PROGRAMME STANDARDS:
MEDICAL AND HEALTH SCIENCES

Health science is the applied science dealing with health, and it includes many sub-disciplines and approaches such as the study and research of the human body and health-related issues and the application of that knowledge to improve health and to prevent and cure diseases. It is built upon the basic sciences and fundamental biomedical sciences, as well as a variety of multidisciplinary fields such as medical sociology.

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FOREWORD

In its effort to ensure the quality of programmes in institutions of higher learning in Malaysia, Malaysian Qualifications Agency (MQA) has published various documents such as Malaysian Qualifications Framework (MQF), Code of Practice for Programme Accreditation (COPPA), Code of Practice for Institutional Audit (COPIA), Guidelines to Good Practices (GGP) and Programme Standards (PS). It is important that these quality assurance documents be read together with this document in developing and delivering higher education programmes in Malaysia.

The Programme Standards document outlines sets of characteristics that describe and represent guidelines on the minimum levels of acceptable practices that cover all the nine Malaysian quality assurance areas: programme aims and learning outcomes, curriculum design and delivery, assessment of students, student selection, academic staff, educational resources, programme monitoring and review, leadership, governance and administration, and continual quality improvement. The Programme Standards: Medical and Health Sciences cover all the education levels: from diploma to doctoral.

This Programme Standards document has been developed by a panel in consultation with various public and private Higher Education Providers (HEPs), relevant government and statutory agencies, professional bodies, related Medical and Health Sciences industry and students.

This standards do not attempt to give specific characteristics for the programmes, especially for those related to the framing of the curricula and provision of educational resources. This Programme Standards document encourages diversity and allows programme providers to be innovative and to be able to customise their programmes in order to create their own niches, while ensuring they produce graduates that meet the current needs of the profession and ensuring they fulfil their obligations to society. Some examples given in this Programme Standards document, such as the statements of programme aims and learning outcomes, are intended to give clarity to the document; they are not intended to be adopted in a verbatim manner.

I would like to express my appreciation to all the panel members, the various stakeholders who have given their input, and all the officers from MQA who have contributed to the development of this Programme Standards: Medical and Health Sciences document.

Thank you.

Dato' Dr. Syed Ahmad Hussein

Chief Executive Officer

Malaysian Qualifications Agency (MQA)

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GLOSSARY

Compulsory module	Module that is taken to fulfill university and national requirements.
Formative assessment	A process of monitoring the achievement of the learning outcomes. It involves evaluating student learning that aids understanding and development of knowledge, skills and abilities without passing any final judgement (via recorded grade) on the level of learning.
Fundamental module	Module that is deemed common to all subgroups of Medical and Health Sciences by this Programme Standards.
Graduate	A student who has successfully completed any level of qualification within this Programme Standards.
Industrial training	A period of time within the programme where students are required to be placed in the industry to gain industrial experience and enhance soft skills. It also includes Clinical/ Professional/Supervised Professional Placement.
Medical and health sciences	19 applied science disciplines that are built upon the basic sciences and fundamental biomedical sciences and deal with better understanding and improving the health of individuals and community as identified in this Programme Standards.
Module	A unit of learning and teaching also described as subject or course or unit in a programme.
Optional module	A module which is selected by a student from a group of identified modules which form part of the Minimum Graduating Credits for the programme. These may either be as free electives or field electives.
Professional module	Modules taken to fulfill the requirements within an identified/ specific subgroup of Medical and Health Sciences.
Programme	An arrangement of modules that are structured a specified duration and learning volume to achieve the stated learning outcomes, which usually leads to an award of qualification.
Summative assessment	A process of evaluating and grading the learning of students at a point in time.

ABBREVIATION

A-Level	Advanced Level
APEL	Accreditation of Prior Experiential Learning
CGPA	Cumulative Grade Point Average
COPIA	Code of Practice for Institutional Audit
COPPA	Code of Practice for Programme Accreditation
CPD	Continuous Professional Development
GCE	General Certificate of Education
GGP	Guidelines to Good Practices
HEP	Higher Education Provider
IELTS	International English Language Testing System
IKM	Malaysian Institute of Chemistry
MCQ	Multiple Choice Questions
MEQ	Mixed Essay Questions
MGC	Minimum Graduating Credits
MOHE	Malaysian Ministry of Higher Education
MQA	Malaysian Qualifications Agency
MQF	Malaysian Qualifications Framework
O-Level	Ordinary Level
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examination
RPL	Recognition of Prior Learning
SEQ	Short Essay Questions
SPM	Sijil Pelajaran Malaysia
STPM	Sijil Tinggi Persekolahan Malaysia
TOEFL	Test of English as a Foreign Language

INTRODUCTION

This document, The Programme Standards: Medical and Health Sciences (the Programme Standards), contains benchmarked statements pertaining to the field of medical and health sciences. The complex multidisciplinary nature of medical and health science requires a sound, research-informed, scientific education. Graduates must acquire sufficient knowledge, understanding, skills and professionalism that underpin the education and training of health professionals. They should be aware of the current approaches used in health care and research. They are encouraged to integrate the knowledge of various key disciplines to further understand their respective fields. These objectives can be achieved by incorporating professional standards within the programme.

Health science is the applied science dealing with health, and it includes many sub-disciplines and approaches such as the study and research of the human body and health-related issues and the application of that knowledge to improve health and to prevent and cure diseases. It is built upon the basic sciences and fundamental biomedical sciences, as well as a variety of multidisciplinary fields such as medical sociology. This Programme Standards also includes applied health sciences which deals with better understanding and improving the health of individuals and community.

In developing this document, the Panel for Medical and Health Sciences Programme Standards had considered the wide array of fields that may fall within the medical and health sciences and decided to include the following fields:

1. Audiology
2. Biochemistry
3. Biomedical Sciences
4. Dietetics
5. Environmental Health
6. Forensic Science
7. Genetics
8. Health Care Management
9. Health Promotion
10. Medical Imaging

11. Medical Laboratory Technology

12. Medical Social Work

13. Microbiology

14. Nutrition

15. Occupational Safety and Health

16. Occupational Therapy

17. Physiotherapy

18. Radiotherapy

19. Speech Sciences

These fields were further clustered into subgroups namely: Nutrition and Dietetics, Lab-based Diagnostic Sciences, Medical Imaging and Radiotherapy, Health Care Sciences, Therapeutic Sciences, Forensic Sciences and Audiology and Speech Sciences. The following paragraphs describe the identified fields within a subgroup.

1. Nutrition and Dietetics

As the name indicates, this subgroup of medical and health sciences contains two fields of study, Nutrition and Dietetics and a brief description is given below.

(a) Nutrition

Nutrition is the science of food and nutrients, their uses, processes, and balance in relation to health and disease. The work of nutritionists emphasises the social, economic, cultural, and psychological implications of food usually associated with public health care services or with food assistance and research activities. The work of a nutritionist includes directing, promoting, and evaluating nutritional components of programmes and projects; developing standards, guides, educational and informational material for use in nutrition programmes; participating in research activities involving applied or basic research; or providing training and consultation in nutrition.

This document provides the architecture for nutrition human capital development in the form of a competency framework. It should be considered as an evolving framework that is responsive to changes in work conditions and priorities. Its essential feature is the specification of threshold

standards, incorporating academic and practitioner elements, against which higher education institutions are expected, as a minimum, to set their standards for the award.

(b) Dietetics

Dietetics is an essential component of the health sciences, usually with emphasis on providing patient care services in hospitals or other treatment facilities. The work of the dietician includes food service management; assessing nutritional needs of individuals or community groups; prescribing medical nutrition therapy; providing dietary consultation for treatment of diseases/illnesses in both acute and chronic care; conducting research in nutrition, dietetics and food services; formulating policies, protocols, clinical practice guidelines, medical nutrition therapy guidelines; providing expertise in the promotion of wellness through healthy eating and health-related programme to support the healthcare needs of the population.

This document provides the architecture for dietetics human capital development in the form of a competency framework. It should be considered as an evolving framework that is responsive to changes in practice within professional contexts. Its essential feature is the specification of benchmark standards, incorporating academic and practitioner elements, against which higher education institutions are expected, as a minimum, to set their standards for the award.

2. Lab-Based Diagnostic Sciences

For the purposes of this Programme Standards, the subgroup of Lab-Based Diagnostic Sciences includes Biochemistry, Genetics, Microbiology, Medical Laboratory Technology and Biomedical Sciences. A brief description of each of the field is provided below.

(a) Biochemistry

Biochemistry is the study of the substances and chemical processes which occur in living organisms. It is the study of the fundamental processes of life at the cellular level and includes the identification and quantitative determination of the substances, studies of their structure, determining how

they are synthesised and degraded in organisms, and elucidating their role in the operation of the organism.

The programme links biological sciences like molecular biology and genetics to physical sciences like chemistry and physics. It includes the study of the structures and physical properties of biological molecules such as the proteins, the carbohydrates, the lipids, and the nucleic acids; the mechanisms of enzyme action; the chemical regulation of metabolism; the molecular basis of genetic expression; the chemistry of vitamins; chemo-luminescence; biological oxidation; energy utilisation in the cell and the chemistry of the immune response. It exposes students to the application of many techniques common in medicine and physiology as well as those of organic, analytical, physical chemistry and clinical biochemistry.

Biochemists work in diverse areas including laboratories, healthcare settings such as hospitals and clinics, at universities and colleges, industry, and the community. Those who choose to work in a hospital department or clinical chemistry/chemical pathology laboratory need to have the understanding of the biochemistry of diseases. They produce and interpret the results of chemical and biochemical analyses performed on blood and other body fluids to help in the diagnosis and management of disease. Increasingly their work involves selected population screening and they advise on planning and monitoring treatment. They also conduct evaluation and quality assessment of diagnostic tests.

(b) Genetics

Geneticists work in diverse areas including laboratories, healthcare settings such as hospitals and clinics, in academia at universities and colleges, industry and the community. Some work in basic science research studying the laws and factors that contribute to the origin, transmission, and development of inherited traits. Others work in clinical sciences applying their genetics knowledge directly to human and veterinary medicine, food technology, and other industries.

Geneticists perform experiments to study the factors that contribute to the origin, transmission, and development of inherited traits. They study different aspects of genetic material (the genome) which consists of DNA, proteins, and the environment. Clinical genetics is the application of genetics to the study of human health and diseases. As a profession, clinical geneticists are usually a mixture of both clinical services and research. Their services include diagnosis, counselling, and management of birth defects and genetic disorders. They also investigate how biological traits such as colour, size, or resistance to disease pass from one generation to the next. Through the study of genetics, geneticists can better understand the relationship of heredity to growth, gender, fertility, obesity, aging, birth defects, genetic diseases, disorders, and conditions, and environmental influences.

(c) Microbiology

The bachelor of science/biomedical science in microbiology degree is intended to prepare graduates for eventual professional careers as clinical microbiologists and other related microbiology fields. This is a broad based programme encompasses all the major specialties within microbiology with emphasizes on laboratory work experience. Related and supporting subjects in biology, chemistry, physics, and zoology are an integral part of this programme. The programme is designed to prepare students for careers in microbiology with emphasis in medical microbiology, immunology, molecular biology, virology, microbial physiology, microbial ecology, microbial genetics, environmental microbiology and pharmaceutical microbiology. Skills and abilities to make critical observations, to organize and analyse data, to conduct research, proficiency in reading and writing of scientific inquiry, operating scientific equipment, proficiency in analyzing, problem solving and creative thinking are included in the teaching programmes.

Diagnostic microbiology concerns with microbiological aspects of human and animal infection by pathogens such as bacteria, viruses, fungi and protozoa. Common topics of interest to clinical microbiology include the nature of the etiologic agents, their interactions with the immune system, and the diagnosis and epidemiology of infectious disease were parts of the study. This programme will explore career opportunities within microbiology

including public health, diagnostic testing, pharmaceutical sales, biotechnology and basic research and development. It also covers laboratory management, infection control, diagnostic techniques and communication skills.

The roles of microbiologists in medical and health professions include bacteriology analysis, antibiotic susceptibility testing, mycology, virology, molecular microbiology, myco-bacteriology, molecular epidemiology, and parasitology. New testing methods include PCR diagnostics, bacterial gene sequencing for identification, and tests for susceptibility of yeasts and viruses to antifungal or antiviral agents in vitro. Microbiologists also involve in advising treating physicians and others on which tests to order and discuss the implications of test results.

(d) Medical Laboratory Technology
Medical Laboratory Technology programme provides an opportunity for education and training in all of the major disciplines of medical laboratory sciences. The programme is designed to provide a vocationally oriented qualification, which will prepare graduates for employment in diagnostic laboratory, medical research, biotechnology, biological manufacturing or the pharmaceutical industry. The complexity of tests performed, the level of judgment needed, and the amount of responsibility they assume depend largely on the amount of education and experience they have.

Medical laboratory technologists (MLT) are health care professionals who are concerned with the diagnosis, management and prevention of disease through the use of clinical laboratory tests. They perform complex biochemical, hematological, histological, cytological, immunological, and bacteriological analyses on specimens obtained from patients in hospitals and other related health care institutions. Technologists also perform microscopic examination on blood specimens and other body fluids. They make cultures of body fluid and tissue samples, to determine the presence of bacteria, fungi, parasites, or other micro-organisms. Technologists analyse samples for chemical content or a chemical reaction and determine concentrations of compounds such as blood glucose and cholesterol levels.

They are also involved in blood components preparation, type and cross-match of blood samples for transfusions. Technologists working in clinical laboratory settings also participate in evaluation of test results, develop and modify procedures, and establish and monitor quality control programmes, to ensure the accuracy of tests produced. To maintain the integrity of the laboratory process, the medical technologists should also be able to recognise factors that could introduce error and reject contaminated or sub-standard specimens.

(e) Biomedical Sciences

Biomedical science programme is multidisciplinary in nature and it exposes students to the latest information and technology in the fields of medical and health sciences. The nature of the programme is intended to cover all aspects of laboratory diagnosis, disease prevention and research in the fields of biomedical sciences including pathology, immunology, haematology, transfusion science, human biochemistry, clinical biochemistry, medical microbiology and parasitology, pharmacology, physiology, anatomy and genetics. In addition courses in psychology and behavioural sciences, biostatistics and research methodology, ethics, animal care and handling, epidemiology and information technology are also offered. Industrial training, biomedical practicum and research project will be introduced in the final stage of the studies to equip the students with the knowledge and skills in the diagnostic and clinical laboratory, disease prevention and research fields.

Generically, all laboratory diagnostic sciences programmes should also emphasise basic management like quality control, good laboratory practice (GLP), quality management, safety and ethical issues.

3. Medical Imaging and Radiotherapy

This subgroup contains medical imaging and radiotherapy fields of study and brief descriptions for each of these are given below.

(a) Medical Imaging

Medical Imaging is a science of imaging of organs or internal human body with the use of ionizing and non-ionizing radiation such as x-rays, gamma

rays, high-frequency sound waves and magnetic fields to achieve a diagnostic and therapeutic health gain. It includes techniques, procedures and processes for clinical purposes to detect, examine and diagnose diseases, while in interventional radiology, imaging procedures are combined with other techniques to treat certain diseases and abnormalities. Other names for medical imaging are diagnostic imaging and radiography.

The trained medical imaging personnel is known as Radiographer or Medical Imaging Technologist who is responsible for providing safe, rapid and accurate diagnostic imaging examinations in a wide range of clinical situations using a wide range of imaging modalities. Such imaging modalities include Radiography, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasonography (US) and Radionuclide Imaging (RNI).

(b) Radiotherapy

Radiotherapy is concerned with the treatment of diseases using ionising radiations such as x-rays, gamma rays and electron beams. Radiation Therapists (or Therapeutic Radiographers) are responsible for the safe and accurate planning and delivery of radiation treatment, employing imaging procedures and taking responsibility for the physical and psychosocial well-being of the patient.

4. Health Care Sciences

Health care services sciences training prepare students a position in planning, supervising and managing health care services delivery in various occupational and environmental setting, health care facilities, research and consultancy institutions and agencies. This subgroup is divided into the following fields; Environmental Health, Occupational Health, Health Care Management, Health Promotion and Medical Social Work.

(a) Environmental Health

Environmental Health is concerned with the establishing and maintaining of a healthy and safe environment – be it in natural or non-natural environment. Development is looked at in the perspective of natural ecology – in saving resources and minimising adverse effects to lives and total environment.

Hazards resulting from man-made environment and development are studied and monitored to suggest control for the Global Sustainability in Consumption and Production. Environmental issues like the Global Climatic Change, Ozone depletion and scarcity and contamination of resources are studied.

Candidates in the field would study, among other things, basics of health sciences – chemistry, biochemistry, biology, microbiology, human structure and functions, statistics; as well as related diseases and disease control, laws, ecology, pollution, environmental assessments, land use and housing, environmental toxicology, environmental health promotion occupational health and hygiene.

(b) Occupational Health

Occupational health learns as much as the environmental health, but in the perspective of work and work environment. It entails into establishing and maintenance of the highest degree of health or workers in their work environment as well as in the community. Experts in the field identify hazards, measure and characterise the risks resulting from it in the workplaces and suggest control measures to mitigate the effects on human if the hazards cannot be avoided.

Candidates in the field would study, among other things, basics of health sciences – chemistry, biochemistry, biology, microbiology, human structure and functions, psychology, epidemiology, statistics; as well as related diseases, laws, ecology, pollution, occupational health, environmental health, ergonomics, risk management, emergency response, safety and hygiene.

(c) Health Care Management

Health care management concerns with administration and management of today's hospitals and other health facilities and healthcare organizations. Health care management professionals ensure the organization have strong medical, operational and financial foundation to serve the needs of patients, their families and the communities. They are skilled and trained deeply about financial, human resources and health facilities management, organizational

behaviour and quality of health care services as well as in health information management.

(d) Health Promotion

Health promotion is the science and art of helping people change their lifestyle to move toward a state of optimal health. Optimal health is defined as a balance of physical, emotional, social, spiritual and intellectual health. Lifestyle change can be facilitated through a combination of efforts to enhance awareness, change behaviour and create environments that support good health practices. Health educators or health promotion professionals are skilled and trained in assessment of health needs at individual, community and organisational levels; plan, develop and evaluate health promotion programme, develop educational and health promotion materials, mobilise organizational and community for action as well as in training and supervision capacity.

(e) Medical Social Work

Medical Social Workers understands the basic concept of modern health and health care incorporating holistic approach to resolve clients' problems resulting from disease and impairment caused by developmental deficits, the ageing process, physical injury and bodily, psychological or social dysfunction.

Practitioners of medical social work collaborate and consolidate their expertise to work with humans as whole beings and are committed to facilitate improvement and maintenance of the highest possible health and quality of life through biological, psychological, social and cultural dimensions of patients as individuals and promulgate their participation in society.

Medical Social Workers acknowledge and study the dynamic integration of physical, cognitive, psychological, social, environmental, economic, creative and spiritual aspects, as well as past experience and future aspirations, as components of a sense of identity in patients in their recuperation and rehabilitation. They study, among other things, theories in psychology,

sociology, medical anthropology, related laws, ethics, principles and standards, behavioural change management and communication.

5. Therapeutic Sciences

This group comprises of Occupational Therapy and Physiotherapy programmes. The philosophical base for Therapeutic Sciences is the basic concept of modern health care in which the holistic approach is used to resolve clients' problems resulting from impairment caused by developmental deficits, the ageing process, physical injury and psychological or social dysfunction. Practitioners of therapeutic sciences collaborate and consolidate their expertise to work with humans as whole beings and are committed to providing opportunities for development and maintenance of the highest potential in the biological, psychological, social and cultural dimensions of each individual and participation in society.

(a) Occupational Therapy

Occupational therapists value occupation in its widest sense. It encompasses all the activities that contribute to a person's identity. It acknowledges the dynamic integration of physical, cognitive, psychological, social, environmental, economic, creative and spiritual aspects, as well as past experience and future aspirations, as components of that sense of identity. Occupational therapists believe in people as autonomous individuals with the potential for change and for whom engagement in meaningful occupation is essential for health and wellbeing.

(b) Physiotherapy

Physiotherapy is a client focused health care profession with a science foundation which emphasizes the use of physical approaches in promotion, maintenance, restoration of individual's physical, physiological and social well being encompassing differences in health status.

The range of work is very broad and varied and involves the application of professional practice and problems solving approaches using reflective behaviour and systematic clinical reasoning skills based on evidence based to patient care. The integration of professional knowledge, skills, application

various competencies in diverse disciplines: inclusive of neuromuscular, musculoskeletal, cardiovascular, respiratory, neurology, women's health, paediatrics, sports and aged related areas. Physiotherapists work in a range of health care settings includes hospital, private practice, industry, sport and wellness centres, public health organisations, community centres aged care facilities and workplaces.

6. **Forensic Science**

Students of forensic science degree programme will be exposed to the latest knowledge and technologies in the field of forensic science via courses which have been developed meticulously. The forensic science programme incorporates chemistry, physical science, criminal investigation, biology and law to provide a comprehensive understanding and hands-on training of the evidentiary process. This academic approach familiarises students with the major components of the criminal justice process, from the investigation and collection of crime scene evidence to its scientific evaluation and subsequent presentation in court. The curriculum of this programme includes theoretical and applied coursework and offers broad preparation in substantive areas of the field with the opportunity for an in-depth exploration of forensic science.

Teaching staff of the programme/department with others from partners faculties, Chemistry Department of Malaysia, The Fire and Rescue Department and The Royal Malaysian Police will together ensure that the programme is run smoothly and in an excellent manner. This teaching partnership provides experiential learning opportunities with law enforcement and scientific personnel to produce graduates with the skills and experience needed to assume positions as forensic science specialists and criminal investigators.

7. **Audiology and Speech Sciences**

(a) **Audiology**

Audiology is the branch of science that studies hearing, balance and related disorders. The study of audiology incorporates anatomy, physiology, acoustics, linguistics, speech and language development, counselling,

communication disorders, assessments, intervention and management for these disorders.

As a healthcare profession, audiology involves prevention, identification, evaluation, management and rehabilitation of hearing and balance disorders.

Audiologists employ various testing strategies such as hearing assessments, balance tests and electrophysiological tests with aims to determine whether someone can hear within the normal range, and if not, to describe the type of hearing loss, to what degree and also to detect any related disorders. This includes patients of all ages from newborns to the elderly. If an audiologist determines that a hearing loss or vestibular abnormality is present, he or she will provide recommendations to the patient as to what measures can be taken to assist them. An audiologist also counsels on the prescription of hearing aids, cochlear implants, rehabilitation tools and also appropriate medical referrals. Audiologists are also responsible in managing hearing screening programmes, hearing conservation programmes and hearing awareness campaigns.

(b) Speech Sciences

Speech sciences is the study of human communication sciences and disorders that includes normal and abnormal aspects of communication (language, voice, speech and fluency) and swallowing. It focuses on the assessment, intervention and management of individuals who are unable to communicate effectively or who have difficulty in swallowing.

The speech sciences curriculum provides a strong foundation in the main areas of speech sciences during the four years of study. The curriculum is designed to cover all fundamental and clinical aspects of speech sciences – sufficient for a graduate to function and perform re habilitation services in communication disorders. The courses will include a balance of both theoretical and practical components. The theoretical components will include lectures and seminars in speech and language pathology and therapeutic, linguistics, medical and health sciences, education, acoustics, research methodology and statistics, psychology, and professional issues.

The practical components of the course will give the student the opportunity to apply the theory to practice and to develop their clinical skills by working with a variety of patients in a range of work settings under the supervision of qualified clinical supervisors.

Speech and Language Pathologists (SLPs) or also known as Speech Language Therapists (SLTs) are the healthcare professionals who provide prevention, screening, consultation, assessment and diagnosis, intervention, management, counselling, and follow-up services to both children and adults with communication disorders and swallowing difficulty.

SLPs / SLTs utilise different assessment materials and instruments such as standardised and non-standardised tests, child-friendly toys, computer software and communication aids to diagnose the nature and the extent of impairment. Based on the assessment findings, SLPs / SLTs plan and conduct the necessary intervention and management for individuals with communication disorders and swallowing difficulty. SLPs / SLTs can work in a variety of settings including schools, public and private hospitals, and private centres.

Application of Programme Standards

This document describes the different levels of standards leading to the award of individual qualifications, namely Diploma (MQF Level 4), Bachelor's Degree (MQF Level 6), Master's Degree (MQF Level 7) and Doctoral Degree (MQF Level 8). These standards are designed to encourage diversity of approach within a framework that is compatible with the national and global human resource requirements and the socio-economic needs. They cannot be seen as a syllabus and no form of prescription is intended in the amount of time devoted to each component or the order in which the material is presented. Higher education providers (HEPs) are expected to combine, teach and assess the subject matter creatively. The Programme Standards provides an inventory of content; delivery and assessment of programmes, thus enabling identification of vital components of qualifications from diploma to doctoral awards.

As the Programme Standards should be viewed as benchmark statements, HEPs are encouraged to go beyond the basic minimum. This document is also intended to be

valuable to potential students, their parents and guardians, employers, professional and regulatory bodies, universities, colleges and schools.

The development and implementation of this Programme Standards is to ensure that the graduates produced would meet the professional requirements and expectations in their respective fields. Graduates may enter employment in the following areas:

- hospitals and healthcare facilities
- community and health services
- health protection agencies
- diagnostic, clinical and research laboratories
- commerce (sales and marketing) related to healthcare and diagnostic products
- educational institutions
- industrial sectors
- self employment
- research institutions

It should also be emphasised that medical and health sciences play a pivotal and essential role in healthcare. Most of the component subjects are at the forefront of science and therefore attract leading-edge research activities. HEPs must take cognisance of the rapidly evolving fields and introduce effective and sustainable programme improvement.

As the purpose of this Programme Standards is to provide guidelines in relation to the development and conduct of programmes in the identified fields, it is paramount that this document be read with other quality assurance documents and policies by the Malaysian Qualifications Agency and related agencies. These include but are not limited to the Malaysian Qualifications Framework, the Code of Practice for Programme Accreditation, the Code of Practice for Institutional Audit and Guidelines to Good Practices.

PROGRAMME AIMS

"The vision, mission and goals of the HEP guide its academic planning and implementation as well as bring together its members to strive towards a tradition of excellence. The general goal of higher education is to produce broadly educated graduates through the:

- provision of knowledge and practical skills based on scientific principles;
- inculcation of attitudes, ethics, sense of professionalism and leadership skills for societal advancement within the framework of the national vision;
- nurturing of the ability to analyse and solve problems as well as to evaluate and make decisions critically and creatively based on evidence and experience;
- development of the quest for knowledge and lifelong learning skills that are essential for continuous upgrading of knowledge and skills that parallel the rapid advancement in global knowledge; and
- consideration of issues relevant to the local, national and international context.

Academic programmes are the building blocks that support the larger vision and mission of the HEP. Hence, one must take into consideration these larger institutional goals when designing programmes to ensure that one complement the other.

The quality of the HEP and the programme that it offers is ultimately assessed by the ability of its graduates to carry out their expected roles and responsibilities in society. This requires a clear statement of the competencies, i.e., the practical, intellectual and soft skills that are expected to be achieved by the student at the end of programme. The main domains of learning outcomes cover knowledge, practical and social skills, critical and analytical thinking, values, ethics and professionalism. The levels of competency of these learning outcomes are defined in the Malaysian Qualifications Framework (MQF)," *(COPPA, 2007,* pp. 10).

The programmes aims are given for each level of qualification within the coverage of this Programme Standards, from diploma to doctoral level qualifications.

DIPLOMA

Diploma level education comprises of theory and practical, and stresses on the instillation of values, ethics and attitudes as well as aims to:

1. prepare knowledgeable, safe and competent practitioners in medical and health sciences;
2. generate graduates who contribute effectively in the community;
3. inculcate professional attitudes, ethical conducts and social responsibilities;
4. develop graduates with coordination, teamwork, communication and social skills;
5. equip graduates with technical, problem-solving and scientific skills;
6. equip graduates with ICT and entrepreneurial skills; and
7. instil lifelong learning skills in graduates.

BACHELOR'S DEGREE

A Bachelor's degree prepares students for general employment, entry into postgraduate programme and research as well as highly skilled careers. It enables the individuals to pair responsibilities, which require great autonomy, with professional decision-making. A bachelor's degree should aim to:

1. prepare knowledgeable, safe and competent practitioners in medical and health sciences;
2. generate graduates who contribute effectively in the community;
3. prepare graduates who are creative, innovative, sensitive and responsive towards the community, culture and environment;
4. inculcate professional attitudes, ethical conducts and social responsibilities;
5. develop graduates with leadership, teamwork and communication skills;
6. equip graduates with technical, problem-solving and scientific skills;
7. generate graduates who can conduct research under supervision;
8. equip graduates with ICT, managerial and entrepreneurial skills; and
9. instil lifelong learning skills in graduates.

MASTER'S DEGREE

A Master's Degree provides for the furtherance of knowledge, skills and abilities obtained at the Bachelor's level. The entrance to masters is usually based on proven capabilities to pursue postgraduate studies in the selected fields. A master's degree aims to:

1. prepare graduates with enhanced knowledge, expertise and skills in specialised areas;
2. train graduates with competencies in evaluating and adapting protocols and procedures;
3. prepare graduates who are analytical, creative, innovative, sensitive and responsive towards the community, culture and environment;
4. inculcate professional attitudes, ethical conducts and social responsibilities;
5. develop graduates who can take leadership role in planning and implementing tasks;
6. strengthen graduates with good teamwork, communication, problem-solving and scientific skills;
7. generate graduates who can conduct research with minimal supervision;
8. further enhance ICT, managerial and entrepreneurial skills in graduates; and
9. enhance lifelong learning skills in graduates.

DOCTORAL DEGREE

A Doctoral Degree provides for the further enhancement of knowledge, skills and abilities obtained at the masters level. It generally provides the graduate with the abilities to conduct independent research and aims to:

1. prepare graduates with advanced knowledge, expertise and skills in specialised areas;
2. prepare graduates who are analytical, creative and innovative in relation to the development of knowledge in their fields;
3. generate graduates who can contribute effectively to the societal and scholarly understanding of current issues and technological advancement;
4. enhance graduates with competencies in developing and reviewing protocols and procedures;
5. train graduates who can communicate with peers and scholarly communities;

6. develop leaders in the respective fields;

7. generate graduates who can conduct independent research;

8. further enhance ICT, managerial and entrepreneurial skills;

9. increase awareness of commercialisation; and

10. enhance lifelong learning skills.

LEARNING OUTCOMES

This particular section of the Programme Standards provides the benchmark learning outcomes for the field of study in medical and health sciences. Where possible, the distinctions are made in the larger subgroup and at the varying levels of qualification. Where this is not possible, the programme learning outcomes are provided for individual field of study.

DIPLOMA

1.   LAB-BASED DIAGNOSTIC SCIENCES

At the end of the programme, graduates should be able to:
1.   demonstrate fundamental knowledge in medical sciences;
2.   perform medical laboratory procedures, validate and refer findings competently;
3.   assist in advanced medical laboratory procedures;
4.   perform quality control procedures competently;
5.   identify technical errors, perform basic troubleshooting and related problem-solving procedures;
6.   assist in the management of the laboratory;
7.   practise according to bio-safety and chemical safety requirements and regulations;
8.   demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;
9.   adhere to the legal, ethical principles and the professional code of conduct in medical laboratory sciences;
10. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;
11. demonstrate leadership, interpersonal and social skills;
12. collaborate with other healthcare professionals;
13. formulate solutions based on critical and lateral thinking;
14. participate in research related to medical laboratory sciences and health sciences; and
15. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

2. THERAPEUTIC SCIENCES

At the end of the programme, graduates should be able to:

1. demonstrate fundamental knowledge in therapeutic sciences;
2. demonstrate appropriate assessment techniques and interpret findings;
3. formulate specific treatment plan and conduct appropriate treatment and intervention;
4. document effectively;
5. re-evaluate the patient/client management;
6. recognise emergency events, complications and refer appropriately;
7. identify the scope and limitation of professional practice and refer appropriately;
8. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;
9. adhere to the legal, ethical principles and the professional code of conduct in therapeutic sciences;
10. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;
11. demonstrate leadership, interpersonal and social skills;
12. collaborate with other healthcare professionals;
13. demonstrate problem solving and clinical reasoning skills;
14. participate in research related to therapeutic sciences; and
15. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

3. RADIOTHERAPY

At the end of the programme, graduates should be able to:

1. demonstrate fundamental knowledge in radiotherapy;
2. perform radiotherapy procedures competently;
3. perform basic quality procedures;
4. assist in other advanced radiotherapy procedures;
5. adhere to radiation safety practices;
6. provide quality management of patient/client-centred care;
7. assist in the management of the radiotherapy department;

8. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

9. adhere to the legal, ethical principles and the professional code of conduct in radiotherapy;

10. communicate effectively in verbal and written forms with patients, their family / caregiver, peers, healthcare professionals and the stakeholders at large;

11. demonstrate leadership, interpersonal and social skills;

12. collaborate with other healthcare professionals;

13. demonstrate problem solving and clinical reasoning skills;

14. participate in research related to radiotherapy; and

15. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

4. MEDICAL IMAGING

At the end of the programme, graduates should be able to:

1. demonstrate fundamental knowledge in medical imaging;

2. perform radiographic procedures competently;

3. perform basic quality procedures;

4. assist in other imaging modalities procedures;

5. adhere to radiation safety practices;

6. provide quality management of patient/client-centred care;

7. assist in the management of the medical imaging department;

8. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

9. adhere to the legal, ethical principles and the professional code of conduct in medical imaging;

10. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

11. demonstrate leadership, interpersonal and social skills;

12. collaborate with other healthcare professionals;

13. demonstrate problem solving and clinical reasoning skills;

14. participate in research related to medical imaging; and

15. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

5. **ENVIRONMENTAL HEALTH**

At the end of the programme, graduates should be able to:
1. apply the technical and scientific knowledge of environmental health principles;
2. evaluate, prevent and support control of environmental health problems;
3. manage the operational unit in environmental health field;
4. contribute to solving contemporary environmental health issues to prevent recurrence;
5. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;
6. adhere to the legal, ethical principles and the professional code of conduct in environmental health;
7. communicate effectively in verbal and written forms with peers, healthcare professionals, stakeholders and the community at large;
8. demonstrate leadership, interpersonal and social skills;
9. collaborate with other healthcare professionals;
10. demonstrate problem solving and clinical reasoning skills;
11. participate in research related to environmental health; and
12. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

6. **OCCUPATIONAL SAFETY & HEALTH**

At the end of the programme, graduates should be able to:
1. describe, interpret and apply the knowledge and skills in occupational safety and health;
2. identify and perform various roles and responsibilities of occupational safety and health professionals in measuring safety and health of workplaces;
3. assess potential occupational safety and health problems at workplaces and the community;
4. apply knowledge and skills to ensure occupational safety and health in workplaces and the community;
5. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

6. adhere to the legal, ethical principles and the professional code of conduct in occupational safety and health;

7. communicate in verbal and written forms with peers, healthcare professionals, stakeholders and the community at large;

8. demonstrate leadership, interpersonal and social skills;

9. collaborate with other healthcare professionals;

10. demonstrate problem solving and clinical reasoning skills;

11. participate in research related to occupational safety and health practices; and

12. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

BACHELOR'S DEGREE

1. LAB-BASED DIAGNOSTIC SCIENCES

At the end of the programme, graduates should be able to:

1. apply fundamental and advanced knowledge in medical and health sciences;

2. perform and supervise medical laboratory procedures competently and validate findings;

3. present information and findings coherently;

4. plan, manage and execute quality management system and Good Laboratory Practices (GLP);

5. evaluate and implement new medical laboratory methodologies and instrumentations;

6. demonstrate the ability to seek, adapt and provide solutions to address challenges in medical laboratory practices;

7. coordinate daily activities of medical laboratory practice;

8. adhere to biological, chemical and radiation safety requirements and regulations;

9. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

10. adhere to the legal, ethical principles and the professional code of conduct in medical laboratory;

11. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

12. demonstrate leadership, interpersonal and social skills;

13. collaborate with other healthcare professionals;

14. utilise relevant techniques and identify problems and solutions based on critical and lateral thinking;

15. conduct research related to medical laboratory under supervision;

16. utilise ICT and information management system to enhance their medical laboratory practice;

17. apply skills and principles of lifelong learning in academic and career development; and

18. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

2. THERAPEUTIC SCIENCES

At the end of the programme, graduates should be able to:

1. apply fundamental and advanced knowledge in therapeutic sciences;

2. demonstrate comprehensive assessment techniques and interpret findings;

3. formulate and prescribe specific treatment plan;

4. conduct a holistic and comprehensive treatment intervention safely and competently;

5. monitor and re-evaluate treatment plans;

6. use problem-solving principles and evidence-based practice in decision making of patient/client management;

7. identify the scope and limitations of professional practices, manage and refer appropriately;

8. coordinate daily activities of therapeutic sciences;

9. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

10. adhere to the legal, ethical principles and the professional code of conduct in therapeutic sciences;

11. communicate effectively in verbal and written forms with patients, their family/caregiver, peers, healthcare professionals and the stakeholders at large;

12. demonstrate leadership, interpersonal and social skills;

13. collaborate with other healthcare professionals;

14. utilise relevant techniques and identify problems and solutions based on critical and lateral thinking;

15. conduct research related to therapeutic sciences under supervision;

16. utilise ICT and information management system to enhance their therapeutic sciences practice;

17. apply skills and principles of lifelong learning in academic and career development; and

18. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

3. RADIOTHERAPY

At the end of the programme, graduates should be able to:

1. demonstrate comprehensive knowledge in radiotherapy;

2. perform radiotherapy procedures competently;

3. perform patient assessment throughout the course of treatment;

4. evaluate procedures and institute corrective actions, including implementation of QA programme;

5. demonstrate the ability to seek, adapt and provide solutions to address challenges in radiotherapy practices;

6. coordinate daily activities of radiotherapy practice;

7. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

8. comply to the legal, ethical principles and the professional code of conduct in radiotherapy;

9. adhere to radiation safety requirements and regulations;

10. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

11. demonstrate leadership, interpersonal and social skills;

12. collaborate with other healthcare professionals;

13. utilise relevant techniques and identify problems and solutions based on critical and lateral thinking;

14. conduct research related to radiotherapy under supervision;

15. present information and findings coherently;

16. utilise ICT and information management system to enhance their radiotherapy practice;

17. apply skills and principles of lifelong learning in academic and career development; and

18. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

4. MEDICAL IMAGING

At the end of the programme, graduates should be able to:

1. demonstrate comprehensive knowledge in medical imaging;

2. perform medical imaging procedures competently;

3. evaluate diagnostic outcomes and institute corrective actions, where necessary;

4. evaluate procedures and institute corrective actions, including implementation of QA programme;

5. demonstrate the ability to seek, adapt and provide solutions to address challenges in medical imaging practices;

6. coordinate daily activities of medical imaging practice;

7. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

8. comply to the legal, ethical principles and the professional code of conduct in medical imaging;

9. adhere to radiation safety requirements and regulations;

10. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

11. demonstrate leadership, interpersonal and social skills;

12. collaborate with other healthcare professionals;

13. utilise relevant techniques and identify problems and solutions based on critical and lateral thinking;

14. conduct research related to medical imaging under supervision;

15. present information and findings coherently;

16. utilise ICT and information management system to enhance their medical imaging practice;

17. apply skills and principles of lifelong learning in academic and career development; and

18. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

5. DIETETICS

At the end of the programme, graduates should be able to:

1. describe, interpret and apply knowledge of food, nutrition, clinical and social sciences in nutrition care process;

2. perform and evaluate the theories and methodologies of nutritional status assessment at individual, group, community and population levels;

3. counsel patients in a caring, empathic and culturally-sensitive manner;

4. educate the health professionals and the community on healthy diet and lifestyle;

5. apply principles of evidence-based practices;

6. manage menu planning, procurement and food service activities in hospitals or health care facilities;

7. coordinate daily activities of dietetics practice;

8. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

9. adhere to the legal, ethical principles and the professional code of conduct in dietetics;

10. implement sanitation and safety procedures in food service management systems;

11. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

12. demonstrate leadership, interpersonal and social skills;

13. collaborate with other healthcare professionals;

14. utilise relevant techniques and identify problems and solutions based on critical and lateral thinking;

15. conduct research related to dietetics under supervision;

16. present information and findings coherently;

17. utilise ICT and information management system to enhance their dietetics practice;

18. apply skills and principles of lifelong learning in academic and career development; and

19. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

6. NUTRITION

At the end of the programme, graduates should be able to:

1. describe, interpret and apply knowledge of food, nutrition and health sciences;

2. perform and evaluate the theories and methodologies of nutritional status assessment at individual, group, community and population levels;

3. identify markers of nutritional status in planning, modifying, implementing and evaluating nutritional surveillance at group, community and/or population levels;

4. educate the health professionals and the community on nutrition and healthy lifestyle;

5. utilise relevant techniques and identify nutrition problems and solutions based on critical and lateral thinking at individual, group, community and/or population levels;

6. plan, implement and evaluate nutrition promotion and intervention activities;

7. prepare, modify and evaluate target-based and food-based nutrition education materials and guidelines for group, community and/or population;

8. coordinate daily activities of nutrition services;

9. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

10. adhere to the legal, ethical principles and the professional code of conduct in nutrition;

11. communicate effectively in verbal and written forms with peers, healthcare professionals, community and the stakeholders at large;

12. demonstrate leadership, interpersonal and social skills;

13. collaborate with other healthcare professionals;

14. conduct research related to nutrition under supervision;

15. present information and findings coherently;

16. utilise ICT and information management system to enhance their nutrition practice;

17. apply skills and principles of lifelong learning in academic and career development; and

18. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

7. HEALTH CARE MANAGEMENT

At the end of the programme, graduates should be able to:

1. demonstrate knowledge and skills in relevant basic medical, health and social science knowledge to health care system and services delivery;

2. demonstrate knowledge and skills in health care management, finance and entrepreneurship;

3. identify and analyse critically health care problems to provide solutions based on evidence;

4. demonstrate knowledge and skills in health facilities and resource management;

5. demonstrate quality assurance and improvement skills;

6. coordinate daily activities of health care and management services;

7. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

8. adhere to the legal, ethical principles and the professional code of conduct in health care;

9. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals, stakeholders and the community at large;

10. demonstrate leadership, interpersonal and social skills;

11. collaborate with other healthcare professionals;

12. conduct research related to health care management under supervision;

13. present information and findings coherently;

14. utilise ICT and information management system to enhance their health care management practices;

15. apply skills and principles of lifelong learning in academic and career development; and

16. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

8. ENVIRONMENTAL HEALTH

At the end of the programme, graduates should be able to:
1. apply knowledge and skills to assess and monitor environment and human health;
2. present and utilise information and findings coherently;
3. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;
4. adhere to the legal, ethical principles and the professional code of conduct in environmental health;
5. communicate effectively in verbal and written forms with peers, healthcare professionals, stakeholders and the community at large;
6. demonstrate leadership, interpersonal and social skills;
7. collaborate with other healthcare professionals;
8. identify and analyse critically environmental health problems to provide solutions based on evidence;
9. conduct research related to environmental health under supervision;
10. utilise ICT and information management system to enhance their environmental health practice;
11. apply skills and principles of lifelong learning in academic and career development; and
12. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

9. OCCUPATIONAL SAFETY AND HEALTH

At the end of the programme, graduates should be able to:
1. describe, interpret and apply knowledge and skills in occupational safety and health;
2. assess and analyse issues of occupational safety and health in workplaces and the community;

3. interpret, analyse, synthesise and recommend preventive and corrective measures in occupational safety and health;

4. educate and train employees, employers and the community on occupational safety and health;

5. apply evidence-based scientific principles in discussing ideas of improvement in occupational safety and health;

6. coordinate daily activities of occupational safety and health;

7. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

8. adhere to the legal, ethical principles and the professional code of conduct in occupational safety and health;

9. communicate effectively in verbal and written forms with peers, healthcare professionals, stakeholders and the community at large;

10. demonstrate leadership, interpersonal and social skills;

11. collaborate with other healthcare professionals;

12. identify and analyse critically occupational safety and health problems to provide solutions based on evidence;

13. conduct research related to occupational safety and health under supervision;

14. utilise ICT and information management system to enhance their occupational safety and health practice;

15. apply skills and principles of lifelong learning in academic and career development; and

16. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

10. HEALTH PROMOTION

At the end of the programme, graduates should be able to:

1. demonstrate knowledge and skills in relevant basic medical, health and behavioural sciences in planning, implementation and evaluation of health promotion and services;

2. identify health problems and needs at individual, group and communities based on relevant epidemiological, environmental, behavioural and socio-cultural perspectives;

3. analyse and develop plan for health promotion intervention;

4. identify, design and produce health promotion resources and educational material in supporting health promotion strategies and programmes;

5. conduct and evaluate health promotion strategies and programmes;

6. coordinate daily activities of health promotion;

7. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

8. adhere to the legal, ethical principles and the professional code of conduct in health care and promotion;

9. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

10. demonstrate leadership, interpersonal and social skills;

11. collaborate with other healthcare agencies;

12. utilise relevant techniques and identify problems and solutions based on critical and lateral thinking;

13. conduct research related to health promotion under supervision;

14. utilise ICT and information management system to enhance their health promotion and educational practice;

15. apply skills and principles of lifelong learning in academic and career development; and

16. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

11. FORENSIC SCIENCE

At the end of the programme, graduates should be able to:

1. apply fundamental knowledge in forensic science;

2. perform forensic science procedures competently;

3. coordinate daily activities of forensic science practice;

4. present information, validate findings, interpret results and produce reports coherently within forensic science context;

5. demonstrate the ability to seek, adapt and provide solutions to address challenges in forensic science practices;

6. apply quality management system required in forensic science;

7. conduct research related to forensic science under supervision;

8. communicate effectively in verbal and written forms with clients, peers and the stakeholders at large;

9. demonstrate leadership, interpersonal and social skills;

10. collaborate with other related professionals;

11. identify problems and solutions based on lateral and critical thinking;

12. utilise ICT and information management system to enhance their forensic science practice;

13. adhere to biosafety and chemical safety requirements and regulations;

14. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

15. adhere to the legal, ethical principles and the professional code of conduct in forensic science;

16. apply skills and principles of lifelong learning in academic and career development; and

17. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

12. AUDIOLOGY

At the end of the programme, graduates should be able to:

1. demonstrate fundamental and advanced knowledge in audiological sciences;

2. integrate their theoretical knowledge and clinical practice in assessment, interpretation, management, and rehabilitation aspects of hearing, balance and related disorders;

3. conduct accurate, organised and problem focused intervention plans using appropriate techniques and judgments;

4. perform appropriate and accurate audiological examination and evaluations using evidence based practice;

5. integrate case history, clinical observation and audiological evaluation to arrive to a diagnosis;

6. formulate a management plan in concert with the patient and caregivers and execute appropriately;

7. practice in a manner that promotes well-being and safety;

8. display good problem solving, decision making, clinical reasoning and reflection skills;

9. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

10. adhere to the legal, ethical principles and the professional code of conduct in audiology;

11. organise hearing awareness, screening, and conservation programmes;

12. conduct research related to audiology under supervision;

13. recognise the health care delivery system, their economic and legislative foundations;

14. demonstrate leadership, interpersonal and social skills;

15. collaborate with other healthcare professionals;

16. utilise ICT and information management system to enhance their audiology practice; and

17. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

13. SPEECH SCIENCES

At the end of the programme, graduates should be able to:

1. demonstrate knowledge related to speech sciences;

2. demonstrate knowledge of the principles and methods of assessment, intervention and prevention for individuals with communication and swallowing disorders;

3. assess individual with communication and swallowing disorders and integrate findings to arrive to a diagnosis;

4. formulate and execute intervention plan based on assessment findings in concert with patients, their family/caregiver, peers, healthcare professionals;

5. counsel patients with communication and swallowing disorders in a caring, empathic and culturally-sensitive manner;

6. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

7. perform methods of prevention for people with risks of communication and swallowing disorders;

8. display good problem solving, decision making, clinical reasoning and reflection skills;

9. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

10. adhere to the legal, ethical principles and the professional code of conduct in speech sciences;

11. conduct research related to audiology under supervision;

12. demonstrate leadership, interpersonal and social skills;

13. collaborate with other healthcare professionals;

14. utilise ICT and information management system to enhance their speech sciences practice; and

15. apply broad business and real world perspectives in workplace and everyday activities and demonstrate entrepreneurial skills.

MASTER'S DEGREE

At the end of the programme, graduates should be able to:

1. demonstrate enhanced knowledge and skills;

2. provide progressive, innovative and creative ideas and strategies and address challenges and concerns within the field;

3. identify problems, evaluate, adapt and provide holistic solutions to services and organisations;

4. analyse and disseminate information and communicate effectively with peers and scholarly community, stakeholders and the society at large;

5. conduct research with minimal supervision;

6. evaluate and implement policies, regulations and guidelines and make recommendations when necessary;

7. provide, manage, evaluate and suggest improvement;

8. enhance capacity building through leadership, teamwork, ICT, lifelong learning and entrepreneurial skills; and

9. adhere to the legal, ethical principles and the professional code of conduct and respect cultural and religious sensitivities.

DOCTORAL DEGREE

At the end of the programme, graduates should be able to:

1. develop specialisation, theories and/or body of knowledge;
2. produce original, independent, scholarly research of international standards and publish the findings in peer-reviewed/refereed journals;
3. make critical analysis, evaluation and synthesis of new and complex ideas;
4. provide expert opinions and evidence in the relevant field;
5. be receptive to and promote diverse opinions and perspectives;
6. evaluate and implement policies, regulations and guidelines and make recommendations where necessary;
7. manage and evaluate services and organisations independently;
8. supervise, train, coach, develop and motivate within the contexts of workplace, higher education and the community; and
9. enhance capacity building through leadership, teamwork, ICT, lifelong learning and entrepreneurial skills; and
10. adhere to the legal, ethical principles and the professional code of conduct and respect cultural and religious sensitivities.

CURRICULUM DESIGN AND DELIVERY

This section of the Programme Standards contains benchmarked statements pertaining to the structure and delivery of a programme within the field of medical and health sciences.

"For the purposes of this code of practice for accreditation of programmes offered by higher education providers, the term 'curriculum design and delivery' is used interchangeably with the term 'programme design and delivery'. "Programme" means an arrangement of courses that are structured for a specified duration and learning volume to achieve the stated learning outcomes and usually leading to an award of a qualification," *(COPPA, 2008,* pp. 12).

The following matrices are proposed specific benchmark requirements for the individual field and **Appendix 1** contains the proposed structure for the various fields at the various levels. The proposed structures are only **guidelines**, HEPs are encouraged to develop the programme to reflect current best practices, achieve higher standards and develop specialisations.

<u>DIPLOMA</u>

- Minimum Graduating Credits are given in the respective tables below and it ranges between 90 and 105.
- Graduates of a diploma are required to spend 1000 hours in practical training or clinical placement.

I. LAB-BASED DIAGNOSTIC SCIENCES

Component		Medical Laboratory Technology
Minimum Graduating Credit		**90**
		Percentage
Compulsory Modules		10 – 15
Core Modules	1. *Fundamental Modules include Basic Sciences*	15 – 25
	2. *Professional Modules*	45 – 53
	3. *Industrial Training**	8 – 16
Optional Modules		4 – 9

*Includes Clinical or Professional Placement or Supervised Professional Placement

II. MEDICAL IMAGING AND RADIOTHERAPY

Component		Radiotherapy	Medical Imaging
Minimum Graduating Credit		**100**	
		Percentage	
Compulsory Modules		10 – 15	10 – 15
Core Modules	1. *Fundamental Modules include Basic Sciences*	10 – 20	10 – 20
	2. *Professional Modules*	40 – 50	40 – 50
	3. *Industrial Training**	15 – 25	15 – 25
Optional Modules		5 – 10	5 – 10

*Includes Clinical or Professional Placement or Supervised Professional Placement

III. HEALTH CARE SCIENCES

Component		Environmental Health	Occupational Health
Minimum Graduating Credit		**90**	
		Percentage	
Compulsory Modules		10 – 15	10 – 15
Core Modules	1. *Fundamental Modules include Basic Sciences*	15 – 28	15 – 28
	2. *Professional Modules*	40 – 50	40 – 50
	3. *Industrial Training**	7 – 12	7 – 12
Optional Modules		10 – 13	10 – 13

*Includes Clinical or Professional Placement or Supervised Professional Placement

IV. THERAPEUTIC SCIENCES

Component		Physiotherapy	Occupational Therapy
Minimum Graduating Credit		**105**	
		Percentage	
Compulsory Modules		10 – 15	10 – 15
Core Modules	1. *Fundamental Modules include Basic Sciences*	10 – 15	10 – 15
	2. *Professional Modules*	40 – 45	35 – 40
	3. *Industrial Training**	20 – 30	20 – 30
Optional Modules		5 – 10	10 – 15

*Includes Clinical or Professional Placement or Supervised Professional Placement

BACHELOR'S DEGREE

- Minimum Graduating Credits are given in the respective tables below and it ranges between 129 and 145 credits.
- Practical training – throughout the course, as required.

Breakdown of Programme

I.   NUTRITION AND DIETETICS

Component	Nutrition	Dietetics
Minimum Graduating Credit	**136**	
	Percentage	
Compulsory Modules	7 – 15	7 – 15
Total: Core + Concentration/Specialisation		
1. Fundamental Modules include Basic Sciences	10 – 23	15 – 20
2. Professional Modules	50 – 58	45 – 50
*3. Industrial Training**	4 – 10	7 – 20
Optional Modules	10 – 13	8 – 13

*Includes Clinical or Professional Placement or Supervised Professional Placement

II.   LAB-BASED DIAGNOSTIC SCIENCES

Component	Biochemistry	Biomedical Sciences	Genetics	Microbiology	Medical Laboratory Technology
Minimum Graduating Credit	**137**	**136**	**138**	**138**	**136**
	Percentage				
Compulsory Modules	7 – 15	7 – 15	7 – 15	7 – 15	7 – 15
Total: Core + Concentration/Specialisation					
1. Fundamental Modules include Basic Sciences	10 – 25	10 – 25	10 – 25	10 – 25	10 – 25
2. Professional Modules	50 – 58	50 – 58	50 – 58	50 – 58	50 – 58
*3. Industrial Training**	4 – 8	4 – 8	4 – 8	4 – 8	4 – 8
Optional Modules	10 – 13	10 – 13	10 – 13	10 – 13	10 – 13

*Includes Clinical or Professional Placement or supervised professional placement

III. MEDICAL IMAGING AND RADIOTHERAPY

Component	Radiotherapy	Medical Imaging
Minimum Graduating Credit	**136**	
	Percentage	
Compulsory Modules	10 – 15	10 – 15
Total: Core + Concentration/Specialisation		
1. Fundamental Modules include Basic Sciences	10 – 20	10 – 20
2. Professional Modules	40 – 50	40 – 50
3. Industrial Training*	15 – 25	15 – 25
Optional Modules	5 – 10	5 – 10

*Includes Clinical or Professional Placement or supervised professional placement

IV. HEALTH CARE SCIENCES

Component	Environmental Health	Occupational Health	Health Care Management	Health Promotion
Minimum Graduating Credit	**129**			
	Percentage			
Compulsory Modules	7 – 15	7 – 15	7 – 15	7 – 15
Total: Core + Concentration/Specialisation				
1. Fundamental Modules includes Basic Sciences	15 – 29	15 – 29	15 – 29	15 – 29
2. Professional Modules	40 – 48	40 – 48	40 – 48	40 – 48
3. Industrial Training*	7 – 12	7 – 12	7 – 12	7 – 12
Optional Modules	12 – 15	12 – 15	12 – 15	12 – 15

*Includes Clinical or Professional Placement or Supervised Professional Placement

V. THERAPEUTIC SCIENCES

Component	Physiotherapy	Occupational Therapy
Minimum Graduating Credit	**129**	**136**
	Percentage	
Compulsory Modules	7 – 15	7 – 15
Total: Core + Concentration/Specialisation		
1. Fundamental Modules include Basic Sciences	10 – 19	10 – 18
2. Professional Modules	40 – 45	35 – 40
3. Industrial Training*	20 – 29	20 – 30
Optional Modules	5 – 10	10 – 15

*Includes Clinical or Professional Placement or Supervised Professional Placement

VI. FORENSIC SCIENCE

Component	Forensic Science
Minimum Graduating Credit	145
	Percentage
Compulsory Modules	10 – 15
Total: Core + Concentration/Specialisation	
1. Fundamental Modules include Basic Sciences	10 – 20
2. Professional Modules	60 – 65
3. Industrial Training*	5 – 7
Optional Modules	3 – 5

*Includes Clinical or Professional Placement or Supervised Professional Placement

Note**:** To be considered for recognition by Malaysian Institute of Chemistry (IKM), a minimum of 30% of the Bachelor of Forensic Science's total credit must be pure chemistry.

VII. AUDIOLOGY AND SPEECH SCIENCES

Component	Audiology	Speech Sciences
Minimum Graduating Credit	**143**	
	Percentage	
Compulsory Modules	10 – 15	
Total: Core + Concentration/Specialisation		
1. *Fundamental Modules include Basic Sciences*	10 – 20	
2. *Professional Modules*	40 – 50	
3. *Industrial Training**	15 – 25	
Optional Modules	5 – 10	

*Includes Clinical or Professional Placement or Supervised Professional Placement

Audiology

Supervised professional placements

350 clinical hours with a minimum of 200 direct student-client contact hours**

Speech Sciences

Supervised professional placements

350 clinical hours with a minimum of 200 direct student-client contact hours**

**Note: What to count as direct student-client hours

- Direct student-client contact hours earned in clinical practice.
- Partially participation clock hours which include student time as assistant in data collection and or in therapy.
- Hours earned for counseling clients or counseling or training caregivers.
- Hours spent in obtaining or giving assessment and management information (including taking a case history, interviewing the clients and the client's family, discussing diagnosis and recommendations with the clients or the client's family).
- Hours spent in speech screening clinic either on campus or off campus.
- Preparation time does not count as direct student-client contact hours (including time for calibrating and preparing equipment, writing reports and developing therapy plans).

MASTER'S DEGREE

- Minimum credit – 40 credits equivalent (including university required courses)
- Structures:
    1. Research Only (No given credit value)
    2. Coursework and Research (maximum of 24 credits for coursework)
    3. Coursework Only (inclusive of a project paper)

DOCTORAL DEGREE

- Minimum credit – No given credit value
- Structures:
    1. Research Only
    2. Coursework and Research (minimum 50% project paper)

ASSESSMENT OF STUDENT LEARNING

"Student assessment is a crucial aspect of quality assurance because it drives student learning. It is one of the most important measures to show the achievement of learning outcomes. The result of assessment is also the basis in awarding qualifications. Hence, methods of student assessment have to be clear, consistent, effective, reliable and in line with current practices and must clearly support the achievement of learning outcomes," *(COPPA, 2008,* pp. 15).

Specific method of assessment will depend on the specific requirement of each subject. However, as a general guide, the following must be considered:

- both summative and formative assessments should be used;
- knowledge and understanding (the cognitive domain) should be tested through written, oral or other suitable means but practical skills should be tested by practical examinations;
- pass in practical examination is compulsory (A pass implies that the examiner is satisfied with the candidates competency to practise safely, meeting the expectations of the professions); and
- the types of assessments indicated below are merely examples. HEPs are encouraged to use a variety of methods and tools appropriate for the learning outcomes and competencies.

DIPLOMA

1. Minimum passing CGPA is 2.00.
2. Types of Assessment (candidates required to pass both):
   - Continuous assessment – 30-60%
   - Final assessment – 40-70% (all core courses require final examination)
3. Assessment Modes (examples):
   - Theory – Objectives Questions, Multiple Choice Questions (MCQ), Short Essay Questions (SEQ), Mixed Essay Questions (MEQ)
   - Project report/s

- Skills – Practical examination, case study presentations, Objective Structured Clinical Examination (OSCE)/Objective Structured Practical Examination (OSPE)
- Final clinical examination (where relevant) – examined by 2 suitably qualified examiners with one external examiner

BACHELOR'S DEGREE

1. Minimum passing CGPA is 2.00.
2. Types of Assessment (candidates required to pass both):
   - Continuous assessment – 30-60%
   - Final assessment – 40-70%
3. Assessment Modes (example):
   - Theory – Objectives Questions, Multiple Choice Questions (MCQ), Short Essay Questions (SEQ), Mixed Essay Questions (MEQ)
   - Skill – Practical examination, case study presentations, Objective Structured Clinical Examination (OSCE)/Objective Structured Practical Examination (OSPE)
   - Final clinical examination (where relevant) – examined by 2 suitably qualified examiners with one external examiner
   - Dissertation or Final Year Project – not more than 20 000 words and examined by 2 examiners

MASTER'S DEGREE

1. Research only
   - Thesis – 20 000-50 000 words and examined by 2 examiners with at least one external examiner and *viva voce*.

2. Master's by coursework only or combined coursework and projects/dissertation of 10 000–20 000 words
   - Minimum passing CGPA is 3.00

DOCTORAL DEGREE

1. Research only
   - Thesis – not less than 35 000 words and examined by 2 examiners with at least one external examiner and *viva voce.*
   - One article accepted for publication in peer-reviewed journal

2. Combined Doctoral (Coursework and Dissertation)
   - Dissertation - not less than 25 000 words and examined by 2 examiners with at least one external examiner and *viva voce*
   - Minimum passing CGPA is 3.00

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STUDENT SELECTION

This section of the Programme Standards concerns the recruitment of students into the individual programme of study.

"In general, admission policies of the programme need to comply with the prevailing policies of the Malaysian Ministry of Higher Education (MOHE). There are varying views on the best method of student selection. Whatever the method used, the higher education provider (HEP) must be able to defend its consistency. The number of students to be admitted to the programme is determined by the capacity of the HEP and the number of qualified applicants. HEP admission and retention policies must not be compromised for the sole purpose of maintaining a desired enrolment. If an HEP operates geographically separated campuses or if the programme is a collaborative one, the selection and assignment of all students must be consistent with national policies," *(COPPA,* pp. 17).

The minimum benchmarked standards for recruitment of students are provided below. These are developed, keeping in mind national higher education student entry policies. HEP should take cognisance of any specific policies that may apply to their individual institution.

DIPLOMA

SPM or equivalent with 5 credits in the following subjects:
- Bahasa Malaysia;
- English;
- Mathematics;
- 1 science subject (Biology/Physics/Chemistry/General Science/Applied Science); and
- Any other subjects.

Or

GCE/O Level or equivalent with 5 credits in the following subjects:

- English;
- Mathematics;
- 1 science subject (Biology/Physics/Chemistry/General Science/Applied Science); and
- Any other 2 subjects.

BACHELOR'S DEGREE

Pass STPM /Matriculation/A-Level/Pre-University programme or its equivalent with minimum CGPA of 2.50 in the following subjects:

- Biology/Physics
- Chemistry

And 5 credits or equivalent at the SPM level, 3 of which in the following subjects*:

- Biology
- Physics
- Mathematics
- Chemistry
- English

*Note: However, depending on the field of study, an institution may insist that the students obtain credits in all the listed subjects.

Or

Related Diploma from recognised institutions with minimum CGPA of 2.75;

Or

Related diploma from recognised institutions with CGPA below than 2.75 and a minimum of 3 years (36 months) working experience in the same field.

English Proficiency for Foreign Students
Candidates should have IELTS (6.0)/TOEFL (550) paper-based or equivalence.

MASTER'S DEGREE

A Bachelor's degree or its equivalent from related fields with minimum CGPA of 2.50;

Or

A Bachelor's degree or equivalent from related fields with CGPA between 2.00 and 2.50 with at least 3 years experience in related fields.

DOCTORAL DEGREE

Master's Degree in related fields;

Or

Candidates registered for Master's level studies, may opt to convert their registration after a year to the Doctoral level, subject to the approval by the postgraduate committee of the HEPs.

ACADEMIC STAFF

"The quality of the academic staff is one of the most important components in assuring the quality of higher education and thus every effort must be made to establish proper and effective recruitment, service, development and appraisal policies that are conducive to staff productivity. It is important that every programme has appropriately qualified and sufficient number of academic staff, in an environment that is conducive and encourages recruitment and retention.

Teaching, research, consultancy services and community engagement are the core interrelated academic activities. Nevertheless, it must be acknowledged that the degree of involvement in these areas varies between academic staff and between academic institutions.

Work and its equitable distribution is one of the ways the HEP recognises meritorious contribution for the purpose of promotion, salary determination or other incentives. It is crucial for the HEP to provide training for its academic staff. The equitable distribution of work helps ensure that such training can be done systematically and fairly," *(COPPA, 2008,* pp. 21).

It is a requirement of this Programme Standards that all academic staff members are required to undergo continuous professional development, including pedagogical training, for a minimum of 7 days in a year.

DIPLOMA

- Minimum qualification of academic staff:
  - ➢ Theory:
    - ▪ Bachelor's Degree in similar or related field; **OR**
    - ▪ Diploma with 10 years working experience in related field.
  - ➢ Preceptors: Diploma with at least 5 years working experience in related field.
- Academic staff-student ratio is 1:20.
- At least one of the permanent faculty members is a graduate in the respective field.

- Clinical training with suitably qualified clinical preceptor:
  - ➢ Institution own preceptor – 1:8
  - ➢ Clinical preceptor in service – 1:5
- The ratio between full time and part time teaching faculty is 3:2.

BACHELOR'S DEGREE

- Minimum qualification of academic staff:
  - ➢ Theory:
    - ▪ Master's Degree in related field; **OR**
    - ▪ Bachelor's Degree with 5 years working experience in related fields (where such skills are required or that lack master's degree holders).
  - ➢ Practical (professional subjects): Bachelor's Degree with 5 years experience in related field.
  - ➢ Preceptors:
    - ▪ Bachelor's degree with 3 years of experience; **OR**
    - ▪ Diploma with 5 years experience in related field.

- Academic staff-student ratio is 1:20.
- Clinical training with suitably qualified clinical preceptor:
  - ➢ Institution own preceptor – 1:8
  - ➢ Clinical preceptor in service – 1:6
- The ratio between full time and part time teaching faculty is 3:2.

MASTER'S DEGREE

- Minimum qualification of academic staff:
  - ➢ Doctoral Degree; **OR**
  - ➢ Masters with minimum 5 years working experience and had supervised undergraduates in related area; **OR**
  - ➢ Clinical Master's with minimum 3 years of experience and had supervised undergraduates in related area.
- Academic staff-student ratio is 1:10.
- The ratio between full time and part time teaching faculty is 1:1.

DOCTORAL DEGREE

- Minimum qualification of academic staff:
  - ➢ Doctoral Degree with 3 years working experience including supervision at Master's Degree level.
- Academic staff-student ratio is 1:4.
- The ratio between full time and part time teaching faculty is 1:1.

EDUCATIONAL RESOURCES

"Adequate educational resources are necessary to support the teaching-learning activities of the programme. These resources include finance, expertise, physical infrastructure, information and communication technology, and research facilities.

The physical facilities of a programme are largely guided by the needs of the specific field of study. These facilities include the space, and the necessary equipment and facilities for administration, for large and small group learning (e.g., libraries, resource centres, lecture halls, auditoriums, tutorial rooms), for practical classes (e.g., science and computer laboratories, workshops, studios), and for clinical learning (e.g., hospitals, clinics).

Where appropriate, research facilities are included as part of educational resources because a research-active environment improves the quality of higher education. A research culture attracts high calibre academics that engender critical thinking and enquiring mind, contributing further to knowledge advancement. Active researchers are best suited to interpret and apply current knowledge for the benefit of academic programmes and the community. Active researchers also attract grants that increase the number of staff and their morale. Interdisciplinary research has positive effects on academic programmes.

A research-active environment provides opportunities for students to observe and participate in research through electives or core courses. Exposure to an environment of curiosity and enquiry encourages students to develop lasting skills in problem-solving, data analysis and continuous updating of knowledge. Some students may develop interest in research as a career choice.

Educational experts are specialised staff from various disciplines who have been trained or who have considerable experience in effective teaching-learning methodologies and related matters of higher education. They would deal with problems and provide training as well as advice on teaching-learning processes and practices. The expertise can be provided by an education unit or division at the HEP or acquired from an external source.

Other facilities, which are essential for supporting teaching-learning activities such as dormitories, transport, security, recreation and counselling, are equally important. A balance and proportional increase in the direct and indirect educational resources supports effective teaching-learning.

Adequate quantity of physical and financial resources and services are crucial. Equally important, if not more so, is the quality, relevance, accessibility, availability and delivery of such resources and services, and their actual utilisation by students. These considerations must be taken into account in evaluating the effectiveness of educational resources," *(COPPA, 2008,* pp. 23-24).

The generic educational resources are included in the following paragraphs. Specific requirements according to the field and level of programmes are provided in **Appendix 2**.

1. **Physical**
   a. Lecture/seminar/tutorial/class rooms
   b. Basic sciences laboratory e.g. anatomy lab and physics lab.
   c. Computer lab
   d. Library
   e. Skill/simulation laboratories sufficient to provide practical and hands-on training.

2. **Clinical practice**
   - Access to related departments in hospitals and healthcare facilities.

3. **Practical attachment**
   - Access to related departments in hospitals, healthcare facilities and industries.

4. **Sufficient and relevant online educational database**

PROGRAMME MONITORING AND REVIEW

"Quality enhancement calls for programmes to be regularly monitored, reviewed and evaluated. This includes the monitoring, reviewing and evaluating of institutional structures and processes (administrative structure, leadership and governance, planning and review mechanisms), curriculum components (syllabi, teaching methodologies, learning outcomes) as well as student progress, employability and performance.

Feedback from multiple sources – students, alumni, academic staff, employers, professional bodies, parents – assist in enhancing the quality of the programme. Feedback can also be obtained from an analysis of student performance and from longitudinal studies.

Measures of student performance would include the average study duration, assessment scores, passing rate at examinations, success and dropout rates, students' and alumni's report about their learning experience, as well as time spent by students in areas of special interest. Evaluation of student performance in examinations can reveal very useful information. If student selection has been correctly done, a high failure rate in a programme, indicates something amiss in the curriculum content, teaching-learning activities or assessment system. The programme committees need to monitor the performance rate in each course and investigate if the rate is too high or too low.

Student feedback, for example, through questionnaires and representation in programme committees, is useful for identifying specific problems and for continual improvement of the programme.

One method to evaluate programme effectiveness is a longitudinal study of the graduates. The department should have mechanisms for monitoring the performance of its graduates and for obtaining the perceptions of society and employers on the strengths and weaknesses of the graduates and to respond appropriately," (*COPPA*, 2008, pp. 27).

LEADERSHIP, GOVERNANCE AND ADMINISTRATION

"There are many ways of administering an educational institution and the methods of management differ between HEPs. Nevertheless, governance that reflects the leadership of an academic organisation must emphasise excellence and scholarship. At the departmental level, it is crucial that the leadership provides clear guidelines and direction, builds relationships amongst the different constituents based on collegiality and transparency, manages finances and other resources with accountability, forge partnership with significant stakeholders in educational delivery, research and consultancy and dedicates itself to academic and scholarly endeavours. Whilst formalised arrangements can protect these relationships, they are best developed by a culture of reciprocity, mutuality and open communication," (*COPPA*, 2008, pp. 28).

Academic leadership for institutions offering the programme at a specific level of qualification is provided below.

DIPLOMA

Relevant qualifications:
1. Master's qualification in related field; **AND** 5 years related practice experience; **OR**
2. A bachelor's degree in related field with 10 year teaching experience; **AND** 5 years related practice experience concurrently.

BACHELOR'S DEGREE AND BELOW

Master's qualification in related field; **AND** 7 years related practice experience; **OR** 5 years teaching experience concurrently.

MASTER'S DEGREE AND BELOW

1. Doctoral in related field; **AND** 5 years related practice experience; **OR** 5 years teaching experience concurrently; **OR**

2. Masters qualification in related field; **AND** 5 years related practice experience; **OR** 10 years teaching and research experience concurrently.

DOCTORAL DEGREE

Doctoral in related field; **AND** 5 years related practice experience; **OR** 5 years teaching and research experience concurrently.

CONTINUAL QUALITY IMPROVEMENT

"Increasingly, society demands greater accountability from the higher education providers (HEPs). Needs are constantly changing because of the advancements in science and technology, and the explosive growth in global knowledge, which are rapidly and widely disseminated. In facing these challenges, HEPs have little choice but to become dynamic learning organisations that need to continually and systematically review and monitor the various issues so as to meet the demands of the constantly changing environment," *(COPPA, 2008,* pp. 30-31).

The HEPs are expected to provide evidence of ability to keep pace with changes in the field and requirements of stakeholders. These may be demonstrated by, but not limited to:

1. curriculum review, conducted at least once every 3 - 5 years;
2. appointment of external reviewer for quality assessment processes;
3. linkages with industry;
4. continuous review of industrial/clinical attachment/ posting practices and records;
5. dialogue sessions with stakeholders at least once every 2 years;
6. active participation of academic staff at relevant conferences, seminars, workshops and short courses;
7. presentations by invited speakers, local or international; and
8. organisation of conferences, seminars and workshops.

APPENDIX 1: PROGRAMME STRUCTURES

DIPLOMA

The proposed structures are merely **samples** provided as a guide in the delivery of medical and health sciences programmes. They contain a breakdown of core modules, divided into fundamental modules which include basic sciences and professional modules. The matrices also contain a suggested breakdown in relation to the weightage between theoretical and practical teaching.

Theoretical teaching is classroom-based delivery of theory whilst practical teaching includes lab-based teaching, demonstrations, site visits/field trips, and simulated clinical training, but does not include postings, industrial attachments and professional development training.

I.   LAB-BASED DIAGNOSTIC SCIENCES

Diploma in Medical Laboratory Technology

Levels	Total	Modules	Total	Theory	Practical
Fundamental (Theory & Concepts)	19	Introduction to Human Anatomy & Physiology	4	3	1
		Introduction to Biochemistry	3	2	1
		Biostatistics and Epidemiology	3	3	0
		Laboratory Sciences & Instrumentation	6	4	2
		Introduction to Health Informatics	3	2	1
		Total Credits	**19**	**14**	**5**
Professional (Core)	45	Clinical Biochemistry	6	4	2
		Clinical Microbiology	6	4	2
		Hematology	6	4	2
		Immunology	3	2	1
		Pathology	4	3	1
		Parasitology	4	3	1
		Transfusion Science & Blood Banking	5	3	2
		Histopathology	3	1	2
		Cytopathology	3	1	2
		Genetics & Molecular Biology	3	2.5	0.5

Levels	Total	Modules	Total	Theory	Practical
		Research Methodology	2	2	0
TOTAL CORE		Total Credits	45	29.5	15.5
Practical Training	12	Practicum / Clinical Attachment	8	0	8
(Throughout the course)		Industrial Training	4	0	4
		Total Credits	12	0	12
Electives	4	Basic Chemistry	2	1.5	0.5
(Free choice)		Principle of Laboratory Animal Sciences	2	1.5	0.5
		Introduction to Pharmacology & Toxicology	2	1.5	0.5
		Health Care Ethics	2	2	0
		Humanities	2	2	0
		Phychology & Behavioral Science	2	2	0
		Total Credits	(4)		
University Modules	10	Bahasa Malaysia	2	2	0
(Compulsory)		Academic English	2	2	0
		Scientific & Medical English	2	2	0
		Ethnics Relation	2	2	0
		TITAS (Islamic & Asian Civilisation)	2	2	0
		Total Credits	10	0	0
TOTAL CREDITS	90				

II. MEDICAL IMAGING AND RADIOTHERAPY

1.   Diploma in Radiotherapy

Basic Sciences

No.	Modules	Total	Theory	Practical	Supervised Professional Placement
1	Human Anatomy and Physiology	4	3	1	
2	General Physics	2	1.5	0.5	
3	Radiation Physics	3	2.5	0.5	
4	General Pathology	2	2	0	
5	Systemic Pathology	2	2	0	
6	Basic Human Psychology	2	2	0	
7	Basic Pharmacology	2	2	0	
	Total Credits	**17**	**15**	**2**	

Core Modules

No.	Modules	Total	Theory	Practical	Supervised Professional Placement
1	Patient Care in Radiotherapy	2	1.5	0.5	
2	Radiotherapy Instrumentation (I and II)	4	3	1	
3	Radiotherapy Technique (I, II, III and IV)	12	8	4	
4	Radiotherapy Physics	2	2	0	
5	Oncology (I and II)	4	4	0	
6	Imaging in Radiotherapy	2	1.5	0.5	

No.	Modules	Total	Theory	Practical	Supervised Professional Placement
7	Sectional Anatomy	2	1.5	0.5	
8	Introduction to advanced radiotherapy techniques.	2	2	0	
9	Radiobiology	2	2	0	
10	Professionalism and Ethics in Radiotherapy	2	2	0	
11	Quality Assurance in Radiotherapy	2	1.5	0.5	
12	Basic Management	2	2	0	
13	Clinical Practice (I, II, III, IV and V)	25			25
	Total Credits	**63**	**31**	**7**	**25**

Compulsory Modules

No.	Modules	Total	Theory	Practical	Supervised Professional Placement
1	Compulsory modules (10 – 12 credits)	12	12	0	0
	Total Credits	**12**	**12**	**0**	**0**

Elective modules

No.	Modules	Total	Theory	Practical	Supervised Professional Placement
1	Elective modules (8 – 10 credits)	8	8	0	0
	Total Credits	**8**	**8**	**0**	**0**
	TOTAL CREDITS	**100**	**66**	**9**	**25**

2. Diploma in Medical Imaging

Basic Sciences

No.	Modules	Total	Theory	Practical	Clinical/ Industrial Placements
1	Human Anatomy and Physiology (I and II)	4	3	1	
2	General Physics	2	2	0	
3	General Pathology	2	2	0	
4	Systemic Pathology	2	2	0	
5	Radiation Physics (including radiation protection)	2	1.5	0.5	
6	Basic Human Psychology	2	2	0	
7	Basic Pharmacology	1	1	0	
	Sub-total Credits	**15**	**13.5**	**1.5**	

Core Modules

No.	Modules	Total	Theory	Practical	Clinical/ Industrial Placements
1	Patient Care in Radiography	2	1	1	0
2	Radiographic Instrumentation (I & II)	6	4	2	0
3	Radiographic Technique (I,II,III,IV)	12	7	5	0
4	Imaging Process	4	3	1	0
5	Radiographic Anatomy	4	2	2	0
6	Image Analysis	2	1	1	0
7	Sectional Anatomy	2	1	1	0
8	Introduction to Other Imaging Modalities (CT, MRI, US, RNI)	2	1	1	0
9	Professionalism and Ethics in Radiography / medical Imaging	1	1	0	0
10	Radiobiology	2	2	0	0
11	Basic Management	1	1	0	0
12	Quality Assurance in Radiography / Medical Imaging	2	1	1	0
13	Clinical Practice (I, II, III, IV)	**25**	0	0	**25**
	Sub-total Credits	**65**	**25**	**15**	**25**

Compulsory Modules + Electives (Non Core)

No.	Modules	Total	Theory	Practical	Clinical/ Industrial Placements
1	*Compulsory/University modules (10-12 Credits)	12	12	-	0
2	*Electives (8-10 credits)	8	8		0
	TOTAL CREDITS	**100**	**58.5**	**16.5**	**25**

III. HEALTH CARE SCIENCES

1. Diploma in Environmental Health

Basic Medical Sciences	Modules	Credits
	Introduction to Human Anatomy and Physiology	2
	Chemistry 1 & 2	2
	Basic psychology	2
	Basic Mathematics	2
	Microbiology 1 & 2	2
	Physics	2
	Total Credits	**12**

Core Environmental Health	Modules	Credits
	Introduction to Environmental Health	3
	Introduction to Soil and Hydrogeology	3
	Water Supply and Sewage Disposal	3
	Microbiology and Food Technology	3
	Government and Organizational Behaviour	2
	Food Hygiene	2
	Environmental Assessment	3
	Introduction to Environmental Toxicology	3
	Pest and Vector Management	3
	Epidemiology and Biostatistics	3
	Human Relation and Behaviour	2
	Environmental Health Legislation	3
	Communicable and Non-Communicable Disease Control	3
	Land Use and Housing	3
	Environmental Health Promotion and Education	3
	Research Methodology (Issues and Principles)	3
	Occupational Health and Safety	3
	Pool and Recreational Water	3
	Legal Procedures	2
	Environmental Health and Building Technology	3
	Total Credits	**56**

Skills and Professional Development	Compulsory Modules	Credits
	English for Health Care	2
	Information and Report Writing	2
	Computer Skills – Application Packages	2
	Total Credits	**6**

Practical training component (3 months)	**Modules**	**Credits**
	Legal Procedures	2
	Entry Points and International Health	2
	Environmental Health Career Development in Health Department	3
	Environmental Health Experience in Local Government Agencies	3
	Total Credits	**10**

Humanities	**Compulsory Modules**	**Credits**
	Malaysian Studies	3
	Pengajian Islam/Moral	3
	Total Credits	**6**

Elective Module	Health Education Environmental Health Project

Electives including Humanities Group B (to choose 1)	i. Swimming ii. Cultural Studies iii. Public Speaking iv. Professional Morals and Ethics v. Non-governmental Organizations associated to health vi. Time Management vii. Corporate Culture viii. Islamic Studies ix. First Aid x. Inventory Management xi. Human Resource Management xii. Failing Systems

ICT and Information Management Skills	Incorporated into all components

Polyvalent courses (3 months)	Seminars, conferences and continuous education.

Total credits (excluding elective)	**90**

2. Diploma in Occupational Health

Basic Medical Sciences	Modules	Credits
	Introduction to Human Anatomy and Physiology	2
	Chemistry 1 & 2	2
	Basic psychology	2
	Basic Mathematics	2
	Microbiology 1 & 2	2
	Physics	2
	Total Credits	**12**

Core Occupational Health	Modules	Credits
	Principles in Occupational Health and Safety	3
	Occupational Safety and Health Laws	3
	Introduction to Hazardous Substances	2
	OSH Consultation Process	2
	Fire Safety and Skills	2
	Environmental Health	2
	First Aid and Emergency Planning	2
	OSH Statistics	2
	Risk Identification and Assessment	2
	Risk Control	2
	Ergonomics 1 & 2	2
	OSH Management System	2
	Occupational Hygiene 1 & 2	2
	OSH Information and Data Systems Management	2
	Emergency Procedures	3
	Workplace Hazard Management	2
	Machinery and Equipment Safety	2
	Contract and Procurement Techniques	2
	Workplace Action Research Project 1 & 2	2
	Business Operations Management	2
	People Performance Management	2
	Rehabilitation and Return-to-Work	2
	Organizational Leadership	2
	OSH Audit 1 & 2	3
	Investigation of Incidents	2
	Customer Focus Management	2
	Total Credits	**56**

Skills and Professional Development	Compulsory Modules	Credits
	English for Health Care	2
	Information and Report Writing	2

	Computer Skills – Application Packages	2
	Total Credits	**6**

	Modules	**Credits**
Practical training component (3 months)	Legal Procedures	2
	Entry Points and International Health	2
	Environmental Health Career Development in Health Department	3
	Environmental Health Experience in Local Government Agencies	3
	Total Credits	**10**

	Compulsory Modules	**Credits**
Humanities	Malaysian Studies	3
	Pengajian Islam/Moral	3
	Total Credits	**6**

Elective Module	Health Education
	Environmental Health Project
Electives including Humanities Group B (to choose 1)	i. Swimming ii. Cultural Studies iii. Public Speaking iv. Professional Morals and Ethics v. Non-governmental Organizations associated to health vi. Time Management vii. Corporate Culture viii. Islamic Studies ix. First Aid x. Inventory Management xi. Human Resource Management xii. Failing Systems
ICT and Information Management Skills	Incorporated into all components
Polyvalent courses (3 months)	Seminars, conferences and continuous education.
Total credits (excluding elective)	**90**

NOTE	**The Medical Social Work and Health promotion Courses are not offered at Diploma Level.**

IV. THERAPEUTIC SCIENCES

1. Diploma in Physiotherapy

No.	Modules	Total	Theory	Practical	Clinical Placement
1	Anatomy I	3	2	1	0
2	Anatomy II	3	2	1	0
3	Physiology I	2	2	0	0
4	Physiology II	2	2	0	0
5	Behavioral Sciences	2	2	0	0
6	Pathology	2	2	0	0
7	Professional Development & Practice	3	3	0	0
8	Kinesiology I	3	1	2	0
9	Kinesiology II	3	1	2	0
10	Physiotherapy skills I	3	1	2	0
11	Physiotherapy skills II	3	1	2	0
12	Electrotherapy modalities I	3	1	2	0
13	Electrotherapy modalities II	3	1	2	0
14	Physiotherapy in Musculoskeletal I	3	2	1	0
15	Physiotherapy in Musculoskeletal II	3	2	1	0
16	Physiotherapy in Musculoskeletal III	2	1	1	0
17	Physiotherapy in Respiratory	3	2	1	0
18	Physiotherapy in Cardiovasular	2	1	1	0
19	Physiotherapy in Acute care	3	2	1	0
20	Physiotherapy in Neurology I	3	1.5	1.5	0
21	Physiotherapy in Neurology II	3	1.5	1.5	0
22	Physiotherapy in Special Clients (Pead)	2	1	1	0
23	Physiotherapy in Special Clients (Women)	2	1.5	0.5	0
24	Physiotherapy in Special Clients (Elderly)	2	1	1	0
25	Bahasa Kebangsaan A/B	4	4	0	0
26	Pengajian Malaysia	4	4	0	0
27	Pendidikan Islam/Pengajian Moral	4	4	0	0
28	Clinical Placement	30	0	0	30
	Total Credits	**105**	**49.5**	**25.5**	**30**

2. Diploma in Occupational Therapy

No.	Modules	Total	Theory	Practical
1.	Sains Tingkahlaku	3	2	1
2.	Anatomi I	4	2	2
3.	Fisiologi	4	3	1
4.	Pemulihan Carakerja Asas I	4	2	2
5.	Pemulihan Carakerja Asas II	4	2	2
6.	Sains Tingkahlaku II	3	2	1
7.	Neurosains	3	2	1
8.	Biomekanik	4	2	2
9.	Anatomi II	4	2	2
10.	Perkembangan Profesion : Perkembangan Diri dan Profesion	2	2	0
11.	Perkembangan Profesion V : Etika kerja & Pengurusan Pejabat	2	2	0
12.	Pemulihan Berasaskan Komuniti	2	1	1
13.	Praktis Klinikal: Pemulihan berasaskan komuniti	3	0	3
14.	Pemulihan Carakerja Penilaian (Neurologi, Perubatan & Ortopedik)	5	2.5	2.5
15.	Pemulihan Carakerja Intervensi (Perubatan & Neurologi)	5	2.5	2.5
16.	Pemulihan Carakerja Penilaian & Intervensi Psikososial	5	2.5	2.5
17.	Pemulihan Carakerja Geriatrik	4	2	2
18.	Pemulihan Carakerja Pediatrik	4	2	2
19.	Pemulihan Carakerja Aplikasi - Ortopedik	4	2	2
20.	Praktis Klinikal Ortopedik	4	0	4
21.	Pemulihan Carakerja Aplikasi - Neurologi & Perubatan	4	2	2
22.	Praktis Klinikal Neurologi & Perubatan	4	0	4
23.	Praktis Klinikal Geriatrik	4	0	4
24.	Perkembangan Profesion IV: Metodologi Penyelidikan	3	3	0
25.	Pemulihan Carakerja - Projek	3	0	3
26.	Pemulihan Carakerja Aplikasi Pediatrik	3	2	1
27.	Praktis Klinikal - Pediatrik	4	0	4
28.	Pemulihan Carakerja Aplikasi – Psikososial	3	2	1
29.	Praktis Klinikal – Psikososial	4	0	4
Total Credits		105	42.5	62.5

The proposed structures are merely **samples** provided as a guide in the delivery of medical and health sciences programmes. They contain a breakdown of core modules, divided into basic sciences and professional modules. The matrices also contain a suggested breakdown in relation to the weightage between theoretical and practical teaching.

Theoretical teaching is classroom based delivery of theory whilst practical teaching includes lab- based teaching, demonstrations, site visits/field trips, and simulated clinical training, but does not include postings, industrial attachments and professional development training.

I. NUTRITION AND DIETETICS

1. Bachelor of Nutrition

Groups	Modules	Total	Theory	Practical	Industrial
Basic	Anatomy and Physiology	6.0	5.0	1.0	
	Basic Pathology	2.0	2.0	0.0	
	Pharmacology	2.0	2.0	0.0	
	Immunology	3.0	3.0	0.0	
	Genetics	3.0	3.0	0.0	
	Biochemistry	4.0	3.5	0.5	
	Microbiology/Food Microbiology	3.0	2.0	1.0	
Food	Food Science	3.0	2.0	1.0	
	Food Preparation	3.0	2.0	1.0	
	Catering and Food Service Management	3.0	2.5	0.5	
Social	Developmental Psychology	3.0	3.0	0.0	
	Counseling	3.0	2.5	0.5	
	Nutritional Anthropology	3.0	3.0	0.0	
Nutrition	Nutrition and Health	3.0	3.0	0.0	
	Nutrition in Lifecycle	3.0	2.5	0.5	
	Assessment of Nutritional Status	3.0	1.5	1.5	
	Nutrition Education/Promotion	3.0	2.0	1.0	
	Nutrition Programme Planning and Assesment	3.0	1.5	1.5	
	Community Nutrition Project	3.0	0.0	3.0	
	Nutrition Policy and Food Security	3.0	3.0	0.0	

Groups	Modules	Total	Theory	Practical	Industrial
	Nutrition for Sport and Physical Activity	3.0	2.5	0.5	
	Techniques in Nutrition Research	3.0	2.5	0.5	
	Advanced Nutrition	3.0	3.0	0.0	
	Industrial Placement (320 hours OR 8 weeks)	4.0	0.0		4.0
	Health care Management	2.0	2.0	0.0	
	Diet and Chronic Diseases	3.0	3.0	0.0	
Dietetics Research	Research Methodology	3.0	3.0	0.0	
	Biostatistics/Epidemiology	3.0	2.0	1.0	
	Seminar	2.0	1.0	1.0	
	Research Project	12.0	2.0	10.0	
	Electives (16-20)	16.0			
	University Modules (16-20)	20.0			
	Total Credits	**136.0**	**70.0**	**26.0**	**4.0**

Groups	Modules	Total	Theory	Practical	Clinical
Basic	Anatomy and Physiology	6.0	5.0	1.0	
	Basic Pathology/Pathophysiology	2.0	2.0	0.0	
	Pharmacology	2.0	2.0	0.0	
	Immunology	3.0	3.0	0.0	
	Genetics	3.0	3.0	0.0	
	Biochemistry /Clinical Biochemistry	4.0	3.5	0.5	
	Microbiology/Food microbiology	3.0	2.5	0.5	
Food	Food Science	3.0	2.0	1.0	
	Food Preparation	3.0	2.0	1.0	
	Catering and Food Service Management	3.0	2.5	0.5	
Social	Developmental Psychology	3.0	3.0	0.0	
	Counseling	3.0	2.5	0.5	
	Nutritional Anthropology	3.0	3.0	0.0	
Nutrition	Nutrition and Health	3.0	3.0	0.0	
	Nutrition in Lifecycle	3.0	3.0	0.0	
	Assessment of Nutritional Status	3.0	2.0	1.0	
	Nutrition Education/Promotion	3.0	2.0	1.0	
Dietetics	Medical Nutrition Therapy	9.0	9.0	0.0	
	Therapeutic Diet Preparation	3.0	1.5	1.5	
	Food Service Placement (160 hours)	4.0			4.0
	Clinical and Community Dietetics Placement (800 hours OR 20 weeks) *40 hours per credit	20.0			20.0
Research	Research Methodology	3.0	3.0	0.0	
	Biostatistics/Epidemiology	3.0	2.0	1.0	
	Seminar	2.0	1.0	1.0	
	Research Project	6.0	1.0	5.0	
	Electives (13-17)	13.0			
	University Modules (16-20)	20.0			
	Total Credits	**136.0**	**63.5**	**15.5**	**24.0**

II. LAB-BASED DIAGNOSTIC SCIENCES

1. Bachelor of Biochemistry

Component	Total	Modules	Total	Theory	Practical
Fundamental (Theory & Concepts)	**90**	Instrumentation	3	2	1
		General & Systemic Anatomy	4	3	1
		Basic Biochemistry	4	3	1
		Health Physiology 1	3	2	1
		Biochemistry of Metabolisms	4	3	1
		Health Physiology 2	4	3	1
		Nutrition & Health	2	2	0
		Bacteriology	3	2	1
		Basic Pathology	3	2	1
		General Pharmacology	3	2	1
		Basic Molecular Biology	4	3	1
		Clinical Biochemistry	4	3	1
		Epidemiology	2	2	0
		Virology & Mycology	3	2	1
		Genetic Diseases	2	2	0
		Chemical Pathology	2	1	1
		Immunology	3	2	1
		Biostatistics	4	4	0
		Hematology & Transfusion Science	2	1	1
		Integrative Diagnosis	3	3	0
		Advanced Molecular Biology	3	3	0
		Applied Biostatistics	3	3	0
		Toxicology	3	3	0
		Pathophysiology	3	3	0
		Health Industrial Technology Process	3	3	0
		Special Topics in Biomedical Sciences	3	3	0
		Case Study/Problem Solving	4	4	0
		Endocrinology Diseases / Disorder	2	2	0
		Applied Biochemistry	2	2	0
		Research Methodology	2	2	0
		TOTAL CREDITS	**90**	**75**	**15**
Practical Training (Throughout the course)	**15**	Community Services	3	0	3
		Laboratory Management	2	0	2
		Biochemistry Research Project	8	0	8
		Industrial Training/Placement	2	0	2
		TOTAL CREDITS	**15**	**0**	**15**

Component	Total	Modules	Total	Theory	Practical
Electives (Free choice: Max. 15)	**16**	Biological Chemistry	3	2	1
		Gender Perspectives in Health	2	2	0
		Ethics and Law for Health Professionals	2	2	0
		Basic Chemistry	3	2	1
		Tissue Banking	2	1.5	0.5
		Oral Health	2	2	0
		Biodiversity	2	1.5	0.5
		Principles of Lab. Animal Sciences	2	1.5	0.5
		Entomology in Public Health	2	1.5	0.5
		Principles of Forensic	2	1.5	0.5
		Health Economy	2	2	0
		Health Communication & Education	2	2	0
		Principles of Health Management	2	2	0
		History of Health Sciences	2	2	0
		Communication & Self Development	2	2	0
		Environmental Biochemistry	2	1.5	0.5
		Systemic Pathology &Histopathology	2	1.5	0.5
		Psychology Skills	2	2	0
		Medical Entomology & Parasitology	2	1.5	0.5
University Modules (Compulsory)	**16**	English for Life Sciences	2	0	0
		Ethnic Communication	3	0	0
		PPU Courses 1&2	6	0	0
		English Language (Choice)	2	0	0
		Islamic & Asian Cultures	3	0	0
Total Credits (Core, Electives and University)	**137**		16		

2. **Bachelor of Biomedical Science**

Component	Total	Modules	Total	Theory	Practical
Fundamental (Theory & Concepts)	**84**	Anatomy & Physiology I	3	2	1
		Biochemistry and Basic Genetics	4	3	1
		Psychology and Behavioral Science	3	3	0
		Anatomy & Physiology II	3	2	1
		Fundamentals of Health Informatics	3	3	0
		Biostatistics	3	3	0
		Human Biochemistry	3	2	1
		Laboratory Science	3	2	1
		Epidemiology	3	3	0
		Basic Immunology	2	2	0
		Molecular Biology Techniques	3	2	1
		Human Genetics	2	2	0
		Basic Microbiology	3	2	1
		Basic Haematology	3	2	1
		Basic Pharmacology	3	2	1
		Basic Pathology	3	2	1
		Clinical Biochemistry	4	3	1
		Medical Microbiology	4	3	1
		Medical Parasitology	3	2	1
		Research Methodology	2	2	0
		Systemic Pathology & Cytology	4	3	1
		Transfusion Science & Blood Banking	3	2	1
		Advanced Haematology	3	2	1
		Toxicology	3	2	1
		Advanced Health Informatics	3	3	0
		Case Study/Problem Solving	3	3	0
		Special topics in Biomedical Sciences	3	3	0
		Advanced Immunology	2	1.5	0.5
		TOTAL CREDITS	**84**	**66.5**	**17.5**
Practical Training (Throughout the course)	**20**	Laboratory Management	2	0	2
		Final Year Research Project	8	0	8
		Biomedical Practicum	8	0	8
		Industrial Training	2	0	2

		TOTAL CREDITS	20	0	20
Component	Total	Modules	Total	Theory	Practical
Electives (Free choice: Max. 15)	**16**	Gender Perspectives in Health	2	2	0
		Ethics and Law for Health Professionals	2	2	0
		Basic Chemistry	2	1.5	0.5
		Tissue Banking	2	1.5	0.5
		Oral Health	2	2	0
		Biodiversity	2	1.5	0.5
		Principles of Lab. Animal Sciences	2	1.5	0.5
		Public Health Entomology	2	1.5	0.5
		Principles of Forensic	2	1.5	0.5
		Health Economy	2	2	0
		Health Communication & Education	2	2	0
		Principles of Health Management	2	2	0
		History of Health Sciences	2	2	0
		Communication & Self Development	2	2	0
		Environmental Microbiology	2	1.5	0.5
		Advanced Pharmacology	2	1.5	0.5
University Modules (Compulsory)	**15**	Bahasa Malaysia IV	2	0	0
		Academic English	2	0	0
		Scientific and Medical English	2	0	0
		TITAS (Islamic and Asian Civilisation)	2	0	0
		Ethnics Relation	2	0	0
		Entrepreneurship	2	0	0
		Thinking Techniques	2	0	0
		Co-curriculum (Sports/ Cultural)	1	0	0
Total Credits (Core, Electives and University)	**135**				

3. **Bachelor of Genetics**

Component	Total	Modules	Total	Theory	Practical
Fundamental (Theory & Concepts)	**88**	Structure and Function of Living Systems	4	3	1
		Organisms and Their Environment	4	3	1
		Microbiology	3	2	1
		Cell Biology	3	2	1
		Anatomy	3	3	0
		Physiology	3	3	0
		Heredity and Reproduction	3	3	0
		Genetic Diversity	4	3	1
		Adaptation	3	3	0
		Evolution & Extinction	4	4	0
		Biotechnology and its Application	3	2	1
		Genetics and Heredity	3	3	0
		Molecular Genetics	4	3	1
		Population Genetics	3	3	0
		Structure and Function of DNA and RNA	4	3	1
		Interaction with the Environment	3	3	0
		Population Genetics	4	4	0
		Human Development	3	3	0
		Diversity of Life	3	3	0
		Natural Selection	3	3	0
		Zoology	4	3	1
		Fundamentals of Health Informatics	3	3	0
		Biostatistics	3	3	0
		Human Biochemistry	3	2	1
		Epidemiology	3	3	0
		Research Methodology	2	2	0
		Molecular Biology Techniques	3	2	1
		TOTAL CREDITS	**88**	**77**	**11**

Component	Total	Modules	Total	Theory	Practical
Practical Training (Throughout the course)	**19**	Final Year Research Project	8	0	8
		Genetics Practicum	6	0	6
		Industrial Training	2	0	2
		Investigation and Experimentation	3	0	3
		TOTAL CREDITS	**19**	**0**	**19**
Levels	Total	Modules	Total	Theory	Practical
Electives (Free choice: Max. 15)	**15**	Earth Sciences	3	3	0
		History and Nature of Science	3	3	0
		Basic Chemistry	3	2	1
		Technology and the Environment	2	2	0
		Theories of Origins	3	3	0
		Personal and Community Health	3	3	0
		Health Communication & Education	2	2	0
		Principles of Health Management	2	2	0
		Communication & Self Development	2	2	0
		Biodiversity	3	2	1
University Modules (Compulsory)	**15**	Bahasa Malaysia IV	2	0	0
		Academic English	2	0	0
		Scientific and Medical English	2	0	0
		TITAS (Islamic and Asian Civilisation)	2	0	0
		Ethnics Relation	2	0	0
		Entrepreneurship	2	0	0
		Thinking Techniques	2	0	0
		Co-curriculum (Sports/ Cultural)	1	0	0
Total Credits (Core, Electives and University)	**137**				

4. **Bachelor of Microbiology**

Component	Total	Modules	Total	Theory	Practical
Fundamental (Theory & Concepts)	**88**	Structure and Function of Living Systems	4	3	1
		Organisms and Their Environment	4	3	1
		Microbiology	3	2	1
		Cell Biology	3	2	1
		Anatomy	3	3	0
		Physiology	3	3	0
		Heredity and Reproduction	3	3	0
		Genetic Diversity	4	3	1
		Adaptation	3	3	0
		Evolution & Extinction	4	4	0
		Biotechnology and its Application	3	2	1
		Genetics and Heredity	3	3	0
		Molecular Genetics	4	3	1
		Population Genetics	3	3	0
		Structure and Function of DNA and RNA	4	3	1
		Interaction with the Environment	3	3	0
		Population Genetics	4	4	0
		Human Development	3	3	0
		Diversity of Life	3	3	0
		Natural Selection	3	3	0
		Zoology	4	3	1
		Fundamentals of Health Informatics	3	3	0
		Biostatistics	3	3	0
		Human Biochemistry	3	2	1
		Epidemiology	3	3	0
		Research Methodology	2	2	0
		Molecular Biology Techniques	3	2	1
		TOTAL CREDITS	**88**	**77**	**11**
Component	**Total**	**Modules**	**Total**	**Theory**	**Practical**
Practical Training (Throughout the course)	**19**	Final Year Research Project	8	0	8
		Genetics Practicum	6	0	6
		Industrial Training	2	0	2
		Investigation and Experimentation	3	0	3
		TOTAL CREDITS	**19**	**0**	**19**

Component	Total	Modules	Total	Theory	Practical
Electives (Free choice: Max. 15)	**15**	Earth Sciences	3	3	0
		History and Nature of Science	3	3	0
		Basic Chemistry	3	2	1
		Technology and the Environment	2	2	0
		Theories of Origins	3	3	0
		Personal and Community Health	3	3	0
		Health Communication & Education	2	2	0
		Principles of Health Management	2	2	0
		Communication & Self Development	2	2	0
		Biodiversity	3	2	1
University Modules (Compulsory)	**15**	Bahasa Malaysia IV	2	0	0
		Academic English	2	0	0
		Scientific and Medical English	2	0	0
		TITAS (Islamic and Asian Civilisation)	2	0	0
		Ethnics Relation	2	0	0
		Entrepreneurship	2	0	0
		Thinking Techniques	2	0	0
		Co-curriculum (Sports/Cultural)	1	0	0
Total Credits (Core, Electives and University)	**137**				

5. **Bachelor of Medical Laboratory Technology**

Component	Total	Modules	Total	Theory	Practical
Fundamental (Theory & Concepts)	**74**	Anatomy & Physiology I	3	2	1
		Laboratory Sciences	2	2	0
		Anatomy & Physiology II	3	2	1
		Biostatistics	2	2	0
		Laboratory Instrumentation	2	1	1
		Basic Biochemistry	2	1	1
		Basic Genetics & Molecular Biology Techniques	2	1	1
		Basic Microbiology	2	1	1
		Basic Immunology & Serology	2	1	1
		Basic Pathology	2	1	1
		Basic Hematology	2	1	1
		Basic Pharmacology & Toxicology	2	2	0
		Clinical Biochemistry	4	3	1
		Medical Microbiology	4	3	1
		Medical Parasitology & Entomology	3	2	1
		Clinical Hematology	4	3	1
		Advanced Pathology	3	2	1
		Cytopathology	2	1	1
		Transfusion Science & Blood Banking	3	2	1
		Advanced Haematology	3	3	0
		Introduction to Research Methodology	2	2	0
		Virology & Mycology	4	3	1
		Genetic Diseases	2	2	0
		Integrative Diagnosis	4	4	0
		Special Topics in Biomedical Sciences	3	3	0
		Case Study/Problem Solving	4	4	0
		Principles of Lab. Animal Sciences	3	2	1
		TOTAL CREDITS	**74**	**56**	**18**

Component	Total	Modules	Total	Theory	Practical
Practical Training (Throughout the course)	**30**	Final Year Research Project	4	0	4
		Introduction to Laboratory Management	2	0	2
		MLT Practicum	24	0	24
		TOTAL CREDITS	**30**	**0**	**30**
Component	**Total**	**Modules**	**Total**	**Theory**	**Practical**
Electives (Free choice: Max. 15)	**16**	Gender Perspectives in Health	2	2	0
		Ethics and Law for Health Professionals	2	2	0
		Tissue Banking	2	1.5	0.5
		Oral Health	2	2	0
		Biodiversity	2	1.5	0.5
		Public Health Entomology	2	1.5	0.5
		Principles of Forensic	2	1.5	0.5
		Health Economy	2	2	0
		Health Communication & Education	2	2	0
		Principles of Health Management	2	2	0
		History of Health Sciences	2	2	0
		Communication & Self Development	2	2	0
		Environmental Microbiology	2	1.5	0.5
		Advanced Immunology	2	1.5	0.5
		Advanced Pharmacology	2	1.5	0.5
University Modules (Compulsory)	**16**	English for Life Sciences	2	0	0
		Ethnic Communication	3	0	0
		PPU Courses 1&2	6	0	0
		English Language (Choice)	2	0	0
		Islamic & Asian Cultures	3	0	0
Total Credits (Core, Electives and University)	**136**				

III. MEDICAL IMAGING AND RADIOTHERAPY

1. Bachelor of Radiotherapy

No.	Modules	Total	Theory	Practical	Project Paper	Supervised Professional Placement
Basic Sciences						
1	Human Anatomy and Physiology	6	4	2	0	0
2	General Physics	3	2.5	0.5	0	0
3	General Pathology	3	3	0	0	0
4	Systemic Pathology	3	3	0	0	0
5	Radiation Physics (including radiation protection)	3	2.5	0.5	0	0
6	Basic Human Psychology	2	2	0	0	0
7	Biostatistics	3	3	0	0	0
8	Basic Pharmacology	2	2	0	0	0
	Total Credits	**25**	**22**	**3**	**0**	**0**
Core Modules						
1	Patient Care	3	2	1	0	0
2	Radiotherapy Instrumentation (I and II)	6	4	2	0	0
3	Radiotherapy Technique (I, II, III and IV)	12	10	2	0	0
4	Radiotherapy physics	3	2.5	0.5	0	0
5	Imaging in Radiotherapy	3	2.5	0.5	0	0
6	Sectional Anatomy	3	2	1	0	0
7	Advanced Radiotherapy	3	3	0	0	0

No.	Modules	Total	Theory	Practical	Project Paper	Supervised Professional Placement
	Techniques					
8	Professionalism and Ethics in Radiotherapy	3	3	0	0	0
9	Radiobiology	3	3	0	0	0
10	Oncology (I & II)	4	4	0	0	0
11	Management	2	2	0	0	0
12	Quality Assurance in Radiotherapy	3	2.5	0.5	0	0
13	Research Methodology	2	2	0	0	0
14	Research	6	0	0	6	0
15	Brachytherapy	3	3	0	0	0
16	Clinical Practice	20	0	0	0	20
	Total Credits	**79**	**45.5**	**7.5**	**6**	**20**
Compulsory Modules						
1	Compulsory modules (18 – 20 credits)	18	18	0	0	0
Electives						
1	Electives (12 – 14 credits)	14	14	0	0	0
	Total Credits	**136**	**99.5**	**10.5**	**6**	**20**

2. **Bachelor of Medical Imaging**

No.	Modules	Total	Theory	Practical	Clinical/ Industrial/ Professional Placements
Basic Sciences					
1.	Human Anatomy and Physiology (I and II)	6	4	2	0
2.	General Physics	3	2.5	0.5	0
3.	General Pathology	3	3	-	0
4.	Systemic Pathology	3	3	-	0
5.	Radiation Physics (including radiation protection)	3	2.5	0.5	0
6.	Basic Human Psychology	2	2	0	0
7.	Basic Pharmacology	2	2	0	0
8.	Biostatistics	2	2	0	0
	Total Credits	**24**	**21**	**3**	**0**
Core Modules					
1.	Patient Care in Radiography	2	1	1	0
2.	Radiographic /Medical Imaging Instrumentation (I & II)	6	4	2	0
3.	Imaging Technique (I,II,III,IV)	12	8	4	0
4.	Imaging Process (I & II)	6	4	2	0
5.	Radiographic Anatomy	4	2	2	0
6.	Image Analysis	2	1	1	0
7.	Sectional Anatomy	2	1	1	0
8.	Comparative Imaging	2	2	-	0
9.	Computerised Tomography (Physics, Instrumentation & Technique)	2	1	1	0
10.	Magnetic Resonance Imaging (Physics, Instrumentation & Technique)	2	1	1	0

No.	Modules	Total	Theory	Practical	Clinical/ Industrial/ Professional Placements
11.	Ultrasonography (Physics, Instrumentation & Technique)	2	1	1	0
12.	Radionuclide Imaging (Physics, Instrumentation & Technique)	2	1	1	0
13.	Professionalism and Ethics in Radiography/medical Imaging	2	2	-	0
14.	Radiobiology	2	2	-	0
15.	Basic Management	2	2	-	0
16.	Quality Assurance in Radiography/ Medical Imaging	2	1	1	0
17.	Research Methodology	2	2	0	0
18.	Research project	6	6	0	0
19.	Clinical Practice (I, II, III, IV)	**20**	0	0	20
	Total Credits	**80**	**42**	**18**	**20**
Compulsory Modules + Electives (Non Core)					
Compulsory/University Modules (18-20 Credits)		**18**	18	0	0
Electives (Non-core) (12-14 Credits)		**14**	14	0	0
	Total Credits	**136**	**95**	**21**	**20**

IV. HEALTH CARE SCIENCES

1. Bachelor of Health Care Management

<table>
<tr><td rowspan="7">Basic Medical Sciences</td><td>Modules</td><td>Credits</td></tr>
<tr><td>Introduction to Human Anatomy and Physiology</td><td>6</td></tr>
<tr><td>Principle of health care and disease prevention</td><td>3</td></tr>
<tr><td>Basic psychology</td><td>3</td></tr>
<tr><td>Basic account</td><td>3</td></tr>
<tr><td>Basic Communication</td><td>3</td></tr>
<tr><td>Total Credits</td><td>18</td></tr>
</table>

<table>
<tr><td rowspan="24">Core Health Care Management Sciences

Practical component</td><td>Modules</td><td>Credits</td></tr>
<tr><td>Principles of management and its application in Health Care Services Management</td><td>3</td></tr>
<tr><td>Organisational behaviour</td><td>3</td></tr>
<tr><td>Introduction to health care system, service and management</td><td>3</td></tr>
<tr><td>Health human resources (health human manpower)</td><td>3</td></tr>
<tr><td>Basic health finance, economy and entrepreneurship.</td><td>3</td></tr>
<tr><td>Health care programme planning and evaluation</td><td>3</td></tr>
<tr><td>Organisational development and transformation</td><td>3</td></tr>
<tr><td>Quality assurance and improvement</td><td>2</td></tr>
<tr><td>Health safety, emergency and crisis management</td><td>3</td></tr>
<tr><td>Health education and promotion</td><td>3</td></tr>
<tr><td>Health Care System – Rural/Urban, Private / Public</td><td>3</td></tr>
<tr><td>Disaster management</td><td>3</td></tr>
<tr><td>Human Resource, Organisational Behaviour and its application in Hospital & Health Care management</td><td>3</td></tr>
<tr><td>Leadership & Conflict Resolution in Health Care Institutions</td><td>3</td></tr>
<tr><td>Planning, Designing and Management of Clinical services departments – Wards Units, OPDs, ICU, A & E, OT.</td><td>3</td></tr>
<tr><td>Supportive Services – Laboratory, CSSD, Dietary, Linen &Laundry, Utility – Sanitation & Hospital waste disposal</td><td>3</td></tr>
<tr><td>Quality Management & Hospital Accreditation System</td><td>2</td></tr>
<tr><td>National Health Policy</td><td>2</td></tr>
<tr><td>Communication Skills</td><td>2</td></tr>
<tr><td>Socio-cultural aspect of health and health care</td><td>2</td></tr>
<tr><td>Total Credits</td><td>55</td></tr>
</table>

Practical Attachment	
Health Attachment	6
Hospital Attachment	6
Total Credits	**12**

Scientific Methods	**Modules**	**Credits**
	Thesis	2
	Health care system research methodology	3
	Biostatistics	2
	Total Credits	**7**

ICT and Information Management Skills	**Module**	**Credits**
	Health Informatics	3
	Total Credits	**3**

	TOTAL CREDITS	**95**

OTHER MODULES		

Humanities	**Modules**	**Credits**
	Pendidikan Islam / Pengajian Moral	3
	TITAS	6
		4
	Total Credits	**13**

HEP Compulsory Modules	**Modules**	**Credits**
	Bahasa Kebangsaan A/B	3
	Pengajian Malaysia	3
	Bahasa Inggeris	3
	Bahasa Lain	3
	Total Credits	**12**

Total credits (excluding elective modules)	**120**

Electives	**Modules**	**Credits**
	Medical Sociology and Anthropology	3
	Tradition Complementary Medicine	3
	Community Health Care/Public Health	3
	Total Credits	**9**

TOTAL CREDITS	**125 – 130**

2. **Bachelor of Health Promotion**

Basic Medical Sciences		
	Modules	**Credits**
	Introduction to Human Anatomy and Physiology	**6**
	Principle of Disease Formation and Disease Prevention	3
	Basic Psychology	3
	Basic Microbiology	3
	Basic Communication	3
	Total Credits	**18**

Core Health Promotion Practical component		
	Modules	**Credits**
	Principles of Management	2
	Organisational Behaviour	2
	Introduction to Health Care System, Service and Management	3
	Health Human Resources (health manpower)	2
	Basic Health Finance, Economy and Entrepreneurship.	2
	Health Care Programme Planning and Evaluation	3
	Organisational Development and Transformation	2
	Quality Assurance and Improvement	2
	Health Safety, Emergency and Crisis Management	2
	Health Education and Promotion	3
	Health Communications Skills	3
	Socio-cultural Aspect of Health and Health Care	3
	Physical Activity and Health	3
	Medical & Health Information and Telemedicine	2
	Rehabilitation Medicine	2
	Graphics and Media on Computer and otherwise	2
	Family Health	3
	Nutrition and Nutritional Status Monitoring	2
	Health Counselling	3
	Adolescence and Reproductive Health	3
	Lifestyle diseases & Healthy Lifestyle Promotion	3
	Hazardous Substances and abuse	3
	Total Credits	**55**
	Attachment Practicum	
	Health Education Practicum	6
	Research Project	6
	Total Credits	**12**

Scientific Methods	Modules	Credits
	Epidemiology	2
	Biostatistics	2
	Research Methodology	3
	Total Credits	**7**

ICT and Information Management Skills	Module	Credits
	Basic Health informatics	3
	Total Credits	**3**

	TOTAL CREDITS	**95**

OTHER MODULES

Humanities	Modules	Credits
	Pendidikan Islam/Pengajian Moral	3
	TITAS	6
		4
	Total Credits	**13**

HEP Compulsory Modules	Modules	Credits
	Bahasa Kebangsaan A/B	3
	Pengajian Malaysia	3
	Bahasa Inggeris	3
	Bahasa Lain	3
	Total Credits	**12**

Total credits (excluding elective modules)	**120**

Electives	Modules	Credits
	Medical Sociology and Anthropology	3
	Tradition Complementary Medicine	3
	Community Health Care/Public Health	3
	Total Credits	**9**

TOTAL CREDITS	**125 – 130**

3. Bachelor of Environmental Health

Basic Medical Sciences	Modules	Credits
	Human Anatomy and Physiology	6
	Principle of health care and disease prevention	3
	Human Biochemistry & Genetics	3
	Basic Chemistry	3
	Laboratory Sciences	3
	Total Credits	**18**

Core Environ-mental Health Practical component	Modules	Credits
	Introduction to Environmental and Occupational Health	3
	Ecological Perspectives of Environmental and Occupational Health	3
	Occupational Safety and Health Management and Services	3
	Occupational Safety	3
	Pollution and health	4
	Psychology and behavioural science	3
	Environmental & Occupational Toxicology	3
	Engineering Perspectives of Environmental & Occupational Health	3
	Environmental & Occupational emergency and crisis management	3
	Environmental Health Education and promotion	3
	Management of Domestic, Laboratory and Industrial Waste	3
	Measurement & Monitoring of Contaminants	3
	Diseases Related to Environmental & Occupational Health	3
	Occupational Rehabilitation	3
	Ethics & Laws for Health Sciences Professionals	3
	Occupational, Environmental Health Laws	3
	Environmental Management	3
	Biodiversity	3
	Total Credits	**55**
	Attachment Practicum	
	Environmental & Occupational Health Practicum	6
	Research Project	6
	Total Credits	**12**

Scientific Methods	Modules	Credits
	Epidemiology	2
	Biostatistics	2
	Research Methodology	3
	Total Credits	**7**

ICT and Information Management Skills	Module	Credits
	Basic Health informatics	3
	Total Credits	**3**

	TOTAL CREDITS	**95**

OTHER MODULES		

Humanities	Modules	Credits
	Pendidikan Islam/Pengajian Moral	3
	TITAS	6
		4
	Total Credits	**13**

HEP Compulsory Modules	Modules	Credits
	Bahasa Kebangsaan A/B	3
	Pengajian Malaysia	3
	Bahasa Inggeris	3
	Bahasa Lain	3
	Total Credits	**12**

Total credits (excluding elective modules)	**120**	

Electives	Modules	Credits
	Medical Sociology and Anthropology	3
	Tradition Complementary Medicine	3
	Community Health Care/Public Health	3
	Total Credits	**9**

TOTAL CREDITS	**125 – 130**	

4. Bachelor of Occupational Health

<table>
<tr><td rowspan="7">Basic Medical Sciences</td><td>Modules</td><td>Credits</td></tr>
<tr><td>Human Anatomy and Physiology</td><td>6</td></tr>
<tr><td>Principle of health care and disease prevention</td><td>3</td></tr>
<tr><td>Human Biochemistry & Genetics</td><td>3</td></tr>
<tr><td>Basic Chemistry</td><td>3</td></tr>
<tr><td>Laboratory Sciences</td><td>3</td></tr>
<tr><td>Total credits</td><td>18</td></tr>
</table>

<table>
<tr><td rowspan="24">Core Environmental Health

Practical component</td><td>Modules</td><td>Credits</td></tr>
<tr><td>Introduction to Environmental and Occupational Health</td><td>3</td></tr>
<tr><td>Risk Management in Environmental and Occupational Health</td><td>3</td></tr>
<tr><td>Occupational Safety and Health Management and Services</td><td>3</td></tr>
<tr><td>Occupational Safety</td><td>3</td></tr>
<tr><td>Ergonomics</td><td>4</td></tr>
<tr><td>Occupational Stress, Psychology and behavioural science</td><td>3</td></tr>
<tr><td>Environmental & Occupational Toxicology</td><td>3</td></tr>
<tr><td>Engineering Perspectives and Environmental & Occupational Health</td><td>3</td></tr>
<tr><td>Environmental & Occupational emergency and crisis management</td><td>3</td></tr>
<tr><td>Occupational Health Education and promotion</td><td>3</td></tr>
<tr><td>Machinery, Equipment and Fire Safety</td><td>3</td></tr>
<tr><td>Hygiene-Measuring & Monitoring of Contaminants</td><td>3</td></tr>
<tr><td>Diseases Related to Environmental & Occupational Health</td><td>3</td></tr>
<tr><td>Occupational Rehabilitation</td><td>3</td></tr>
<tr><td>OSH Surveillance and Monitoring</td><td>3</td></tr>
<tr><td>Occupational, Environmental Health Law & Ethics</td><td>3</td></tr>
<tr><td>OSH Information and Data Systems Management</td><td>3</td></tr>
<tr><td>First Aid and Emergency Response Planning</td><td>3</td></tr>
<tr><td>Total credits</td><td>55</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Attachment Practicum</td><td></td></tr>
<tr><td>Environmental & Occupational Health Practicum</td><td>6</td></tr>
<tr><td>Research Project</td><td>6</td></tr>
<tr><td>Total credits</td><td>12</td></tr>
</table>

<table>
<tr><td rowspan="5">Scientific Methods</td><td>Modules</td><td>Credits</td></tr>
<tr><td>Epidemiology</td><td>2</td></tr>
<tr><td>Biostatistics</td><td>2</td></tr>
<tr><td>Research Methodology</td><td>3</td></tr>
<tr><td>Total credits</td><td>7</td></tr>
</table>

ICT and Information Management Skills	Module	Credits
	Basic Health informatics	3
	Total credits	**3**

	TOTAL CREDITS	**95**

OTHER MODULES		

Humanities	Modules	Credits
	Pendidikan Islam/Pengajian Moral	3
	TITAS	6
		4
	Total credits	**13**

HEP Compulsory Modules	Modules	Credits
	Bahasa Kebangsaan A/B	3
	Pengajian Malaysia	3
	Bahasa Inggeris	3
	Bahasa Lain	3
	Total credits	**12**

Total credits (excluding elective modules)	**120**	

Electives	Modules	Credits
	Medical Sociology and Anthropology	3
	Tradition Complementary Medicine	3
	Community Health Care/Public Health	3
	Total credits	**9**

TOTAL CREDITS	**125 – 130**	

V. THERAPEUTIC SCIENCES

1. Bachelor of Physiotherapy

No.	Modules	Total	Theory	Practical	Clinical Placement	Research/ Project
1.	Anatomy I	3	2	1		
2.	Anatomy II	3	2	1		
3.	Physiology I	2	2	0		
4.	Physiology II	2	2	0		
5.	Kinesiology I	3	1	2		
6.	Kinesiology II	3	1	2		
7.	Biomechanics	3	2	1		
8.	Physiotherapeutic skills I	4	1	3		
9.	Physiotherapeutic skills II	4	1	3		
10.	Electrotherapeutic modalities I	2	1	1		
11.	Electrotherapeutic modalities II	2	1	1		
12.	Professional development & practice	3	3	0		
13.	Neuroscience	2	2	0		
14.	Health Psychology	3	3	0		
15.	Pathology	3	3	0		
16.	Clinical Reasoning & Evidence based Practice	2	2	0		
17.	Musculoskeletal Physiotherapy I	3	2	1		
18.	Cardiopulmonary Physiotherapy I	3	2	1		
19.	Neurological Physiotherapy I	3	2	1		
20.	Pharmacology for Physiotherapy	2	2	0		
21.	Introduction to Biostatistics	3	2	1		
22.	Research Methodology	3	2	1		

No.	Modules	Total	Theory	Practical	Clinical Placement	Research/ Project
23.	Musculoskeletal Physiotherapy II	3	2	1		
24.	Sport rehabilitation.	2	1.5	0.5		
25.	Cardiopulmonary Physiotherapy II	3	2	1		
26.	Neurological Physiotherapy II	3	2	1		
27.	Elective module I	2	2	0		
28.	Physiotherapy in Acute Care	2	1.5	0.5		
29.	Physiotherapy in Paediatrics	2	1.5	0.5		
30.	Physiotherapy in Women's Health	2	1.5	0.5		
31.	Spinal Care & Rehabilitation	2	1.5	0.5		
32.	Elective module II	2	2	0		
33.	Physiotherapy management for Gerontology	2	1.5	0.5		
34.	Elective studies III	2	2	0		
35.	University modules	10	10	0		
	Clinical Placement (1000 hours OR 25 weeks) 1. Ms 2. Cardiorespiratory 3. Surgery 4. Neurology 5. Special areas	25	0	0	25	
36.	Research for Allied Health Professions/project	6	0	0	0	6
	Total credits	**129**	**72**	**26**	**25**	**6**

2.   **Bachelor of Occupational Therapy**

Modules	Total	Theory	Practical	Clinical
University Modules	10	10	0	0
Psikologi Asas	2	2	0	0
Pengenalan Dan Asas Terapi Carakerja	5	3	2	0
Anatomi Asas	2	2	0	0
Fisiologi Manusia	4	3	1	0
Psikologi Perkembangan	3	3	0	0
Komunikasi Dan Kaedah Kaunseling	3	2	1	0
Neurosains	4	4	0	0
Patologi Asas	2	2	0	0
Biomekanik Untuk Terapi Carakerja	3	2	1	0
Anatomi Gunaan Dan Kinesiologi	4	3	1	0
Farmakologi Am	3	3	0	0
Intervensi Terapi Carakerja	5	3	2	0
Penilaian Terapi Carakerja	5	3	2	0
Patologi Sistem	2	2	0	0
Neuropsikologi Dan Psikologi Kesihatan	3	3	0	0
Geriatrik	4	4	0	0
Pediatrik	4	4	0	0
Rehabilitasi Komuniti	4	2	2	0
Biostatistik	2	2	0	0
Terapi Carakerja Neurologi	4	3	1	0

Modules	Total	Theory	Practical	Clinical
Terapi Carakerja Perubatan	4	3	1	0
Terapi Carakerja Psikiatri	4	3	1	0
Terapi Carakerja Geriatrik	4	3	1	0
Terapi Carakerja Ortopedik Dan Surgeri	5	3	2	0
Terapi Carakerja Pediatrik	4	3	1	0
Orientasi Dan Mobiliti	4	2	2	0
Latihan Amali	2	0.5	1.5	0

Penempatan Klinikal
 	
    1. Ortopedik Dan Surgeri
    2. Perubatan
    3. Neurologi
    4. Geriatrik
    5. Pediatrik
    6. Psikiatri
    7. Orientasi Dan Mobiliti
	25	0	0	25

Penyelidikan Terapi Carakerja I	3	1	2	0
Penyelidikan Terapi Carakerja II	3	0	3	0
TOTAL CREDITS	**136**	**83.5**	**27.5**	**25**

VI. FORENSIC SCIENCE

Bachelor of Forensic Science

Components	Modules	Body of Knowledge	Credits
Compulsory Modules (10-15%) 15-22 credits	Comprises university and statutory required modules	1. National Requirement - Bahasa Melayu, Malaysian Studies, Islamic/Moral Studies 2. University Requirement - Social Science/Humanities Options, Co-Curriculum 3. Personal Development - Languages, Communication Skills (Presentation)	**15 (10%)**
Fundamental Modules including Basic Sciences (10-20%) 15-29 credits	Comprises relevant fundamental modules offered by faculty	Relevant components of the following modules: 1. Chemistry 2. Physics 3. Biology 4. Mathematics 5. ICT	**20 (14%)**

	Modules	Total	Theory	Practical
Professional Modules (57-67%) 83-97 credits	Instrumentation in Chemistry	3	2	1
	Analytical Chemistry	8	5	3
	Bio-organic Chemistry	3	3	0
	Physical Chemistry	6	4	2
	Inorganic Chemistry	6	4	2
	Food Chemistry	3	3	0
	Organic Chemistry	9	6	3
	Pollution and Environmental Chemistry	3	2	1
	Chemistry Industry Management	3	3	0
	Fundamental of Spectroscopy	3	2	1

Modules	Total	Theory	Practical
Physical Evidence	3	2	1
Biological Evidence	3	2	1
Fire Investigation	3	2	1
Forensic Psychology	4	4	0
Drugs Chemistry and Forensic Toxicology	4	3	1
Forensic Serology	3	2	1
Forensic DNA Analysis	3	2	1
Forensic Anthropology	3	2	1
Ballistic and Explosives Chemistry	4	3	1
Questioned Document Examination	2	1	1
Forensic Medicine	3	2	1
Research Project	6	0	6
Criminology	2	2	0
Forensic Odontology	2	1	1
Basic law & presenting of evidence	2	1	1
Subtotal credits	**94 (65%)**	**63**	**31**

	Modules	Total	Theory	Practical
Industrial Training (5-7%) 7-10 credits	**Credits**	**8 (5.5%)**		
Optional Modules (3-6%) 4-9 credits	Any elective modules offered by the Higher Education Provider	**8 (5.5%)**		
	Total credits	**145** **(100%)**		

VII. AUDIOLOGY AND SPEECH SCIENCES

1. Bachelor of Audiology

Components	Modules	Total	Theory	Practical	Clinical
Compulsory Modules (10-15%)	Compulsory comprises university and statutory required modules	Body of Knowledge: 1. National Requirement - Bahasa Melayu, Malaysian Studies, Islamic/Moral Studies 2. University Requirement - Social Science/ Humanities Options, Co-Curriculum 3. Personal Development - Languages, Communication Skills (Presentation)			
	14%	**20**	**20**	**0**	**0**

Components	Modules	Total	Theory	Practical	Clinical
Fundamental Modules include basic science (10-20%)	Human Structure and Function	4	3	1	0
	Psychology	4	4	0	0
	Language Development	4	4	0	0
	Basic Linguistics	3	3	0	0
	Research statistics i. Biostatistics ii. Research methodology	6	4	2	0
	Acoustics and Phonetic	4	3	1	0
	18%	**25**	**21**	**4**	**0**
Professional modules (40-50%)	Anatomy and physiology of speech and hearing	4	3	1	0
	Clinical Orientation	2	1	1	0
	Introduction to Psychoacoustic	2	1.5	0.5	0
	Basic Audiology Techniques	2	1	1	0
	Basic Communication Disorders	3	2.5	0.5	0

Components	Modules	Total	Theory	Practical	Clinical
	Paediatric for Speech and Hearing	3	3	0	0
	Advanced Audiology Techniques	3	2	1	0
	Neurology for Hearing and Speech	2	1.5	0.5	0
	Otology	3	3	0	0
	Auditory Electrophysiology Assessments	3	2	1	0
	Vestibular Assessments and Rehabilitation	2	1	1	0
	Auditory Amplification	3	2	1	0
	Paediatric Audiology	3	2	1	0
	Learning Processes and Special Needs	3	2.5	0.5	0
	Advanced Auditory Amplification	3	2	1	0
	Aural Rehabilitation	4	3	1	0
	Counseling for Communication Disorders	3	2	1	0
	Industrial Audiology	2	1	1	0
	Hearing screening	2	1	1	0
	Seminar in Audiology	2	0	2	0
	Professional Issues	2	2	0	0
	Research Project	6	0	6	0
	43%	**62**	**39**	**23**	**0**
Industrial training includes Clinical Placement (15-25%)	Audiology Clinic	20	0	0	20
	Audiology Clinical Placement	6	0	0	6
	18%	**26**	**0**	**0**	**26**
Optional modules (5-10%)	Elective modules	10	10	0	0
	7%	**10**	**10**	**0**	**0**
	Total Credits	**143**	**90**	**27**	**26**
		100%	63%	19%	18%

2. Bachelor of Speech Sciences / Speech-language Pathology

Components	Modules	Total	Theory	Practical	Clinical
Compulsory Modules (10-15%)	Compulsory comprises university and statutory required modules	Body of Knowledge: 1. National Requirement - Bahasa Melayu, Malaysian Studies, Islamic/Moral Studies 2. University Requirement - Social Science/ Humanities Options, Co-Curriculum 3. Personal Development - Languages, Communication Skills (Presentation)			
	10%	**15**	**15**	**0**	**0**

Components	Modules	Total	Theory	Practical	Clinical
Fundamental Modules include basic science (10-20%)	Human Structure and Function	4	3	1	0
	Psychology i. Developmental psychology ii. Abnormal psychology	3 2	3 2	0	0
	Language Development	3	3	0	0
	Basic Linguistics	3	3	0	0
	Research statistics i. Biostatistics ii. Research methodology	6	4	2	0
	Acoustics and Phonetic	3	2	1	0
	17%	**24**	**20**	**4**	**0**
Professional modules (40-50%)	Clinical orientation	2	1	1	0
	Introduction to Communication Disorders	3	3	0	0
	Childhood language disorders	3	2.5	0.5	0
	Adult language disorders	3	2.5	0.5	0
	Articulation and phonological disorders	3	2.5	0.5	0
	Motor speech disorders	2	1.5	0.5	0
	Fluency disorders	2	1.5	0.5	0

Components	Modules	Total	Theory	Practical	Clinical
	Voice disorders	3	2.5	0.5	0
	Swallowing	2	1.5	0.5	0
	Aural rehabilitation	3	2.5	0.5	0
	Alternative and augmentative communication	2	1	1	0
	Professional issues	2	2	0	0
	Linguistics	6	4	2	0
	Clinical linguistics	2	1	1	0
	Anatomy and physiology for speech and hearing	4	3	1	0
	Medical bases for communication disorders i. Neuroloy for Speech ii. Otology iii. Pediatric for Audiology and Speech	2 2 2	2 2 2	0 0 0	0 0 0
	Psychoacoustics	2	1.5	0.5	0
	Neuro psychology	2	2	0	0
	Basic audiology techniques	2	1	1	0
	Learning processes and special needs	3	2.5	0.5	0
	Counseling for communication disorders	3	2	1	0
	Research project	6	0	6	0
	46%	**66**	**47**	**19**	**0**
Industrial training includes Clinical Placement (15-25%)	Clinical practice	22	0	0	22
	Clinical placement	6	0	0	6
	20%	**28**	**0**	**0**	**28**
Optional modules (5-10%)	Elective modules	10	10	0	0
	7%	**10**	**10**	**0**	**0**
	Total Credits	**143**	**94.5**	**28.5**	**28**
		100%	63%	19%	19%

APPENDIX 2: RESOURCES SPECIFIC TO THE FIELD OF STUDY

This section contains the resources specific to some fields of study which are necessary and those that will enhance effective teaching and learning. They are provided in two categories: BENCHMARKED and ENHANCED. Benchmarked resources are MUST HAVE resources, whilst enhanced resources are those categorised as GOOD TO HAVE. The information is displayed in a non-standardised manner to capture the demand and essence of the individual subgroup.

Index:

I.   NUTRITION AND DIETETICS

1.   Food Preparation Laboratory

No.	Items	Benchmarked (B)/ Enhanced (E)
1.	Measuring equipment	B
2.	Slicing and Cutting Tools	B
3.	Mixing tools	B
4.	Baking tools	B
5.	Cooking tools	B
6.	Kitchen aids	B
7.	Cookware	B
8.	Cleaning equipment	B
9.	Storage facility	B
10.	Fridge & Freezer	B

2.   Nutrition Assessment Laboratory

No.	Items	Benchmarked (B)/ Enhanced (E)
1.	Computers - connected to network system	B
2.	Dietary Analysis software	B
3.	Statistical analysis software	B
4.	Anthropometric equipments	
	• Stadiometer	B
	• recumbent length board	B
	• weight, height scale with precision	B
	• baby scale	B
	• hanging baby scale	E
	• Lange/Harpenden skinfold calipers	B
5.	Bioelectrical Impedance Analyser	B
6.	Sphygmomanometer	B
7.	Hemocues, portable hemoglobin photometers	B
8.	Food models & measuring utensils	B
9.	Indirect Calorimetry	E
10.	Biochemical Test Kits for blood and urine	E

3. Food Science Laboratory

No.	Items	Benchmarked (B)/ Enhanced (E)
1.	Universal Oven (105°C) for moisture determination	B
2.	Furnace (600°C) for ash determination	B
3.	Kjeldahl System for crude protein determination	B
4.	Soxhlet System for crude fat determination	B
5.	Fiber determination system	B
6.	Determination System	B
7.	Electronic Balances	B
8.	Water Baths	B
9.	Light meter	B
10.	pH Apparatus	B
11.	Rotary Evaporator	B
12.	UV/VIS Spectrophotometer	B
13.	Calorimeter	E
14.	High Performance Liquid Chromatograph	E
15.	Gas Chromatograph	E
16.	Atomic Absorption Spectroscopy	E
17.	Water Activity Meter	E
18.	Viscometer	E
19.	Food Testing Instrument	E
20.	Lab Mills	E
21.	Melting Point Apparatus	E
22.	Refractometer	E

II.   LAB-BASED DIAGNOSTIC SCIENCES

The table contains the benchmarked resources estimate based on 50 students per intake.

1.   MEDICAL LABORATORY TECHNOLOGY (MLT) LABORATORY

No.	Items	Total Unit
1.	Autoclave (Mid range)	1
2.	Automatic pipette (adjustable volumes)	5 of each
	Pipette - fixed volume (various volume)	5 of each
3.	Bench top centrifuge	1
4.	Blood mixer/rotator	2
5.	Blood pressure monitor	5
6.	Bunsen burner	25
7.	spectrophotometer	2
8.	Deep freezer	2
9.	Electrophoresis system	2
10.	Electronic balance	2
11.	Hazardous chemical cabinet	2
12.	Immunohematology gel card system (Semi-auto)	2
13.	Incubator	2
14.	Laminar flow hood (Clean bench)	1
15.	Microhematocrit centrifuge	2
16.	Microtome rotary	2
17.	Microfuge/serofuge	2
18.	Microscope (student)	30
19.	Oven (Hot air)	2
20.	Platform shaker	1
21.	Safety cabinet	1
22.	Slide warmer	1
23.	Float bath	1
24.	Stethoscope	5
25.	Refrigerated centrifuge	1
26.	refrigerator	2
27.	pH meter	2
28.	Fume cupboard	1
29.	Hotplate/stirrer	3
30.	Vortex mixer	2
31.	Water distiller	2
32.	Water bath	1
33.	Water deioniser	1
34.	Safety goggles/glasses	25
35.	Timers	10

2. **ADVANCED ANALYTICAL LABORATORY - (STRONGLY RECOMMENDED)**

   (Clinical Biochemistry/Microbiology/Biomedical Science/Genetics)

No.	Items	Total Unit
1.	Chemistry analyser system	1
2.	Immunoassay system	1
3.	Analytical balance (High end)	1
4.	Atomic absorption meter (AA)	1
5.	Comparison microscope with closed circuit TV	1
6.	Fourier transform infrared (FITR)	1
7.	Gas chromatograph	1
8.	High performance liquid chromatograph	1
9.	High speed centrifuge	1
10.	Microscope-dissecting	1
11.	Microwave oven	1
12.	Solid phase extractor apparatus	1
13.	Stereomicroscope	1
14.	Thin layer chromatograph	1
15.	Top pan balance	2
16.	UV-Visible spectrophotometer	1
17.	Video microscope	1
18.	Network computer	5
19.	Water Purification System (Ultra pure)	1

3. SMALL & MISCELLANEOUS ITEMS (Adequate quantities for each practical session)

No.	Items
1.	Alcohol burner
2.	Autoclavable carboys
3.	Autoclavable pipette filler
4.	Autoclaving basket
5.	Bag Sealer
6.	Balance - Kitchen Use
7.	Basin
8.	Beaker
9.	Beaker (Low) graduated with spout
10.	Beaker (Low) polypropylene with spout
11.	Beaker (Tall) graduated with spout
12.	Bedpan
13.	Bench top cooler/freezer
14.	Biohazard bags
15.	Biohazard container
16.	Biohazard - Sharps container
17.	Bottle - aspirator with spigot
18.	Bottle - Bijou
19.	Bottle - Media
20.	Bottle - reagent
21.	Bottle - Universal
22.	Bottle - wash (polythene)
23.	Bottle - Dropping
24.	Bottle - Dropping, amber glass
25.	Bottle specimen, low form
26.	Bowl - Stainless steel
27.	Brush - Biuret
28.	Brush - Tube (Small)
29.	Bunsen burner
30.	Buret

No.	Items
31.	Calipers
32.	Clamp - Biuret
33.	Clamp - Three prong
34.	Counter - Hand tally
35.	Counter - Laboratory counter
36.	Cryogenic box
37.	Cup - (Medication)
38.	Cups - Iodine
39.	Cutter - Glass tubing
40.	Dish - Kidney dish
41.	Dish - slide staining
42.	Dispenser - slide glass
43.	Draw sheet
44.	Face shields (Chemical)
45.	Face shields (UV-absorbing)
46.	Flask – Conical/Erlenmeyer
47.	Flask - Filtering (Small)
48.	Flask - volumetric
49.	Food Blenders
50.	Forceps
51.	Funnel - Analytical 30mm diameter
52.	Goggles (Chemical resistant)
53.	Goggles (UV-absorbing)
54.	Hair Dryers
55.	Hemocytometer set
56.	Holder - test tube
57.	Holder - wire loop
58.	Jar - Desiccator
59.	Kettle - Electric
60.	Measuring cylinder 1000ml
61.	Microcentrifuge tube racks
62.	Microfuge tubes 1000ul
63.	Mixer - Hand

No.	Items
64.	Pasteur Pipette Containers/Cans
65.	Pipette
66.	Pipette - Micropipette adjustable volume
67.	Pipette - Micropipette fixed volume
68.	Pipette - Rack (graduated)
69.	Pipette - Stand
70.	Pipette - Sterilization box
71.	Pipette pump (fast release) (5-10ml)
72.	Pump - Aspirator
73.	Rack - Sample storage cup
74.	Rack - Test tube
75.	Reader - Microhematocrit tube
76.	Refractometer
77.	Rod - Stirring
78.	Safety bottle carriers
79.	Scalpel handle
80.	Scissors
81.	Slide - Microscope
82.	Spatula
83.	Sputum Mug
84.	Stand
85.	Stand - Retort
86.	Table lamps
87.	Test-tube (glass)
88.	Thermometer
89.	Timer - Stop watch
90.	Tube - centrifuge

4. **TEACHING AIDS - (ANATOMICAL MODELS)**
   (Clinical Biochemistry/Microbiology/Biomedical Science/Genetics) -
   (Adequate quantities for each practical session)

No.	Items
1.	Arm skeleton
2.	Artery and vein model (Enlarged)
3.	Corpuscles of kidney
4.	Digestive tract
5.	Ear (Enlarged)
6.	Ear Model (Functional)
7.	Elbow Joint (Functional)
8.	Embryo (Human)
9.	Eye (Enlarged)
10.	Eyeball with part of orbit.
11.	Female genital organ
12.	Female pelvis with ligaments.
13.	Female pelvis with pelvic floor
14.	Female reproductive system
15.	Foot and ankle
16.	Hand showing muscle
17.	Head and neck
18.	Head and neck with muscles
19.	Head with brain (Base)
20.	Heart (Life form)
21.	Hip joint
22.	Kidney (Dissected)
23.	Knee joint (Flexible)
24.	Larynx (Enlarged)
25.	Larynx, trachea & bronchus
26.	Leg showing muscles
27.	Leg skeleton
28.	Liver & gall bladder
29.	Lung lobule and alveolus set

No.	Items
30.	Lung, heart & diaphragm
31.	Male muscles figure
32.	Male reproductive system
33.	Muscles of the arm model
34.	Muscles of the hand model
35.	Nephron (Enlarged)
36.	Ovary (Enlarged)
37.	Pancreas, spleen & duodenum
38.	Pelvic skeleton (Male)
39.	Pelvic skeleton (Female)
40.	Pelvic skeleton with ligaments
41.	Physiology laboratory systems (Computerised)
42.	Shoulder joint
43.	Skeleton (Half human)
44.	Skeleton (Human) c/w stand
45.	Skin (Bisected)
46.	Skull (Human) - Adult
47.	Skull (Human) - Baby
48.	Spinal cord (Section of)
49.	Stomach (Entire anatomy)
50.	Teeth - Complete Set
51.	Teeth (Enlarged)
52.	Thorax with diaphragm
53.	Tongue showing muscles
54.	Torso with head
55.	Urinary organ
56.	Vertebrae column with pelvis

5. **TEACHING AIDS - (ANATOMICAL CHARTS)**
   (Clinical Biochemistry/Microbiology/Biomedical Science/Genetics) -
   (Adequate quantities for each practical session)

No.	Items
1.	Circulatory system
2.	Digestive system
3.	Human skeleton
4.	Human musculature
5.	Nervous system
6.	Reproductive system
7.	Respiratory system
8.	Urinary system

III.   MEDICAL IMAGING AND RADIOTHERAPY

1.   Medical Imaging

Diploma and Degree

No.	Modules	Ratio	Benchmarked (B) /Enhanced (E)
1	Human anatomy & Physiology (1 & 11) Standard anatomy & physiology models, phantoms, apparatus and teaching aids for theory and demonstration session	1:20	B
2.	General Physics Basic experimental model/apparatus for laboratory sessions	1:20	B
3.	General pathology - Anatomical models, charts and posters for teaching aids	1:20	E
4.	Radiation Physics (including radiation protection) Basic experimental apparatus and radiation protection accessories/lead gowns for laboratory sessions	1:20	B
5.	Patient Care in Radiography For Basic Nursing care procedures to be equipped with: • bed, mattress, pillow, linen, • bed-pan & urinal, • thermometer – conventional & digital Set of Sphygmomanometer, • Suction apparatus, • CPR phantom – adult & baby • Emergency trolley, • Wheelchair,	1:20	B

No.	Modules	Ratio	Benchmarked (B) /Enhanced (E)
	• Patient trolley, transfer board and other relevant apparatus.		
6.	Old radiographic equipment Radiation Instrumentation and accessories Radiographic Technique Imaging Process Simulation/X-ray Room to be equipped with: • Modern X-ray equipment with x-ray table and/erect bucky • Screen/Films/cassette of various sizes • Dark room with automatic processor in a specific darkroom layout • Illuminators • X-ray accessories – lead gown / apron, immobilisation devices, cassette holder etc. • Radiographic phantoms with various models AND/OR • ** Integrated Computed radiography system / Digital radiography with Image Reader & monitor console/workstation **Imaging plate for Computed radiography system	1:20	E
7.	Radiographic Anatomy Image Analysis Sectional Anatomy • Sectional anatomical models/	1:10	B

No.	Modules	Ratio	Benchmarked (B) /Enhanced (E)
	cadaver slices • Radiographic images • Computer terminals • Illuminators		
8.	Quality Assurance in Radiography/Medical Imaging *Sets of QA tools for Processing and radiographic equipment*	1: 10	B

CRITERIA FOR SELECTION OF CLINICAL PLACEMENTS

The Imaging department in hospitals chosen for clinical placements should have:

a) At least two General X-ray rooms, for conventional X-ray examinations, and one Special/Contrast Examination room.

b) Larger hospitals for other special Imaging Modalities, such as Angiography, CT, MRI, US and RNI.

c) Workload (at least 30 patients/per day during their clinical placements).

2. Radiotherapy

Diploma and Degree

No.	Modules	Benchmarked (B)/ Enhanced (E)
1	Human Anatomy and Physiology (I and II) *Standard anatomy and physiology models, phantom, apparatus and teaching aids for theory and laboratory sessions.*	B
2	General Physics *Basic experimental apparatus for laboratory sessions.*	B
3	General Pathology Anatomical models, charts and posters for teaching aid.	E
4	Systemic Pathology Anatomical models, charts and posters for teaching aid.	E
5	Radiation Physics (including radiation protection) Basic experimental apparatus for laboratory sessions.	B
6	Patient Care in Radiotherapy apparatus commonly used in hospital such as thermometer, stethoscope, spygmomanometer, sucker, wheelchair, patient trolley, curtain screen, transfer board, CPR model, pillow, blanket, and many more for teaching/demonstration about care of all types of patients such as walking patient, patient on wheelchair, patient on trolley, unconscious patient, child and geriatric patient, patient on drip, patient with colostomy and tracheostomy, first aid, etc.	B
7	Radiotherapy Technique (I, II, III and IV) Immobilisation devices, human phantom, mould room accessories.	B
8	Sectional Anatomy Sectional anatomical model or cadaver slices	E

IV.   HEALTH CARE SCIENCES

Generic requirement for programmes within this sub-group are:

a.   Basic facilities

Basic Generic Facilities include classroom suited for teaching and learning, in buildings, with CF (Certification of Fitness to stay) appropriate to the Uniform Building By-Laws, in particular sections related to School Premises; with proper BOMBA certification. Space should be sufficient to the number of students taken in. Premises must be well-furnished with appropriate fittings, furniture and equipment which are safe, according to health standards and well-maintained.

b.   Laboratories and other facilities

Labs should be sufficient to meet the training needs of the students:
a.   Basic science lab
b.   Chemistry and toxicology labs
c.   Environmental Health and Science laboratory

Most of the laboratory work can be conducted in groups.

c.   Placement in various related premises and centres

a.   Access to clinical set-ups such as – wards, clinics, clinical laboratories, radiology and imaging facilities.
b.   Access to water catchment areas, water treatment facilities, sewage treatment facilities and garbage disposals facilities system including scheduled waste treatment and disposals.
c.   Access to multiple industries and plants.
d.   Access to multiple related government agencies.

CRITERIA FOR SELECTION OF PLACEMENT CENTRES

a.   Detail of the registered enterprise or professional practitioner

- name
- registration number
- address
- working experience

- current APC and PNC
- qualification/CV
- continuous professional development (CPD) record
- disciplinary record

b. Type of services offered

- Primary Care
- Specialty Care – occupational or environmental health services.

c. Operation hours

Workload (sufficient workload to benefit trainees, but not too much as for productivity to be affected by the students presence); would continuously accept students for placement; valid Business Registration or related accreditation.

Specific Requirements

1. Environmental Health and Occupational Safety and Health (EOSH)

The proposed list of equipment is equivalent for 40 EOSH students. The institutions must take necessary steps to ensure that the equipment available is in keeping with the progress of the profession.

No	Equipment	Minimum Quantity (unit)
1	Airborne particle sampler	2
2	Airborne air sampler	6
3	GPS	6
4	Sound level meter	1
5	Vibration Level Meter	3
6	Welding Set	2
7	Portable multi gas meter	1
8	Portable VOC meter	1
9	Microbial Sampler	2
10	Anemometer	2
11	Mannequin for First aid courses	5
12	CPR simulation chest pressure detector	5
13	Fire extinguishers – cut opened, demo set	1
14	Fire extinguisher – intact	1
15	Teaching fire panels	1
16	Hose reels for courses	3
17	Safety shoes – construction	5
18	Safety shoes – chemicals	5
19	Hard hat	30
20	Climbing set	5
21	Hot and cold bulb temperature monitoring	1
22	Audiometer	1

No	Equipment	Minimum Quantity (unit)
23	Audiometry booth	1
24	Personal monitoring air sampler	6
25	Air sampler cyclones	6
26	Air sampler cassettes	6
27	Ventilation system demo set with fan	1
28	Ergonomic Time study Portable Camera System	1
29	Goniometers	3 sets
30	Accelerometers	3 sets
31	Different sets of ergonomic chairs	3 sets
32	Demo set ergonomic computer tables	1
33	Demo set ergonomic work station	1
34	Soft, Flexible Curve Ruler for spinal anthropometry	3 nos
35	Tuning forks	3 nos
36	Demo lab coats – normal khaki	2 pcs
37	Demo lab coats – chemical resistant	
38	Demo non slippery homogenous heavy duty floor tiles	20 pcs
39	Demo emergency eye wash	1
40	Demo emergency lighting	1
41	Demo set - fire (warmth) detector, with different glass bulbs	3
42	Demo set – fire smoke detector	3
43	Demo emergency shower sets or set in labs	1
44	Demo easy to fix- home DIY smoke detector sets	3
45	Demo small car fire extinguisher set	1
46	Anatomy models set	1
47	Skull, Spines and skeleton set	3
48	Safety goggles – all types	
49	Computer anti-glare spectacles	6 pairs
50	First Aid Box	2 sets
51	First Aid Mobile Set	3 sets

No	Equipment	Minimum Quantity (unit)
52	Traffic controller Reflector Suit	2 sets
53	Different types of specialty work gloves	6
54	Different specific respirator sets	6
55	Different types of Ear muffs	6
56	Dentist Face shields	
57	Welding face shields	
58	Construction Fall protection suits and harnesses	3 sets
59	Emergency hammer	2 nos
60	Emergency torch lights	6 sets
61	Emergency forehead torch	6 sets
62	Sphygmomanometer	6 sets
63	Stethoscopes	6 sets
64	Snellen Chart	3 sets
65	Stop watch	6 nos
66	Emergency CB radio	6 sets
67	Stretchers	6 sets
68	Bandage sets – triangular	2 doz
69	Safety Ladders	3 sets
70	Current meter	1 set
71	EMF Volt test meter	1 set
72	Sets of demo safety labels	2 sets
73	Sets of Chemical Labels – GHS (Global Harmonized System)	2 sets
74	Lock-out/tag-out	3 sets
75	Safety Levels for disabled people	2 sets
76	Safety patios/tiles for the blind	6 tiles
77	Hygrometers	1 set
78	Thermometers – multiple sets for rooms and caves	3 sets
79	Light meters	3 sets
80	Ultrasound distance measuring device	1 set

No	Equipment	Minimum Quantity (unit)
81	Weighing scales	3 sets
82	Body fat analyzer	1 set
83	Mid arm circumference tape	3 sets
84	Height measure – mobile	3 sets
85	Skin fold thickness callipers	3 sets
86	Loud hailer/speakers	1 set
87	Back belts	3 sets
88	O2 gear, SCBA set	2 sets
89	Masks, regulators, cannula	2 sets
90	Emergency Whistles	6 nos
91	Fire buckets	6 nos

Suggestions for other laboratory equipment

Sufficient quantities of glassware and other laboratory equipment should be provided so that students will be able to work independently without sharing.

2. Health Promotion

The proposed list of equipment is equivalent for 40 HP students. The institutions must take necessary steps to ensure that the equipment available is in keeping with the progress of the profession.

No.	Equipment	Minimum Quantity (unit)
1	Anatomy models set	1
2	Skull, Spines and skeleton set	3
3	GPS	6
4	First Aid Box	2 sets
5	First Aid Mobile Set	3 sets
6	Sphygmomanometer	6 sets
7	Stethoscopes	6 sets

No.	Equipment	Minimum Quantity (unit)
8	Snellen Chart	3 sets
9	Stop watch	6 nos
10	Loud hailer/speakers	1 set
11	Mannequin for first aid courses	5
12	CPR simulation chest pressure detector	5
13	Stretchers	6 sets
14	Bandage sets – triangular	2 doz
15	Weighing scales	3 sets
16	Body fat analyzer	1 set
17	Mid arm circumference tape	3 sets
18	Height measure - mobile	3 sets
19	Skin fold thickness callipers	3 sets

Suggestions for other laboratory equipment

Sufficient quantities of glassware and other laboratory equipment should be provided so that students will be able to work independently without sharing.

3. Medical Social Work

There is no requirement for equipment for the Medical Social Work Masters Programme apart from stationery and printing or Photostat equipment for making bindings of papers for surveys and reports. This equipment can be shared equipment of the school.

V. THERAPEUTIC SCIENCES

Generic requirements for this subgroup are:

a. Laboratories and other facilities

Labs should be sufficient to meet the training needs of the students:

a. Gymnasium.

b. Electrotherapy laboratory.

c. Basic science laboratory.

Most of the physiotherapeutic skills can be conducted in groups and the apparatus/equipment ratio to students is 1:5. This is to ensure students are able to practise the necessary skills.

b. In-house training centre/hospital training

Either the in-house training centre/hospital for clinical training should have the following disciplines:

a. Traumatology and Orthopaedics

b. Cardiopulmonary & cardiovascular

c. Surgery & Intensive care/Acute care

d. Neurology

e. Paediatrics

f. Obstetrics and Gynaecology

g. Sport

h. Community/Hospices/Gerontology

c. Criteria for selection of clinical placements

- Hospital/health centre having all the disciplines mentioned above.
- Type of services offered:
  a. Inpatient department
  b. Outpatient department
- Workload (at least 5 patients/per day during their clinical placement)
- Supervisor to supervise student.
- Placement of students in hospitals and private practice must be included in the programme and each placement must not be less than 4 weeks in duration.

Specific Requirements

1. Physiotherapy

The proposed list of equipment is for 40 physiotherapy students. The institutions must take necessary steps to ensure that the equipment available is in tandem with the progress of the profession.

No.	Equipment	Minimum Quantity (unit)
1.	Hydrocollator unit / pack heater (12 packs)	1
2.	Paraffin wax bath	1
3.	Paraffin thermometer	1
4.	Cryocuff tumbler & cryocuff for shoulder, elbow, knee,& ankle	3 set
5.	Luminous Infra red	2
6.	Non Luminous Infrared	2
7.	Shortwave diathermy	3
8.	PUVA machine	optional
9.	Ultrasound	3
10.	Interferential therapy	3
11.	TENS	3
12.	Electrical stimulation unit / Neuromuscular electrical stimulator / Faradic machine	3
13.	Electrodiagnostic machine (Strength duration curve)	2
14.	Traction machine for lumbar and cervical	2
15.	Wooden treatment couch, chair, table & footrest	10
16.	Blood pressure cuff and stethoscope	5
17.	Blankets	10
18.	Pillows	10
19.	Towels	10
20.	Manipulative plinth	10
21.	Quadriceps bench	2
22.	Suspension frame with accessories	4
23.	Parallel bar (adjustable)	1
24.	Wall bar	1
25.	Wooden steps with railing	1
26.	Balance beam set	2
27.	Long bench	2
28.	Shoulder wheel	1
29.	Walking frame (foldable)	5

No.	Equipment	Minimum Quantity (unit)
30.	Walking stick	5
31.	Axillary & elbow crutches	10
32.	Pulley & weight	2 set
33.	Sand bags	1 set
34.	Dumb bell with different weights	1 set
35.	Indian Clubs	1 set
36.	Poles	1 set
37.	Theraband	1 set
38.	Goniometer set	1 set
39.	Hand grip measurement	1 set
40.	Stop watches	4
41.	Long Mirror at the gym wall (I side)	1
42.	Skeleton model (Box)	5
43.	Skeleton Model on roller	3
44.	Airex mattress	10
45.	Wobble board	2
46.	Tendon hammer	5
47.	Tuning fork	5
48.	Gym ball	2
49.	Tumble form wedges	1
50.	Pulse oximeter	4
51.	Volumetric incentive spirometers	10
52.	Flutter	10
53.	Incentive spirometry	10
54.	X-ray viewer	2
55.	Peak flow meter	10
56.	Chest model	2
57.	Portable Suction machine & catheter	2
58.	Portable nebulizer machine	2
59.	Lung sound auscultation trainer	2
60.	Weighing scale (seca)	1
61.	Stepper	1
62.	Static bicycle	1
63.	Treadmill	1
64.	Rowing machine	1
65.	Baby mannequin	2
66.	Mannequin (adult)	2
67.	Swimming pool*	optional

*Note: Where facilities are not available in-house, institutions should make arrangements with other institutions for access.

2. Occupational Therapy

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
1	Purdue Pegboard	1:10	B
2	Minnesota Manual Dexterity Test	1:10	B
3	Feeding Evaluation Kit	1:10	B
4	Hand Evaluation Kit	1:10	B
5	Assure Safety Transfer Belt	1:20	B
6	ADL Lap Tray	1:20	B
7	Foldable Two Wheel Walker with Seat	1:20	B
8	Touch-Test Sensory Evaluators	1:20	B
9	Detachable Armrest & Detachable Footrest	1:05	B
10	Parallel Bars	1:20	B
11	Refrigerator - Freezer	1:20	B
12	Foldable Commode Wheelchair	1:20	B
13	Rivermead Perceptual Assessment Battery - Complete set	1:10	B
14	Volumeter Hand Edema Assessment Set	1:10	B
15	Elevating Adult Wheelchair	1:20	B
16	Exercise Steps for Adults	1:20	B
17	Tumble Forms Rools set (C 2794 C, C 2794 G, C 2794 E, C 2794 D, C 2794 H, C 2794 J	1:20	B
18	Posture Mirror with Mobile Stands	1:20	B
19	Table Adapta with Switch	1:20	B
20	LOTCA Battery Lowenstein Occ. Therapy	1:20	B
21	LOTCA Battery Lowenstein Occ. Therapy (Child)	1:20	B
22	Bruininks Oseretsky Test of Motor Proficiency	1:20	B
23	Chrome Plated Reclining Wheel Chair	1:20	B
24	Neuro Scanner 97.4 + Professional, Level 1 Training	1:20	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
25	Hand Evaluation Kit	1:20	B
26	Multifunctional workstation	1:20	B
27	Ball Pool + 500 Balls	1:20	B
28	COTNAB	1:20	B
29	Portable Early Education Programme	1:20	B
30	Heavy Duty Zig zag Sewing Machine	1:02	B
31	Corner Seat Large Base	1:20	B
32	Shoulder Wheel	1:20	B
33	Grasshopper Equivalent	1:20	B
34	Water Suspan For Heating Thermos (Small)	1:08	B
35	PVI Wheel Chair Ramp	1:20	B
36	Tadpole Multiuse	1:20	B
37	Multisensory System	1:20	B
38	Heavy Duty Zig zag Sewing Machine	1:02	B
39	Microcomputer Upper Limb Exerciser	1:20	B
40	Standing Frame	1:20	B
41	Multi channel data acquisition System	1:20	B
42	TPAL (Valpar Therapist's)	1:20	B
43	Wardrobe	1:20	B
44	Make-up desk + stool	1:20	B
45	*Alatan Makmal* Splinting	2:20	B
46	Splinting tools & Accessories	1:05	B
47	Brain 8-parts	1:20	B
48	Spinal Cord	1:20	B
49	Pillow Perfect (heel, leg, elbow, knee, body, cervical)	1:20	B
50	Trampoline	1:20	B
51	Glucometer + Glucostrips	1:20	B
52	Stethoscope	1:20	B
53	Thermometer : Digital	1:20	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
54	Manual Oral	1:20	B
55	Patella Hammer	1:01	B
56	Body Fat Monitor (Omron)	1:20	E
57	Body Fat Analyser	1;20	E
58	Lumbar Vertebra with prolapsed disc. flexibility mounted & Brain Ventrical	1:20	B
59	Lumbar Spinal Column, Deluxe Osteoporosis (model 3 vertebrae & Cervical collar (adult)	1:20	B
60	Cervical Spinal Column & Thoracic Spinal Column	1:20	B
61	Pressballs	1:20	B
62	Neck Roll Cervical 20"x3", Night roll & Pillow perfect-cervical roll	1:20	B
63	Tredle Lockstitch Machine + 4drawers + 1 pocket	1:20	B
64	Powder free latex gloves (6), Surgical masks (6) Alcohol swap (6), First Aid Kit (6) & Cotton wool (4)	1:01	B
65	Door Refrigerator (Panasonic)	1:20	B
66	Disposable Hem Durastick 11 electrodes 5cm sq.	1:20	B
67	Multifoam Non-Bond (4sheets)	1:20	B
68	Thermoplastic perforated Non-Bond (2 sheets / cs)	1:04	B
69	Satinet material (per meter)	1:01	B
70	Glucometer	1:20	E
71	Stethoscope adult	1:20	B
72	Digital Thermometer	1:20	E
73	Water distiller 4L / hr	1:20	E
74	Heavy Duty Table / Trolley	1:08	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
75	Trolleys 3 tiers VS 124-C	1:20	B
76	Dressing Trolleys with 2 drawers	1:20	B
77	Round electrodes 100pcs / bag + gel	1:20	B
78	Squre Electrodes 50 strips / bag	1:20	B
79	Edema Control: (Alat)		
	- Foam Arm Support	1:20	B
	- Waterproof Support	1:20	B
80	Scar & Hypersensitivity:		
	- Mini Massager	1:20	B
	- Vibrator	1:20	B
81	Thermoplastic		
	1 / 8" x 18" x 24 " (4 sheets / cs)	1:04	B
	b) Perforated Non-Bond	1:04	B
	1 / 8" x 24" x 36" (2 Sheets / cs)	1:04	
82	Padding		
	a) Firm Foam Padding	1:10	B
	b) Luxafoam (soft Sponge)	1:10	B
83	Hook & Loop Kit		
	a) Hook – Plain 25 yd 1" (per yard	1:1yard	B
84	Edema Control (material)		
	a) Satinet Material – 50 m / roll / Lycra (per meter)	1:1m	B
	b) Coban 1"x 5yd - 30 roll / box	1:1yard	B
85	a) Stokinette 1'	1:1yard	B
	b) Stokinette 3"	1:1yard	B
	c) Stokinette 5'	1:1yard	B
86	a) Bandage 2"	1:1m	B
	b) Bandage 5"	1:1m	B
87	Scissors	1:04	B
88	Threads	1:1roll	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
89	NMES Portable Digital	1:20	B
90	Body Fat Monitor (Omron)	1:20	B
91	Sewing Machine Portable	1:02	B
92	Tuining Forks	1:20	B
93	Roche Accu-chek Softclix	1:20	E
94	Round table	1:08	E
95	Wooden trolley	1:10	E
96	Aspirator Bottle	1:20	E
97	Roche Accu-chek Glucostrip 25 test strip	1:20	E
98	Luminous spot	1:20	E
99	Paint roller with tray	1:20	E
100	Paint brush set of 3	1:01	B
101	Plasticine set of 5	1:10	E
102	Plaster of Paris (25kg)	1:20	E
103	Permanent Marker pen	1:20	E
104	Tool Box	1:20	B
105	Feather Duster	1:20	E
106	Face towel	1:20	E
107	Stress Management Neurofeedback Package (BOSLAB), Notebook & DLP Projector	1:20	B
108	PDMS-2 Peabody Developmental Motor Scales 2nd edition	1:20	B
109	High Speed Overedge Machine	1:10	B
110	Portage Early Education Programme	1;20	B
111	Deluxe Vestibulator 11 Set	1:20	B
112	Fluido DHT 230 Volt Double Extremity	1:20	B
113	Adapta Height Adjustable Therapy Work Table	1:20	B
114	Classic Torso with Open Back, 21-parts	1:22	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
115	Notebook	1:22	B
116	DVD Handycam	1:22	E
117	Video Editing Software Adobe 7.0	1:22	E
118	Sensory Stimulation Activities Kit	1:22	B
119	Kinetic Elbow CPM Machine	1:22	E
120	Kinetic Maestra Hand & Wrist CPM Machine	1:22	E
121	Kinetic Centura Shoulder CPM Machine	1:22	E
122	Patient Lifter Complete with Sling	1:22	E
123	Play House Set	1:22	B
124	Music Instrument System (Yamaha Keyboard,	1:22	E
	Cordless Mic, Conga Drum, Yamaha Folk		E
	Guitar (bag,string) JD folk guitar, Guiro, Ratchet,		E
	Tamborine, Kompang, Casternet, Wooden		E
	Shaker, Bell set, Hand symbal, Bongo, Maracas		E
	Woodblock, wooden claves		E
125	Electrical cooker oven *(balang gas, kepala*	1:22	B
	tiub gas, kuali elektrik, periuk kukusan)		B
126	PA Karaoke Power Mixer & 2 unit Beta 3 speaker with stands, monitor, Hi-Fi radio DVD / CD player	1:22	E
127	Ball Bath (small)	1:22	B
128	Heat Pan (small)	2:22	B
129	Heat Pan (large)	4:22	B
130	Helter Skelter Loopie	1:23	E
131	Clown Box	1;23	E
132	Foam Board	1:23	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
133	Puzzle; a) Fruit b) Vegetable c) Toys d) Baby Items	1:23	B
134	Super Sound Sorter	1:23	E
135	Rotating Disc Puzzle	1;23	E
136	Giant Knob Puzzle: Animals	1:23	B
137	Stacking Ring Switch	1:23	B
138	Wooden Ball Run	1:23	E
139	Multilid Sorting Box	1;23	B
140	Preschool Visual Motor Integration (PVMIA)	1:23	B
141	Easy Grip Scissors	1:23	B
142	Geo-Lastic Art	1:23	B
143	Pegboards And Pegs-100 holes (292mm)	1;23	B
144	Sensorimotor Performance Analysis (SPA)	1:23	B
145	Medium Soft Red Therapy Putty	1:23	B
146	Medium Green Therapy Putty	1;23	B
147	Soft Yellow	1:23	B
148	Coloured Foam Tubing	1:23	B
149	Biofeedback Computer Game		
150	Based Training Kit	1:23	B
151	BP Set Sphygmomameter Mercurial	2:23	B
152	Stroke Driver Screening Assessment	1:23	B
153	Para-Care Parafin Bath	1:23	B
154	Wax Remover	1;23	B
155	Wax Refill (Unscented)	1:23	B
156	Mitt (pair)	1:23	E
157	Booties (pair)	1:23	E
159	Goniometer - 6 3 / 4"	2:23	B
159	Goniometer - 8 " (C7512)	2:23	B
160	Goniometer - 8" (C7509)	2:23	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
161	Goniometers 12 1 / 2 " International Std	2:23	B
162	Balance-Pad Plus	5:22	E
163	Movin' Step	5:23	E
164	Digiband Yellow (25M)	1:23	B
165	Digiband Green (24M)	1:23	B
166	Digiband Orange (25M)	1:23	B
167	Tridex Tube Light R (1.2M)	10:23	E
168	Tridex Tube Medium G (1.2M)	10:23	E
169	Tridex Tube Strong BL (1.2M)	10:23	E
170	Tridex Tube X-Strong BK (1.2M)	10 unit	E
171	Balance-beam	3:23	E
172	Rock & Rody	1:23	E
173	Activity Ball	1:23	E
174	Hop 45 cm	1:23	E
175	Hop 55 cm	1;23	E
176	Thera Bolly	1:23	E
177	Nervous System, 1 / 2 life-size	1:23	B
178	Internal Hand Structure Model 3 parts	1:23	B
179	JAW Professional - Software	1:20	E
180	Magic Professional with Speech	1:20	E
181	SMA for Magic Professional	1:20	E
182	Brain Injury Visual Assm. Batery for adult	1:20	E
183	Behavioral Inattention Test Complete Kit	1:20	E
184	Folding Mobility Cane - 48"L	1:20	E
185	Folding Mobility Cane - 50"L	1:20	E
186	Folding Mobility Cane - 52"L	1:20	E
187	Carrying case	1:20	E
188	Glow Tape	1:20	E
189	Sports & Line Pen	1:20	E
190	Set of Mangkok (set of 4)	1:20	E

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
191	ADL Low Vision Aids (*Pakai Habis*)	1:20	E
192	Max Digital CCTV (black & white)	1:20	E
193	Max Digital CCTV (color)	1:20	E
194	Tangent Screen	1:20	E
195	BM 36 Blue Perkins	1:20	E
196	Simulation Package with Video	1:20	E
197	Jody including Stand	1:20	E
198	ADL Low Vision Aids (goggles, magnifying glass, etc)	1:20	E
199	BR- 24 Braillliant-24 Braille Cells display.	1:20	E
200	D-Braille Embosser	1:20	E
201	VNBT / QT Voicenote Mpower ^Braille Keyboard	1:20	E
202	Sets of Splinting Tools (in tool box)	1:20	B
203	Pressure Garments Accessories (*benang, gunting, kain, brown paper, kertas minyak, kertas kertas, geometric box, velcro, minyak mesen*)	1:20	E
204	Satinette Material for Pressure Garments	1:23	B
205	Fiskars Heavy-Duty Shears L 9"	1:23	B
206	Heavy Duty Needle Nose pliers 6" L	1:23	B
207	Flat Nose Pliers : 14cm x 5mm	1:23	B
208	Heavy -Duty Wire Cutters: 22 cm	1:23	B
209	Rolyan TAP Splint (Toddler) - Left	1:23	B
210	Rolyan TAP Splint (Toddler) - right	1:23	B
211	Rolyan TAP Splint XL (24.8 cm +) - Left	1:23	B
212	Rolyan TAP Splint XL (24.8 cm +) - Right	1:23	B
213	Rolyan Carve-It Upper Extremity Positioning splint Elbow - Left.	1:23	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
214	Rolyan Carve-It Upper Extremity Positioning splint Elbow - Right	1:23	B
215	Rolyan Carve-It Upper Extremity Positioning splint Hand - Left	1:23	B
216	Rolyan Carve-It Upper Extremity Positioning splint Hand - Right	1:23	B
217	Wedge Hand positioner	1:23	B
218	Rolyan Tennis Elbow Strap - Beige	1:23	B
219	Rolyan Tennis Elbow Strap – Blue / Black	1:23	B
220	SPR Tennis Elbow Airband - Black	1:23	B
221	SPR Tennis Elbow Airband - Beige	1:23	B
222	Cutting Mat 45.5.x 61 cm	1:23	B
223	Static Progressive Splinting Up Close and Personal	1:23	B
224	Rolyan Static Progressive Finger Extension Splint - M	1:23	B
225	Rolyan Static Progressive Finger Extension Splint - XL	1:23	B
226	Rolyan Static Progressive Finger Extension Splint - S	1:23	B
227	Rolyan Static Progressive Finger Extension Splint - L	1:23	B
228	Rolyan Workhard D-Ring Wrist and Thumb Spica - Left	1:23	B
229	Rolyan Workhard D-Ring Wrist and Thumb Spica - Right	1:23	B
230	Rolyan Workhard D-ring wrist and thumb spica - XL	1:23	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
231	Tendon Hammer dia. 5cm flexible plastic handle 30cm	1:23	B
232	Measuring tape	1:23	B
233	T-30-06R baseline 360 degree 6ins rulongmeter	1:23	B
234	Pen torch lighter 2AAA batteries	1:23	B
235	Softclix pro lancet x 200pcs	1:23	B
236	Accuchek Advantage Glucose strips x 25 pcs	1:23	B
237	3 M litman Stethoscope	1:23	B
238	Foal BP set (Child)	1:23	B
239	Crepe Bandage 7.5cmx4.5Mperbox of 12 rolls	1:23	B
240	Student Respiratory Kit	1:23	B
241	Reveal Thermoplastic Splinting Material	1:23	B
242	Research Power Lab system	1:10	E
243	Computer-Aided Cognitive rehabilitation	1:10	E
244	Super Skeleton Sam on 5 ft stand	1:20	B
245	Muscle Skeletal Max + Stand	1:20	B
246	Deluxe Arm skeletal	1:20	B
247	Deluxe Leg Skeleton	1:20	B
248	Child PCR Mannequin	1:20	B
249	Glass Cupboards for LV - clinic	1:20	E
250	Hand Evaluation Kits -JAMAR	1:10	B
251	Clinical Trolley	1:20	
	a) VS 129-B + (2 drawers)	1	B
	b) VS 124-C3	1	B
252	Bruininks Oseretsky Test of Motor Proficiency: 2nd Edition	1:20	B
253	Hard Disk Drive Handycam	1:20	E

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
	Memory Stick 4 GB	1:20	E
	VNP-FH100 Battery (Superhigh Capacity)	1:20	E
	Bag VA30	1:20	E
	ECM HW1 Microphone	1:10	E
254	Sensory Profile School Companion Complete Kit	1:20	E
	Adolescent / Adult Sensory Profile Complete Kit	1:20	E
	Infant / Toddler Sensory Profile Complete Kit	1:20	E
	Sensory Profile Complete Kit	1:20	E
255	Software for Embosser (Screen Reader)	1:20	E
256	8439-7 Complete Kit	1:20	E
	8448-6 Practical Guide to Handwriting-Manuscript	1:20	E
	8449-4 Practical Guide to Handwriting-Cursive	1:20	E
	Evaluation Tools of Children's Handwriting (ETCH)	1:20	E
	School Function Assessment(SFA) Complete Kit	1:20	E
257	Jebsen Taylor Hand Function Test	1:10	B
258	Roeder Manipulative Aptitude Test	1:20	E
259	Disk-Criminator (set of 2 disc)	1:10	B
260	Peabody Development Motor Scales 2nd Edition	1:20	B
261	Sensory Stimulation Activities Kit	1:20	E
262	Purdue Pegboard	1:10	B
263	Minnesota Manual Dexterity Test	1:10	B
264	LOTCA Battery 2nd Edition	1:10	B
265	LOTCA-G Cognitive Battery (Geriatric)	1:10	B

No	Equipment	Ratio	Benchmarked (B) / Enhanced (E)
266	DOTCA-CH Battery	1:20	E
267	PEDI Scoring Forms_ISBN:076-1617	1:20	E
268	PEDI Software_ISBN:015-8010-37x	1:20	E
269	PEDI Manual	1:20	E
270	Laptop for PEDI software	1:20	E
271	Preschool Visual-Motor Integration Assessment(PVMIA)	1:20	E
272	Rivermead Perceptual Assessment Battery, Complete	1:10	B
273	VALPAR (Functional Capacity Evaluation System)	1:30	E
274	FCE Software System	1:30	E
275	Maltron BF-916 Body Composition Analyzer	1:20	E
276	Plasma TV 42"	1:50	E
277	Life fitness x5 Elliptical Trainer	1:20	E
278	Reebok Active Runner Treadmill	1:20	E
279	Bowflex SelectTech Dumbbells and Stand	1:20	E
280	Rowing Machine	1:20	E
281	Multi Gyms	1:20	E
282	Exercise Bikes	1:20	B
283	Vienna Test System / Cognitive rehabilitation software.	1:20	E
284	Digital Camera	1:20	B
285	LCD Projector (per lecture room)	1:01	B
286	Seating for students	1:01	B
287	Screen (per lecture room)	1:01	B
288	Whiteboard (per lecture room)	1:01	B
289	Notice board	1:50	B

VI. FORENSIC SCIENCE

Specialised Teaching Laboratory

No.	Items	Total Units	Proposed minimum ratio to student
	DNA LAB		
	DNA sample preparation lab		
1.	Autoclave Machine	1	1:200
2.	Fume Hood	2	1:50
3.	Oven	2	1:50
4.	Microcentrifuge	2	1: 20
5.	Ultra Pure Water	1	1:200
6.	Micropipette	5 set	1 set : 10
	Cold room / facilities		
7.	Freezer -20	1	1:200
8.	Refrigerator	1	1:200
	DNA extraction room		
9.	Agarose Electrophoresis Set	3	1: 10
	Amplification and quantitation room		
10.	Thermal Cycler	1	1:20
	Detection room		
11.	UV –Vis Spectrophotometer	1	1:20
12.	DNA Sequencer	1	1:200
13.	Gel Documentation System	1	1:20
	CRIMINALISTICS LAB		
	Car examination space - optional		
1.	Crime Scene Kit	2	1:20

No.	Items	Total Units	Proposed minimum ratio to student
2.	Alternate light source	4	1:20
3.	Digital Camera with SLR	1	1:20
4.	Evidence Collection Kit	2	1:20
5.	Video Digital Camera	2	1:20
6.	Laser Trajectory Kit	2	1:20
7.	Engraved Photo Evidence Marker	2	1:20
8.	Dust Print Lifter	1	1:20
	Fingerprint room		
9.	Fingerprint Kit (Powder)	2	1:20
10.	Super Glue Kit	1	1:20
	Analysis room		
11.	Comparison Microscope	1	1:20
12.	Electron Microscope – SEM	1	1:200
13.	Evidence Drying Cabinet	1	1:200
14.	FTIR Microscope	1	1:200
15.	Visual Spectral Comparator System	1	1:200
ANALYSIS LAB			
1.	Gas Chromatography (FID Detector)	1	1:200
2.	Gas Chromatography (ECD Detector)	2	1:200
3.	Gas Chromatography (MS Detector)	1	1:200
4.	High Performance Liquid Chromatography	2	1:200
5.	AAS / ICP	1	1:200
	Preparation room		
6.	Fume hood	2	1:200

No.	Items	Total Units	Proposed minimum ratio to student
7.	Micropipette	5 set	1 set : 4
	Microscope room		
8.	Dissecting Microscope	7	1:3
9.	Low Magnification Microscope	20	1:1
	Insectorium		
10.	Incubator	1	1:20
11.	Growth Chamber	1	1:20
	Specimen examination room		
12.	Freezer -20	1	1:20
13.	Refrigerator	1	1:20
14.	Biohazard Safety Cabinet	2	1:20
	ANTHROPOLOGY LAB – optional		
1.	Human Model	2	1:200
2.	Anthropology Set	5	1:20
3.	Animal bone	1 set	1 set : 200
	CRIME SCENE EXAMINATION PRACTICE		
1.	Electrostatic lifting apparatus		
2.	Mannequin (adult male, adult female, child)		
3.	Evidence Packaging Kit		
4.	Personal Protective Equipment (PPE)		
5.	Allocated Crime Scene House		

Note: For a specialised field of study in forensic science, sufficient resources must be made available.

VII. AUDIOLOGY AND SPEECH SCIENCES

1. Audiology (Bachelor's Degree)

i. Mandatory resources for clinical practice

   a. 1 audiometric booth with live observation facilities per 8 clinical year students

   b. 1 set of diagnostic audiometer per 8 clinical year students

   c. 2 sound field Visual Reinforcement Audiometry (VRA) unit per programme

   d. 1 unit of diagnostic impedance audiometer per 8 clinical year students

   e. 1 electrophysiological room per programme equipped with:

   - 1 unit of diagnostic evoked potential response unit per programme

   - 1 unit of Auditory Steady State Response per programme

   - 1 unit of diagnostic Otoacoustic Emissions (OAE) per programme

   f. 1 unit of adult speech audiometry or speech test material per programme

   g. 1 unit of paediatric speech audiometry or speech test material per programme

   h. 1 hearing aid fitting room per programme equipped with:

   - real ear measure equipment per programme or maximum of 16 students

   - 1 unit of hearing aid test box (HATB) per programme

   i. 1 set of audiology outcome measure validation tool per programme

   j. 1 set of distraction test equipment per 8 clinical year students

   k. 1 set of clinical sound level meter per programme

   l. 1 set of sound level meter with octave band filters per programme

   m. 1 unit of portable screening OAE per programme

   n. 1 unit of portable screening audiometer per 16 clinical year students

   o. 1 unit of portable screening tympanometer per 16 clinical year students

p.   1 set of appropriate toys for respective paediatric audiometric test techniques per programme

ii.   Recommended resources

   a.   1 unit psychoacoustic workstation per programme
   b.   1 unit bithermal calorics per programme
   c.   1 unit Electronystagmography (ENG) or Videonystagmography (VNG) per programme
   d.   1 unit rotational chair per programme
   e.   1 unit VEMP per programme
   f.   1 unit posturography per programme
   g.   1 unit earmould laboratory per programme
   h.   1 unit cochlear implant mapping setup per programme
   i.   1 unit dosimeter per programme
   j.   1 unit tinnitus assessment tool per programme

2. Speech Sciences (Bachelor's Degree)

i. Mandatory resources for clinical practice
   a. 1 therapy room with live observation facilities per 8 clinical year students
   b. 1 toy-resource room per programme
   c. 1 room for speech laboratory per programme
   d. 1 set instrument to assess acoustic of voice per programme
   e. 1 set instrument to assess resonance per programme
   f. 1 set video recording equipment per 8 clinical year students
   g. 1 set audio visual equipment per 15 clinical year students
   h. 1 set audio recorder per speech therapy room
   i. 1 set of standardised assessment for childhood language disorders per programme
   j. 1 set of standardised assessment for adult language disorders per programme
   k. 1 set of standardised assessment for articulation per phonological disorders per programme
   l. 1 set of standardised assessment for motor speech disorders per programme
   m. 1 set of standardised assessment for fluency disorders per programme
   n. 1 set of standardised assessment for learning disabilities per programme
   o. 1 set of standardised assessment for hearing impairment per programme
   p. 1 set of standardised assessment for oro-motor per programme

ii. Recommended resources
   a. 1 set of CCTV equipment per speech therapy room
   b. 1 set of electropalatography per programme
   c. 1 set of swallowing workstation per programme
   d. 1 set video strobolaryngoscopy per programme

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