SESSION 2012/2013

PROSPECTUS *for* UNDERGRADUATE

BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS)

DEPARTMENT OF BIOMEDICAL ENGINEERING
FACULTY OF ENGINEERING, UNIVERSITY OF MALAYA

PROSPECTUS FOR UNDERGRADUATE

DEPARTMENT OF BIOMEDICAL ENGINEERING

ACADEMIC SESSION 2012/2013

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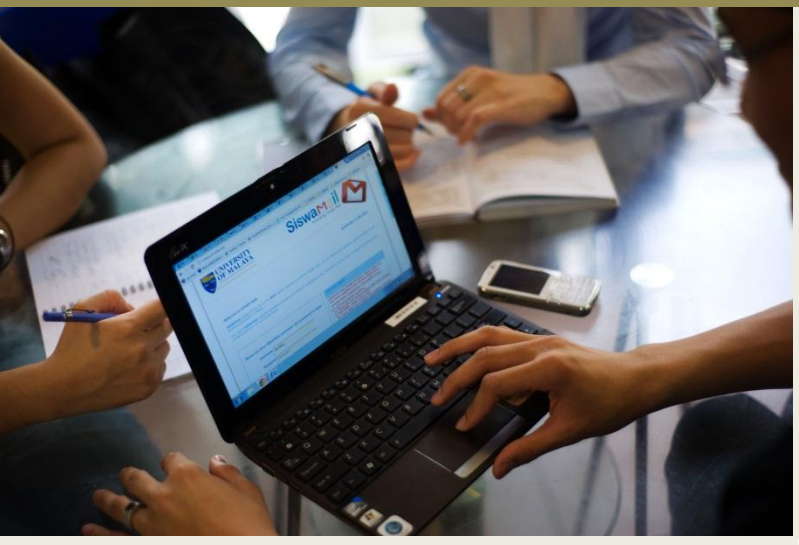
University of Malaya STATEMENTS

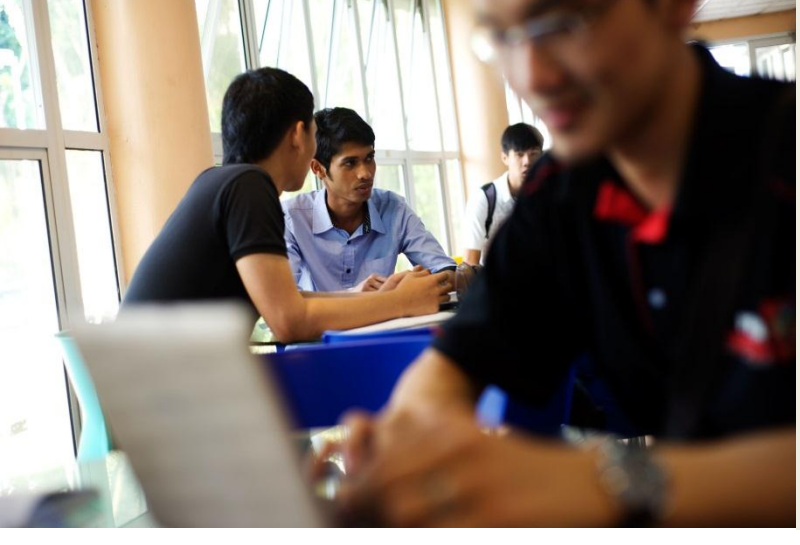


mission

To advance knowledge and learning through quality research and education for the nation and for humanity.

vision

To be an internationally renowned institution of higher learning in research, innovation, publication and teaching.



core values

Integrity Respect

Social Responsibility

Open-mindedness

Academic Freedom

Professionalism

Accountability

Teamwork Creativity

Meritocracy

Faculty of Engineering STATEMENTS

mission

To advance engineering knowledge and learning through quality education and research in the pursuit of fulfilling the aspirations of the University and nation.

vision

To be an internationally renowned Faculty of Engineering in research, innovation, publication and teaching.

quality products

Produce highly competent and skilled individuals with leadership qualities and good interpersonal skills.

Produce good citizens who respect universal human values.

Produce students with diverse backgrounds who respect and internalise diversity.

Produce students incalculated with social awareness and obligation values.

Produce students with international outlook and outreach.

Produce highly competent engineers capable of identifying ,formulating, and solving problems in a creative and innovative manner.

academic programmes

Ensure academic programmes are relevant, current, innovative and internationally recognised to meet national and global needs.

Continuously develop academic programmes that inspire and tap students' potential.

Ensure academic programmes are accredited by local and international engineering professional bodies.

Continously develop programmes that are relevant to industrial requirements.


CANSELERI

Message from the ACTING DEAN

Assalamualaikum w.b.t and warm greetings
Welcome to the Faculty of Engineering

Engineering education at the tertiary level began in Malaysia in 1956 with the establishment of the Engineering Department at University of Malaya's Bukit timah campus in Singapore. Only a Bachelor Degree course in Civil Engineering was offered then. The department was upgraded to a faculty when University of Malaya relocated to its campus in Lembah Pantai in 1958.

In the same year, the second bachelor degree course in Mechanical Engineering was introduced. A year later, a Bachelor Degree course in Electrical Engineering was added to the number of courses available to undergraduates.

In 1970, the Faculty introduced the fourth course, a bachelor degree in Chemical Engineering. All four courses were turned into respective departments in 1974. In the 1996/97 session, the Faculty introduced six other courses namely in Telecommuncation Engineering, Environmental Engineering, Materials Engineering, Computer Aided Design and Manufacturing Engineering and Biomedical Engineering.

To-date, the Faculty has six departments, Civil Engineering, Biomedical Engineering, Chemical Engineering, Electrical Engineering, Mechanical Engineering and Engineering Design & Manufacture. The Faculty now offers 12 programmes, with the lates addition of the Bachelor of Biomedical Engineering (Prosthetics and Orthotics) which was introduced in the 2009/2010 session.

All engineering courses, offered by University of Malaya, have been accreditated by the Engineering Accreditation Council (EAC), the Board of Engineers, Malaysia (BEM) in order for all undergraduate engineering students to register with them, upon graduation. All programmes have been structured such, that they meet the nation and the stakeholder's vision of producing responsible, multi-talented and highly qualified engineers of excellent leadership quality. This is evident from the Programme Outcome and Programme Educational Objectives mapped out for each course offered.

In line with the global tertiary education scenario, efforts are in place to drive the Faculty towards excellence and to ensure that the human capital produced by the university meets current needs.

" All engineering courses, offered by University of Malaya, have been accreditated by the Engineering Accreditation Council (EAC), the Board of Engineers, Malaysia (BEM)"

Towards this direction, the Faculty has adopted the National Tertiary Education Strategic Plan and inputs from various stakeholder programmes as the basis to improve the quality, competitiveness and creativity of each course offered. As a preliminary step to ensure that all courses offered are relevant to market needs, the Faculty is reviewing the overall curriculum in order to produce engineering graduates of high calibre.

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Associate Professor

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Deputy Dean
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Professor
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Academic Schedule SESSION 2012/2013

SEMESTER 1

Induction	03.09.2012 – 09.09.2012	1 week
Lecture Week	10.09.2012 – 09.11.2012	9 weeks #
Mid-Semester Break / Special Break	10.11.2012 – 18.11.2012	1 week*
Lecture Week	19.11.2012 – 21.12.2012	5 weeks
Study Week	22.12.2012 – 01.01.2013	1 week**
Examination	02.01.2013 – 18.01.2013	3 weeks
Semester Break	19.01.2013 – 17.02.2013	4 weeks

24 WEEKS

SEMESTER 2

Lecture Week	18.02.2013 – 05.04.2013	7 weeks
Mid-Semester Break	06.04.2013 – 14.04.2013	1 week
Lecture Week	15.04.2013 – 31.05.2013	7 weeks
Study Week	01.06.2013 – 09.06.2013	1 week
Examination	10.06.2013 – 28.06.2013	3 weeks

19 WEEKS

SESSION BREAK / SPECIAL SEMESTER

Semester Break	29.06.2013 – 01.09.2013	9 weeks	OR
Lecture and Examination	01.07.2013 – 23.08.2013	8 weeks	

#	Hari Raya Aidil Adha Public Holiday	26.10.2012
*	Deepavali Public Holiday	13.11.2012
**	Christmas Public Holiday	25.12.2012
+	Chinese New Year Public Holiday	10.02.2013

Prohibition Against PLAGIARISM

extract from University of Malaya (Discipline of Students) Rules 1999

(1) A student shall not plagiarize any idea/writing, data or invention belonging to another person.

(2) For the purposes of this rule, plagiarism includes:-

a) the act of taking an idea, writing, data or invention of another person and claiming that the idea, writing, data or invention is the result of one's own findings or creation; or

b) an attempt to make out or the act of making out, in such a way that one is original source or the creator of an idea, writing, data or invention which has actually been taken from some other resources

(3) Without prejudice to the generality of subrule (2) a student plagiarizes when he

a) publishes, with himself as the author, an abstract, article, scientific or academic paper or book which is wholly or partly written by some other person;

b) incorporates himself or allows himself to be incorporated as a co-author of an abstract, article, scientific or academic paper, or book, when he has not at all made any written contribution to the abstract, article, paper, or book;

c) forces another person to include his name in the list of co-researchers for a particular research project or in the list of co-authors for a publication when he has not made any contribution which may qualify him as a co-researcher or co-author;

d) extracts academic data which are the results of research undertaken by some other person, such as laboratory finding or field work findings or data obtained through library research, whether published or unpublished, and incorporate those data as part of his academic research Without Giving due acknowledgement to the actual Source;

e) uses research data obtained through collaborative work with some other person, whether or not that other person is a staff member or a student of the University, as part of another distinct personal academic, research of his, or for a publication in his own name as sole author without obtaining the consent of his personal research or prior to publishing the data;

f) transcribes the ideas of creations of others kept in whatever form whether written, printed or available in electronic form, or in slide form, or in whatever form of teaching or research apparatus or in any other form, and claims whether directly or indirectly that he is the creator of that idea or creation;

g) translates the writing or creation of another person from one language to another whether or not wholly or partly, and subsequently presents the translation in whatever form or manner as his own writing or creation; or

h) extracts ideas from another person's writing or creation and makes certain modification due reference to the original source and rearranges them in such a way that it appears as if he is the creator of those ideas.

Engineering LIBRARY

Introduction

The Engineering Library is situated on level 6, Laboratory Wing of the Engineering Tower at the Faculty of Engineering. It started out as a Reading Room at the Faculty of Engineering. In 1985 this library was absorbed under the University of Malaya Library System and is known as the Engineering Library. The library provides services and facilities for lecturers, researchers, students and staffs of the Engineering Faculty, including the Faculty of Built Environment. This library also open to all students in campus, and registered members of the UM Library.

General Collection

This library has a general collection of text and reference books, encyclopaedias, dictionaries, manuals, guide books and technical reports. A large portion of the collection can be borrowed.

Books in this library are arranged according to subject matter, based on the Library of Congress Classification System, i.e. according to alphabetical order.

Final Year Project Reports, Dissertations and Thesis

The collection is the result of research undertaken by students of the Faculty of Engineering. A large portion of the collection is the Final Year Project Report. The collection is used for reference purposes only.

Standards

This library has a collection of standards including that of, the British Institute (BSI) (until the year 2000), some Malaysian standards from the Standards Industrial Research Institute of Malaysia (SIRIM), and other standards such as the American Standards for Testing Material (ASTM). These standards are arranged according to the index arrangement provided by the issuing bodies for these standards, such as the British Standards Institute or SIRIM. These standards are for reference purpose only.

Audio Visual Materials

The audio visual material available at the Library include film rolls, film strips, diskettes, compact discs, audio tapes, videos and slides on topic related to Engineering and Architecture. Facilities to view these materials are provided by the library.

Loans

All registered students are allowed to borrow from the library.

USER CATEGORIES	NO OF BOOKS	PERIOD OF LOAN
Postgraduate Student	6	14 days
Undergraduate Student	4	7 days

Renewal of reading materials can be done through the internet (Pendeta Web PAC) according to the rules and regulations.

Inter-Library Loan Service

The facility is available to lecturers, researchers and postgraduates at the Faculty of Engineering. This facility is to allow them to obtain articles which are not available in the UM Library collection. Service conditions are according to the rules stated.

Information Services

The Library offers reference and information services. This includes attending to queries and obtaining information from the database for users of UM Library within and outside the campus.

User Services

Induction programmes are conducted at the Main Library and Engineering Library at the beginning of each academic session. The main aim of this programme is to introduce the use of the Online Public Access Catalogue, Pendeta Web PAC, and library facilities to new students. Special information search sessions are also offered to postgraduate students, lecturers and staffs from time to time. In these sessions, emphasis is given to the use of Pendeta Web PAC, CD-ROM and online database to search for reference materials in engineering and related fields.

Electronic Sources (online access via internet)

The UM Library subscribes to a number of online databases, including those related to engineering. Registered library users may access these databases via the UM Library website http://www.umlib.edu.my, in the 'online databases' section. The user is required to key in the 'user ID' before being allowed to access.

Catalogues in the online Engineering Library are a part of the online catalogue of the UM Library and may be accessed through the UM Library website http://www.pendetaumlib.um.edu.my.

Service Hours

Monday – Thursday	8.30 am – 5.30 pm
Friday	8.30 am – 12.30 noon
	2.45 pm – 5.30 pm

The library is closed on Saturday, Sunday and Public Holiday

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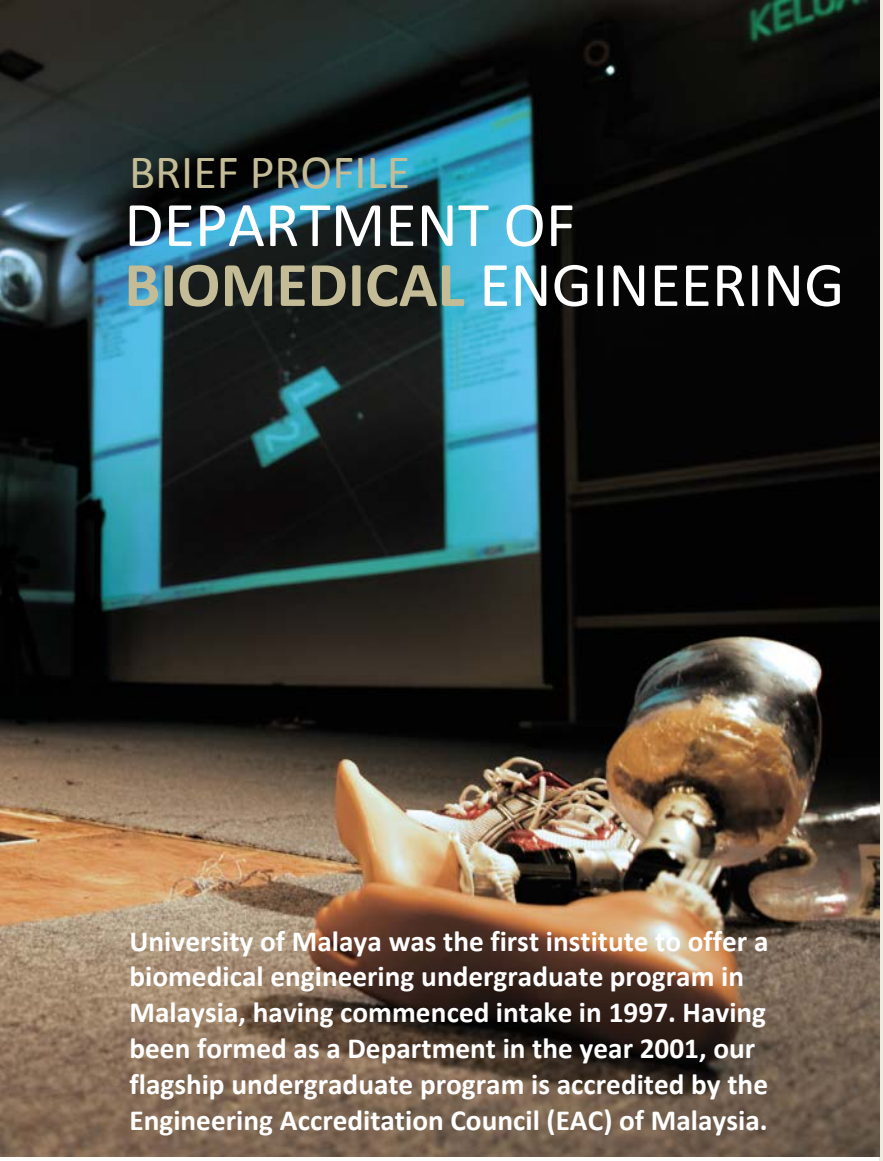


BRIEF PROFILE

DEPARTMENT OF BIOMEDICAL ENGINEERING

University of Malaya was the first institute to offer a biomedical engineering undergraduate program in Malaysia, having commenced intake in 1997. Having been formed as a Department in the year 2001, our flagship undergraduate program is accredited by the Engineering Accreditation Council (EAC) of Malaysia.

Our lectures are planned and delivered in conjunction with both University Malaya Medical Centre's expert staff and representatives from the local Biomedical Engineering industry in order to provide the very best in targeted transferable education.

There are many different taxonomic breakdowns within biomedical engineering such as bioinformatics, biomaterials, biomechanics, tissue engineering, neuroengineering and physiological measurements. The aim of the department is to produce professional engineers who are able to make technical decision in biomedical engineering field.

The department also established a research center and specialized research laboratory in 2008. Center for Applied Biomechanics (CAB) and Medical Informatics and Biological Microelectromechanical Systems (MIMEMS) Laboratory are formed to enhance research activities in this department.

BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS AND ORTHOTICS

In Malaysia, there are about 300,000 of disabled people due to various health and diseases problems. From this total, according to the World Health Organisation (WHO), the disabled are in needs of Prosthethics and Orthotics (P&O) equipments lies about 0.5% from the total people in a country. Therefore, there are a total of 125,000 of Malaysians are in needs for P&O services. The P&O services are available in local medical institutions such as Pusat Perubatan Universiti Malaya (PPUM), Hospital Kuala Lumpur (HKL), Hospital Universiti Kebangsaan Malaysia (HUKM), Pusat Latihan Perindustrian dan Pemulihan Orang Kurang Upaya (PLPP) dan Hospital Universiti Sains Malaysia (HUSM). There are also about 10 of private companies all over Malaysia that offer the P&O services to patients in needs.

Until to this day, there is none of structured educational program and being accredidated by the International Society for Prosthetics and Orthotics (ISPO), a international committee in monitoring and regulating services and trainings in the P&O that is recognized by the WHO. The P&O services in Malaysia are practiced by technicians that obtained short and brief trainings locally and oversea using the 'on-the-job training' approach.

The objective of Bachelor of Biomedical Engineering (Posthetics and Orthotics) programme is to produce experts in the professional levels along with possesing strong knowledge in the P&O fields with the required international standards and current national requirements. This programme will produce reponsible, inovative and proactive graduates in improving the quality of services to patients/clients within their respectively professional care. This programme will be able to improve the position of the current P&O officer to be a respectable individuals in the society with multidisciplinary expertises that are being practice in the rehabilitation medicine services. The Department of Biomedical Engineering of University of Malaya will play a major role as the catalyst to the development of the rehabilitation medicine engineering fields in Malaysia. This programme will be acredidated by the International ociety of Prosthetics and Orthotics (ISPO) and also the Engineering Accrediadation Council (EAC) of Malaysia.

INTRODUCTION OF OUTCOME-BASED EDUCATION (OBE)

Outcome-Based Education (OBE) had been implemented in the Faculty of Engineering since 2004, in accordance with the directives of the Ministry of Higher Education and the Board of Engineers, Malaysia (BEM). This is also one of the requirements for Malaysia to become a full member of the Washington Accord, an international agreement to mutually recognize Bachelor degrees in engineering. The implementation of OBE, as outlined below, is based on guidelines prescribed by the Engineering Accreditation Council (EAC) of Malaysia.

Unlike the traditional teacher-centred method, OBE is an educational approach that is more concerned about the outcome (what students can do) rather than the process (what instructors did). This is believed to enhance learning, and hence produce better graduates. For OBE to be successful, it is critical to prescribe the expected outcomes, to measure them objectively, and to take corrective actions where required.

The outcomes are prescribed at two levels:

(a) Course Outcomes (CO) --- what students should be able to perform at the end of each course
(b) Programme outcomes (PO) --- a composite set of abilities after students finished all courses

All COs will contribute to some of the POs. This is to ensure that upon completion of the courses, all POs are sufficiently covered.

Programme Educational Objectives (Peo)

The PEO is a set of objectives that the academic programme aspires that the graduates would achieve in their career and professional life a few years after graduation.

To guide the formation and fine-tuning of these outcomes, the Department has formulated the Programme Educational Objectives (PEO). These are aspirations for graduates to attain 3 to 5 years upon graduation. The POs are designed to produce graduates who are well-prepared to achieve these PEOs.

The PEOs and POs had been formulated in consultation with all major stakeholders (employers, alumni and students), to meet the demands of a challenging and globalized workplace. Any material changes will also require their views.

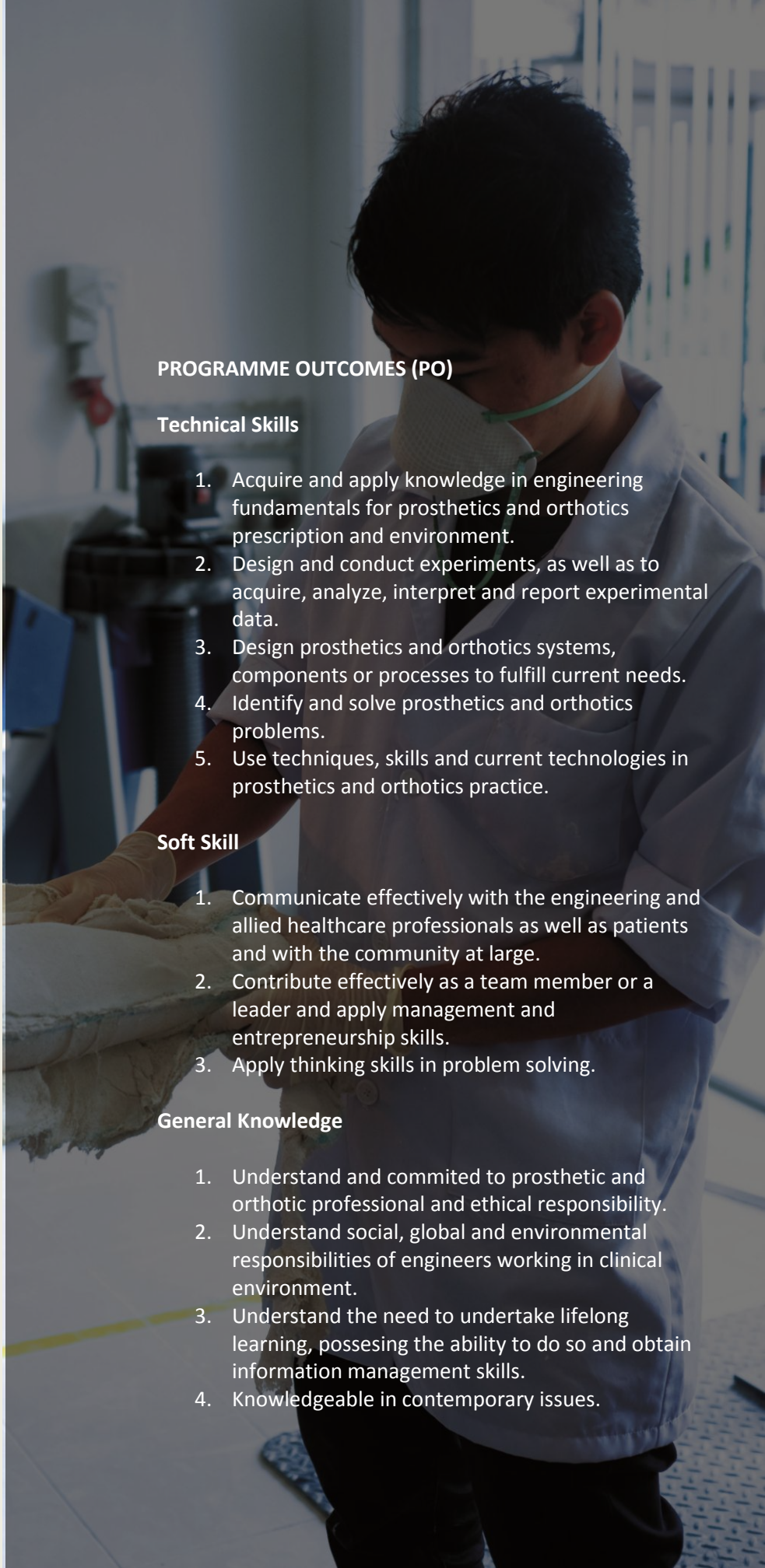
A critical component of OBE is the objective measurement of the outcomes. This is done via multiple channels and methods. At the course level, there is formative assessment via discussion, assignment, quizzes *etc.*, in addition to the summative assessment in the final examination. Students also have the opportunity to provide feedback through course evaluation, meetings with their academic advisors, annual surveys, and student-lecturer meetings. Opinions and feedback from external parties, *e.g.* employers, alumni, Industrial Advisory Panel, are also routinely sought to further calibrate the outcome measurements.

Based on the input and trends received, the Department will take the necessary corrective actions, and the results monitored. In short, OBE is a dynamic, student-centred educational process which incorporates continuous improvement.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1 To produce professional experts having knowledge in engineering design with skills, innovation, and cooperation-minded in prosthetics and orthotics practice complying with international standards.

PEO 2 To produce professional experts who are dedicated towards a sustainable development in the



PROGRAMME OUTCOMES (PO)

Technical Skills

1. Acquire and apply knowledge in engineering fundamentals for prosthetics and orthotics prescription and environment.
2. Design and conduct experiments, as well as to acquire, analyze, interpret and report experimental data.
3. Design prosthetics and orthotics systems, components or processes to fulfill current needs.
4. Identify and solve prosthetics and orthotics problems.
5. Use techniques, skills and current technologies in prosthetics and orthotics practice.

Soft Skill

1. Communicate effectively with the engineering and allied healthcare professionals as well as patients and with the community at large.
2. Contribute effectively as a team member or a leader and apply management and entrepreneurship skills.
3. Apply thinking skills in problem solving.

General Knowledge

1. Understand and commited to prosthetic and orthotic professional and ethical responsibility.
2. Understand social, global and environmental responsibilities of engineers working in clinical environment.
3. Understand the need to undertake lifelong learning, possesing the ability to do so and obtain information management skills.
4. Knowledgeable in contemporary issues.

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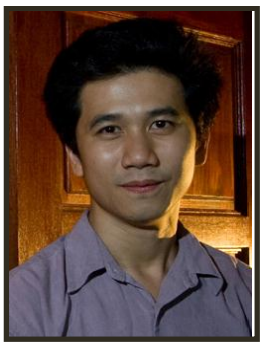

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CURRICULUM STRUCTURE SESSION 2012/2013

DEGREE IN BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS)

COURSES	CONTENT	CREDIT HOURS
UNIVERSITY COURSES (15%)	Information Skills Islamic and Asian Civilizations (TITAS)* Ethnic Relation* / Introduction to Malaysia** Basic of Entrepreneurship Culture Thinking and Communication Skills English Communication Programme Co-Curriculum Elective Course (outside faculty)	1 2 2 2 3 6 2 2*/ 4**
	Sub-Total Credit Hours	20
FACULTY COURSES (85%)	Faculty Core Courses Department Compulsory Courses Department Elective Courses	17 93 8
	Sub-Total Credit Hours	118
	Total Credit Hours	138

Note:

* For Malaysian Students

** For International Students

ACADEMIC PLANNER FOR BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS) PROGRAMME
ACADEMIC SESSION 2012/2013

YEAR 1						
CODE	**COURSE**	**S1**	**S2**	**SS**	**TOTAL**	**PRE-REQUISITE**
UNIVERSITY COURSES						
GXEX1414	Islamic and Asian Civilizations (TITAS)*		2			
	Elective Courses (other faculty)**					
GTEE1xxx	English Communication Programme 1		3			
KXEX2163	Thinking and Communication Skills		3			
	Sub-total	**0**	**8**	**0**	**8**	
FACULTY COURSES						
KXEX1110	Foundation of Materials Science	3				
KXEX1144	Basic Engineering Calculus	2				
KXEX1145	Basic Engineering Algebra		2			
	Sub-total	**5**	**2**	**0**	**7**	
DEPARTMENTAL COURSES						
KUEP1131	Statics	2				
KUEP1132	Thermofluids	2				
KUEP1133	Human Systems Anatomy 1	2				
KUEP1134	Human Systems Physiology 1	2				
KUEP1135	Introduction to Computer Systems	2				
KUEP1171	Laboratory 1	1				
KUEP1136	General Health Education		2			
KUEP1137	Human Systems Anatomy 2		2			
KUEP1138	Human Systems Physiology 2		2			
KUEP1139	Dynamics		2			
KUEP1140	Biomechanics 1		2			
KUEP1172	Laboratory 2		1			
	Sub-total	**11**	**11**	**0**	**22**	
	Total	**16**	**21**	**0**	**37**	

YEAR 2						
CODE	**COURSE**	**S1**	**S2**	**SS**	**TOTAL**	**PRE-REQUISITE**
UNIVERSITY COURSES						
GXEX1401	Information skills		1			
GTEE1xxx	English Communication Programme 2	3				
GXEX1412	Basic of Entrepreneurship Culture		2			
	Sub-total	**3**	**3**	**0**	**6**	
FACULTY COURSES						
KXEX2244	Ordinary Differential Equations		2			KXEX1144
KXEX2245	Vector Analysis	2				KXEX1144, KXEX1145
	Sub-total	**2**	**2**	**0**	**4**	
DEPARTMENTAL COURSES						
KUEP2130	Mechanics of Material	2				
KUEP2131	Electrotechnology I: Electrical Circuit Analysis	3				
KUEP2132	Workshop Technology	2				
KUEP2133	Computer-Aided Drawing	2				
KUEP2134	Biomechanics of Human Motion	2				
KUEP2135	Human System III(Pathology/Microbiology/ Biomolecular Medicine)	2				
KUEP2136	Clinical Study I	2				
KUEP2173	Laboratory 3	1				
KUEP2137	Basic Prosthetic & Orthotic		3			
KUEP2143	Material Technology		2			
KUEP2139	Electrotechnology II: Electronics		3			

ACADEMIC PLANNER FOR BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS) PROGRAMME
ACADEMIC SESSION 2012/2013

YEAR 2						
CODE	**COURSE**	**S1**	**S2**	**SS**	**TOTAL**	**PRE-REQUISITE**
DEPARTMENTAL COURSES						
KUEP2140	Biostatistics		2			
KUEP2141	Workshop Technology II		2			
KUEP2142	Clinical Study II		2			
KUEP2174	Laboratory 4		1			
	Sub-total	**16**	**15**	**0**	**31**	
	Total	**21**	**20**	**0**	**41**	

YEAR 3						
CODE	**COURSE**	**S1**	**S2**	**SS**	**TOTAL**	**PRE-REQUISITE**
UNIVERSITY COURSES						
GXEX1411	Ethnic Relations*	2				
GXEX1413	Introduction to Malaysia**					
	Sub-total	**2**	**0**	**0**	**2**	
FACULTY COURSES						
KXEX2166	Law and Engineer	2				
KXEX2162	Economy, Finance & Engineer	2				
KXEX2165	Moral and Ethics in Engineering Profession	2				
	Sub-total	**6**	**0**	**0**	**6**	
DEPARTMENTAL COURSES						
KUEP3130	Biomechanics in Orthotic	3				
KUEP3131	Biomechanics in Prosthetic	3				
KUEP3132	Clinical Study III	2				
KUEP3133	Rehabilitation Medicine	3				
KUEP3134	Clinical Practice I	2				
KUEP3180	Clinical Prosthetics and Orthotics		6	6		
KUEP433X	Departmental Elective 1		2			
KUEP4130	Humanistic Sciences			3		
	Sub-total	**13**	**8**	**9**	**30**	
	Total	**21**	**8**	**9**	**38**	

YEAR 4						
CODE	**COURSE**	**S1**	**S2**	**SS**	**TOTAL**	**PRE-REQUISITE**
UNIVERSITY COURSES						
	Elective Courses (other faculty)		2			
	Co-Curriculum		2			
	Sub-total	**0**	**4**	**0**	**4**	
DEPARTMENTAL COURSES						
KUEP3192	Industrial Training	6				
KUEP428x	Graduation Project		6			
KUEP433x	Departmental Elective 2		2			
KUEP433x	Departmental Elective 3		2			
KUEP433x	Departmental Elective 4		2			
	Sub-total	**6**	**12**	**0**	**18**	
	Total	**6**	**16**	**0**	**22**	
TOTAL CREDIT HOURS					**138**	

Note:

* Only applicable to local students

** Only applicable to international students

GRADUATION REQUIREMENT CHART
BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS) PROGRAMME
INTAKE SESSION 2012/2013

CODE	COURSE	CREDIT	PASSING GRADE
UNIVERSITY COURSES			
GXEX1401	Information skills	1	S
GXEX1414	Islamic and Asian Civilizations	2	C
GXEX1411/ GXEX1413	Ethnic Relations/ Introduction to Malaysia	2	C
GTEE11xx	English Communication Programme I	3	C
GTEE11xx	English Communication Programme II	3	C
	Co-curriculum	2	S
KXEX2163	Thinking and Communication Skills	3	C
GXEX1412	Basic of Entrepreneurship Culture	2	C
	Elective Courses (Other Faculty)	2	C
	Sub-total Credit Hours	**20**	
FACULTY COURSES			
KXEX1110	Foundation of Materials Science	3	C
KXEX1144	Basic Engineering Calculus	2	C
KXEX1145	Basic Engineering Algebra	2	C
KXEX2244	Ordinary Differential Equations	2	C
KXEX2245	Vector Analysis	2	C
KXEX2166	Law and Engineer	2	C
KXEX2162	Economy, Finance & Engineer	2	C
KXEX2165	Moral and Ethics in Engineering Profession	2	C
	Sub-total Credit Hours	**17**	

MARKING SCHEME

Marks	Grade	Grade Points
80 – 100	A	4.0
75 – 79	A-	3.7
70 – 74	B+	3.3
65 – 69	B	3.0
60 – 64	B-	2.7
55 – 59	C+	2.3
50 – 54	C	2.0
45 – 49	C-	1.7
40 – 44	D+	1.5
35 – 39	D	1.0
< 35	F	0.0

Grade	Remarks
U	Unsatisfactory / Fail
S	Satisfactory / Pass
P	Progressive

GRADUATION REQUIREMENT CHART
BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS) PROGRAMME
INTAKE SESSION 2012/2013

CODE	COURSE	CREDIT	PASSING GRADE
DEPARTMENTAL COURSES			
KUEP 1131	Statics	2	C
KUEP 1132	Thermofluids	2	C
KUEP 1133	Human Systems Anatomy 1	2	C
KUEP 1134	Human Systems Physiology 1	2	C
KUEP 1135	Introduction to Computer Systems	2	C
KUEP 1171	Laboratory 1	1	C
KUEP 1136	General Health Education	2	C
KUEP 1137	Human Systems Anatomy 2	2	C
KUEP 1138	Human Systems Physiology 2	2	C
KUEP 1139	Dynamics	2	C
KUEP 1140	Biomechanics 1	2	C
KUEP 1172	Laboratory 2	1	C
KUEP 2130	Mechanics of Material	2	C
KUEP 2131	Electrotechnology I – Electrical Circuit Analysis	3	C
KUEP 2132	Workshop Technology	2	C
KUEP 2133	Computer-Aided Drawing	2	C
KUEP 2134	Biomechanics of Human Motion	2	C
KUEP 2135	Human System III(Pathology/Microbiology/ Biomolecular Medicine)	2	C
KUEP 2136	Clinical Study I	2	C
KUEP 2173	Laboratory 3	1	C
KUEP 2137	Basic Prosthetic & Orthotic	3	C
KUEP 2143	Material Technology	2	C
KUEP 2139	Electrotechnology II: Electronics	3	C
KUEP 2140	Biostatistics	2	C
KUEP 2141	Workshop Technology II	2	C
KUEP 2142	Clinical Study II	2	C
KUEP 2174	Laboratory 4	1	C
KUEP 3130	Biomechanics in Orthotic	3	C
KUEP 3131	Biomechanics in Prosthetic	3	C
KUEP 3132	Clinical Study III	2	C
KUEP 3133	Rehabilitation Medicine	3	C
KUEP 3134	Clinical Practice I	2	C
KUEP 3192	Industrial Training	6	S
KUEP 3180	Clinical Prosthetics & Orthotics	12	C
KUEP 4130	Humanistic Science	3	C
KUEP 428x	Graduation Project	6	C
KUEP 433x	Departmental Elective 1	2	C
KUEP 433x	Departmental Elective 2	2	C
KUEP 433x	Departmental Elective 3	2	C
KUEP 433x	Departmental Elective 4	2	C
	Sub-total Credits	**101**	
TOTAL CREDITS		**138**	

MARKING SCHEME

Marks	Grade	Grade Points
80 – 100	A	4.0
75 – 79	A-	3.7
70 – 74	B+	3.3
65 – 69	B	3.0
60 – 64	B-	2.7
55 – 59	C+	2.3
50 – 54	C	2.0
45 – 49	C-	1.7
40 – 44	D+	1.5
35 – 39	D	1.0
< 35	F	0.0

Grade	Remarks
U	Unsatisfactory / Fail
S	Satisfactory / Pass
P	Progressive

FACULTY OF ENGINEERING

COURSE PRO-FORMA

UNIVERSITY COURSES

Course Pro-forma

University Course

Code	GTEE1105
Title	Communication in English I
Pre-requisite	MUET Band 1
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Speak accurately at the pre-elementary level 2. Apply grammar correctly at the pre-elementary level 3. Use words at 250 headword level
Synopsis	This course is designed for students with a low proficiency in English. It aims to provide basic communication skills to students, with an emphasis on vocabulary building and accuracy in grammar at the pre-elementary level.
Assessment	70 % Continuous Assessments 30 % Final Examination
References	1. Milner, M. (2010). World English Intro, USA: Heinle, Cengage Learning. 2. Hornby, A.S.(ed) (2005). Oxford Advanced Learners' Dictionary of Current English. Oxford, UK: Oxford University Press. 3. Elbaum, S.N. (2010).Grammar in Context. 5th Edition. USA: Heinle, Cengage Learning. 4. www.vocabulary.com 5. www.dictionary.cambridge.org
Soft Skills	Communication Skills (CS1, CS2) Teamwork Skills (TS1)

Course Pro-forma

University Course

Code	GTEE1107
Title	Communication in English III
Pre-requisite	MUET Band 2
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Speak accurately and fluently at post- elementary level 2. Apply grammar correctly at post-elementary level 3. Write a coherent and cohesive paragraph 4. Use words at 750 headword level
Synopsis	This course is designed for students with an elementary proficiency in English. It provides basic communication skills to students with an emphasis on vocabulary building and accuracy in grammar at the post-elementary level. The course enables students to speak and write moderately well.
Assessment	70 % Continuous Assessments 30 % Final Examination
References	1. Johannsen, K. L., & Chase, R.C. (2010). World English 2, USA: Heinle, Cengage Learning. 2. Hornby, A.S.(ed) (2005). Oxford Advanced Learners' Dictionary of Current English. Oxford, UK: Oxford University Press. 3. Elbaum, S.N. (2010).Grammar in Context. 5th Edition. USA: Heinle, Cengage Learning. 4. www.vocabulary.com 5. www.dictionary.cambridge.org
Soft Skills	Communication Skills (CS1, CS2, CS3) Teamwork Skills (TS1)

Course Pro-forma

University Course

Code	GTEE1109
Title	Speaking Skills in English
Pre-requisite	MUET Band 3
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Express ideas clearly using appropriate communication strategies 2. Converse effectively using appropriate communication strategies 3. Discuss topics of current interest in informal settings
Synopsis	This course focuses on various speaking skills in English. It develops students communication skills and strategies that enable them to interact appropriately on topics of current interest. Students will learn to speak fluently in a variety of informal situations.
Assessment	100 % Continuous Assessments
References	1. Liu, J., Davis,T., Rizzo S.(2008). Communication Strategies 3. Singapore:Cengage Learning. 2. Hornby, A.S.(ed) (2005). Oxford Advanced Learners' Dictionary of Current English. Oxford, UK: Oxford University Press. 3. Web English. www.brody.iif.hu/webenglish/Pages/mg_speaking.html 4. Windle, R. , Warren,S. Communication Skills.www.directionservice.org/cadre/section4.cfm 5. www.dictionary.cambridge.org
Soft Skills	Communication Skills (CS1, CS2, CS3) Teamwork Skills (TS1)

Course Pro-forma

University Course

Code	GTEE1110
Title	Writing Skills in English
Pre-requisite	MUET Band 3
Student Learning Time (SLT)	122 hours
Credit	3
Learning Outcomes	1. Express ideas clearly, appropriately and effectively through the written mode 2. Develop different types of paragraphs coherently and cohesively 3. Write different types of essays.
Synopsis	This course introduces the process of paragraph development and the generation of ideas in order to write within a variety of rhetorical patterns. It does this by focusing on the elements of good sentences within the context of a paragraph, the active use of a wide range of vocabulary as well as the elements of a good paragraph. The course helps students to understand the relationship between paragraphs in an essay, to edit their work and to produce different types of essays.
Assessment	100 % Continuous Assessments
References	1. Folse, K S, Solomon E V, Clabeaux D. (2010). Great Writing 3,2nd Edition, USA: Heinle Cengage Learning. 2. Sinclair, J (Ed), (2009).Collins COBUILD Advanced Dictionary. USA: Heinle Cengage Learning. 3. Elbaum, S.N. (2010).Grammar in Context. 5th Edition. USA: Heinle, Cengage Learning. 4. www.vocabulary.com 5. www.dictionary.cambridge.org
Soft Skills	Communication Skills (CS1, CS2, CS3) Teamwork Skills (TS1)

Course Pro-forma

University Course

Code	GTEE1111
Title	Presentation Skills at the Work Place
Pre-requisite	MUET Band 4
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Employ appropriate interviewing techniques when collecting information 2. Write speech outlines for presentations 3. Apply appropriate presentation skills and strategies when delivering impromptu speeches to a selected audience 4. Apply appropriate presentation skills and strategies when delivering prepared speeches to a selected audience
Synopsis	The course encompasses different aspects of communication used in delivering effective impromptu speeches, oral presentations and conducting interviews for presentations. Appropriate examples from a variety of situations are used as practice materials for students to analyse, discuss and apply the communication strategies taught.
Assessment	100 % Continuous Assessments
References	1. Dale, P. & Wolf, J.C. (2006). Speech Communication Made Simple (3rd Edition). White Plains, NY: Pearson Education. 2. Comfort, J. (1995). Effective Presentations. Great Clarendon Street, Oxford: Oxford University Press. 3. Jaffe, C.(2010). Public Speaking: Concepts and Skills for a Diverse Society. Boston,MA: Wadsworth Cengage Learning. 4. Lucas, S. (2008).The Art of Public Speaking with Connect Lucas.New York,NY: McGraw-Hill. 5. Articles and videos on Oral Presentations. http://www.ehow.com/about_6324248_definition-_oral-presentation_.html
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical Thinking and Problem Solving Skills (CT1, CT2) Long Life Learning and Information Management (LL1)

Course Pro-forma

University Course

Code	GTEE1112
Title	Introduction to Critical Reading in English
Pre-requisite	MUET Band 4
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Identify an authors purpose, assertions and assumptions 2. Comprehend ideas based on evidence 3. Analyze ideas from multiple sources and perspectives
Synopsis	This course aims at developing the critical reading fluency of students towards meeting their academic needs. Students will engage with reading selections which are complemented with exercises and activities. Some of the skills that will be taught include interrogating texts to understand the stance of the author, the relationships between ideas in the texts, and the supporting evidence.
Assessment	100 % Continuous Assessments
References	1. Benz, Cheryl & Cynthia M. Shuemann (2006). College Reading 4: English for Academic Success. Boston: Heinle. 2. The Cambridge Dictionary of English (1995). Cambridge University Press 3. Fleming, L. (2012). Reading for Thinking. 7th ed. Australia: Wadsworth 4. Mather, P. & McCarthy, R. (2009).The Art of Critical Reading. 2nd ed.Boston, MA: McGraw-Hill. 5. Metcalf, M. (2006). Reading Critically at University. London: Sage Publications.
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical Thinking and Problem Solving Skills (CT1, CT2) Team Work Skills (TS1) Long Life Learning and Information Management (LL1)

Course Pro-forma

University Course

Code	GTEE1113
Title	Technical Writing
Pre-requisite	MUET Band 4
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Determine audiences and purposes for written documents 2. Formulate appropriate messages for brief correspondence 3. Write informative reports 4. Produce a problem-solution report
Synopsis	This course will introduce students to the importance of good technical writing skills. Using materials related to their field, students will be taught in stages to write a variety of technical documents. Technical writing mechanisms will also be taught.
Assessment	100 % Continuous Assessments
References	1. Smith-Worthington, D. & Jefferson, S. (2011). 3rd Edition Technical Writing for Success. USA: South Western Cengage Learning. 2. Sargunan, R.A. et al. (2010) Report Writing for Business and Professional Purposes: An Introduction. 2nd Edition. 3. Hornby, A.S.(ed) (2005). Oxford Advanced Learners Dictionary of Current English. Oxford, UK: Oxford University Press. 4. www.dictionary.cambridge.org 5. www.apastyle.org/
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical Thinking and Problem Solving Skills (CT1, CT2) Team Work Skills (TS1, TS2) Long Life Learning and Information Management (LL1)

Course Pro-forma

University Course

Code	GTEE1205
Title	Communication in English II
Pre-requisite	Passed GTEE 1105
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Speak accurately and grammatically at the elementary level 2. Construct grammatical sentences appropriate to an idea 3. Use words at 500-headword level
Synopsis	This course is designed for students with pre-elementary proficiency in English. It aims to provide basic communication skills to students, with an emphasis on vocabulary building and accuracy in grammar as well as producing correct sentences at the elementary level.
Assessment	70 % Continuous Assessments 30 % Final Examination
References	1. Milner, M. (2010). World English 1, USA: Heinle,Cengage Learning. 2. Hornby, A.S.(ed) (2005). Oxford Advanced Learners' Dictionary of Current English. Oxford, UK: Oxford University Press. 3. Elbaum, S.N. (2010).Grammar in Context. 5th Edition. USA: Heinle,Cengage Learning. 4. www.vocabulary.com 5. www.dictionary.cambridge.org
Soft Skills	Communication Skills (CS1, CS2) Team Work Skills (TS1)

Course Pro-forma

University Course

Code	GTEE1207
Title	GTEE1207
Pre-requisite	Passed GTEE1107
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Speak accurately, fluently and appropriately at pre-intermediate level 2. Apply grammar correctly at pre- intermediate level 3. Write different types of coherent and cohesive paragraphs 4. Use words at 1200 headword level
Synopsis	This course is designed for students with a post-elementary proficiency in English. It provides basic communication skills to students with an emphasis on vocabulary building and accuracy in grammar at the pre-intermediate level. The course enables students to speak and to write different types of paragraphs fairly well.
Assessment	70 % Continuous Assessments 30 % Final Examination
References	1. Chase, R. T., & Johannsen, K.L. (2010).World English 3. USA: Heinle, Cengage Learning. 2. Hornby, A.S.(ed) (2005). Oxford Advanced Learners' Dictionary of Current English. Oxford, UK: Oxford University Press. 3. Elbaum, S.N. (2010).Grammar in Context. 5th Edition. USA: Heinle, Cengage Learning. 4. www.vocabulary.com 5. www.dictionary.cambridge.org
Soft Skills	Communication Skills (CS1, CS2, CS3) Team Work Skills (TS1)

Course Pro-forma

University Course

Code	GXEX1401
Title	Information Skills Course
Pre-requisite	None
Student Learning Time (SLT)	40 hours
Credit	1
Learning Outcomes	1. State the various information and reference sources 2. Identify information from various sources such as OPAC (Online Public Access Catalogue), Online Databases and Internet 3. Prepare list of references based on the APA (American Psychological Association) / Vancouver / CSLW (Citation Style for Legal Works) citation style
Synopsis	This course focus on the use of basic references sources in print and electronic format, effective information search strategy, information evaluation and preparing reference list.
Assessment	50 % Continuous Assessments 50 % Final Examination
References	1. Gash, S. (1998). Effective literature searching for studies. Aldershot: Gowers. 2. Gates. J. K. (1994). Guide to the use of libraries and information sources (7th ed.).New York: McGraw Hills 3. Irma Indayu Omar, & Yushiana Mansor. (2005). Panduan mencari maklumat. Pahang: PTS Professional. 4. E-Learning website (http://adec.um.edu.my/main)
Soft Skills	Life Long Learning and Information Management (LL1, LL2, LL3) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3)

Course Pro-forma

University Course

Code	GXEX1411
Title	Hubungan Etnik
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Menerangkan konsep asas dan teori hubungan etnik. 2. Mengaplikasi ilmu, konsep dan prinsip interaksi sosial dan integrasi nasional. 3. Memaparkan kelakuan yang beretika dan sikap bertanggungjawab terhadap masyarakat. 4. Menunjuk cara kemahiran interpersonal yang berkesan dan bekerja secara berkumpulan.
Synopsis	Kursus ini akan memperkenalkan konsep asas dan teori hubungan etnik. Pelajar juga akan didedahkan dengan sejarah pluraliti masyarakat Alam Melayu dan masyarakat Malaysia kontemporari. Selain itu, topik-topik tentang perlembagaan, perkembangan ekonomi, politik dan Islam Hadhari dalam konteks hubungan etnik juga akan diperjelaskan. Sehubungan itu perbincangan tentang cabaran terhadap hubungan etnik di Malaysia dan global juga perlu bagi membentuk masyarakat berintegrasi.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	Modul Hubungan Etnik, Shamsul Amri Baharuddin (Ed.). Kuala Lumpur: UPENA, 2007. (Modul yang ditetapkan oleh KPT)
Soft Skills	Communication Skills (CS1, CS2, CS3) Team Work Skills (TS1) Life Long Learning and Information Management (LL1, LL2) Professional Ethics and Moral (EM1)

Course Pro-forma

University Course

Code	GXEX1412
Title	Basic Entrepreneurship Culture
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explain the concepts of entrepreneurship and its importance. 2. Explain the meaning of entrepreneurial ethics. 3. Evaluate entrepreneurial spirit in themselves. 4. Apply creativity and innovation in entrepreneurship. 5. Develop a concrete business plan.
Synopsis	This course will attempt to inculcate the basic elements of entrepreneurship in the students. Initiatives are taken to open their minds and motivate the entrepreneurial spirit in this potential target group. The course encompasses concepts and development of entrepreneurship, analysis of entrepreneurship competency, ethics of entrepreneurship, creativity and innovation in entrepreneurship, business opportunity, ability to start a business, developing business plans, skills to run and manage a business. The course also incorporates a practical application of skills acquired through joint or individual setting up and running of business stalls to inculcate interest in the entrepreneurial spirit, provide meaningfull experience and expose students to a semblance of the business world.
Assessment	70 % Continuous Assessments 30 % Final Examination
References	1. Ab. Aziz Yusof, Prinsip Keusahawanan, 2003, Malaysia : Pearson Malaysia Sdn. Bhd. 2. Hisrich, R.D., Peters, M.P. & Shepherd, D.A, 2005, Entrepreneurship, 6th. Edition, Singapore : McGraw Hill. 3. Kuratko, D.F. & Hodgetts, R.M. 2007, Entrepreneurships theory, process, practice, 7th. Edition, Canada : Thomson South-Western. 4. Lambing, P.A. & Kuehl, C.R. 2007, Entrepreneurship, 4th. Edition, New Jersey : Pearson Education, Inc. 5. Rosli Mahmood & rakan-rakan, Prinsip-prinsip Asas Keusahawanan, 2007, Malaysia : Thomson.
Soft Skills	Communication Skills (CS1, CS2, CS3) Team Work Skills (TS1) Life Long Learning and Information Management (LL1, LL2) Entrepreneneurial Skills (KK1, KK2)

Course Pro-forma

University Course

Code	GXEX1413
Title	Introduction to Malaysia
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explain history, administrative structure and Constitution of Malaysia. 2. Explain places, races, way of life, values and culture of Malaysians 3. Demonstrate effective interpersonal skills and teamwork.
Synopsis	This course will explain the history and formation of Malaysia. It will also discuss the national administrative structure and system of Malaysia, the Malaysian Constitution, culture, values, ethnic orientation, national integration, unity and guidelines on social interactions with Malaysians.
Assessment	50 % Continuous Assessments 50 % Final Examination
References	1. Multicultural Malaysia: Delights, puzzles & irritations, Kuala Lumpur: Prentice Hall Pearson Malaysia Sdn. Bhd. 2. Cheah Boon Kheng. (2002), Malaysia: The Making of a Nation, Singapore: Institute of Southeast Asian Studies. 3. Kahn, J. And Loh Kok Wah (eds). (1993), Fragmented Vision: Culture and Politics in Contemporary Malaysia, Sydney: Allen and Unwin.
Soft Skills	Communication Skills (CS1, CS2, CS3) Team Work Skills (TS1)

Course Pro-forma

University Course

Code	GXEX1414
Title	Islamic and Asian Civilisation (TITAS)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explain the meaning of civilisation. 2. Identify the concepts, principles, history, society, culture, and achievements in islamic, malay, chinese and indian civilisations. 3. Relate to current and future issues on civilisational dialogue. 4. Demonstrate effective interpersonal skills and teamwork.
Synopsis	This course will discuss knowledge of civilisations incorporating such topics as introduction to civilisational knowledge, concepts, values, history, society, culture and the achievements of Islamic, Chinese, and Indian civilisations. The course also discusses contemporary and future issues on civilisational dialogue.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Penerbit UM. 2001. Tamadun Islam dan Tamadun Asia, Kuala Lumpur: Penerbit Universiti Malaya. 2. Penerbit UM. 2006. Tamadun Islam dan Tamadun Melayu, Kuala Lumpur: Penerbit Universiti Malaya. 3. Huntington, Samuel. 1996. The Clash of Civilizations and the Remaking of World Order. New York: Simon and Schuster. 4. Ibn Khaldun. 1995. Mukaddimah (terj), Kuala Lumpur: Dewan Bahasa dan Pustaka 5. Azizan Baharuddin. 2005. Islam dan Dialog Peradaban: Satu Perspektif. Kuala Lumpur: Pusat Dialog Peradaban Universiti Malaya.
Soft Skills	Communication Skills (CS1, CS2, CS3) Team Work Skills (TS1)

Course Pro-forma

University Course

Code	KXEX2163
Title	Thinking and Communication Skills
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Recognize the ways words and phrases are used to convey a message. 2. Recognize the method of thinking critically 3. Use different thinking methods to solve a problem 4. Present ideas convincingly and work in group 5. Point out the importance of knowledge in contemporary issues
Synopsis	Introduction: Objective, procedure, evaluation, explanation regarding thinking and communication skills. Explain and analyze ideas. Oral communication. Analyze and evaluate arguments. Listening skills. Determining source credibility. Non-verbal communication. Recognizing persuasive language. Listening skills. Recognizing fallacy. Interpersonal communication. Group interaction skills. Barriers in communication. Problem solving & decision making. Applying communication skills.
Assessment	100 % Continuous Assessments
References	1. Fisher, A (2001) Critical Thinking: An Introduction, Cambridge: Cambridge University Press 2. Lumsdaine, E & Lumsdaine, M (1995), Creative Problem Solving: Thinking Skills for a Changing World, New York: McGraw-Hill, Inc 3. Taylor, Shirley (2002) Essential Communication Skills, New York: Longman
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4, CS5, CS6, CS7, CS8) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3, CT4) Team Work Skills (TS1, TS2) Continuous learning and Information Management (LL1, LL2) Ethics and Professional Moral (EM1) Leadership Skills (LS1)

FACULTY OF ENGINEERING

COURSE PRO-FORMA

FACULTY COURSES

Course Pro-forma

Faculty Course

Code	KXEX1110
Title	Fundamentals of Material Science
Pre-requisite	None
Student Learning Time (SLT)	122 hours
Credit	3
Learning Outcomes	1. Explain the theory of basic atomic structure and the imperfection. 2. Describe the phase diagram, materials characteristic and mechanical testing 3. Discuss the characteristic, processing and application of polymer, ceramic and composite 4. Give example of some electrical and magnetic properties of materials
Synopsis	Introduction to Materials science and engineering, atomic structure and atomic bonding. Crystal structure and imperfection. Steel characteristic and processing, phase diagram and engineering alloy. Characteristic. Processing and application of polymer, ceramic and composite
Assessment	40 % Continuous Assessments 60 % Final Examination
References	Foundation of Materials Science and Engineering, William F. Smith, Javad Hashemi, McGraw Hill. 2005
Soft Skills	Communication Skills (CS1, CS2) Critical Thinking and Problem Solving Skills (CT1) Teamwork Skills (TS1, TS2) Life Long Learning and Information Management (LL1, LL2)

Course Pro-forma

Faculty Course

Code	KXEX1144
Title	Basic Engineering Calculus
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe elementary special functions (e.g. exponential, log, and trigonometric functions) which arise in engineering. 2. Practice the skills obtained from differential and integral calculus to deal with models in engineering 3. Use the basic calculus concepts and apply knowledge gained in subsequent engineering courses or others
Synopsis	Functions. Trigonometric and hyperbolic functions, exponential functions, logarithmic functions. Concept domain and range of function, graphs of function, Inverse functions, combining functions, composite functions, rational functions and partial functions. Limit continuity and differentiation. Concept of limit. Continuity and types of discontinuity. Derivative of trigonometric and hyperbolic functions. Increasing and decreasing functions. Implicit differentiation and the chain rule. Higher
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Modern Engineering Mathematics, (4th edition), Glyn James (Edison-Wesley), 2007 2. Engineering Mathematics, (5th edition), K. A. Stroud and D.J. Booth (Palgrave), 2007 3. Further Engineering Mathematics, (3rd edition), K. A. Stroud (MacMillan) 1992
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3) Teamwork Skills (TS1, TS2) Life Long Learning and Information Management (LL1, LL2)

Course Pro-forma

Faculty Course

Code	KXEX1145
Title	Basic Engineering Algebra
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Use DeMoivre Theorem and Euler Formula to determine the power and roots of complex numbers. 2. Explain the concepts of matrices, determinants, ranks,eigenvalues and eigenvectors. 3. Solve systems of linear equations and diagonalize square matrices. 4. Use the dot product, cross product and triple products of vectors to determine the parametric equations and vector equations of lines and planes.
Synopsis	Complex numbers: Addition, substraction, multiplication and division. Complex numbers in polar form. Complex numbers in exponent form. DeMoivre Theorem. Power and roots of complex number. Euler Formula. Matrices: Diagonal, symmetric, skew symmetric, orthogonal, Hermitian, skew Hermitian and unit matrix. Transpose. Determinant. Minor, cofactor and adjoint. Singular and non-singular matrices. Inverse of matrix. Linearly dependent and linearly independent vectors. Rank of a matrix. Homogenous and non-homogenous system of linear equations. Existence of solutions and their properties. Gaussian Elimination method. Cramers Rule. Eigenvalues and eigenvectors. Diagonalization. Cayley-Hamilton Theorem. Vector Algebra: Cartesian Vector in two and three dimension systems. Dot and cross product. Parametric Equations and Vector Equations of lines. Skew Lines. Equations of planes. Distance between a point and a plane. Distance between two planes. Angle between two intersecting lines an
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Modern Engineering Mathematics, (4th edition), Glyn James (Edison-Wesley), 2007 2. Theory and Problems of Vector Analysis, (2nd edition), Murray R. Spiegel (Schaum's series) 2008 3. Engineering Mathematics, (5th edition), K. A. Stroud and D.J. Booth (Palgrave), 2007 4. Further Engineering Mathematics, (3rd edition), K. A. Stroud (MacMillan)) 1992
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3) Teamwork Skills (TS1, TS2) Life Long Learning and Information Management (LL1, LL2)

Course Pro-forma

Faculty Course

Code	KXEX2162
Title	Economics, Finance and Engineers
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. recognize key ideas in economic analysis that address the economic problem of how to allocate scarce resources among unlimited wants. 2. to conceptualize the principles of demand and supply as well as the analysis of competitive markets 3. to satisfy the very practical needs of the engineer toward making informed financial decisions when acting as a team member or project manager for an engineering projects. 4. apply the concept of Time Value of Money and discounted cash flow in investment decision making and financial management
Synopsis	This course introduces the economic principles and analytical tools needed to think intelligently about economic problems. The course begins by focusing on microeconomics, in which students will examine the concept and principles of individual consumer and firm behaviour. In the second part of the course deals with the thought processes, concepts, methods, and knowledge bases used by engineers to cost engineering projects and to evaluate the merit of making a particular investment, and to chose
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. McEachern, Economics- A Contemporary Introduction, Seventh Edition, Thomson Learning 2. Pindyck Rubinfield, Micro Economics, Sixth Edition, Prentice Hall, New Jersey 3. Blank Tarquin, Engineering Economy, Sixth Edition, McGraw-Hill.2005
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3) Teamwork Skills (TS1, TS2) Life Long Learning and Information Management (LL1, LL2)

Course Pro-forma

Faculty Course

Code	KXEX2165
Title	Moral and Ethics in Engineering Profession
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Learn the implications of moral and ethics in engineering works 2. Understand the basis of moral & ethics behind the promulgation of codes of ethics(COE) which are adopted by professional engineering bodies 3. Recognise the practical needs of COE to regulate engineering practices 4. Understand COE of various organisation such as Institution of Engineers , Malaysia(IEM) and National Society of Professional Engineers(NSPE,USA) and the importance of Registration of Engineers Act 5. Realise the implication of moral & ethics for engineers behaviour through presentation of case studies 6. Assess between good and bad course of actions when facing with corporate decision which need to be made in their organisation
Synopsis	Introduction to engineering profession and implication of engineering career. Moral, religious and ethical theories &current Codes of Ethics. Responsibilities and right of Engineers and implication of public welfare and loyalty to employer. Environmental ethics, risks, liability and law. Roles of Engineers on sustainable development and globalisation
Assessment	100 % Continuous Assessments
References	Fleddermann,C.B. Engineering Ethics, 1999, Prentice Hall,N.J
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Teamwork Skills (TS1, TS2) Professional Ethics and Moral (EM1, EM2, EM3) Leadership Skills (LS1, LS2)

Course Pro-forma

Faculty Course

Code	KXEX2166
Title	Law and Engineer
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Identify the effect of the law on the society with emphasis on engineers. 2. Apply principles of law to a given situation and identify the liability from a legal perspective. 3. Identify wrongdoings from the legal perspective and the consequences of such wrongdoing 4. Analyse the principles of law in order to avoid conflicts in society 5. Establish and analyse contractual obligations 6. Explain the dimensions of the law in relation to every human behaviour
Synopsis	Introduction to law and its functions, the basis of laws in relation to the area of engineering with emphasis on the laws of tort, contract and intellectual property, Acts of Parliament that are relevant to these areas
Assessment	40 % Continuous Assessments 60 % Final Examination
References	The Law of Tort in Malaysia by Norchaya Talib
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3) Teamwork Skills (TS1, TS2) Life Long Learning and Information Management (LL1, LL2)

Course Pro-forma

Faculty Course

Code	KXEX2244
Title	Ordinary Differential Equations
Pre-requisite	KXEX1144
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Ability to recognize the order and linearity of an ODE and verifying whether a given function is a solution or not. Find the solution of first order ODE. 2. Find the solution of linear second order ODE analytically. 3. Find the solution of linear second order ODE in series form.
Synopsis	Fundamental concepts and definitions in ODE, Initial value problem, First order ODE: separable, linear, exact equations and equations reducible to those forms. Integrating factor. Linear equation of higher order: Linearly independent solutions, Wronskian, Lagranges reduction of order, complementary functions and particular solutions, the method of undetermined coefficients, the variation of parameters, Euler-Cauchys equation. Series solution method: power series, convergence, series soluti
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Engineering Mathematics (5th Ed), K Stroud & D Booth, Palgrave (2001) 2. Modern Engineering Mathematics (2nd Ed), Glyn James, Addison-Wesley (1996) 3. Frank Ayres Jr, Schaum Outline Series: Differential Equations, McGraw Hill, 1972
Soft Skills	Communication Skills (CS1, CS2) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3) Teamwork Skills (TS1) Life Long Learning and Information Management (LL1)

Course Pro-forma

Faculty Course

Code	KXEX2245
Title	Vector Analysis
Pre-requisite	KXEX1144, KXEX1145
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Differentiate & Integrate The Vector Function 2. Deal With Gradient, Divergence & Curl 3. Use Gauss Theorem & Stokes Theorem
Synopsis	Differentiation & Integration Of Vector Function. Gradient, Divergence & Curl. Directional Derivative. Line, Surface & Volume Integrals. Curvilinear Coordinates. Gauss Theorem & Stokes Theoram
Assessment	40 % Continuous Assessments 60 % Final Examination
References	Vector Analysis (Schaums Outline Series) Murray R. Spiegal, Mcgraw-Hill(1959)
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical Thinking and Problem Solving Skills (CT1, CT2) Teamwork Skills (TS1, TS2)

DEPARTMENT OF BIOMEDICAL ENGINEERING

COURSE PRO-FORMA

BACHELOR OF BIOMEDICAL ENGINEERING (PROSTHETICS & ORTHOTICS)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1131
Title	Statics
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Classify force systems. 2. Solve forces and moments acting on rigid bodies in equilibrium in 2D and 3D systems. 3. Classify forces that exist within stationary and moving structures. 4. Solve problems involving geometrical properties of figures and actions of distributed forces. 5. Explain the effects of friction and to solve problems involving application in mechanical systems. 6. Solve problems involving rigid bodies in equilibrium using the virtual work method.
Synopsis	This course introduces force systems, force and moment in 2D and 3D systems, forces that exist within stationary and moving structures, geometrical properties of figures, actions of distributed forces, and rigid bodies in equilibrium.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Wan Abu Bakar Wan Abas. Mekanik Kejuruteraan Statik, Edisi Ke-2, Dewan Bahasa dan Pustaka, 2001 2. Wan Abu Bakar Wan Abas. Kamus Mekanik Gunaan, Dewan Bahasa dan Pustaka, 1991; 3. Engineering Mechanics books written by Meriam & Kraige, Hibbeler, and Beer & Johnston.
Soft Skills	Critical Thinking and problem solving (CT1,CT2, CT3) Life Long Learning and information management (LL1,LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1132
Title	Thermofluids
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the basic principles governing the Thermal-Fluid and Mechanic of fluid. 2. Apply basic principles of Thermal-Fluid and Mechanic of Fluid to solve related engineering problems. 3. Apply the uses of the principles of Thermal-Fluid and Mechanic of Fluid in Bio-medical Engineering.
Synopsis	Basic principles governing thermofluid and mechanics of fluid. Application of basic principles in thermofluid to solve engineering problems. Application of basic principles in thermofluid in biomedical engineering field.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	None
Soft Skills	Communication Skills (CS1,CS2) Critical Thinking and Problem Solving Skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1133
Title	Human System Anatomy I
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the functions of joints and muscles and its interactions. 2. Describe pathological areas, analyse using measuring devices, applying motion range to determine feasible methods of prosthetic/orthotic treatments. 3. Recognise biomechanical and pathology factors should be taken into account parallel with anatomical factors 4. Elaborate human anatomy by overall as well as the interaction process
Synopsis	Basic learning on human anatomy, with histological scope and rough overview. This includes comprehensive anatomical study of the lower limb, upper limb, and vertebrae and complete human body. Also, include the fundamental background of spinal system, cardiovascular, respiratory and skin.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Donna M. Van Wynsberghe, Charles R. Noback & Robert Carola. 1995 Human Anatomy and Physiology. 3rd Edition. Mc-Graw Hill. ISBN: 0-07-011171-5 2. Eric Wise. 1998. Anatomy and Physiology Laboratory Manual. Mc-Graw Hill. ISBN 0-697-20554-1. 3. Elaine Marieb. 1998. Human Anatomy & Physiology. 4TH Edition. Addison Wessley. ISBN 0-8053-4196-X 4. Alexander P.Spence. Basic Human Anatomy. Addison Wessley. ISBN 0-8053-8860-5
Soft Skills	Communication Skills (CS1, CS2). Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1134
Title	Human System Physiology I
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the basic concept of physiology. 2. Describe the association between the structure and the function of the body system. 3. Relate physiological knowledge towards the application of prosthetic and orthotic practices.
Synopsis	This course covers basic physiology of human body and its relation with physiology and pathology: Cell physiology, Homeostasis principles, skeletal muscle system, cardiovascular system, hemodynamic, and respiratory system.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Donna M. Van Wynsberghe, Charles R. Noback & Robert Carola. 1995 Human Anatomy and Physiology. 3rd Edition. Mc-Graw Hill. ISBN: 0-07- 011171-5 2. Eric Wise. 1998. Anatomy and Physiology Laboratory Manual. Mc-Graw Hill. ISBN 0-697-20554-1. 3. Elaine Marieb. 1998. Human Anatomy & Physiology. 4TH Edition.Addison Wessley. ISBN 0-8053-4196-X 4. Alexander P.Spence. Basic Human Anatomy. Addison Wessley. ISBN 0-8053-8860-5
Soft Skills	Communication Skills (CS1, CS2). Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1135
Title	Introduction to Computer System
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explains the art and structures of microprocessing and microcomputer system. 2. Apply binary, decimal, and hexadecimal number systems. 3. Explains type of programming language, examples of its use, and flowchart. 4. Describes common networking system and topology. 5. Explains technology related to the Internet, including World Wide Web and other protocols. 6. Explains the use of computer in healthcare industry, especially in prosthetic and orthotic.
Synopsis	Microprocessing system, microcomputer, network system, Internet, computers in healthcare industry with major emphasis on prosthetic and orthotic. Application of number system and programming language.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Carr, J. J. & Brown, J. M.,Introduction to Biomedical Equipment Technology, Prentice Hall. 2. Cromwell, L., Weibell F. J., Pfeiffer, E. A., 'Biomedical Instrumentation and Measurements', 2nd Edition, Prentice Hall. 1980. 3. William H. Righy,Computer Interfacing and Practical Approach to DA and Control.
Soft Skills	Communication Skills (CS1, CS2). Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1136
Title	General Health Education
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the healthcare services in Malaysia and the national priorities of healthcare policy, mainly to the people with disabilities and to the needy ones. 2. Describe the objective of prosthetic and orthotic in rehabilitation process with emphasis on the procedures involved. 3. Recognize the socio-economic differences of certain individuals who may have limited access to the healthcare services. 4. Assess patients individually on the aspects of clinical, socioculture, and behaviour
Synopsis	Basic knowledge of the healthcare services and welfare in Malaysia, including the role of prosthetists and orthotists.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2). Critical thinking and problem solving skills (CT1, CT2, CT3) Professional ethics and moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1137
Title	Human System Anatomy II
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the functions of joints and muscles and its interactions. 2. Describe pathological areas, analyse using measuring devices, applying motion range to determine feasible methods of prosthetic/orthotic treatments. 3. Recognise biomechanical and pathology factors should be taken into account parallel with anatomical factors. 4. Elaborate human anatomy by overall as well as the interaction process
Synopsis	Basic learning on human anatomy, with histological scope and rough overview. This includes comprehensive anatomical study of the lower limb, upper limb, and vertebrae and complete human body. Also, include the fundamental background of spinal system, cardiovascular, respiratory and skin.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Donna M. Van Wynsberghe, Charles R. Noback & Robert Carola. 1995, Human Anatomy and Physiology. 3rd Edition. Mc-Graw Hill. ISBN: 0-07-011171-5 2. Eric Wise. 1998. Anatomy and Physiology Laboratory Manual. McGrawHill. ISBN 0-697-20554-1. 3. Elaine Marieb. 1998. Human Anatomy & Physiology. 4TH Edition. Addison Wessley. ISBN 0-8053-4196-X 4. Alexander P.Spence. Basic Human Anatomy. Addison Wessley. ISBN 0-8053-8860-5
Soft Skills	Communication Skills (CS1, CS2). Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1138
Title	Human System Physiology II
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the basic concept of physiology. 2. Describe the association between the structure and the function of the body system. 3. Relate physiological knowledge towards the application of prosthetic and orthotic practices.
Synopsis	Gastrointestinal System, Renal System including acid-base & body fluids Endocrine & Reproductive System, Central Nervous System
Assessment	40 % Continuous Assessments 60 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1139
Title	Dynamics
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Solve kinematics and kinetic problems in accelerating particles 2. Solve kinematics problems in accelerating 2D rigid bodies 3. Solve kinetics problems in accelerating 2D rigid bodies 4. Solve problems involving accelerating motion using the principle of work and energy 5. Solve kinematics and kinetics problems in vibrating particles 6. Solve problems involving simple kinematic mechanisms
Synopsis	Kinematics in accelerating particles. Kinetics in accelerating particles. Kinematics in accelerating 2D rigid bodies. Kinetics in accelerating rigid bodies. Principle of work and energy. Kinematics and kinetics in vibrating particles. Kinematics of simple mechanisms.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. J.L Meriam and L.G Kraige. Engineering Mechanics - Dynamics, John Wiley and Sons 2. Wan Abu Bakar Wan Abas. Mekanik Kejuruteraan — Dinamik, Dewan Bahasa dan Pustaka, 2001 3. RS Khurmi. Theory of Machines.
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1140
Title	Biomechanic 1
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Determine biomechanics, statics, dynamics, kinetics, kinematics and identify instrumentation used for measuring kinetics and kinematics quantities. 2. Evaluate the concepts and theories of human skeletal, human upper and lower extremities and human spine from a biomechanical perspective. 3. Identify, describes all types of mechanical loading on the human body and the relationship to bone injuries. 4. Solve problems related to kinematics (linear and angular) and kinetics (linear and angular) and justify the solutions.
Synopsis	Biomechanics, statics, dynamics, kinetics, kinematics and identify instrumentation used for measuring kinetics and kinematics quantities. Concepts and theories of human skeletal, human upper and lower extremities and human spine from a biomechanical perspective. Types of mechanical loading on the human body and the relationship to bone injuries. Solving problems related to kinematics (linear and angular) and kinetics (linear and angular).
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Susan J. Hall. Basic Biomechanics, WCB Mc Graw Hill, USA, 1995. 2. Biomechanics of Human Movement, Adrian MJ and Cooper JM, WCB MC Graw Hill, 1995 3. Functional Human Movement-Measurement and Analysis, BR Darward, GD Baer and Rowe PJ, Butterworth Heinemann, 1999
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1171
Title	Lab 1
Pre-requisite	None
Student Learning Time (SLT)	40 hours
Credit	1
Learning Outcomes	1. Conduct experiment after studying the lab experiment instructions. 2. Use the proper equipment and procedure to analyze data. 3. Interpret the data. 4. Write the laboratory report in the proper format. 5. Use the proper graphs to display the results in a clear and concise manner.
Synopsis	In the practice studies students develop a basis for professional evaluation through planning, carrying out and evaluating their own work
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP1172
Title	Lab 2
Pre-requisite	None
Student Learning Time (SLT)	40 hours
Credit	1
Learning Outcomes	1. Conduct experiment based on brief lab experiment instruction. 2. Use the proper equipment and procedure to analyze data 3. Interpret the data 4. Write the laboratory report in the proper format. 5. Use the proper graphs to display the results in a clear and concise manner.
Synopsis	In the practice studies students develop a basis for professional evaluation through planning, carrying out and evaluating their own work.
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Professional ethics and moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2130
Title	Mechanics of Material
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Solve problems involving a body under the action of simple Tension and circular rods under the action of a torque 2. Describe and design beams in equilibrium. 3. Describe and solve problems involving stresses in beams and stresses deflections of beams. 4. Describe and solve problems involving buckling beams (slender rods under axial load). 5. Describe and solve problems involving plane stresses and strains. 6. Describe and solve problems involving a body under combined loadings
Synopsis	Describe and solve problems involving: body under the action of simple tension. Circular rod under the action of torque.Beams in equilibrium.Containers under internal pressure.Stresses in beams.Stresses deflections of beams.Buckling beams. Plane stresses. Plane strains.Body under combined loadings.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Logan DL. Mechanics of Materials, HarperCollins. 2. Craig RC. Mechanics of Materials, John Wiley & Sons. 3. WF Riley, LD Sturges, dan DH Morris. Static and Mechanics of Materials, John Wiley & Sons. 4. FP Beer and ER Johnston. Mechanics of Materials.
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2131
Title	Electrotechnology I: Electrical Circuit Analysis
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Use and solve problems using Kirchoffs Law 2. Analyze circuits using nodal analysis and Thevins Law 3. Analyze circuits using mesh and superposition analysis 4. Calculate current voltage and power in AC circuits using phasor approach 5. Calculate transient response of RC and RL circuits. 6. Analyze transformers and resonance circuits
Synopsis	Describe and solve DC and AC analysis using KCL, KVL and other techniques of circuit analysis. Calculate transient response of RC, RL, and RLC circuits. Describe the concept of mutual inductance and solve the problems. Perform circuit analysis using Laplace transform, and explain and interpret the concept of two-port networks.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Franco, Electric Circuit Fundamentals, Saunders College Publishing, 1995. 2. Floyd, Electric Circuit Fundamentals, Pearson International Edition, Seventh Edition, 2007. 3. Alexander & Saunder, Fundamentals of Electric Circuits, McGraw-Hill, 2003
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2132
Title	Workshop Technology
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Classify with various types of jobs available in metal-non-metal working industry and capable to select various tools used for cutting, holding, assembling or dismantling work piece. 2. Identify and state the purpose of the main operative parts of the workshop machines. 3. Identify the types and control systems used in CNC and explain a basic CNC program for a machine centre.
Synopsis	Classify with various types of jobs available in metal and non-metal working industry and capable to select various tools used for cutting, holding, assembling or dismantling work piece. Identify and state the purpose of the main operative parts of the workshop machines. Identify the types and control systems used in CNC and explain a basic CNC program for a machine centre
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Richard Budynas, Keith NisbettMechanical Engineering Design,McGraw Hill 2. Robert Norton, “Machine Design: An Integrated approach”, Pearson 3. A.W. Boundy,Engineering Drawing, McGraw Hill 4. Steve Krar, Arthur Gill, Peter Smid,Technology of Machine Tools, McGraw Hill
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2133
Title	Computer-Aided Drawing
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Outline the guidelines for good manual drawing practice. 2. Distinguish orthographic, isometric and oblique projection 3. Visualize and explain the drawings in the orthographic, isometric and oblique projection 4. Determine the true length, shape, bearing and slope of a line/plane 5. Use the commanding engineering drawing software such as mirror,copy, array and rotate 6. Draw 3D drawings using extrude, revolve, cut and merge.
Synopsis	Guidelines for good manual drawing practice. Distinguish orthographic, isometric and oblique projection. Visualize and explain the drawings in the orthographic, isometric and oblique projection. Determine the true length, shape, bearing and slope of a line/plane. Use the commanding engineering drawing software such as mirror, copy, array and rotate. Draw 3D drawings using extrude, revolve, cut and merge.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Richard Budynas, Keith NisbettMechanical Engineering Design, McGraw Hill 2. Robert Norton, “Machine Design: An Integrated approach”, Pearson 3. A.W. Boundy,Engineering Drawing, McGraw Hill 4. Steve Krar, Arthur Gill, Peter Smid,Technology of Machine Tools, McGraw Hill
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2134
Title	Biomechanics of Human Motion
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Determine the concept of biomechanics 2. Evaluate and distinguish the different measurement parameters and determine the type of measurement system used in biomechanics 3. Formulate the kinetics and kinematics of normal and pathological gait 4. Explain the concepts of rehabilitative biomechanics and its relationship in human movement particularly of the injured and disabled people 5. Describe the mechanics and properties of soft and hard tissues
Synopsis	Concept of biomechanics. Different measurement parameters and determine the type of measurement system used in biomechanics. Kinetics and kinematics of normal and pathological gait. Rehabilitative biomechanics and its relationship in human movement particularly of the injured and disabled people. The mechanics and properties of soft and hard tissues.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Susan J. Hall. Basic Biomechanics, WCB Mc Graw Hill, USA, 1995. 2. Biomechanics of Human Movement, Adrian MJ and Cooper JM, WCB MC Graw Hill, 1995 3. Functional Human Movement-Measurement and Analysis, BR Darward,GD Baer and Rowe PJ, Butterworth Heinemann, 1999
Soft Skills	Communication Skills (CS1, CS2) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2135
Title	Human System III (Pathology/Microbiology/Biomolecular Medicine)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Understand basic pathology, microbiology, and biomolecular medicine and relate it with structures and functions of human body and disease. 2. Understand the process of disease and factors causing diseases.
Synopsis	Basic pathologies, microbiology and biomolecular medicine: Chemicals of Life, Cell Biology, Development, Infection, Defence Mechanism, Pathophysiology
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Donna M. Van Wynsberghe, Charles R. Noback & Robert Carola. 1995 Human Anatomy and Physiology. 3rd Edition. Mc-Graw Hill. ISBN: 0-07-011171-5 2. Eric Wise. 1998. Anatomy and Physiology Laboratory Manual. Mc-Graw Hill. ISBN 0-697-20554-1. 3. Elaine Marieb. 1998. Human Anatomy & Physiology. 4TH Edition. Addison Wessley. ISBN 0-8053-4196-X 4. Alexander P.Spence. Basic Human Anatomy. Addison Wessley. ISBN 0-8053-8860-5
Soft Skills	Communication Skills (CS1, CS2) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2136
Title	Clinical Study I
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Know orthopedic and musculoskeletal diseases that may cause deformation that requires prosthetic and orthotic treatment. 2. Know the use of orthotic and prosthetic devices 3. Know pediatric disorders that may cause damage/deformation that requires prosthetic and orthotic treatment.
Synopsis	Background on orthopaedic and musculoskeletal problems as well as paediatric that requires prosthetic and orthotic devices.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Team Work Skills (TS1, TS2) Professional Ethics and Moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2137
Title	Basic Prosthetic and Orthotic
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Apply biomechanic principles in dealing with transtibial prosthetic, transfemoral prosthetic, and orthotic. 2. Compare types of socket and the design. 3. Explain the design and biomechanic consideration for wheelchair. 4. Describe the concept of Functional Electrical Stimulation including its stimulation parameters.
Synopsis	The principles of biomechanics for the use of transtibial and transfemoral prosthetics and orthotics. Types of socket and its design. Design and biomechanics consideration for wheelchair. Functional Electrical Stimulation.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	Prosthetics and Orthotics Practice. Edited by George Murdoch; Edward Arnold (Publishers)Ltd. London
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2139
Title	Electrotechnology II: Electronics
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. To identify p-type and n-type materials and describe doping process of p and n, and p-n junction as circuit element. 2. To be able to analyze diode circuit. 3. To be able to describe half-wave and full-wave rectifier and their applications as rectifiers, clippers and clampers. 4. To be able to describe the characteristics of Bipolar Junction Transistor (BJT). 5. To be able to perform analysis of BJT circuits, its load lines and bias configurations. 6. To be able to analyze and characterize Field Effect Transistor (FET).
Synopsis	Basic electronic components. Diodes and applications. DC and AC analysis of transistors and applications. Power supply and voltage regulator.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Robert L. Boylestad, Louis Nashelsky,Electronic Devices and Circuit Theory, 9th Ed., Pearson, Prentice Hall, 2010. (Main book) 2. Donald Neaman, “Electronic Circuit Analysis and Design”, 2nd Ed., 2001, McGraw Hill.
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2140
Title	Biostatistic
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Evaluate the concepts and theories of statistical used in biomedical engineering. 2. Apply statistical package to analyse biomedical engineering problems. 3. Formulate statistical analysis to the case study.
Synopsis	Basic concepts, theory and techniques of statistics used in biomedical engineering. Introduction of statistical package to analyse biomedical engineering problems. Application of statistical analysis in the case study
Assessment	50 % Continuous Assessments 50 % Final Examination
References	1. Jan W. Kuzma, Stephen E. Bohnenblust. Basic Statistics for the Health Sciences. McGraw-Hill International Editiopn. Fifth Edition. 2. Neil A. Weiss. Introductory Statistics: International edition. Pearson Addison Wesley. Eight Edition.
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2141
Title	Workshop Technology II
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Know the characteristics of material to be used in biomedical devices 2. Describe the biocompatibility aspects and its practical use; the choice of suitable material to be used and processed for normal condition. 3. Describe the structure and machine operation and equipment commonly used in the workshop. 4. Choose correct orthotic material in term of its medical techniques 5. Describe health safety and ways to keep away from danger. Rules and regulation in using machines.
Synopsis	Provide basic knowledge and skills in handling hand equipment and machines, including the aspect of safety. Introduction to materials that commonly used in prosthetic and orthotic, including its physical and chemical characteristics and ways to use it. The production of common plastic part to be used in orthotic. Basic safety guide in workshop and accident prevention. Preparation to choose technique, material and appropriate equipments to any kind of related tasks given.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Richard Budynas, Keith NisbettMechanical Engineering Design, McGraw Hill 2. Robert Norton, “Machine Design: An Integrated approach”, Pearson 3. A.W. Boundy,Engineering Drawing, McGraw Hill 4. Steve Krar, Arthur Gill, Peter Smid,Technology of Machine Tools, McGraw Hill
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2142
Title	Clinical Study II
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Identify problems and complications of internal medicine that may cause certain disorders or damage that requires prosthetic and orthotic treatment. 2. Recognize neurological disease that may cause certain disorders or disability that requires prosthetic and orthotic treatment. 3. Recognize rheumotological disease that may cause certain disorders or disability that requires prosthetic and orthotic treatment. 4. Recognize geriatric condition that may cause disability or damage that requires prosthetic and orthotic treatment. 5. Identify and choose correct orthotic and prosthetic devices to perform treatment on the type of diseases or disorders.
Synopsis	Introduction to the health condition, metabolic, neurology, rheumatology, and geriatric that needs prosthetic and orthotic treatment with the use of appropriate device and tools.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Professional Ethics and Moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2143
Title	Materials Technology
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explain the properties and structure-function relationship of various types of P & O materials 2. Explain mechanical and failure behaviour of these materials, along with techniques used to improve the mechanical and failure properties in terms of alteration of structural elements 3. Describe the basis for the selection of different materials for specific prosthetic and orthotic applications, including resolving specific toxicity and safety issues which arise
Synopsis	This course provides a materials science foundation for prosthetics and orthotics. It includes a thorough study of the properties of the various classes and relevant forms of material. Through an understanding of structure-function relationships, particular attention is given to the basis and assessment of mechanical, toxicity and safety characteristics. Means of improving mechanical properties through the alteration of structural elements are explored.
Assessment	40 % Continuous Assessments 60 % Final Examination
References	1. Temenoff, J.S and Mikos, A.G (2008). Biomaterials: The intersection of Biology and Materials Science. Pearson International Edition. 2. AAOS Atlas of Orthoses and Assistive Devices. Editors Hsu J.D, Michael J.W and Fisk J.R 4th Ed 3. Atlas of Amputations and Limb Deficiencies: Surgical, Prosthetic, and Rehabilitation Principles. Editors Smith D.G, Michael J.W and Bowker J.H. 3rd Ed
Soft Skills	Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2173
Title	Lab III
Pre-requisite	None
Student Learning Time (SLT)	40 hours
Credit	1
Learning Outcomes	1. Understand responsibilities and commitment in emphasizing accuracy, objectives, question-asking skills, initiative and new discoveries. 2. Perform experiments, analyze and interpret obtained data. 3. Analyze and solve any potential problems
Synopsis	In the practice studies students develop a basis for professional evaluation through planning, carrying out and evaluating their own work.
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP2174
Title	Lab IV
Pre-requisite	None
Student Learning Time (SLT)	40 hours
Credit	1
Learning Outcomes	1. Understand responsibilities and commitment in emphasizing accuracy, objectives, question-asking skills, initiative and new discoveries. 2. Perform experiments, analyze and interpret obtained data. 3. Analyze and solve any potential problems
Synopsis	In the practice studies students develop a basis for professional evaluation through planning, carrying out and evaluating their own work.
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3130
Title	Biomechanics in Orthotic
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Apply biomechanics principles in orthotic field. 2. Determine pressure level imposed on orthotic component for certain placement. 3. Apply the concept of balance in mechanical engineering for the analysis of the forces of the joints when walking. 4. Valuate patients form of walking who use orthotic and apply mechanical balance concept to determine force and pressure involved.
Synopsis	Apply biomechanics principles in orthotic field. Mechanical properties of human tissues and the effects of force to the tissues. The effects of the same forces to the replacing orthotic device, and its process design.
Assessment	60 % Continuous Assessments 40 % Final Examination
References	Prosthetics and Orthotics Practice. Edited by George Murdoch; Edward Arnold (Publishers)Ltd. London
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3131
Title	Biomechanics in Prosthetic
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Apply biomechanic principles in orthotic field. 2. Determine pressure level imposed on prosthetic component for certain placement. 3. Apply the concept of balance in mechanical engineering for the analysis of the forces of the joints when walking. 4. Valuate patients form of walking who use orthotic and apply mechanical balance concept to determine force and pressure involved
Synopsis	Apply biomechanic principles in prosthetic field. Mechanical properties of human tissues and the effects of force to the tissues. The effects of the same forces to the replacing prosthetic device, and its process design.
Assessment	60 % Continuous Assessments 40 % Final Examination
References	Prosthetics and Orthotics Practice. Edited by George Murdoch; Edward Arnold (Publishers)Ltd. London
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3132
Title	Clinical Study III
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Recognize vascular disease that may cause damage or disorders that may require prosthetic and orthotic treatment. 2. Learn the techniques of amputation that requires prosthetic treatment. 3. Recognize other form of diseases or injuries such as burned skin or other skin problems. 4. Explain basic medical imaging and learn basic techniques of X-Ray interpretation. 5. Recognize the use of orthotic and prosthetic devices suitable for different forms of diseases or damages.
Synopsis	This course will introduce to students the significance of knowing all various conditions that requires specific and correct prosthetic and orthotic devices to be used
Assessment	40 % Continuous Assessments 60 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2) Professional Ethics and Moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3133
Title	Rehabilitation Medicine
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	3
Learning Outcomes	1. Describe the holistic approach in attending patients health. 2. Describe the principles of rehabilitation medicine practice. 3. Describe various techniques of rehabilition medicine
Synopsis	Provide basic knowledge of the principle and practice of rehabilitation medicine treatment along with managing disabled patients
Assessment	60 % Continuous Assessments 40 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Professional Ethics and Moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3134
Title	Clinical Practice I
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Use equipment to perform diagnosis effectively. 2. Use the skills and clinical history when performing physical inspection in prosthetic and orthotic treatment.
Synopsis	Use various diagnostic methods to meet the patients medical and treatment needs.
Assessment	50 % Continuous Assessments 50 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2) Leadership skills (LS1, LS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3180
Title	Clinical Prosthetic and Orthotic
Pre-requisite	None
Student Learning Time (SLT)	480 hours
Credit	8
Learning Outcomes	1. Design and produce orthotic devices 2. Choose the best method to prescribe orthotic devices to patients 3. Investigate and evaluate a clinical management system
Synopsis	Basic knowledge in orthotics development, mainly in the device manufacturing aspect and prescription of orthotics to patients, practiced under supervision to obtain the optimal outcome.
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Entrepreneurial Skills (KK1)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP3192
Title	Industrial Training
Pre-requisite	None
Student Learning Time (SLT)	240 hours
Credit	6
Learning Outcomes	1. Apply engineering knowledge in practice. 2. Communicate effectively. 3. Practice good work ethics and safety
Synopsis	Basic knowledge in prosthetic development, mainly in the device manufacturing aspect and prescription of prosthetics to patient, practiced under supervision to obtain the optimal outcome.
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2) Entrepreneurial Skills (KK1)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP4130
Title	Humanistic Sciences
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	3
Learning Outcomes	1. Apply the etiquette principles as professional in the rehabilitation technology field, especially in respecting individuals right, multi-cultured and religious believes. 2. Describe the life values and concepts of truths, justice, passionate, freedom and well being. 3. Avoid the negative behaviour such as taking something with little concern, manipulates, and practice cheating, whether in individual or professional stage.
Synopsis	This course encourages the purification in teaching and learning processes by delivering the understanding and exposure about the humanistic science via the study of etiquette, moral and religious approaches.
Assessment	60 % Continuous Assessments 40 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3) Life-long learning and information management (LL1, LL2) Professional Ethics and Moral (EM1, EM2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP428X
Title	Graduation Project
Pre-requisite	None
Student Learning Time (SLT)	120 hours
Credit	6
Learning Outcomes	1. Search for relevant information to a research problem 2. Discreminate the current available methods of solving problems 3. Work independantly or in a group to complete a research project 4. Conduct appropiate experiments to solve the research problem 5. Analyze data obtained 6. Discuss and state logical conclusions from results.
Synopsis	Students will learn to search for relevant inofrmation and discreminate the current available methods of solving problems. They will experience working independently or in a group and conducting appropiate experiments to solve the research problems. They will have skills to analyze data, discuss and state logical conclusions from results.
Assessment	100 % Continuous Assessments
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical thinking and problem solving skills (CT1, CT2, CT3, CT4) Team work skills (TS1, TS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP4330
Title	Advanced Rehabilitation Medicine (Elective 1)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the holistic approach concept in ensuring patient health. 2. Describe the practical rehabilitation medicine principle. 3. Describe various techniques that are used in the practical specialized rehabilitation treatment.
Synopsis	The course gives basic knowledge in principles and practical medical treatment of rehabilitation medicine in special cases and care for disabled individuals.
Assessment	60 % Continuous Assessments 40 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical thinking and problem solving skills (CT1, CT2, CT3, CT4) Team work skills (TS1, TS2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP4331
Title	Rehabilitation Shoe Design (Elective 2)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Identify different types of rehabilitation shoes 2. Describe various parts and function of a rehabilitation shoe. 3. Optimize the rehabilitation shoe component in order to satisfy the needs of the specific patient.
Synopsis	This course offers the basic knowledge in development process of rehabilitation shoe, taking account of the requirement for the specific parts and components in order to satisfy identified functions.
Assessment	60 % Continuous Assessments 40 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2) Entrepreneurial Skills (KK1, KK2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP4332
Title	Perspective in Health Technology (Elective 3)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Describe the importance of the health technology development. 2. Know technologies involved and applied in the medical field.
Synopsis	This course introduces health technology, telemedicine, and management of bio-medicine equipment, health technology evaluation, and development of the health technology.
Assessment	60 % Continuous Assessments 40 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2) Entrepreneurial Skills (KK1, KK2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

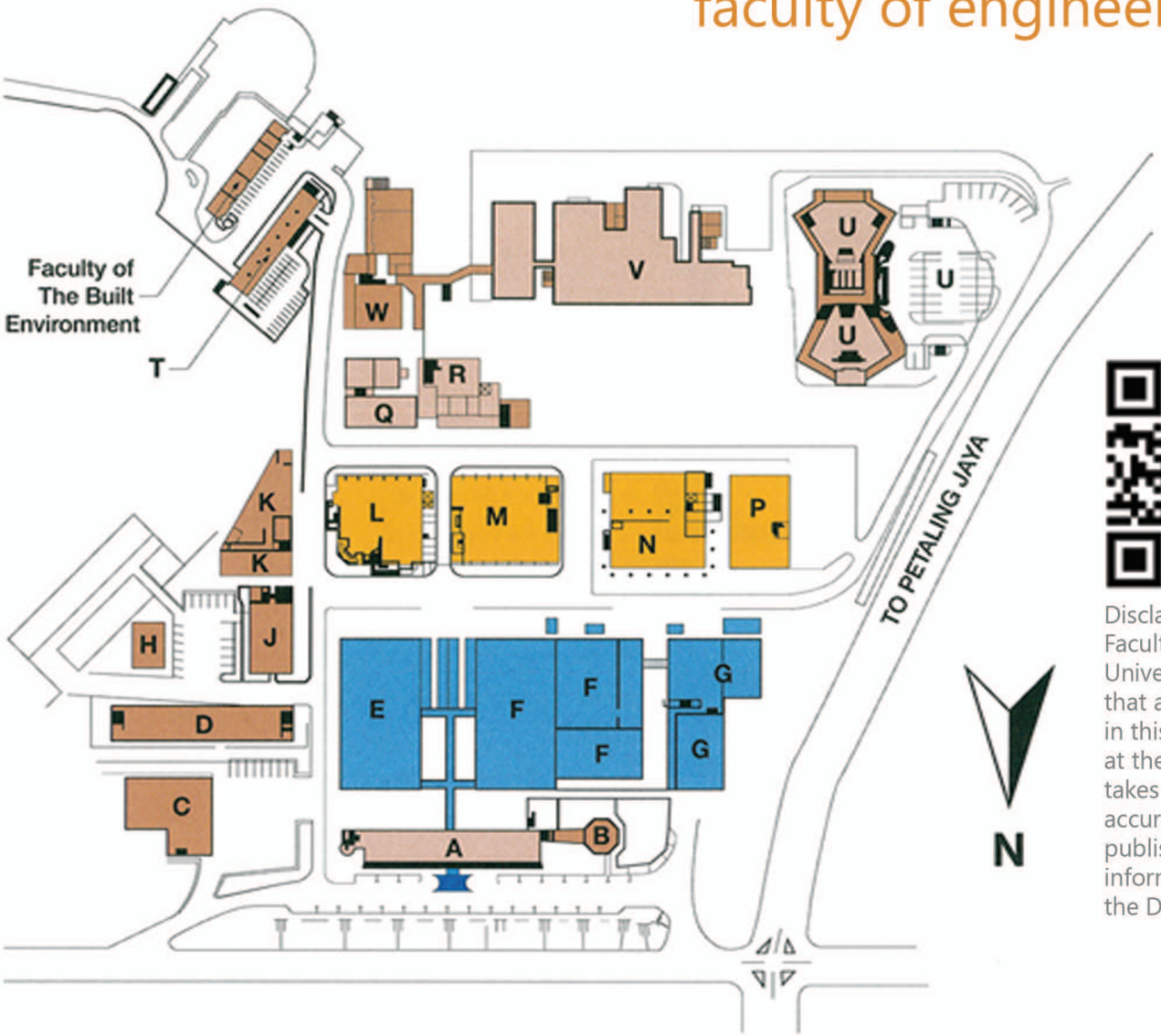
Code	KUEP4333
Title	Artificial Intelligence (Elective 4)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explain the concept of artificial intelligence techniques 2. Determine the theories of Artificial Intelligence technique. 3. Apply the AI technique in biomedical engineering applications
Synopsis	This course is intended to provide fundamental understanding of the artificial intelligence concepts (abstract logic, neural networks, specialized languages) and its basic applications in Biomedical Engineering.
Assessment	50 % Continuous Assessments 50 % Final Examination
References	None
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical thinking and problem solving skills (CT1, CT2, CT3) Team work skills (TS1, TS2) Life-long learning and information management (LL1, LL2)

Course Pro-forma

Bachelor of Biomedical Engineering (Prosthetics and Orthotics)

Code	KUEP4334
Title	Medical Imaging (Elective 5)
Pre-requisite	None
Student Learning Time (SLT)	80 hours
Credit	2
Learning Outcomes	1. Explain the basics of principles and design of medical diagnostic imaging equipment. 2. Describe features of x-rays, gamma-rays and computed tomography. 3. Describe features of projection radiography, fluoroscopy, and mammography. 4. Describe features of magnetic resonance imaging; ultrasound. 5. Describe features and importance of quality control in diagnostics. 6. Describe features of bio-magnetic diagnostics, laser and optoelectronics.
Synopsis	The course introduces the basic principles and design of medical diagnostic imaging equipment. A few medical imaging technologies are covered such as X-rays, gamma rays, and computed tomography, fluoroscopy, mammography, projection radiography, magnetic resonance imaging, ultrasound, biomagnetic diagnostics, laser and optoelectronics. The course also exposes the students to the quality control in diagnostics
Assessment	60 % Continuous Assessments 40 % Final Examination
References	Erich Krestel. Imaging systems for medical diagnostics, Siemens Aktiengesellschaft 1990.
Soft Skills	Communication Skills (CS1, CS2, CS3, CS4) Critical thinking and problem solving skills (CT1, CT2, CT3) Life-long learning and information management (LL1, LL2) Professional Ethics and Moral (EM1, EM2)

faculty of engineering map



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A	Department of Biomedical Engineering
B	Lecturer Hall 1 (DK1)
C	Mechanical Engineering Workshop
D	Research Block (BP)
E	Mechanical Engineering Labs
F	Civil Engineering Labs
G	Advanced Structured Labs (Civil)
H	Faculty of Engineering Cafe
J	Department of Engineering Design & Manufacture
K	Department of Engineering Design & Manufacture
L	Engineering Tower (Administrative Wing)
M	Engineering Tower (Research Wing)
N	Hydraulic Lab (Mechanical)
P	Public Health Engineering Lab (Civil)
Q	Metallurgy Lab (Mechanical)
R	Mechanical and Electrical Engineering Labs
T	Multiple Storey Parking Block
U	Lecture Halls
V	Department of Chemical Engineering
W	Department of Chemical Engineering

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