practice Safety Management in the Chemical and Process Industries,” 2013.
6. DOSH CIMAH Regulation.

GTN304 Nutrition Research Project I

This course provides the opportunity to the student to prepare food, nutrition and health sciences related research project proposal under the supervision of lecturer. Besides preparing the research project proposal, this course also exposes the students to reference management software and techniques related to research proposal writing. This course is conducted by supervision of research proposal preparation and discussion. Students are evaluated through research proposal, presentation and discussion.

List of text/reference books:

1. Guidelines for the preparation of final year research project dissertation. School of Health Sciences, USM, 2015.
2. Thomas D.R. and Hodges I.D., Designing and Managing Your Research Project: Core Skills for Social and Health Research. London. SAGE Publications Ltd, 2013.
3. Abdul Aziz Al Safi I., Kamarul Imran M., Muhamed Rusli A., Nor Azwany Y. and Wan Mohd Zahiruddin W.M. Research Methodology in Health Sciences (2nd Ed.), PPSP Publication,2015

GTN311 Food Service Management

This course designs to familiarize the students to the fundamentals of foodservice management. Throughout this course, the students will gain exposure to aspects such as issues in the foodservice industry, food safety and sanitation, menu planning, costing and recipes standardization, the dynamic flow of food from the point of purchase to the meal service, design and layout of industry-related equipment selection and foodservice systems. At the end of the course, students will be able to differentiate between foodservice classifications, integrate the management knowledge, and skills learnt thinking and scientific enquiry in the menu preparation process, and become proficient in financial management in line with industry requirements.

List of text/reference books:

1. Reynolds, D., Foodservice Management Fundamentals. Wiley and Sons. New Jersey, 2013.
2. Palacio, J.P and Theis, M, Foodservice Management Principles and Practices. (Pearson New International edition, Twelfth Edition) Pearson Education Limited. Essex, England, 2014.
3. Edelstein, S, Managing Food and Nutrition Services. Jones and Bartlett Publishers. Sudbury, Massachusetts, 2008.
4. Spears, M.C., Foodservice Organisations: A Managerial and systems Approach. (Fourth Edition). Prentice Hall, New Jersey, 2000.

GTN321 Food Safety and Microbiology

This course introduces students to the role of microorganism in food, identification methods and classifications, and intrinsic and extrinsic factors which affect the microorganisms' growth. It also covers Hazard Analysis Critical Control Point (HACCP), ISO 22000, 'Good Manufacturing Practice' (GMP) and Food Act 1983 which are used in food industries in Malaysia and other countries. This course will be conducted via lectures, tutorials, practical sessions and discussion. Students will be assessed through test, assignment, practical reports and final examination.

List of text/reference books:

1. Georges Martin (ed). Food Safety: Contaminants, Pathogens and Illnesses, Nova Science Publishers Inc New York, United States, 2020.
2. Bibek Ray and Arun Bhunia, Fundamental Food Microbiology, 5th Edition, London:CRC Press, 2013.
3. Martin R. Adams and Maurice O. Moss, Food Microbiology, 4th Edition, Cambridge: Royal Society of Chemistry, 2015.
4. Thomas J. Montville and Karl R. Matthews, Food Microbiology: An Introduction, 4th Edition, ASM Press, 2017.

GTN322 Nutrition Education and Promotion

This course imparts knowledge about nutrition education and promotion with special emphasis on school children as well as high risk groups. It also introduces methods in planning, implementing strategies, monitoring and evaluating nutrition education and promotion programs. This course will be taught via lectures and discussion. Students will be assessed through assignment, project, tests and final examination.

List of text/reference books:

1. Isobel R Contento and Pamela A Koch. Nutrition Education: Linking Research, Theory, and Practice. 4thEd., Jones & Bartlett Publishers, 2020
2. Tony Worsley. Nutrition Promotion: Theories and Methods, Systems and Settings, CAB International, 2008.
3. Anastasia Snelling. Introduction to Health Promotion. Jossey-Bass, 2014
4. National Coordinating Committee on Food and Nutrition. Malaysian Dietary Guidelines. Ministry of Health Malaysia, Putrajaya; 2010.
5. National Coordinating Committee on Food and Nutrition. National Plan of Action for Nutrition of Malaysia III 2016-2025. Ministry of Health Malaysia, Putrajaya; 2016.

GTN323 Nutrition and Genetics

This course introduces students to component of genetics, nutrigenomics, nutrigenetic and epigenetics. It also covers aspects related to the above-mentioned components with nutrition metabolism and its effect on nutrition related diseases. This course will be taught via lecture and discussion. Students will be assessed through test, report, assignment and final examination.

List of text/reference books:

1. Burdge, G. & Lillycrop, K., Nutrition, Epigenetics and Health. (1st Ed.), World Scientific-New Jersey, 2017.
2. Pathak Yashwant & Ardekani Ali MF. Nutrigenomics and nutraceuticals : clinical relevance and disease prevention, CRC Press/Taylor & Francis 2018.
3. Thomas Alison. Introducing Genetics, Garland Science, 2th Ed., 2015.

GTS317 Sports Management

This course introduces students to the concept and theories in sports management. This course also introduces students to the skills in managing and organizing events sysmatically. This course will be taught via lectures, practicals and discussion. Students will be assessed through tests, assignments, presentation and final examination.

List of text/reference books:

1. Karen Bill, Sport Management (Active Learning in Sport). Learning Matters, 2009.
2. Russell Hoye, Aaron C.T. Smith, Matthew Nicholson, Bob Stewart, Sport Management Series Sport Management: Principles and Applications. 4th edition. Oxford: Routledge, 2015.
3. Bucher C.A. & Krotee M.L., Management of Physical Education and Sport. 13th edition. New York: McGraw-Hill, 2013.
4. George, F., Greysey, S.A. & Walsh, B., The Business of Sports: Text and Cases on Strategy and Management, 2012.

GTS322 Research Project

This course introduces students to diverse research disciplines pertaining to exercise and sports science. Students will be engaged in a supervised research under the guidance of a faculty member. They can choose any research topics which include sport physiology, sport psychology, sport nutrition, sport biomechanic etc. which emphasize on health and healthy lifestyle. This course requires substantial independent work by students. Students will be assessed through dissertation, presentation and work quality.

List of text/reference books:

1. Minichiello, V., Sullivan, G., Greenwood, K. & Axford, R., Handbook for Research Methods in Health Sciences, Australia: Addison Wesley, Longman, 1999.
2. Montgomery, D.C., Design and Analysis of Experiments (5th edition). New York: John Wiley and Sons, 2000.
3. Guidelines for the preparation of final year research project dissertation. School of Health Sciences, USM, 2015.
4. Any books/journals relevant to the fields or topics of research chosen by the students.

GTX307 Radiation Protection and Safety II

This course is the continuity of Radiation Protection and Safety I course. This course focus on giving the output through lectures and practicals regarding the application of fundamentals in radiation protection towards health and industrial fields. Students will be taught on radiation protection and safety aspects including administration, work procedure and construction of three main departments in hospital; diagnostic radiology, radiotherapy and nuclear medicine. Students will be taught practically on workplace and personnel monitoring according to Atomic Energy Licensing Board (AELB) and Ministry of Health (MOH). Students also will be taught theoretically and practically regarding working procedure and safety aspects in research using radiation as well as radiation waste management. The course will be conducted via F2F and online lectures, tutorials and discussions. Students will be assessed based on test, assignment, presentation, simulation and final examination.

List of text/reference books:

1. Mary A. Statkiewicz, Paul J Visconti, Russell Ritenour, Radiation Protection in Medical Radiography 8th Edition, Mosby Inc., 2017.
2. Max H Lombardi, Radiation Safety in Nuclear Medicine 2nd Edition, Taylor & Francis Group, 2007.
3. Ismail Bahari, Mohd Yusof Ismail, Managing Radiation Safety, Atomic Energy Licensing Board, McGraw-Hill, 2007.
4. Abd Aziz Mohd Ramli, Idris Besar, Radiation Safety 3rd Edition, Malaysian Nuclear Agency, 2008.
5. E B Podgrosak, Radiation Oncology Physics, International Atomic Energy Agency, 2005.

GTX326 Principles of Radiotherapy

This is an introductory course for the student to the basic principles of radiotherapy which including basic concept of radiotherapy physics, clinical radiotherapy machine, dose calculation, treatment planning and modern radiotherapy techniques.

List of text/reference books:

1. P. Mayles, A. Nahum, J.C Rosenwald, Handbook of Radiotherapy Physics: Theory and Practice, (2nd Edition), CRC Press, 2020.
2. F. Khan, The Physics of radiation therapy (5th Edition), Lippincott Williams & Wilkins, 2014.
3. C. Washington and D. Leaver, Principles and Practice of Radiation Therapy, (4th Edition), Mosby, 2016.
4. R. Stanton and D. Stinson, Applied Physics for Radiation Oncology, (Revised edition), Medical Physics Publishing, 2009.

GTX327 Brachytherapy

This course discussed fundamental physics and dosimetry aspects of brachytherapy. Radioactive sources commonly used in brachytherapy and types of brachytherapy will be discussed in this course. The course will be conducted via F2F and online lectures and tutorials. The students will be assessed through test, project, assignment on problem solving, practical exercise and final examination.

List of text/reference books:

1. Washington, C. M. & Leaver, D. T., Principles and Practice of Radiation Therapy (4th Ed.), St Louis: Mosby, 2016.
2. Khan, F. M. The Physics of Radiation Therapy (5th Ed.), Lippincott William & Wilkins, 2014.
3. Venselaar, J.L.M., Baltas, D., Ali, S.M., Hoskin, P.J., Comprehensive Brachytherapy: Physical and Clinical Aspects (1st Ed.). CRC Press, 2013.
4. Symonds, P., Walter and Miller's Textbook of Radiotherapy: Radiation Physics, Therapy and Oncology (7th Ed.). Churchill Livingstone/Elsevier Science Limited, 2012.

GTX328 Diagnostic Radiology Imaging Techniques

Students will learn about radiographic anatomy as well as undergo clinical training related to general radiographic imaging techniques, emergency radiography, dental radiography, fluoroscopy, CT scanning, MRI, DSA and mammography in detecting anatomical and pathological structures. Students will be assessed in terms of practical tests, logbooks, presentations and practical exercises.

List of text/reference books:

1. Bruce W. Long, Jeannean Hall Rollins, Barbara J. Smith, Merrill's Atlas of Radiographic Positioning & Procedures, Fourteenth edition, Publisher: St. Louis, Missouri : Elsevier, 2019.
2. Sanjay M. Mallya and Ernest W.N. Lam, White and Pharoah's Oral Radiology : Principles and Iinterpretation, 8th edition, Publisher: St. Louis, Missouri : Elsevier, 2019.
3. Bontrager, K. L. & Lampignano, J. P., Textbook of Radiographic Positioning and Related Anatomy (9th Ed.), Elsevier Mosby, 2018.

GTX329 Quality Assurance in Diagnostic Radiology

This course deals with theoretical and practical knowledge in the quality assurance of diagnostic radiology imaging equipment such as General Radiography, Mammography, Fluoroscopy, Digital Radiography, Oral Radiography and CT scanner. Implementation of course is through lectures/practicum/SCL. Students assessments are based on practical report and practical test.

List of text/reference books:

1. Carlton, R.R., Adler, A.M., Vesna Balac, Randy Griswold, Lisa Kang, Sharon Barrow Lakia, Mathew Matthew Marquess, Principles of Radiographic Imaging: An Art and A Science (6th Ed.), New York: Thomson Delmar Learning, 2020.
2. Papp, J., Quality Management in the Imaging Sciences (5th Ed.), Mosby Elsevier, 2015.
3. Siti Aishah Binti Abdul Aziz, Handbook of Quality Control in Radiography, 1st Ed, Universiti Sains Malaysia, 2012.

GTX330 Nuclear Medicine Imaging Techniques

This course is practical training for handling nuclear medicine imaging procedures such as 2D, SPECT, and SPECT/CT imaging. This training includes radiopharmaceutical preparation, imaging techniques, radiation protection, and quality assurance in nuclear medicine. Students are also trained to work in teams and display ethical responsibilities and values. Students will be assessed through continuous examinations, logbooks, practical tests (OSPE), and presentations.

List of text/reference books:

1. Gilmore, D., Waterstram-Rich, K.M., Nuclear Medicine and PET: Technology and Techniques (8th Edition). United States: Elsevier, 2017.
2. Shackett, P., Nuclear Medicine Technology: Procedures and Quick Reference (3rd Edition). Wolters Kluwer, 2019.
3. Sharp, P.F., Gemmell, H.G. and Murray, A.D., Practical Nuclear Medicine (3rd Edition). London: Springer, 2005.

GTX331 Quality Assurance in Nuclear Medicine and Radiotherapy

The course consists of two parts, quality assurance in radiotherapy and nuclear medicine. For radiotherapy, students will be trained to perform calibration of linear accelerator according to IAEA TRS 398:2000 protocols for photon and electron beams as well as other quality assurance tests such as gantry, isocenter and beam alignment tests. Students will be trained to perform the calibration of Ir-192 brachytherapy source. For nuclear medicine, students will be trained to perform routine quality assurance tests for gamma camera including uniformity, spatial resolution and center of rotation tests for SPECT imaging. Students are also trained to perform calibration on radiopharmaceuticals such as chi-square tests for radionuclide. The course will be conducted via F2F lectures, practical and discussions. Students will be assessed based on reports, test and experiments.

List of text/reference books:

1. Cherry, S.R., Sorenson, J.A. Phelps, M.E. (4th Ed.), Elsevier, 2012.
2. Khan F. M. & Gibbons, J. P., The Physics of Radiation Therapy (5th Ed.), Lippincott Williams & Wilkins, 2014.
3. Rachel A Powsner, Edeard R Powsner, Nuclear Medicine Physics (2nd Edition), Blackwell Publishing, 2006.

6.5 CORE COURSE LEVEL 4

GTA401 Research Project

This course introduces students to a research project pertaining to the audiological field. The students are trained to conduct research under the supervision of the faculty members. They are encouraged to select research topics that are important and current to the audiological field. The course requires the students to work independently and professionally while adhering to the ethical standards. Students will be assessed through research proposal paper, presentation, dissertation and viva.

List of text/reference books:

1. Daniel. W. W., Biostatistics: A Foundation for Analysis in the Health Sciences (8th Ed.), John Wiley & Sons, 2008.
2. Norman, G. R. & Streiner, D. L., Biostatistics: The Bare Essentials (3rd Ed.), McGraw-Hill Medical, 2008.
3. Motulsky, H., Intuitive Biostatistics (2nd Ed.), Oxford University Press, 2010.
4. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.

GTA406 Noise and Hearing

This course introduces students to different types of noises, damage risk criteria, noise exposure guidelines internationally and locally, hearing assessment on noise induced hearing loss cases and hearing conservation program. It also covers the specific effects of noise on the auditory and other systems. This course will be conducted via lectures, tutorials and practical sessions. Students will be assessed through tests, presentation, practical reports and final examination.

List of text/reference books:

1. Rawool, V., Hearing Conservation: In Occupational, Recreational, Educational, and Home Settings, Thieme, 2011.
2. Le Prell, C. G., Henderson, D., Fay, R. R, & Popper, A. N., Noise-Induced Hearing Loss: Scientific Advances, Springer, 2011.
3. Chasin, M., Hearing Loss in Musicians, Plural Publishing Inc., 2009.
4. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.

GTA407 Audiology Clinic IV

This course is a continuation from Audiology Clinic l, ll and III courses. This clinical training will cover adult and pediatric cases in basic audiological tests and explanation results. Students are also able to handle the procedures related to hearing aids, electrophysiological test, non-organic hearing loss test, site-of-lesion test and assessment for difficult-to-test children. This course is taught through clinical supervision, and discussion. Students will be assessed through supervisor's evaluation (practicum), reports, presentation, logbook and final exam (Objective Structured Clinical Exam, clinical exam and clinical viva). In order to pass this course, each student must pass the final exam with at least grade C+.

List of text/reference books:

1. Valente, M. & Valente, L. M., Adult Audiology Casebook, New York: Thieme, 2015.
2. Katz, J., Burkard, R., Hood, L., & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.
3. Welling, D.R., & Ukstins, C.A., Fundamentals of Audiology for the Speech-language Pathologist. Burlington: Jones & Bartlett Learning, 2015.
4. Hall, J. W., Introduction to Audiology, Boston: Pearson, 2014.
5. Madell, J. R. & Flexer, C., Pediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.), New York: Thieme, 2014.

GTA408 Audiology Clinical Placement

This course introduces students to clinical audiology practice in selected hospitals in Malaysia. Students are attached to Audiology Clinic for five days clinic per week and supervised via experienced Audiologists for 6 weeks. This clinical training will cover adult and pediatric cases, interviewing session for history taking, routine tests such as otoscopic examination, tympanometry, acoustic reflex, PTA (with and without masking), measurement of hearing aid function and explaining results as well as giving counselling to the patients. This course will be taught via clinical supervision and discussions. Students will be assessed through supervisor's evaluation (practicum), reports, presentation and log book.

List of text/reference books:

1. Valente, M. & Valente, L. M., Adult Audiology Casebook, New York: Thieme, 2015.
2. Katz, J., Burkard, R., Hood, L. & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.
3. Welling, D.R. & Ukstins, C.A., Fundamentals of Audiology for the Speech-language Pathologist. Burlington: Jones & Bartlett Learning, 2015.
4. Hall, J. W., Introduction to Audiology, Boston: Pearson, 2014.
5. Madell, J. R. & Flexer, C., Pediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.), New York: Thieme, 2014.

GTA410 Ethics and Professionalism in Audiology

This course introduces the student to professionalism, ethics, clinical audiology practice, codes of ethics, ethical decision making, beneficence and nonmaleficence, competency and public statements in audiology. This course will be taught through lectures, tutorials, discussions and case studies. Students will be assessed through assignments, presentations, test and final examination.

List of text/reference books:

1. Irwin, D. L., Pannbacker, M., Powell, T. W. & Vekovius, G. T., Ethics for Speech-Language Pathologists and Audiologists: An Illustrative Casebook, Delmar Cengage Learning, 2006.
2. Lubinski, R. & Hudson, M. W., Professional Issues in Speech-Language Pathology and Audiology (4th Ed.), Delmar Cengage Learning, 2012.

3. Hosford-Dunn, H., Roeser, R. J. & Valente, M., Audiology Practice Management, United States of America: Thieme, 2007.
4. Roeser, R. J., Valente, M. & Hosford-Dunn, H., Audiology Diagnosis, New York: Thieme, 2007.
5. Katz, J., Medwetsky, L., Burkard, R. & Hood, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.

GTA411 Audiology Clinic V

This course is a continuation from Audiology Clinic l, ll III and IV courses. This clinical training will cover adult and pediatric cases in basic audiological tests and explanation of results. Students are also able to handle the procedures related to hearing aids, advanced audiological tests including vestibular tests, tinnitus audiometry tests and mapping of cochlear implant. This course is taught through clinical supervision, and discussion. Students will be assessed through supervisor's evaluation (practicum), reports, presentation, logbook and final exam (Objective Structured Clinical Examination, clinical exam and clinical viva). In order to pass this course, each student must pass the final exam with at least grade C+.

List of text/reference books:

1. Valente, M. & Valente, L. M., Adult Audiology Casebook, New York: Thieme, 2015.
2. Katz, J., Burkard, R., Hood, L. & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.
3. Welling, D.R. & Ukstins, C.A., Fundamentals of Audiology for the Speech-language Pathologist. Burlington: Jones & Bartlett Learning, 2015.
4. Hall, J. W., Introduction to Audiology, Boston: Pearson, 2014.
5. Madell, J. R. & Flexer, C., Pediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.), New York: Thieme, 2014.

GTA413 Practice Management and Seminar in Audiology

This course introduces students to principles of practice management, essential issues in business administrations, basic managerial accounting, financial management of clinical practice, human resource and staff management as well as the infection control at workplace. This course also introduces students to the audiology seminar, evidence-based practice (EBP) and issues related to statistics. This course will be taught through lectures, tutorials and discussions. Students will be assessed through test, assignment, presentations and final exam.

List of text/reference books:

1. Hosford-Dunn, H., Roeser, R. J. & Valente, M., Audiology Practice Management, United States of America: Thieme, 2007.
2. Madell, J. R. & Flexer, C., Pediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.), New York: Thieme, 2014.
3. Katz, J., Burkard, R., Hood, L. & Medwetsky, L., Handbook of Clinical Audiology, Philadelphia: Lippincott Williams & Wilkins, 2009.

4. Wong, L. & Hickson, L., Evidence Based Practice in Audiology: Evaluating Interventions for Children and Adults with Hearing Impairment, San Diego: Plural Publishing Inc., 2012.
5. Rubin, A., Statistics for Evidence-Based Practice and Evaluation (Research, Statistics, & Program Evaluation) (3rd Ed.), Brooks Cole, 2012.

GTB408 Biomedical Practicum

This course introduces the students to the best practice in clinical diagnostic laboratory services for sustainability of health and quality of life. Students will be given opportunities to acquire knowledge and experience as well as to observe, perform, analyze and interpret the laboratory test results. Students will be trained to identify and solve problems in laboratory services; to implement quality control program; to do troubleshooting and to manage the diagnostic laboratory. Besides, students will be equipped with knowledge and skill on venepuncture, "One Health" concept, medical laboratory devices technology, laboratory security and safety system and good laboratory practice as well as entrepreneurship in biomedical field. The course will be taught via practical training, seminar and discussion (F2F and online). Students will be assessed through practical tests (as performance-based assessment), discussion, presentation (as authentic assessment) and logbook.

List of text/reference books:

1. Willey, J. M., Sherwood, L. M. & Woolverton, C. J., Prescott's Microbiology (10th Ed.), McGraw Hill, 2016.
2. Riedel, S., Morse, S.A., Mietzner, T. and Miller, S., Jawetz, Melnick and Adelberg‟s Medical Microbiology, 28th ed. McGraw-Hill Education, Australia, 2019.
3. Tille, P., Bailey & Scotts Diagnostic Microbiology, 14th ed. Mosby, USA, 2018.
4. Cheesbrough, M., District Laboratory Practices in Tropical Countries, 2nd edn. Cambridge University Press, UK, 2006.
5. Goering, R., Dockrell, H., Zuckerman, M. and P.L. Chiodini, MIMS Medical Microbiology and Immunology, 6th ed. Elsevier Health Sciences, London, UK, 2018.
6. Hoffbrand, V. and Steensma, D., Hoffbrand's Essential Haematology, 8th ed. Wiley-Blackwell, USA, 2019.
7. Hall, A., Scott, C. and Buckland, M., Clinical Immunology, 2nd ed. Oxford University Press, UK, 2016.
8. Harmening D. M., Modern Blood Banking and Transfusion Practices (7th Ed.), F.A. Davis Company, 2019.
9. Kumar V., Abbas, A.K., Aster, J.C., Robbins Essential Pathology, Elsevier, 2020.

GTB411 Research Project

This course provides the opportunity for the students to carry out biomedicine and health related research project under the supervision of a lecturer. This course also exposes the students to the best practice in research as well as occupational health and safety during research project briefing. This course is conducted by supervision of research work in the lab, discussion and workshop. Students are evaluated through thesis, presentation, short assignment and discussion with supervisor beginning from long break after third year.

List of text/reference books:

1. Guidelines for the preparation of final year research project dissertation. School of Health Sciences, USM, 2015.
2. Any books/journals relevant to the fields or topics of research chosen by the students.

GTB413 Industrial Training

This is the main course whereby all students will be given a choice to experience training in product marketing/industrial research/fundamental research/applied research/clinical/industry laboratory support services (diagnostic and analysis). At the chosen company, the student will be trained on the aspect of production management skills as well as the basics of entrepreneur knowledge that include marketing and quality control. At the industrial research laboratory, the student will be trained with various SOP and other laboratory quality requirements as well as various knowledge related to Good Lab Practice (GLP) and ISO requirements related to production and services. At the fundamental/applied research lab, the student will be exposed to deepen of the critical aspects of research and development and digging into the knowledge to solve the main problem related to biomedical sciences. At the clinical/hospital support laboratory, the student will be exposed to the adequate diagnostics practicality and will be trained to handle samples analysis and they will be supervised by medical lab technologist/scientist in the designated period. The student will be evaluated through final report (mini-thesis like) and evaluation report by the respective field supervisors. On the other hand, the student will be requested to apply their digital expertise with the latest ICT and information management system in their assignment. The soft-skills such as self-discipline, communication and team work will be evaluated by the respective field supervisors.

List of text/reference books:

Text books relevant to the field of clinical/industrial attachment chosen by the students including those journals in their respective field of specialty.

GTB414 Industrial Attachment

Industrial attachment is an innovative work-based program that will be carried out for 30 weeks throughout the first and second semesters of the fourth year. Students will be placed at designated Biomedical-related industries to experience some learning aspects of training, research, development and administration. Students will be attached in rotation at different units or departments throughout the attachment period to allow them to be exposed to the best practice in industry and real working ecosystem. Their ability to write a scientific report and think critically will be evaluated using logbook and final report as performance-based and integrated assessments. Their soft skills such as communication, leadership and professionalism will be evaluated through supervisor report and presentation as a real-time assessment.

List of text/reference books:

Text books relevant to the field of clinical/industrial attachment chosen by the students including those journals in their respective field of specialty.

GTB415 Industrial Research Project

This course provides the opportunity for students to gain industry experience and carry out biomedicine-related research project under the supervision of appointing industrial scientists. This course exposes the students to the best practice in research as well as occupational health and safety at real working industry. Students will be evaluated through industrial thesis as a performance-based assessment. Their soft skills such as communication, leadership and professionalism will be evaluated using presentation and discussion on problem solving as a real-time assessment.

List of text/reference books:

1. Any books/journals relevant to the fields or topics of research chosen by the students.

GTD412 Clinical Dietetics Practicum II

The purpose of this practicum course is to fulfill competency criteria of professional clinical dietetics and to enhance student's skills in practicing standard nutrition care process of medical nutrition therapy for patients in the ward and special unit settings. During the practicum, students need to manage the case based on standard nutrition care process, conduct the provision of enteral nutrition support and feeding transition, provide patients with nutrition education upon discharge and perform medical documentation with supervision by clinical instructor. Students will be assessed through continuous assessment of practicum, practical examination, presentation and assignment.

List of text/reference books:

1. Mahan, L.K. et al, Krause's Food, Nutrition & Diet Therapy,14th Edition, Saunders Co, 2017.
2. Nelms, M. & Sucher K, Nutrition Therapy & Pathophysiology, 4th nd Edition, Cengage Learning, 2020.
3. Whitney, W., Understanding Normal & Clinical Nutrition, 11th Edition, Australia, Wadsworth, 2017.
4. Nelms, M.H, Medical Nutrition Therapy A Case Study Approach : 5th Edition Thomson Wadsworth , 2016.
5. Gail A. Cresci, Nutrition Support for the Critically Ill Patience A guide to Practice. 2nd Ed. CRC Press Taylor & Francis Group, 2015.
6. Malaysian Dietitian Asc. (MDA) Medical Nutrition Therapy
7. Clinical Practice Guidelines, Ministry of Health Malaysia

GTD413 Food Service and Industry Practicum

This course will stress on food service handling in hospitals and institutions and the relationship between quantitative food production with different menus, equipments, service staff, time of serving, kitchen sanitation, food preparation and quality assurance. The main focus is on the practical sessions at hospitals, institutions, industries and major restaurants. Briefing session will be given on the first week or before the commencement of internship. The students will undergo internship service for a period of four weeks in chosen premises. During the attachments, the students are required to observe the utilization of equipments, services and food management under supervision of supervisors.

List of text/reference books:

1. Reynolds, D., Foodservice Management Fundamentals. Wiley and Sons. New Jersey, 2013.
2. Palacio, J.P and Theis, M, Foodservice Management Principles and Practices. (Pearson New International edition, Twelfth Edition) Pearson Education Limited. Essex, England, 2014.
3. Edelstein, S, Managing Food and Nutrition Services. Jones and Bartlett Publishers. Sudbury, Massachusetts, 2008.
5. Spears, M.C., Foodservice Organisations: A Managerial and systems Approach. (Fourth Edition). Prentice Hall, New Jersey, 2000.

GTD414 Clinical Dietetics Practicum I

This is one of the core practical courses of the dietetics program. The students will be exposed to observe and give diet education to the patients, in the outpatient diet clinic and exposed to observe and give medical nutrition therapy to the patients with many diseased conditions admitted in the hospital wards with aims to help improved the quality of nutrition and health of patients. They will be able to relate the theory into practice and trained to provide medical nutrition therapy with the nutrition care process. Practical training will cultivate diet counselling skills among the students and skills that are required to become a clinical dietitian. Students will be assessed through practicum, presentation, assignment and practical test.

List of text/reference books:

1. Catherine, H. & Kevin, W., Advanced Nutrition and Dietetics in Obesity, Willey Blackwell, 2018.
2. Mahan, L.K. et al Krause's Food, Nutrition & Diet Therapy,14th Edition, Saunders Co, 2017.
3. Nelms, M. & Sucher, K.P., Nutrition Therapy & Pathophysiology, 3rd Edition, Cencage Learning, 2015.
4. Koletzko, B. et al Pediatric nutrition in practice, 2nd Edition, Karger, 2015.
5. Samour, P.Q & King, K., Pediatric Nutrition, Jones & Bartlet Learning, 2012.
6. Malaysian Dietitian Association. (MDA) Medical Nutrition Therapy.
7. Clinical Practice Guidelines, Ministry of Health Malaysia (MOH).

GTF400 Forensic Medicine

This course introduces students to the various kinds of death and its signs, various chemical transformations taking place after death, post-mortem study, pattern, and types of injuries. It also covers theoretical aspects of the victims dying of unknown causes, killing, suicide, blunt/sharp force injuries, firearm & explosive injuries, asphyxia, drowning, burns and electrical shocks. Risk management in crime scene is discussed for community and national well-beings. This course will be taught via lecture, tutorial, and discussion. Students will be assessed through tests, reports, discussion, assignments, and final examination.

List of text/reference books:

1. M. A. Sens and R. Hughes. Diagnostic Pathology: Forensic Autopsy. Elsevier, 2021.
2. P. Venezis. Essential Forensic Medicine. Wiley, 2019.
3. S. Black. All That Remains: A Life in Death. Arcade, 2018.
4. P. Saukko and B. Knight. Knight's Forensic Pathology (4th Edition). CRC Press, 2015.
5. K. Vij. Textbook of Forensic Medicine & Toxicology: Principles & Practice. Elsevier India, 2014.

GTF402 Ballistics and Explosives Chemistry

This course introduces students to concepts of ballistics and knowledge for ballistic and explosive investigations. This course also introduces concepts of explosives and various types of firearms dan explosives commonly used by terrorist and criminals. This course is conducted at Chemistry Department by experts in both disciplines, ballistics, and explosives. This course will be taught via lecture, discussion and practical. Students will be assessed through tests, assignments, practical reports, and final examination.

List of text/reference books:

1. V.J.M. Di Maio. Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques (3rd Edition). CRC Press, 2015.
2. J.A. Zukas and W. Walters. Explosive Effects and Applications (Shock Wave and High-Pressure Phenomena). Springer, 2013.
3. D.E. Carlucci and S.S Jacobson. Ballistics - Theory and Design of Guns and Ammunition (2nd Edition). CRC Press, 2013.
4. T. Warlow. Firearms, the Law, and Forensic Ballistics (3rd Edition). CRC Press, 2011.
5. M. Pickett M. Explosives Identification Guide (2nd Edition). Delmar Cengage Learning, 2004.

GTF407 Forensic Practicum

This course introduces students to training on crime scene management and forensic examination related to mock crime scenes and moot court which will be conducted at the Police College and Forensic Laboratory of Royal Malaysia Police in Cheras, Kuala Lumpur by qualified police personnel assisted by the forensic experts from the Department of Chemistry, Petaling Jaya. Students will be conducting practical training in the aspect of fingerprints, ballistics, and clandestine laboratory and will be exposed to various chemical and instrumental analyses. The students will also be taken to real crime scenes and will be taught with procedures in relation to the search and collection of evidence materials. This course also provides fundamental knowledge on the Malaysian Legal System and the police administration in processing of evidence materials at the Department of Chemistry. Besides, this course provides detailed knowledge on the report preparation and evidence presentation before trial. Students will be assessed through test, practical reports, assignment, presentation, seminar, and final examination.

List of text/reference books:

1. R. Saferstein. Criminalistics: An Introduction to Forensic Science (12th Edition). Pearson, 2018.
2. M.M. Houck and J.A. Siegel. Fundamentals of Forensic Science (3rd Edition). Academic Press, 2015.
3. A.R.W. Jackson and J.M. Jackson. Forensic Science (4th Edition). Pearson Prentice Hall, 2017.

GTF408 Forensic Documents Examination

This course introduces students to various techniques to examine sample of forensic documents. The course will be taught via lectures and practical sessions by document examination experts from Chemistry Department of Malaysia. Students will be assessed through tests, assignments, laboratory reports, and final examination.

List of text/reference books:

1. H.H. Harralson and L.S. Miller. Huber and Headrick's Handwriting Identification: Facts and Fundamentals. CRC Press LLC, 2017.
2. K.M. Koppenhaven. Forensic Document Examination: Principles and Practices. Humana Press, 2007.
3. J.S. Kelly and B.S. Lindblom. Scientific Examination of Questioned Documents. CRC Press, 2006.
4. S.P. Day, D. Ellen and C. Davies. Scientific Examination of Documents: Methods and Techniques (3rd Edition). CRC Press, 2005.

GTF409 Statistics for Forensic Science

This course introduces to students the use of statistics for forensic data interpretation and common fallacies of prosecutors and defence lawyers. It covers the key statistical techniques used to evaluate various types of forensic evidence. This course also introduces pattern recognition and data analytics to support decision making and research in forensic science. Real-life examples from the forensic science literature and forensic casework are used to illustrate relevant statistical concepts and methods in areas such as vehicle paint survey data, glass fragment interpretation, DNA profiling and biochemical matching (e.g. blood stains). This course will be taught via lectures and discussions. Students will be assessed through tests, assignments, reports, presentation dan final examination.

List of text/reference books:

1. B. David, F. Karen, H.K. David and M Tackett. Handbook of Forensic Statistics. CRC Press, 2020.
2. C. Adam. Essential Mathematics and Statistics for Forensic Science. Wiley, 2010.
3. D. Lucy. Introduction to Statistics for Forensic Scientists. John Wiley and Sons Ltd, 2005.

GTF410 Forensic Digital Evidence

This course introduces to students the fundamental of digital forensics. It covers the recovery and handling of digital evidence, investigation approach, device, and storage of digital information. Computer forensic analysis and validation as well as digital crimes will also be discussed. This course will be taught via lecture and discussion. Students will be assessed through tests, presentation, project paper and final examination.

List of text/reference books:

1. B. Nelson, A. Phillips and C. Steuart. Guide to Computer Forensics and Investigations (6th Edition). Course Technology, 2021.
2. E. Casey. Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet (3rd Edition). Academic Press, 2011.
3. E. Casey. Handbook of Digital Forensics and Investigation. Academic Press, 2009.
4. A.M. Marshall. Digital Forensics: Digital Evidence in Criminal Investigations. Wiley-Blackwell, 2008.

GTF411 Research Project

This course provides the opportunity to the student to carry out forensic science research project under the supervision of a lecturer. Besides doing the research project, this course also exposes the students to reference management software and techniques related to thesis writing. This course is conducted by supervision of research work in the lab, discussion, and workshop. Students are evaluated through thesis, logbook and presentation.

List of text/reference books:

1. G. Thomas. How to Do Your Research Project: A Guide for Students. SAGE Publications Ltd., 2017.
2. B. Judith and S. Waters. Doing Your Research Project: A Guide for First-Time Researchers (UK Higher Education OUP Humanities & Social Sciences Study Skills). Open University Press, 2014.
3. Journals and other references based on areas of research.

GTK441 Environmental and Occupational Safety and Health Internship

Through USM-industry collaboration, the students will be placed for 12 months in selected government or private organizations. Students will learn the actual working environment in the field of environmental health and occupational safety. The students will apply the knowledge that has been learned to improve their skills and prepare them to face the real working environment. This includes sectors such as water, energy, health, agriculture, biodiversity, Climate Change & Disaster Risk Management and Production & Consumption. Furthermore through industrial internship students shall also be exposed to sustainable development goals which include Good Health & Well-Being, Quality Education, Clean Water & Sanitation, Industry, Innovation, & Infrastructure, Sustainable Cities & Communities, and more. Students will be evaluated through, logbook, report, presentation and performance.

List of text/reference books:

1. Legislation in regards to industrial placement activity.
2. Standards in regards to industrial placement activity.
3. Manual and procedure in regards to industrial placement activity.

GTN410 Nutrition Research Project II

This course provides the opportunity to the student to carry out nutrition related research project under the supervision of lecturer. Besides doing the research project, this course also exposes the students to techniques related to thesis writing. This course will be conducted by supervision of research work in the laboratory, discussion and fieldwork. Students will be assessed through thesis, presentation and discussion.

List of text/reference books:

1. Guidelines for the preparation of final year research project dissertation. School of Health Sciences, USM, 2015.
2. Thomas D.R. and Hodges I.D., Designing and Managing Your Research Project: Core Skills for Social and Health Research. London. SAGE Publications Ltd, 2013.
3. Abdul Aziz Al Safi I., Kamarul Imran M., Muhamed Rusli A., Nor Azwany Y. and Wan Mohd Zahiruddin W.M. Research Methodology in Health Sciences (2nd Ed.), PPSP Publication,2015 Publications, 2015.

GTN411 Contemporary Issues in Nutrition

This course introduces students to current issues of recent advancements on nutritional sciences such as concepts and current development. It also covers application of nutritional sciences in healthy populations throughout the lifespan to prevent and alleviate diet- and lifestyle-related diseases. This course will be taught via physical and digital lecture. Students will be assessed through test, assignment, presentation dan final examination.

List of text/reference books:

1. Brown J. E. Nutrition now. Cengage, 2020
2. Mahan L. K and Raymond J. L. Krause's Food & the Nutrition Care Process. Elsevier. 2016.
3. Wardlaw G.M and Smith A.M. Contemporary nutrition. McGraw-Hill, 2013.

GTN412 Nutrition Policy and Food Security

This course introduces students to nutrition policy, components of food security, food system, sustainable diet, food safety and sustainable agro-food. It also covers technology, innovation and halal research in food industry. This course will be taught via physical and digital lecture. Students will be assessed through test, presentation, project proposal dan final examination.

List of text/reference books:

1. Spark A., Dinour L. M., Obenchain, J. Nutrition in Public Health :Principles, Policies, and Practice. CRC Press, 2015.
2. Lawrence, G., Lyons, K. & Wallington, T., Food Security, Nutrition and Sustainability. Sterling, VA Earthscan, 2010.
3. Mason, P. & Lang,T., Sustainable Diets: How Ecological Nutrition can transform consumption and the food system. Routledge,Taylor & Francis Group, 2017.
4. Galanakis, C.M. Innovation strategies in Food Industry, Elsevier, 2016
5. Ghosh, D. Innovation in healthy and functional foods. Boca Raton, FL : CRC Press, 2013

GTN413 Nutrition Industrial Training

This course will give opportunity for student to experience the real work life in nutrition field. In this course, student will be placed in institution to undergo industrial practicum in the industry selected. Briefing session will be conducted in the first week or at the beginning of the practicum. Students will undergo this industrial practicum for 14 weeks (3-4 months) during the last semester of study and will be supervised by field supervisor. This course will be taught through practical and discussion sessions. Students will be assessed through practicum, report and log book.

List of text/reference books:

1. Reynolds, D., Foodservice Management Fundamentals. Wiley and Sons. New Jersey, 2013.
2. Palacio, J.P and Theis, M, Foodservice Management Principles and Practices. (Pearson New International edition, Twelfth Edition) Pearson Education Limited. Essex, England, 2014.
3. Edelstein, S, Managing Food and Nutrition Services. Jones and Bartlett Publishers. Sudbury, Massachusetts, 2008.
4. Spears, M.C., Foodservice Organisations: A Managerial and systems Approach. (Fourth Edition). Prentice Hall, New Jersey, 2000.

GTS411 Industrial Training

This course is conducted via short term training in a suitable places chosen by the students. The training needs basic knowledge in health and sports science that require the application of technology, psychomotor skill, informatics, critical and rationale thinking, communication skill, ethic, professionalism, management skill, entrepreneurship and involvement in social activity and community service. Students will be assessed through practicum, report and log book.

List of text/reference books:

Text books relevant to the field of clinical/industrial attachment chosen by the students including those journals in their respective field of specialty.

GTX411 Radiotherapy Techniques

This is a clinical course for the student to learn the practical application of radiotherapy techniques. Student will participate and developed their skill in clinical radiotherapy which includes photon beam radiotherapy, electron beam radiotherapy, brachytherapy, dose calculation, treatment planning and simulation.

List of text/reference books:

1. P. Mayles, A. Nahum, J.C Rosenwald, Handbook of Radiotherapy Physics: Theory and Practice, (2nd Edition), CRC Press, 2020.
2. F. Khan, The Physics of radiation therapy (5th Edition), Lippincott Williams & Wilkins, 2014.
3. C. Washington and D. Leaver, Principles and Practice of Radiation Therapy, (4th Edition), Mosby, 2016.
4. R. Stanton and D. Stinson, Applied Physics for Radiation Oncology, (Revised edition), Medical Physics Publishing, 2009.

GTX415 Research Project

This course provides opportunities to students to conduct research in radiology, nuclear medicine, radiotherapy or radiation protection as the initial exposure to life-long research. At the same time, students will learn to write their research findings scientifically as a dissertation that need to be submitted by the end of second semester in the final year. In this course, students will be trained to manage their projects and plan the preparation of their dissertations and presentations. The students will be assessed through commitment, presentation and dissertation.

List of text/reference books:

1. Bushberg J.T., Seibert J.A., Leidholdt E.M. & Boone J.M., The Essential Physics of Medical Imaging (4th Ed.), Lippincott Williams & Wilkins, 2020.
2. Cherry, S.R., Sorenson, J.A. & Phelps, M.E., Physics in Nuclear Medicine (4th Ed.), Elsevier, 2012.
3. Washington, C.M. & Leaver, D.T., Principles and Practice of Radiation Therapy (4th Ed.), Mosby, 2016.
4. Khan, F. M. & Gerbi, B. J., Treatment Planning in Radiation Oncology (4th Ed.), Lippincott Williams & Wilkins, 2016.
5. Khan F. M. & Gibbons, J. P., The Physics of Radiation Therapy (5th Ed.), Lippincott Williams & Wilkins, 2014.
6. Gilmore, D. & Waterstram-Rich, K.M., Nuclear Medicine and PET/CT:Technology and Techniques (8th Ed.)., Elsevier, 2017.

GTX416 Professional Training

This course gives students chances to see the applications of radiation in a working environment clearly included diagnostic and therapeutic procedures, research and radiation protection. This includes installation and commissioning of radiation equipment in hospitals by suppliers. Students will be trained to present case study verbally and to manage case taking and report writing systematically. The students will go through a 2-month training at government or private hospitals and private companies. The students will be assessed through logbook, supervision, report and presentation.

List of text/reference books:

1. Bushberg, J. T., Seibert, J. A., Leidholdt, E. M. & Boone, J. M., Essential Physics of Medical Imaging (4th Ed.), Lippincott Williams & Wilkins, 2020.
2. Washington C. M. & Leaver D. T., Principles and Practice of Radiation Therapy (4th Ed.), Mosby, 2016.
3. Khan F. M. & Gibbons, J. P., The Physics of Radiation Therapy (5th Ed.), Lippincott Williams & Wilkins, 2014.
4. Cherry, S.R., Sorenson, J.A. & Phelps, M.E., Physics in Nuclear Medicine (4th ed.), Elsevier, 2012.
5. Venselaar, J.L.M., Baltas, D., Ali, S.M. & Hoskin, P.J., Comprehensive Brachytherapy: Physical and Clinical Aspects (1st Ed.). CRC Press, 2013.
6. Gilmore, D. & Waterstram-Rich, K.M., Nuclear Medicine and PET/CT:Technology and Techniques (8th Ed.)., Elsevier, 2017.
7. Khan, F. M. & Gerbi, B. J., Treatment Planning in Radiation Oncology (4th Ed.), Lippincott Williams & Wilkins, 2016.

GTX417 Radiotherapy Treatment Planning Techniques

This course is a clinical course that the students will be able to apply the knowledge obtained from the theoretical courses. Students will participate and develop their skills in the clinical radiotherapy planning which includes treatment planning techniques of the external beam radiotherapy and brachytherapy. Students will be assessed based on technical competence, practical examination and case study presentation.

List of text/reference books:

1. Xia, P., Godley, A., Shah, C, Videtic, G.M.M. and Suh, J.H. 2019. Strategies for Radiation Therapy Treatment Planning. Springer Publishing. 2018.
2. Videtic, G.M.M., Vassil, A.D., Woody, N.M. Handbook of Treatment Planning in Radiation Oncology. 3rd Edition. Springer Publishing Company, 2020
3. Barrett, A., Dobbs, J., Morris, S. and Roques, T. Practical Radiotherapy Planning, 4th Edition. Hodder Arnold. 2009.

GTX418 Dose Calculations and Treatment Planning in Radiotherapy

This course introduces students to the method of manual dose calculation for radiotherapy treatment and revise the principles of radiotherapy. Students will be taught the use of radiotherapy treatment planning computer software to assess the dose distributions for different radiotherapy procedures. The course will be assessed throughout tests, quiz, assignments, practical assessment and final examination.

List of text/reference books:

1. Washington, C.M.,Leaver, D.T. and Trad, M. Principles and Practice of Radiation Therapy, 5th Ed., Mosby, 2020.
2. Khan, F.M., Gibbons, J.P. and Sperduto, P.W. Treatment Planning in Radiation Oncology. 4th Ed., Wolters Kluwer Health, 2016.
3. Gibbons, J.P. Khan's The Physics of Radiation Therapy, 6th Ed., Lippincott Williams & Wilkins, 2019.

6.6 ELECTIVE COURSES

GEG103/3 Fitness and Health

This course will expose students to the important of maintaining a healthy lifestyle. The course content includes fitness assessment, exercise behaviour, exercise prescription, nutrition, injuries, and stress management. This course will be taught via lecture and practical. Students will be assessed through continuous test, practical report, assignment, and presentation.

List of text/reference books:

1. Corbin, C.N., Welk, G.J., Corbin, W.R. & Welk, K.A., Concepts of Fitness and Wellness A Comprehensive Lifestyle Approach (11th edition). McGrawHill. New York, 2015.
2. Bushman, B., ACSM's Complete Guide To Fitness & Health (2nd edition). Champaign, IL: Human Kinetics, 2017.
3. Shakey, B.J. & Gaskill, S.E., Fitness and Health (8th ed). Champaign: Human Kinetics, 2016.

GEG108/2 Health Promotion

This course is an introductory course to health promotion field which explain the concepts and principles of health promotion as well as the role of health communication and education in the national healthcare system. In addition, topics such as health behavior, patient education, the role of the media in health promotion, the application of health promotion to communicable and non-communicable diseases as well as various ethical issues and health policies are also discussed. This course is taught through the medium of lectures and tutorials. Student assessment based on assignments, presentation, media reviewed and final examination.

List of text/reference books:

1. Carole Lium Elizabeth C. Kudzma Edelman & Carol Lynn Mandle, Health Promotion Throughout the Life Span (8th edition), Elsevier, 2014.
2. Claudia Parvanta, David E. Nelson, Sarah A. Parvanta & Richard N. Harne, Essentials Of Public Health Communication, Jones & Bartlett Learning, 2010.
3. Karen Glanz & Barbara K. Rimer, 5th Edition. Health Behavior: Theory, Research, and Practice, Josse-Bass A Wiley Brand, 2015.

GEG109/2 History of Health Sciences

This course exposes the history and development of health and medical sciences. It covers historical aspects of Greek philosophy, modern medicine and history of medicine from the earlier years to the present. Aspects of social sciences, religion, philosophy of physical sciences, behavioural sciences, biological sciences and medicine outside of Europe including the impact of Islam in the field of medicine and health will also be explored. This course is delivered through lecturers and assessments involving assignments, presentation and test.

List of text/reference books:

1. Spector, R. E., Cultural Diversity in Health and Illness, New Jersey: Prentice Hall, 2010.
2. Bakar, O., Tawhid and Science, Shah Alam: Arah Publication, 2008.
3. Baharuddin Ahmad, Falsafah Sains Dari Perspektif Islam, Kuala Lumpur: Dewan Bahasa dan Pustaka, 2008

GEG201/2 Women's Health

This course gives emphasis on the diversity of perceptions and paradigms in women's health. Students will be exposed to a more holistic approach not limited to maternal and child care only. Various factors that influence the health status of women such as economy, politics, religion and culture will be examined. This course will be taught via lectures, discussion and multimedia. Students will be assessed through presentations, assignment, media review and final exams.

List of text/reference books:

1. Anandale, E., Women's Health and Social Change, London: Routledge, 2009.
2. The Reader's Digest Association, Women's Health Encyclopedia: An Integrated Approach to Wellness for Every Season of a Women's Life, 2010.
3. Goldman, M. B., Troisi, R. & Rextrode, K. M., Women's Health (2nd Ed.), Academic Press, 2012.
4. Rosser, S. V., Diversity and Women's Health, Baltimore: Johns Hopkins University Press, 2009.

GEG208/2 Human Resource Management in Healthcare Organizations

This course explains human resource management in healthcare organisations. Throughout the course, human resource issues will be analysed to improve staff performance, increase service standards and support healthcare sustainability. Teaching and learning will consist of lectures, tutorials and e-learning. Assessment will consist of essay, report, presentation and final examination.

List of text/reference books:

1. Fried, B. J. & Fottler, M.D., Human Resources in Healthcare: Managing For Success (4th Ed.), Health Administration Press, 2015.
2. Niles N.J. Basic Concepts of Health Care Human Resource Management, Second Edition, Jones & Bartlett Learning. 2019
3. Flynn, W.J., Mathis, R.L, Jackson, J.H. & Valentine, S.R., Healthcare Human Resource Management (3rd Ed.), Cengage Learning, 2015.

GEG213/3 Stress Management

This course exposes students to a holistic approach to stress management and its benefits for general health. Various theories of stress, its management, and affects are discussed and carried out. This course equips students with knowledge and skills in coping skills and relaxation techniques with the intention of preventing and/or alleviating the physical symptoms of stress. Assessment is done through assignments, tutorial exercise, test, and a final exam.

List of text/reference books:

1. Seaward, C. L., Managing Stress: Skills for Self-Care, Personal Resiliency and Work-Life Balance in a Rapidly Changing World. Jones & Bartlett Learning, 2020.
2. Olpin, M., & Margie Hesson, M, Stress Management for Life: A Research-Based Experiential Approach. Cengage Learning, 2020.
3. Peterson, C. (2017). Work Stress. Taylor & FrancisBlonna, R., Coping with Stress in a Changing World (4th Ed.), McGraw-Hill, 2007.

GEG216/3 Development of Health Services in Malaysia

This course introduces students to the development of health and medical services in Malaysia from the pre-colonial period up to now. Topics discussed included the pattern of disease, factors that influence the development of health services, health policies and current issues. Students will be assessed through test, assignment, presentation and final exam.

List of text/reference books:

1. Lim Kean Ghee, The History of Medicine and Health in Malaysia, Malaysia: Lim Kean Ghee, 2016.
2. Sebastian A, Alzain MA, Asweto CO, et al The Malaysian Health Care System: Ecology, Plans, and Reforms Family Medicine and Community Health 2016;4: doi: 10.15212/FMCH.2016.0101
3. Jaafar S, Noh KM, Muttalib K, Othman NH, Healy J, Maskon K, et al. Malaysia Health System Review. Health Systems in Transition. 2013;3(1):7.

GEG218/3 Community Development in Health Promotion

This course introduces students to the concept of community development as an approach to improve the health status of individuals and communities within the context of health promotion. It covers the fundamental elements of community development such as the needs assessment, capacity building, community empowerment and program evaluation. The course will be conducted through lectures, tutorial and community visits. Students will be assessed through test, report, assignments and presentation.

List of text/reference books:

1. Ogilvie R.S. Community Development Approaches to Improving Public Health. Routledge, New York, 2013.
2. Mckenzie, J.F, Pinger, R.B, Kotecki, J.E. An Introduction to Community Health (7th Ed.). Canada: Jones and Bartlett, 2012.
3. Doyle E., Susan, W. & Oomen-Early, J., Process of Community Health Education and Promotion (2nd Ed.), Mayfield Publishing Company, 2009.
4. Laverack, G. Health Promotion Practice: Building Empowered Communities. England: Open University Press, 2007.

GEG219/2 Health Care Management
This course introduces students to the management implications for health professionals and healthcare organisations. Students will learn to analyse the interactions of health professionals and examine the influence of management on professionals in healthcare organisations. Throughout the course, management concepts will be applied to solve problems involving health professionals and issues affecting healthcare organisations. This course will be conducted via lectures, tutorials and e-learning. Students will be assessed through tests, assignments, presentation and final examination.

List of text/reference books:

1. Burns, L. R., Bradley, E. H. & Weiner, B. J., Shortell and Kaluzny's Healthcare Management: Organization Design and Behavior (7th Ed.), Delmar Cengage Learning, 2019.
2. Longest Jr., B.B. & Darr, K., Managing Health Services Organizations and Systems (6th Ed.), Health Professions Press, 2014.
3. Dunn, R.T., Dunn & Haimann's Healthcare Management (10th Ed.), Health Administration Pr, 2015.
4. Walshe, K. & Smith, J., Healthcare Management (3rd Ed.), Open University Press, 2016.

GEG220/2 Occupational Therapy for People with Disability
This course will introduce basic understanding about Occupational Therapy profession, theoretically and practically, knowledge and understanding about People with Disabilities (PWD), physical, intellectual and mental disabilities. Students will be exposed to the assessment and rehabilitation of PWD, including PWD empowerment program, inline to the SDGs goals. Students will be assessed through test, assignment, presentation as well as participation in planning and organising activities with people with disabilities and senior citizen.

List of text/referencen books:

1. Bernadette, H. Fundamentals of Occupational Therapy : An Introduction to the profession, Slack Incorporated: Danvers, MA.2018
2. Pendleton, H. M., Schultz-Krohn, W. Pedretti's Occupational Therapy: Practice skills for Physical Dysfunction, 8th Revised Ed, Mosby/Elsevier: St Louis. 2018
3. Dunn, Winnie. Best Practice Occupational Therapy in community service with children and families, 2nd Ed. Slack Inc: Thorofare. 2011

GEG302/3 Violence and Society
This course gives exposure about issues concerning in violence and socity. The first part of the course examines the concept and theory of violence in a society. The second part is an interactive discussion on the interpersonal violence such as violence in family, towards children and the elderly. Students will also be exposed to theories and interventions to overcome violence. Lectures will be the main instrument in delivering the course, however students will be encouraged to be creative in their discussion and during the continuous assessments. Students will be assessed through a presentation, assignments, tests, and media review.

List of text/reference books:

1. Ray, L. Violence and Society. Sage, 2018
2. Burke, R. J., & Cooper, C. L. (Eds.). Violence and Abuse In and Around Organisations. Routledge, 2018
3. Steenkamp, C.Violent Societies: Networks of Violence Iin Civil War and Peace. Springer, 2014
4. Herman, J. L. Trauma and Recovery: The Aftermath of Violence--From Domestic Abuse to Political Terror. Hachette UK, 2015

GEG311/2 Botany and Health

This course will discuss the association between plants and health. The topics covered including history of plant usage in health, plant morphology, taxonomy, basic plant biochemistry, phytochemical groups, the importance of plant biotechnology, conservation and preservation of plant resources, ethnobotany and development of plant-based health product. Integrated teaching and learning approach is executed through F2F and online lectures, discussion, and seminar. Students will be assessed through tests, assignment, project, presentation and final examination

List of text/reference books:

1. Hao, D-C., Gu, X. J, Xiao P.G., Medicinal Plants: Chemistry, Biology and Omics. Elsevier Science & Technology. Cambridge, 2015.
2. Lall, N., Mahomoodally, F. M., Esposito, D., Steenkamp, V., Zengin, G.,eds., Cosmeceuticals From Medicinal Plants. Lausanne: Frontiers Media SA, 2020.
3. Murray, M.T. & Pizzorno, J., The Encyclopedia of Natural Medicine Third Edition. Atria Book, New York, 2014.
4. Rai, M. K., Cordell, G. A., Martinez J. L, Marinoff, M., Rastrelli, L. eds, Medicinal Plants Biodiversity and Drugs 1st edition. CRC Press, 2012.

GEG313/2 Health Economics

The course syllabus basically covers both, microeconomic and utilization of healthcare services as well as its association with issues within the health organization and its deliverable to the community. Economic evaluation as a basis of healthcare policy making will be discussed focusing on both; individual and community and supply and demand in health care services. The course will be conducted via lecture and tutorial. The students assessed will be through assignment, presentation, quizzes and final examination.

List of text/reference books:

1. Syed Mohamed Aljunid, Rosminah M, Rohaizat Yon, M. Rizal. Ekonomi Kesihatan. Dewan Bahasa dan Pustaka, 2013.
2. Getzen, T.E. Health Economics: Fundamentals and Flow of Funds. New York: Prentice Hall. 2013.
3. Beth Walter Honadle, Beverly A. Cigler. Fiscal Health for Local Governments: An Introduction to Concepts, Practical Analysis, and Strategies. Academic Press, 2013

GEG315/3 Fiqh of Health

This course introduces students to the Islamic solution to some issues related to health sciences. The understanding of the basic formulation of Islamic law will be discussed in relation to issues raised in the course. The discussion of the issues will be divided into three categories that are most critical, critical and daily issues. The course will be taught via lectures and tutorial. Students will be assessed through tests, essay , and book review.

List of text/reference books:

1. Harmy Mohd Yusoff. Syamsul Kamal Abdullah, Rosediani Muhamad, Wan Nor Ainon Wan Abdullah Fikah Perubatan. Selangor, Batu Caves: PTS Millennia, 2011.
2. Ahmad, Yusuf Al-Hajj. The Islamic Guideline on Medicine, Darussalam, Riyadh: KSA, 2010.
3. Al-Ashqar, M. S., Ijtihad di dalam Fiqh Perubatan, Kuala Lumpur: Pustakan Syuhada, 2004.

GEG316/3 Industrial Internship

This is an elective course which enables students to gain experiences in industrial, service and research fields. Student can choose to perform his/her industrial placement in industries which related to his/her academic programme. Student will be guided under a supervisor from the related industry in performing research/test/assignment. Student will also be exposed to various adminstrative or management skills during the industrial placement. Students will be assessed through effort, log book, report and presentation by supervisors from industry and lecturer.

List of text/reference books:

1. Klaus, P., The Hard Truth About Soft Skills: Workplace Lessons Smart People Wish They'd Learned Sooner. HarperCollins e- book, 2008.
2. Gardentswartz L., Cherbosque J., Rowe A., Emotional Intelligence for Managing Results in a Diverse World. Daview-Black Publishing, 2009.

GEG317/2 Healthcare Entrepreneurship

This course brings the students to identify problems and develop business strategic plan based on real-life challenges faced by entrepreneurs in the field of healthcare. Students need to investigate problems through interviews, discussions and produce an action plan in the form of project work. Evaluation will be made through project paper and presentation.

List of text/reference books:

1. Alexander Osterwalder & Yves Pigneur, Business Model Generation. John Wiley & Sons, USA, 2010.
2. Wilden, R., Garbuio, M., Angeli, F., & Mascia, D., Entrepreneurship in healthcare. Routledge, 2018.
3. Shimasaki, C. (Ed.), Biotechnology Entrepreneurship: Leading, Managing and Commercializing Innovative Technologies. Academic Press, 2020.

GEG318/2 Presentation Literacy in Health Sciences

The course offers health science students the opportunity to hone and enhance presentation literacy skills that covers public speaking and communication skills that are inspired by TED Talks. Students will be trained in different types of speeches, engage in intercultural dialogues and explore pitching of entrepreneurial ideas and projects in the course. Course assessments will include media reviews, discussions and presentations.

List of text/reference books:

1. Anderson, C, TED TALKS: The Official TED Guide to Public Speaking. New York: Houghton Mifflin Harcourt, 2016.
2. Lucas, S. E., The Art of Public Speaking (11th ed). Boston: Mc. Graw Hill, 2009.
3. O'Hair, D., Rubenstein, H. & Stewart, R., A Pocket Guide to Public Speaking (5th ed). Boston: Bedford/St. Martin's Press, 2016.

GEG319/2 Conflict and Resolution

This course introduces issues on conflicts and resolution through a series of movies, videos, reports or news excerpts and review the issues/problems faced. Topics of discussion include ethics for business and entrepreneurship, women's health, gender equality, violence, ethics for health sciences and care, poverty in society and other related issues; to ensure students gain skills to view conflict from a broader perspective in striving to seek collective resolutions. Assessments will be through media review, performance, discussion and presentation.

List of text/reference books:

1. Wallensteen P., Understanding Conflict Resolution, 5th Edition, Sage Publications Ltd, 2019.
2. d'Estree T.P. & Parsons R.J., Cultural Encounters and Emergent Practices in Conflict Resolution Capacity-Building, Springer Nature Switzerland AG, 2019.
3. Furlong G.T. & Moore C.W., The Conflict Resolution Toolbox: Models and Maps for Analyzing, Diagnosing, and Resolving Conflict, John Wiley & Sons, Inc, 2020.

GEG320/2 Digital in Healthcare and Entrepreneurship

Students will be introduced to various models of digitization and issues in the digital realm such as ethics, copyright, intellectual property, rules and laws, as well as the acts involved. Students in groups are required to develop a website or YouTube channel for the presentation and promotion of information in the identified areas. Students will also need to apply a variety of entrepreneurial skills to market the websites or channels developed. Evaluation will be made based on production and quality of work.

List of text/reference books:

1. Alexander Osterwalder & Yves Pigneur, Business Model Generation. John Wiley & Sons, USA, 2010.
2. Wilden, R., Garbuio, M., Angeli, F., & Mascia, D., Entrepreneurship in healthcare. Routledge, 2018.
3. Shimasaki, C. (Ed.)., Biotechnology Entrepreneurship: Leading, Managing and Commercializing Innovative Technologies. Academic Press, 2020.

LAA 100/2 Arabic Language I

The initial sections of this course emphasise the usage of correct Arabic grammatical forms for communication purposes. Vocabulary used in daily interactional situations such as in greetings, introductions, descriptions of common objects andplaces are also introduced. Writing skills are also given due emphasis through the provision of exercises and through the enhancement of Arabic via topic-related textual discussions.

List of text/reference books:

1. Shirwani, H., Build Your Arabic Vocabulary. McGraw-Hill, 2007.
2. Kershul, K. K., Arabic in 10 Minutes A Day. Seattle Bilingual Books Inc., 2004.
3. Al-Fauzan, A. E., Husain, M. T. & Muhammad Fadl, M. A., Al-Arabiah Baina Yadaik, Student's Book 1. Riyadh, Arabic for All, 2004.
4. Abd Mutholib, H. M., An-Nahu Al-Muyassar, Darul Afaq Al-Arabiah, Kaherah, 2001.

LAA 200/2 Arabic Language II

This course exposes learners to a wide range of communication skills used in daily activities. The number of vocabulary items vital for the acquisition of Arabic will be increased through their application in both conversational and writing tasks. Learners are introduced to interrogatives and prepositions that form the basis of effective interaction/dialogue. Grammatical items such as simple sentences using the present and past tense verb forms are also introduced to enhance communication skills.

List of text/reference books:

1. Shirwani, H., Build your Arabic Vocabulary. McGraw-Hill, 2007.
2. Kershul, K. K., Arabic in 10 Minutes A Day. Seattle Bilingual Books Inc., 2004.
3. Al-Fauzan, A. E., Husain, M. T. & Muhammad Fadl, M. A., Al-Arabiah Baina Yadaik, Student's Book 1. Riyadh, Arabic for All, 2004.
4. Abd Mutholib, H. M., An-Nahu Al-Muyassar, Darul Afaq Al-Arabiah, Kaherah, 2001.
5. Abbas, I., Kamus Al-Jadidi Arab-Melayu, Seri Kota Publications, 2001.

LAA 300/2 Arabic Language III

This course offers practice in vocabulary usage and in the construction of various sentence patterns for general and complex communication needs. It also introduces the correct usage of a variety of sentence structures by providing detailed explanations of past, present and imperative verb forms. Dialogue practice through a variety of conversational situations such as during convocation ceremonies, in job interviews, at flight terminals and during vacations are emphasised upon in all teaching and learning sessions.

List of text/reference books:

1. Shirwani, H., Build your Arabic Vocabulary. McGraw-Hill, 2007.
2. Kershul, K. K., Arabic in 10 Minutes A Day. Seattle Bilingual Books Inc., 2004.
3. Al-Fauzan, A. E., Husain, M. T. & Muhammad Fadl, M. A., Al-Arabiah Baina Yadaik, Student's Book 1. Riyadh, Arabic for All, 2004.

4. Abd Mutholib, H. M., An-Nahu Al-Muyassar, Darul Afaq Al-Arabiah, Kaherah, 2001.
5. Abbas, I., Kamus Al-Jadidi Arab-Melayu, Seri Kota Publications, 2001.

LAJ 100/2 Japanese Language I

This course is an introduction to the Japanese language, Japanese society and its culture. Learners will distinguish typical Japanese pronunciation and acquire basic grammatical structures and a range of vocabulary related to communication in everyday situations. Learners will also identify and display words and sentences in Hiragana, one of the three writing systems of the Japanese language.

List of text/reference books:

1. Makino, A., Minna no Nihongo Shokyu Choukai Tasuku 25 (Listening Comprehension Tasks), Japan: 3A Corporation, 2004.
2. Kenichiro, H., Nihongo Takarabune, Japan: ASK, 2004.
3. Michiko, M. & Sachiko, G., Now You're Talking, Japan: 3A Corporation, 2003.

LAJ 200/2 Japanese Language II

This course aims to develop elementary proficiency in spoken and written Japanese, focusing on listening comprehension, speaking, reading, writing, and cultural literacy. Learners will identify Katakana, one of the three Japanese writing systems, increase basic grammatical and lexical knowledge, and gain some insight into cultural aspects pertaining to Japanese society. By the end of the course, learners will be able to express and understand simple needs in predictable and common situations related to their personal lives.

List of text/reference books:

1. Makino, A., Minna no Nihongo Shokyu Choukai Tasuku 25 (Listening Comprehension Tasks), Japan: 3A Corporation, 2004.
2. Kenichiro, H., Nihongo Takarabune, Japan: ASK, 2004.
3. Michiko, M. & Sachiko, G., Now You're Talking, Japan: 3A Corporation, 2003.

LAJ 300/2 Japanese Language III

This course aims to consolidate learners' command of Japanese grammatical structures and their acquisition of vocabulary. While mastering complex sentence structures, learners will be able to understand and use a variety of basic sentence patterns that will enable them to enhance their interaction skills as well as their comprehension of conversations. This will also improve their essay writing skills. About 80 basic Kanji characters will be introduced.

List of text/reference books:

1. Makino, A., Minna no Nihongo Shokyu Choukai Tasuku 25 (Listening Comprehension Tasks), Japan: 3A Corporation, 2004.
2. Kenichiro, H., Nihongo Takarabune, Japan: ASK, 2004.
3. Michiko, M. & Sachiko, G., Now You're Talking, Japan: 3A Corporation, 2003.

7.0 FACILITIES

The buildings of School of Health Sciences have facilities such as lecture theatres, tutorial and seminar rooms together with the latest audio-visual and multimedia equipment.

IT facilities are provided for the use of students at the Multi-Media Laboratories of the School. It is opened for students during office hours.

All laboratory requirements are provided, complete with instruments and equipment.

Library, hostels and the sports complex with their respective ancillary facilities are provided for students at the USM Health Campus.

8.0 GENERAL INFORMATION

8.1 CAREER GUIDANCE

It must be emphasised that the examples of jobs and career options given below are not limited to those mentioned. The curricula which are offered by the School are flexible enough to provide graduates with skills and abilities which will enable them to prospects jobs in a wider domain and related areas.

8.1.1 Biomedical Science

- Science/research officers at research institutes, institutions of higher learning, hospitals, public and private medical laboratories.

- Production and administrative officers in related industries including Quality Control officers, sales personnel and advisors in the pharmaceutical, food and beverage industries, suppliers of medical products and instrumentations and as environmental officers.

- Tutors/Lecturers at institutions of higher learning in both private and public sectors. Graduates can also register as graduate students, or join the institutions for higher learning.

- The examples given above are not restrictive and graduates can also involve themselves in many areas of scientific or commercial ventures that is available now or in development particularly in the biotechnology field.

8.1.2 Dietetics

- Clinical dietitians, catering dietitians, sport dietitians in government hospitals, health clinics, private hospitals, wellness centre and institutions.
- Science or research officers at institutions of higher learning and research.
- Tutors at public and private institutions of higher learning. Graduates can also register as graduate students and join the institutions of higher learning.

8.1.3 Forensic Science

- Officers at the forensic services of the Royal Malaysia Police, Department of Chemistry, Fire and Rescue Department, government hospitals and forensic private agencies.
- Science or research officers at research institutes or institutions of higher learning, private and public hospitals and diagnostic laboratories.
- Production, administrative or sales personnel of industries such as pharmaceuticals, food and beverages, reagent suppliers and biomedical instrument suppliers as well as environmental officers.
- Tutors/Lecturers at public and private institutions of higher learning.
- Graduates can also register as graduate students and join the institutions of higher learning.

8.1.4 Medical Radiation

- Radiation protection officers at government and private hospitals, research institutions and public and private health organisations.
- Personnel involved in commercial activities within the production industries related to the radiation field and also in the health care industries.
- Science or research officers at institutions of higher education.
- Tutors/Lecturers at public and private institutions of higher education. Graduates can also register as graduate students and join the institutions of higher education.

8.1.5 Audiology

- As audiologists at medical settings (e.g. government and public hospitals, rehabilitation centres); educational settings (e.g. special education schools, early intervention centers); hearing aid centers; hearing implant centers; or private practice offices.

- As academicians (e.g. tutors, lecturers) at public and private institutes of higher learning.

- As researchers at the institutes of higher learning, research laboratories or centres.

8.1.6 Exercise and Sports Science

- As science/research/sports officers in medical institutions (e.g. government and public hospitals, rehabilitation centers, Youth and Sports Departments); educational settings (e.g. special education schools, sport schools, early intervention centers, universities); sports institutions and associations (National Sports Institute, BAM, FAM) or private practising organisations.

- As academicians (e.g. tutors, lecturers) at public and private institutes of higher learning.

- As coaches, sports science consultants, sports administrators and managers, health coordinators, health club managers in both government and private sector.

8.1.7 Nutrition

- Nutritionists, nutrition product advisor, sports nutritionist in the government sector and private industries, wellness centres and institutions.

- Science or research officers at institutions of higher learning and research institutes.

- Tutors at public and private institutions of higher learning. Graduates can also register as graduate students and join the institutions of higher learning.

8.1.8 Environmental and Occupational Health

- Safety and health officers, environmental health officers, environmental control officers, factory and machinery inspectors and safety supervisors.
- EMS engineers, EHS executives, health promotion officers and operation officers.
- Training officers, auditors and marketing executives.
- Science or research officers at institutions of higher learning and research.
- Tutors/Lecturers at public and private institutions of higher learning. Graduates can also register as graduate students and possibly join as teaching staff in Higher Education institution.

8.2 PRIZES, AWARDS AND DEAN'S LIST

The School is continually soliciting funds for the setting up of gold medal awards to be awarded to the best final year students in all programmes as well as funds for other prizes and awards.
Students obtaining a CGP of 3.67 and above in any semester will receive a Dean's List Certificate.

8.3 SOCIETY

Students of the School of Health Sciences automatically become the members of the Health Science Society of the University. Forensic Science Students can also join the Forensic Science Student Association.

8.4 POSTGRADUATE PROGRAMMES

The School of Health Sciences offers Masters (M.Sc.) and Doctorate (Ph.D.) courses via coursework (MSc in Sport Science) and mixed mode (MSc in Biomedicine and Forensic Science), as well as research mode in many disciplines such as Biomedicine (e.g. Diagnostics, neurocognitive science, natural health products, vaccinology, cancer biology, immune regulations, gene regulations and protein-protein interaction), Forensic Science (e.g. DNA fingerprinting, Forensic Chemistry, Environmental Forensics and Forensic Toxicology), Dietetics and Nutrition (e.g. community nutrition, clinical nutrition and human nutrition) and many others.

Candidates shall have graduated with a Bachelor degree from recognised universities and obtained a CGPA of at least 2.75 for the Masters programme and 3.67 or graduate with a Masters for the Ph.D. programme. However students with a CGPA of less than 2.75 may be considered if they possess appropriate and relevant working experience or experience in research. Interested candidates can contact the Deputy Dean (Postgraduate, Career and International) or the USM Institute of Postgraduate Studies for further information.

8.5 OVERSEAS TRAINING SCHEME

Universiti Sains Malaysia offers limited and highly competitive overseas training schemes to students of levels 100 and 200 who are interested to pursue courses of one semester duration at any foreign university. This scheme is devised with the purpose of exposing students to experience studying at the international level with the possibility of credit transfers. Further details of this scheme can be obtained from the office of International Relations, Division of Academic and International Affairs, USM.