

RESEARCH UNIVERSITY

POSTGRADUATE PROGRAMMES

MASTER & DOCTORAL DEGREE BY RESEARCH

Faculty of Health Science & Biomedical Engineering



Faculty of Health Science & Biomedical Engineering - Postgraduate Programmes

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Faculty of Health Science and Biomedical Engineering

GRADUATE STUDIES IN HEALTH SCIENCES & BIOMEDICAL ENGINEERING

MASTER & DOCTORAL DEGREE

ACADEMIC SESSION 2011/2012

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Faculty of Health Science & Biomedical Engineering - Postgraduate Programmes

DEAN'S OFFICE

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Dr. Azli bin Yahya Head of Postgraduate Studies B.Eng.(Glamorgan), M.Sc.(Glamorgan), PhD (Loughborough)

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Assoc. Prof. Dr. -Ing. Eko Supriyanto Head, Department of Clinical Science and Engineering B.Eng.(ITB), M.Eng.(ITB), Dr.Ing (Hamburg)

PREFACE



Welcome to the Faculty of Health Science and Biomedical Engineering. Our postgraduate research programmes offer an excellent training which will challenge your abilities and help you to develop skills which will benefit you in your future career. As a research student, you will work on an exciting and relevant project with a supervisor who is an expert and an enthusiast in the field, using first class facilities. 7

We welcome application from individuals seeking full time study from local and international students as well as part time students who may be juggling their academic studies with professional and family commitments. We look forward to you joining our postgraduate community and we will seek to ensure that you enjoy not only your academic study but also other aspects of your life.

Prof. Dr. Jasmy bin Yunus Dean, Faculty of Health Science and Biomedical Engineering

UNIVERSITI TEKNOLOGI MALAYSIA

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Universiti Teknologi Malaysia (UTM) is a leading innovationdriven entrepreneurial research university in engineering science and technology located both in Kuala Lumpur, the capital city of Malaysia and Johor Bahru, the southern city in Iskandar Malaysia, which is a vibrant economic corridor in the south of Peninsular Malaysia.

With a strength of more than 2,000 academic staff, of which more than 200 are foreign graduate faculty members, UTM continuously strives to develop and enhance quality academic and professional programmes of international standard and global recognition. The student population consists of more than 11,000 full-time undergraduate students, more than 6,000 enrolled on distance learning programmes as part-time students and more than 9,000 postgraduate students in various fields of specialisation. Out of this, more than 3,000 are foreign students.

UTM has also established a reputation for innovative education and leading-edge, proven by becoming the three-time winner for the National Intellectual Property Award for organization category. A stimulating research culture exists in UTM through 11 Research Alliances (RA) in strategic disciplines namely Sustainability, Infocomm, Water, Cybernetics, Biotech, Construction, Materials & Manufacturing, K-Economy, Energy, Transportation and Nanotechnology. In addition there are 28 Centres of Excellence (CoE) in addition to academic faculties to service technological education and research needs of the university.

UTM is also actively engaged in research collaboration with renowned institutions such as Harvard University, MIT, University of Oxford, Imperial College of London, University of Cambridge, Tokyo University and Meiji University on areas of mutual interests. To facilitate further engagement and networking in academic and research undertakings, international satellite offices have been established in Tokyo, and already in the pipeline are plans to establish satellite offices in Doha (Qatar), Madinah (Saudi Arabia), and in Boston (USA).

UTM is thus renowned for being at the forefront of engineering and technological knowledge and expertise, contributing to the technical and professional workforce of the nation since 1904. Being a graduate-focused university, UTM has the highest number of postgraduate enrolment in engineering and technology, which is one of the important components in contributing towards the development of an innovation-led economy. Having produced more than 200,000 technical graduates and qualified professionals over the years, UTM has earned its place as Malaysia's premier university in engineering and technology which inspires creativity and innovation.

UTM VISION

To be recognized as a world-class centre of academic and technological excellence.

UTM MISSION

To be a leader in the development of human capital and innovative technologies that will contribute to the nation's wealth creation.

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FACULTY OF HEALTH SCIENCE & BIOMEDICAL ENGINEERING

Faculty of Health Science and Biomedical Engineering is a newly established faculty in UTM to champion Biomedical Engineering and Health Science. The faculty offers Biomedical Engineering programmes for both undergraduates and postgraduates. We believe strongly in the value of interdisciplinary pursuits in this emerging field where engineering techniques and technologies from various disciplines are used to address needs within the medical and healthcare industries.

FACULTY VISION

The Faculty of Health Science and Biomedical Engineering is committed to be a world class center of excellence and a leader in teaching and learning within the field of biomedical engineering and health science.

FACULTY MISSION

- To provide world class programme in teaching and learning within the field of biomedical engineering and health science.
- To develop technology and technologists in the field of biomedical engineering and health science possessing high ethical value and moral.
- To spearhead technology and knowledge in the field of biomedical engineering and health science

DEPARTMENTS

The faculty is supported by four departments which are:

- Department Biomedical Instrumentation and Signal
 Processing
- Department of Biomechanics and Biomedical Materials
- Department of Therapy and Rehabilitation
- Department of Clinical Science and Engineering

The faculty is also supported by Centre of Biomedical Engineering (CBE), Centre for Innovation in Sports Technology (Sports InnoTech), Medical Implant Technology Group (MEDITEG), Progressive Healthcare and Human Development Research Group (PH2D-RG), Biosignal Processing Research Group (BSP) and Computer Added Rehabilitation Engineering (CARE).

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POSTGRADUATE STUDIES

The Faculty of Health Science and Biomedical Engineering offers postgraduate programmes leading to the degrees of Master of Engineering (M.Eng.) and the Doctor of Philosophy (Ph.D) in Biomedical Engineering, Master of Philosophy (M.Phil) in Rehabilitation and Doctor of Philosophy (Ph.D) in Health Science. The programmes are conducted in research mode. The degrees offered are as follows:

MASTER OF ENGINEERING (BIOMEDICAL) BY RESEARCH

Student shall carry out research in any of the areas in Biomedical Engineering. Assessment is made by semester progress reports and a thesis examination (viva voce). All students are supervised by academic staff from the Graduate Faculty member. The programme requires a nominal duration of three to four semesters (18 to 24 months).

MASTER OF PHILOSOPHY (REHABILITATION TECHNOLOGY) BY RESEARCH

This programme is conducted by research within the required duration of 3-6 semesters (18-36 months) for full-time study or 4-8 semesters (2-4 years) for part-time study mode. All students are supervised by academic staff from the Graduate Faculty member. Research focuses are in the area of Motion Analysis, Rehabilitation Equipment Technology, Therapy Modalities, Exercise Therapy and Prescription, Assistive Technology, Disabilities and Rehabilitation Ergonomics. Other research areas are also considered with supervisor approval.

DOCTOR OF PHILOSOPHY (HEALTH SCIENCES) BY RE-SEARCH

All candidates in this programme are required to complete their studies within a period not exceeding six years (12 semester typical) for a full-time and eight years (16 semester typical) for part time

students. The progress of research is evaluated each semester. Evaluation of research progress will be made by the supervisor on each semester. Research thesis focuses on the solution of certain aspects of research field in rehabilitation technology.

DOCTOR OF PHILOSOPHY (BIOMEDICAL ENGINEERING) BY RESEARCH

This programme of study is by research only. The programme requires a nominal duration of six semesters (3 years). The progress of the student is assessed each semester through a progress report. The degree is awarded based on a comprehensive examination (viva voce) of the doctoral thesis submitted by the student at end of study. All PhD students are supervised by academic staff from the Graduate Faculty member.

INTERNATIONAL DOUBLE DEGREE PROGRAMMES IN BIO-MEDICAL ENGINEERING

Universiti Teknologi Malaysia (UTM) and Technical University Ilmenau (TUIL), Germany have started an International Double Degree programme in Bomedical Engineering for Master and Doctoral studies. The International Double Degree Programme enables students to be awarded with 2 certificates;

- Doctorate Programme Doctor of Philosophy (PhD) degree in Biomedical Engineering from UTM and Doctor in Computer Science and Automation (Dr.-Ing) from Technical University Ilmenau, Germany (TUIL). The students are required to spend at least 9 months at the partner university.
- Master Programme Master in Biomedical Engineering (M. Eng) from UTM and/or Master in Biomedical Engineering (M.Sc) from TUIL. The students are required to spend at least 7 months at the partner university.

AREAS OF RESEARCH

The main areas of research in the faculty are spread across the wide spectrum of Biomedical Engineering and Health Science disciplines. These are listed as below:

BIOMECHANICS AND BIOMEDICAL MATERIALS

Biosolid/Biofluid Mechanics, Biomechanics, Biomaterials, Biocompatibility, Modeling and Simulation, Prosthetic / Orthotic, Motion Analysis, Ergonomics, Biomedical Manufacturing.

BIOMEDICAL INSTRUMENTATION AND SIGNAL PROCESSING

Telemedicine, Biomedical Instrumentation, Embedded System and Digital Signal Processing (DSP), Biomedical Imaging and Image Processing.

CLINICAL SCIENCE AND ENGINEERING

Anatomy, Physiology, Microbiology, Medical Diagnostic, Radiation Therapy, Medical Imaging, Health Care Technology Management, Drug Delivery, Hospital Engineering.

THERAPY AND REHABILITATION

Rehabilitation Engineering, Sports Rehabilitation & Training, Speech Training & Therapy, Assistive Aids for the Handicapped, Therapy & Training Aids for the Mentally Retarded. Master & Doctoral Degree by Research

MASTER OF BIOMEDICAL ENGINEERING BY RESEARCH



ENTRY QUALIFICATIONS

A Bachelor Degree in Science, Medical Science, Medical, Engineering (Electrical, Electronic, Mechanical, Biomedical) or related disciplines with good honour from Universiti Teknologi Malaysia or any other institution of higher learning recognised by the Senate; or

A qualification equivalent to a Bachelor Degree and experience in the relevant field recognised by the Senate.

ENGLISH PROFICIENCY

All international students applying to UTM must have a TOEFL or IELTS score as follows:

- A minimum score of 550 in the Test of English as a Foreign Language (TOEFL) or
- A minimum overall band score of 6.0 in the British Council IELTS Test.

However, a student with a lower score and does not meet the entry requirement can be accepted after attending and passing the Intensive English Course (IEC). IEC can be one or two semesters depending on the performance of the student.

CURRICULUM REQUIREMENT

Master of Biomedical Engineering consists of two requirements:

1) Research thesis

Research thesis focuses on biomedical engineering problem solving and the research plan must be approved by the supervisor from the faculty.

2) Course work

Students must pass university compulsory courses offered by the university during the semester.

PROGRAMME OBJECTIVES

- 1) To produce professionals trained in graduate programs in biomedical engineering field to serve in the institutions and industries.
- 2) To prepare graduates for jobs that require training at undergraduate level or to increase his career in engineering, including further studies to doctoral level.
- **3)** Enhance the good name of the UTM in the field of biomedical engineering through research, publica tions and consultancy.

PROGRAMME LEARNING OUTCOMES

- PLO1: Able to use knowledge of undergraduate engineering and other disciplines to identify, formulate and solve problems in advanced biomedical engineering.
- PLO2: Able to conduct research and development activities guided / directed systematically in the field of biomedical engineering.
- PLO3: Build awareness and understanding of professional ethical impact of engineering solutions in a global and societal context.
- PLO4: Able to promote and disseminate research-based knowledge and development activities in biomedical engineering through peer review and publication.
- PLO5: Know how and resources required to transfer technology to the commercialization and clinical implementation.
- **PLO6:** Aware of the need and ability to lifelong learning.



MASTER OF REHABILITATION TECHNOLOGY BY RESEARCH

ENTRY QUALIFICATIONS

A Bachelor Degree in Electrical Engineering, Biomedical Engineering, Mechanical Engineering, Medical Physics, Health Sciences, related to Therapy and Rehabilitation, Sports Sciences or related fields with good honour from Universiti Teknologi Malaysia or any other institution of higher learning recognised by the Senate; **or**

Other qualifications equivalent to a Bachelor Degree and experience in the relevant field recognised by the Senate.

ENGLISH PROFICIENCY

All international students applying to UTM must have a TOEFL or IELTS score as follows:

- A minimum score of 550 in the Test of English as a Foreign Language (TOEFL) or
- A minimum overall band score of 6.0 in the British Council IELTS Test.

However, a student with a lower score and does not meet the entry requirement can be accepted after attending and passing the Intensive English Course (IEC). IEC can be one or two semesters depending on the performance of the student.

CURRICULUM REQUIREMENT

Research Thesis

Research Thesis focuses on rehabilitation technology problem solving and the research proposal must be approved by the supervisor from the faculty.

Course Work

Student must pass university compulsory courses offered by the university during the semester.

PROGRAMME OBJECTIVES

The objectives of the Master of Philosophy (Rehabilitation Technology) programme are:

- To produce graduates with the knowledge, skills and expertise in the field of rehabilitation technology.
- To produce graduates in the field of rehabilitation technology who able to conduct researches, apply critical thinking and further develop the health industry in this country.
- To train and produce graduates who are persistently enhancing his professionalism in the field of rehabilitation technology and able to lead and disseminate knowledge to society effectively.
- To expand the field of rehabilitation technology and identify entrepreneurial opportunities.

PROGRAMME OUTCOMES (PO)

PO1 Ability to utilize and analyze the knowledge to develop methods of technology application to solve problems in t h e field of rehabilitation.

PO2 Ability to integrate various skills in conducting a systematic scientific research in the field of rehabilitation technology.

PO3 Posses effective interaction with colleagues and the public in the implementation of research and dissemination of knowledge In the field.

- PO4 Capable to integrate professional values, ethics and teamwork effectively.
- **PO5** Ability to develop self and embrace lifelong learning.
- **PO6** Capable to identify entrepreneurial opportunities to commercialize research.



MASTER OF BIOMEDICAL ENGINEERING BY COURSE (proposed programme)

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ENTRY QUALIFICATIONS

Candidate must hold a Bachelor Degree in Engineering (Biomedical, Electrical, Mechanical, Computer), Science (Physics, Biology, Chemistry, Mathematics, Medical and Health), Medical or other related disciplines from UTM or other Recognised Higher Learning Institution with CGPA \geq 3.0 or equivalent. For CGPA < 3.0, relevant working experience is required.

ENGLISH PROFICIENCY

All international students applying to UTM must have a TOEFL or IELTS score as follows:

- A minimum score of 550 in the Test of English as a Foreign Language (TOEFL) or
- A minimum overall band score of 6.0 in the British Council IELTS Test.

However, a student with a lower score and does not meet the entry requirement can be accepted after attending and passing the Intensive English Course (IEC). IEC can be one or two semesters depending on the performance of the student.

CURRICULUM REQUIREMENT

This program is offered on full-time (1.5 years) and part time (2.5 years) mode with a specific subjects being delivered and assessed in each semester. Assessment is based on coursework, final examination and master project.

This programme consists of

- 1) University General Elective Courses
- 2) Program Core Course (Courses and Master Project)
- 3) Program Elective Course

PROGRAMME OBJECTIVES

The objectives of this programme are to produce profesional with expertise in biomedical engineering and able to conduct research in this field. The objectives are achived by:

- 1. Producing graduates with knowledge, skills and expertise in biomedical engineering filed.
- 2. Producing biomedical engineering graduates that can conduct research and able to think critically and can enhance health industries in this country.
- 3. Training and producing professional graduates that always advance themselves forward troughout their lifetime and spread the knowledge to the community.
- 4. Expanding biomedical engineering and defining entrepreneurship opportunity.

PROGRAMME OUTCOMES (PO)

PO1-Ability to integrate and generate in-depth engineering knowledge in professional practices in overcome biomedical engineering issues .

PO2- Able to conducts projects and perform research scientifically to solve and explain observed phenomena in the field of biomedical engineering

PO3- Ability to evaluate situations and communicate clearly the findings, knowledge, recommendations and rationale to peers and experts in the biomedical engineering.

PO4-Ability to evaluate and make decisions by considering social responsibilities and related ethical issues in biomedical engineering.

PO5-Ability to organize and adapt biomedical engineering knowledge independently and manage biomedical engineering info effectively.

PO6-Ability to manage projects or research and recognize business opportunities.



DOCTOR OF PHILOSOPHY BIOMEDICAL ENGINEERING BY RESEARCH

ENTRY QUALIFICATIONS

A Master Degree in Science, Medical Science, Medical, Engineering (Electrical, Electronic, Mechanical, Biomedical) or related disciplines with good honour from Universiti Teknologi Malaysia or any other institution of higher learning recognised by the Senate; or

Other qualifications equivalent to a Master degree and experience in the relevant field recognised by the Senate; or

Candidates who are currently registered in a Master Degree programme at Universiti Teknologi Malaysia, and approved by the Graduate Studies Committee of the respective faculty and the Senate for conversion to PhD.

ENGLISH PROFICIENCY

All international students applying to UTM must have a TOEFL or IELTS score as follows:

- A minimum score of 550 in the Test of English as a Foreign Language (TOEFL) or
- A minimum overall band score of 6.0 in the British Council IELTS Test.

However, a student with a lower score and does not meet the entry requirement can be accepted after attending and passing the Intensive English Course (IEC). IEC can be one or two semesters depending on the performance of the student.

CURRICULUM REQUIREMENT

Doctor of Philosophy (Biomedical Engineering) by research consists of two requirements:

1) Research thesis

Research thesis focuses on biomedical engineering problem solving and the research plan must be approved by the supervisor from the faculty.

2) Course work

Students must pass university compulsory courses offered by the university during the semester.

PROGRAMME OBJECTIVES

1) To produce professionals trained at the doctoral degree in biomedical engineering field to serve and become leaders in institutions and industries.

2) Enhance the good name of the UTM in the field of biomedical engineering through research, publication and consultancy

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PROGRAMME LEARNING OUTCOMES

- PLO1: Acquire in-depth technical knowledge in biomedical engineering and be able to use a variety of technical knowledge and multi-disciplinary context to solve engineering problems.
- PLO2: Able to plan and carry out original research and development activities systematically and independently in the field of biomedical engineering.
- **PLO3**: Having awareness of professional ethics and under stand the impact of engineering solutions in a global and societal context.
- PLO4: Able to promote and disseminate research-based knowledge and development activities in biomedical engineering through peer review and publication.
- PLO5: Knowing how and resources required to transfer technology to the commercialization and clinical implementation.
- PLO6: Recognizing the need and ability to lifelong learning





ENTRY QUALIFICATIONS

A Master Degree in Rehabilitation Technology, Electrical Engineering, Biomedical Engineering, Mechanical Engineering, Medical Physics, Health Sciences, Sport Sciences related fields with good honour from Universiti Teknologi Malaysia or any other institution of higher learning recognised by the Senate; **or**

Other qualifications equivalent to a Master Degree and experience in the relevant field recognised by the Senate; or

A candidate with lower qualifications may be considered if he can demonstrate sufficient academic background and appropriate experience.

ENGLISH PROFICIENCY

All international students applying to UTM must have a TOEFL or IELTS score as follows:

- A minimum score of 550 in the Test of English as a Foreign Language (TOEFL) or
- A minimum overall band score of 6.0 in the British Council IELTS Test.

However, a student with a lower score and does not meet the entry requirement can be accepted after attending and passing the Intensive English Course (IEC). IEC can be one or two semesters depending on the performance of the student.

CURRICULUM REQUIREMENT

Doctor of Philosophy (Health Science) by research consists of two requirements:

1) Research Thesis

Research Thesis focuses on rehabilitation technology problem solving and the research proposal must be approved by the supervisor from the faculty.

2) Course Work

Student must pass university compulsory courses offered by the university during the semester.

PROGRAMME OBJECTIVES

This program aims to produce professionals with deep expertise in rehabilitation technology who can lead the aspects of research in this field.

The above goals can be achieved by:

- 1) Produce graduates who have the knowledge, skills and deep expertise in the field of rehabilitation technology.
- 2) To produce graduates in the field of rehabilitation technol ogy that can defend the results of the research and apply critical thinking and further develop the health industry in this country.
- 3) To train and produce graduates who are constantly enhancing his professional life in the field of rehabilitation technology and can influence the dissemination of knowl edge and effectively serve the community.
- 4) Playing role to adopt rehabilitation technology and seek for entrepreneurial opportunities.

PROGRAMME OUTCOMES (PO)

- **PO1:** Using and analyzing the knowledge to determine the method of appropriate technology application to solve problems in the field of rehabilitation.
- **PO2:** Comparing and integrating various skills in a scientific research systematically in the field of rehabilitation technology.
- **PO3:** Adopting effective interaction with colleagues and the public in the implementation of research and dissemination of knowledge in the field.
- **PO4:** Applying the professional values, ethics and team work effectively.
- **PO5:** Implementing self-development and able to influence society towards lifelong learning.
- **PO6:** Suggesting entrepreneurial opportunities to commercialize research.



INTERNATIONAL DOUBLE DEGREE PROGRAMME IN BIOMEDICAL ENGINEERING



Universiti Teknologi Malaysia (UTM) and Technical University Ilmenau (TUIL), Germany have started an International Double Degree programme in Biomedical Engineering. Details for each programmes as below:

DOUBLE DEGREE DOCTORATE IN BIOMEDICAL ENGI-NEERING

 The doctorate double degree programme enables student to be awarded with 2 certificates, which are Doctor of Philosophy (PhD) degree in Biomedical Engineering from UTM and Doctor in Computer Science and Automation (Dr.-Ing) from Technical University Ilmenau, Germany (TUIL). The students are required to spend at least 9 months at the partner university.

DOUBLE DEGREE MASTER IN BIOMEDICAL ENGINEER-ING

 The student will be awarded with 2 certificates, which are Master in Biomedical Engineering (M. Eng) from UTM and/ or Master in Biomedical Engineering (M.Sc) from TUIL. The students are required to spend at least 7 months at the partner university. Limited scholarships from German's government are available for selected students.

For further information, please contact UTM-TUIL program coordinator Assoc. Prof. Dr-Ing Eko Supriyanto (<u>eko@utm.my</u>).

CENTRE OF EXCELLENCE

1) Centre for Biomedical Engineering (CBE)

The Centre for Biomedical Engineering (CBE) is at the forefront of research and education in Biomedical Engineering.

CBE is concerned with a wide range of biomedical research in many different application areas, particularly in biomedical signal processing (ECG and Heart Sound), biomedical instruments, Biometrics, DSP algorithms, hardware architectures and softwares.

Contact:

Prof. Ir. Dr. Sheikh Hussain bin Shaikh Salleh Faculty of Health Science and Biomedical Engineering, Universiti Teknologi Malaysia, UTM Johor Bahru, 81310 Skudai, Johor, Malaysia.

Email : hussain@fkbsk.utm.my Tel : +6(07) 5535208
2) Centre for Innovation in Sports Technology (Sports InnoTech)

Establishment of Centre for Innovation in Sports Technology, Universiti Teknologi Malaysia is a collaboration between Universiti Teknologi Malaysia (UTM) and Massachusetts Institute of Technology (Massachusetts Institute of Technology (MIT)), United States of America, Malaysia Ministry of Youth and Sports (National Sports Council of Malaysia and National Sports Institute) and the Malaysia Ministry of Education.

Sports InnoTech consists of two (2) main units- Athlete Performance and Equipment Development. Athlete Performance Unit focuses on an exercise physiology, sports psychology, sports nutrition, coaching, fitness and injury prevention. Equipment Development Unit focuses on engineering design, material selection, prototyping and manufacturing, testing and simulation and electronic embedded system.

Contact:

Prof. Dr. Abdul Hafidz bin Omar Faculty of Health Science and Biomedical Engineering, Universiti Teknologi Malaysia, UTM Johor Bahru, 81310 Skudai, Johor, Malaysia.

Email : aho@utm.my / aho@biomedical.utm.my Tel : +6(07) 5535972

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RESEARCH GROUPS

1) Medical Implant Technology Group (MEDITEG)

MEDITEG was found in August 2006 to champion the research, development and commercialisation of medical implants and their related technologies. This research group believe strongly in the value of interdisciplinary pursuits in this challenging field where engineering techniques and technologies from various disciplines are utilised to address needs within the medical industries and healthcare services. Our area of interest include joint and dental biomechanics, cardiovascular and cardiothoracic fluid dynamics, prosthetics and orthotics, biomedical materials for tissue replacement, bone substitution, artificial organs and endosseus implants.

MEDITEG is one of the most successful research groups in UTM with a total research project of 25 and a total approved grant of RM8, 425,413. Some of the achievements are 52 patents pending, 36 copyrights, 53 publications and 5 awards.

Contact:

Assoc. Prof. Engr. Dr. Mohammed Rafiq bin Dato' Abdul Kadir, M.I.E.M. Faculty of Health Science and Biomedical Engineering, Universiti Teknologi Malaysia, UTM Johor Bahru, 81310 Skudai, Johor, Malaysia. Email : rafiq@biomedical.utm.my Tel : +6(07) 5535961

2) Progressive Healthcare and Human Development Research Group (PH2D-RG)

Progressive Healthcare and Human Development Research Group (PH2D-RG) is a multidisciplinary research group established on 22 June 2009. This group combines medical fields, engineering and educations to create a solution for better healthcare and human development. This group formerly known as Clinical Engineering and Application Research Group (CLEANER Group). CLEANER group has been established in January 2007 with initial project for development of Early Intervention Support System for Down-syndrome children. The first project was supported by Agilent Technologies Sdn. Bhd and very successful in resulting a patented prototype, some journal and conference papers. In September 2007, the group also won Malaysia Innovator Award 2007.

This group currently has 5 research grants from MOSTI and MOHE with total grants about RM 1 million. The achievement during last 2 years includes 7 marketable prototypes, 5 patents applications and 2 copyrights, 13 national and international innovation awards and more than 40 international and national publications.

Contact:

Assoc. Prof. Dr. -Ing. Eko Supriyanto Faculty of Health Science and Biomedical Engineering, Universiti Teknologi Malaysia, UTM Johor Bahru, 81310 Skudai, Johor, Malaysia. Email : eko@biomedical.utm.my Tel : +6(07) 5535429

3) Computer Added Rehab Engineering (CARE)

This group is involved in the development of computer based tools for the training and rehabilitation of the disabled, both physical disabilities as well as mental retardation. The group works very closely with Taman Sinar Harapan in Johor Bahru which is a government institution for training the disabled. Among others, the group has developed computer based tools for life skills training, tools for speech and stuttering therapy, soft key for the disabled to use computers and evaluation tools to assess physical disabilities.

Contact:

Prof. Dr. Jasmy bin Yunus Faculty of Health Science and Biomedical Engineering, Universiti Teknologi Malaysia, UTM Johor Bahru, 81310 Skudai, Johor, Malaysia.

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4) Biosignal Processing Research Group (BSP)

Biomedical is a wide area of study and a very active research field. Biomedical signals are bioelectrical signals that originate from human body. Biomedical signal processing involves the processing of signals such as ECG, EEG, EMG and etc. in order to improve medical diagnosis and prognosis. Biomedical signals need an accurate and detail process to avoid errors in diagnosis and to solve various problems occurs in human body. For this reason, BSP was founded in 2008 with the following objectives:

- To conduct research related to physiological signal processing such as ECG. EEG, EMG and others.
- To develop algorithm and software based on the physiological signals and thus detect various types of related disease.
- To create a group of researchers that specialized in the physiological signal processing.
- To create an opportunity for researchers to share knowledge and expertise in order to expand the physiological signal processing field.

Contact:

Dr. Malarvili Balakrishnan Faculty of Health Science and Biomedical Engineering Universiti Teknologi Malaysia, UTM Johor Bahru, 81310 Skudai, Johor, Malaysia.

Email : malarvili@biomedical.utm.my Tel : +6(07) 5536221

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RESEARCH GRANT

Since its establishment in 2007, the faculty has succeeded in securing a total of RM 20 million in research grants. The active research environment provides the academic staff, researchers and students with the latest facilities and technology necessary for quality research work, relevant to today's engineering field. Most of the grants awarded to FKBSK academic staff are from:

- MOSTI: Science Fund (eSF), Techno Fund (TechF)
- MOHE: Fundamental Research Grant Scheme (FRGS)
- UTM: Institutional Research Grant (IRG), GUP
- Ministry of Health

MOSTI= Ministry of Science, Technology and Innovation MOHE = Ministry of Higher Education

	Research Title	Department	Grant
1.	Up-scaling of Prototype Tita- nium Alloy Implant for Dental and Craniofacial Application by Powder Injection Moulding Technique Using Palm Oil Based Binder System	Biomechanics and Biomedical Materials	eTechno- Fund RM3,658,583
2.	Development of Hydroxyapa- tite Biomimetic Coating of Biomedical Grade Metallic Implant Using Investment Casting Technique	Biomechanics and Biomedical Materials	eScience- Fund RM3,658,583
3.	Failure Prediction of Cancel- lous Bone Using Morphologi- cal Data of Trabeculae Struc- ture."	Biomechanics and Biomedical Materials	eScience- Fund RM349,610
4.	Bio-tribocorrosion Perform- ance of High Carbon and Low Carbon Biomedical Grade CoCrMo Alloys	Biomechanics and Biomedical Materials	eScience- Fund RM272,000
5.	Nano-sized Hydroxyapatite Particles Reinforced Ultra High Molecular Weight Poly- ethylene for Biomedical Appli- cations	Biomechanics and Biomedical Materials	eScience- Fund RM265,630
6.	Development of Binary Mg- Ca Alloys as Bone Analogue Scaffold	Biomechanics and Biomedical Materials	eScience- Fund RM257,830
7.	Biomimetic Design and Fabri- cation of Load Bearing Tissue Scaffolds for Stem Cells Tis- sue Regeneration	Biomechanics and Biomedical Materials	eScience- Fund RM248,600
8.	Design and Fabrication of Specialised High Flexion (HF) Knee Implants Fortified by Nano-Crystalline Diamond Coatings	Biomechanics and Biomedical Materials	eScience- Fund RM208,200

	Research Title	Department	Grant
9.	Bone Adaptation Algorithm as a Preoperative Surgical Tool in Joint Arthroplasty	Biomechanics and Biomedical Materials	eScience- Fund RM199,600
10.	Development of Low Friction Lightweight Acetabular Cup Specialised for Malaysian Population	Biomechanics and Biomedical Materials	eScience- Fund RM196,800
11.	The Effect of Cartilage Rings on 3D Simulated Airflow of the Trachea and Main Bron- chi	Biomechanics and Biomedical Materials	eScience- Fund RM186,760
12.	Biomechanical Analyses and Design Optimisation Using the Bone Remodeling Poten- tial (BRP) for Hip Joint Ar- throplasty	Biomechanics and Biomedical Materials	eScience- Fund RM177,100
13.	Development of Polyethere- therketone Hydroxyapatite Bioactive Composite for Load Bearing Bone Ana- logue	Biomechanics and Biomedical Materials	eScience- Fund RM163,700
14.	Early Warning Detection of the Risk of Rupture of Ab- dominal Aortic Aneurysm using the Fluid Structure Interaction Technique	Biomechanics and Biomedical Materials	eScience- Fund RM140,100
15.	Development of a Mechani- cal Interlock Dental Prosthe- sis with Hydroxyapatite/ Silver/Titania Biocomposite Thin Film Coating	Biomechanics and Biomedical Materials	eScience- Fund RM254,500
16.	Three Dimensional Recon- struction and Fluid Flow Simulation for Pre and Post Functional Endoscopic Sinus Surgery, and through the Radiocephalic Arteriovenous Fistula with and without lo- calized Stenosis	Biomechanics and Biomedical Materials	eScience- Fund RM258,200

	Research Title	Department	Grant
17.	Biomechanical Analysis and Implant Development for To- tal Arthroplasty of the Shoul- der and Elbow Joint	Biomechanics and Biomedical Materials	eScience- Fund RM235,100
18.	Development of Novel Im- plant with Micropatterns to Improve Wear Resistance in Load Bearing Joint of the Hip and Knee	Biomechanics and Biomedical Materials	eScience- Fund RM192,600
19.	Development of Biodegrad- able Elastomer/Calcium Phosphate Synthetic Liga- ment Graft for Potential Use in Ligament Reconstruction	Biomechanics and Biomedical Materials	eScience- Fund RM200,000
20.	Development of Porous Tan- talum Chondrocyte Implant for Repair of Focal Osteo- chondral Defects - <i>in vivo</i> Study in Goats	Biomechanics and Biomedical Materials	eScience- Fund RM238,600
21.	Three Dimensional Investi- gation of Cerebrospinal Fluid Flow in the Third Ventricle and the Aqueduct of Sylvius	Biomechanics and Biomedical Materials	eScience- Fund RM190,800
22.	Interface Micromotion Failure Simulation of Cementless Hip Prosthesis	Biomechanics and Biomedical Materials	FRGS RM15,000
23.	A New Method for Material Properties Assignment to Individual Element of Finite Element Model Based on Greyscale Value	Biomechanics and Biomedical Materials	FRGS RM40,000
24.	A Study on the Effect of Car- bon Content of Cobalt Chrome Molybdenum Alloys to Diamond Coating Surface Treatment	Biomechanics and Biomedical Materials	FRGS RM44,000

	Research Title	Department	Grant
25.	Diffusion Evaluation of Hy- droxyapatite on Biometallic Implant Using Investment Casting Technique	Biomechanics and Biomedical Materials	FRGS RM52,000
26.	Study and Characterization of polymer and ceramic materials for multi- frequency ultrasound trans- ducer	Clinical Science and Engineering	FRGS RM43,680
27.	Early Detection of Trisomy 21 using maternal bio- chemical and fetal anatomi- cal markers	Clinical Science and Engineering	FRGS RM30K
28.	Ultrasound Power Meter	Clinical Science and Engineering	UTM-MDEC RM150K
29.	Biomedical Power Supply	Biomedical In- strumentation and Signal Proc- essing	Innofund MOSTI RM275K
30.	Instantaneous frequency estimation technique for multicomponent biomedical signal based on time- frequency approach	Biomedical In- strumentation and Signal Proc- essing	FRGS RM50K

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LIST OF RESEARCH GRANT (2011)

	Research Title	Department	Grant
1.	Exploring New Techniques of Articulation for Wrist Joint Replacement Implant	Biomechanics and Biomedical Materials	ERGS RM 95,000
2.	Anti-Diabetic Effect of EPA/ DHA (Omega 3) In Vivo and In Vitro	Clinical Science and Engineering	GUP RM 129,000
3.	Development of a real-time in vivo degradation monitoring system to investigate interac- tion between metallic biode- gradable implant with the sur- rounding implantation site	Clinical Science and Engineering	ERGS RM 246,000
4.	Novel metal-polymers system for biodegradable implants	Biomechanics and Biomedical Materials	GUP RM 150,000
5.	Monitoring system for in vivo degradation of biodegradable implants	Biomechanics and Biomedical Materials	ERGS RM 246,000
6.	Characterisation of Multi De- grees of Freedom (DOF) Bio- Inspired Inertial Sensor for Medical	Biomechanics and Biomedical Materials	UTM Short Term Re- search Grant RM 30,000
7.	Development of Novel Top- Down Manufacturing Meth- ods for Textile-Based (Bio) Medical Micro-/Nano-devices	Biomechanics and Biomedical Materials	GUP RM 129,000
8.	Micromechanical Behaviour of Campaniform Sensillum and Its Mimetic Structure for Biomedical Sensor	Biomechanics and Biomedical Materials	FRGS RM 189,600
9.	Patients satisfaction with or- thotic and prosthetic devices in Malaysia	Biomedical Instru- mentation and Signal Processing	UTM Short Term Re- search Grant RM 20,000

RESEARCH GRANT (2011)

	Research Title	Department	Grant
10.	Identification of situation based environment towards noise reduction in EEG and ECG acquisition	Biomedical Instru- mentation and Signal Processing	Research University Grant RM 40,000
11.	Development of Biomedical Image Processing Software Package for new learners	Biomedical Instru- mentation and Signal Processing	DPP RM 15,000
12.	Adaptive Wavelet Filter Bank for Intelligent Diagnostic of Cardiac Diseases	Biomedical Instru- mentation and Signal Processing	GUP RM 40,000
13.	Design and Implementation of Autonomous Ultrasound Scanning Model for Cervix Cancer Diagnosis	Clinical Science and Engineering	Academic Visitor RM 30,000
14.	Novel Method of Assessing Compliance Levels and Task Performance of Incentive Spi- rometry - a Pilot Study	Therapy and Rehabilitation	GUP RM 40,000
15.	Study and Modelling of Hy- brid Polymer-Ceramic Materi- als for Multi-frequency Ultra- sound Transducer	Clinical Science and Engineering	FRGS RM 44,000
16.	Instantaneous Frequency Estimation Technique for Bio- medical Signal based on Time-Frequency Approach	Clinical Science and Engineering	New Aca- demic Staff RM 10,000
17.	New Learning Algorithm based Hidden Markov Model (HMM) as Stochastic Model- ing for Pattern Classification	Clinical Science and Engineering	FRGS RM 78,000
18.	Instantaneous Frequency Estimation Technique for Multicomponent Biomedical Signal based on Time- Frequency Approach	Clinical Science and Engineering	FRGS RM 50,000

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RESEARCH GRANT (2011)

	Research Title	Department	Grant
19.	Automatic Detection of Asth- matic Patient Using Digital Processing of Capnogram	Clinical Science and Engineering	GUP RM 129,000
20.	Development of Malay Speech Technology for Pre- school Vocabulary Learning System	Biomedical Instru- mentation and Signal Processing	GUP RM 150,000
21.	Bio-photonics Medical Sensor	Biomedical Instru- mentation and Signal Processing	Flagship RM 100,000

LIST OF SELECTED PUBLICATIONS

Until year 2011, faculty's postgraduate students and academic staff have published for more than 50 publications. Some of the journal publications are listed below:

- Azadeh Nilghaz, Dedy H.B. Wicaksono, Dwi G. Riban, Fadzilah Adibah Abdul Majid, Eko Supriyanto and Mohammed Rafiq Abdul Kadir "Flexible Microfluidic Cloth-based Analytical Devices Using Low- Cost Wax Patterning Technique." Lab on Chip, Accepted, In Press.
- Vijayajothi Paramasivam, Kanesan Muthusamy & Mohammed Rafiq Abdul Kadir, "Mixed Velocity-Pressure (v-p) Finite Element Method in Assessing the Hemodynamic Wall Shear Stresses in a Fusiform Abdominal Aortic Aneurysm." Biomedical Soft Computing and Human Sciences, Vol. 17, No. 1, pp. 81-87, 2011.
- Nasrul Hadi Johari, Kahar Osman, Mohammed Rafiq Abdul Kadir, & Azian Abd Aziz, "The Effect of Different Locations of Tracheal Stenosis to the Flow Characteristics using Reconstructed CT- Scanned Image. Journal of Mechanics in Medicine and Biol ogy, Accepted, In Press.
- Raja Mohd Aizat Raja Izaham, Mohammed Rafiq Abdul Kadir, MuraliMalliga Raman & Tengku Kamarul Zaman Tengk Zainal Abidin, "Evaluating the Stability of Puddu and Tomofix Plate fixation for Open Wedge High Tibial Osteotomy: A Finite Element Analysis." Injury, In Press, Corrected Proof, 2011.

Ardiyansyah Syahrom, Mohammed Rafiq Abdul Kadir, Jaafar Abdullah & Andreas Ochsner, "Mechanical and Microarchitectural Analyses of Cancellous Bone Through Experiment and Computer Simulation." Medical & Biological Engineering & Computing, Accepted, In Press. Mohd Yusof Baharuddin, Mohammed Rafiq Abdul Kadir, Ahmad Hafiz Zulkifly, Azlin Sa'at & Azian Abdul Aziz, "Morphology Study of the Proximal Femur in Malay Population." International Journal of Morphology, Accepted, In Press. Bakhsheshi Rad, Mohd Hasbullah Idris, Mohammed Rafiq Abdul Kadir & Saeed Farahany, "Microstructure Analysis and Corrosion Behavior of Biodegradable Mg-Ca Implant Alloys." Materials & Design, Accepted, In Press. Bakhsheshi Rad, Ahmad Monshi, Mohd Hasbullah Idris, Mohammed Rafiq Abdul Kadir & Hassan Jafari, "Premature Failure Analysis of Forged Cold Backup

Roll in a Continuous Tandem Mill." Materials & Design, Vol. 32, Issue 8-9, pp. 4376-4384, 2011.

Bakhsheshi Rad, Mohd Hasbullah Idris, Ahmad Monshi, H. Monajatizadeh, Hassan Jafari & Mohammed Rafiq Abdul Kadir, "Effect of Multi-Step Tempering on Retained Austenite and Mechanical Properties of Low Alloy Steel." International Journal of Iron and Steel Research, Accepted, In Press.

S. Izman, Mohammed Rafiq Abdul Kadir, Mahmood Anwar, E.M. Nazim, Adila Nalisa & M. Konneh, "Effect of Carburization Process on Adhesion Strength of Ti Carbide Layer on Titanium Alloy Substrate." Advanced Materials Research, 197-198, pg 219-224, 2011.

- S. Izman, Mohammed Rafiq Abdul Kadir, Mahmood Anwar, E.M. Nazim, L.Y. Kuan & E.K. Khor, "Effect of Pickling Process on Adhesion Strength of Ti Oxide Layer on Titanium Alloy Substrate." Advanced Materials Research,146-147, pg1621-1630, 2011.
- Muhamad Rasyidi Husin, Mat Uzir Wahit, Mohammed Rafiq Abdul Kadir & Wan Aizan Wan Abdul Rahman, "Effect of Hydroxyapatite Reinforced High Density Polyethylene Composites on Mechanical and Bioactivity Properties." Key Engineering Materials, 471-472, pg 303-308, 2011.
- Mazatusziha Ahmad, Mat Uzir Wahit, Mohammed Rafiq Abdul Kadir & Khairul Zaman Mohd Dahlan, "Influence of Processing Aids and Hydroxyapatite as Fillers on Flow Behaviour and Mechanical Properties of Ultra High Molecular Weight Polyethylene/High Density Polyethylene Composites." Key Engineering Materials, 471-472,pg 827-832, 2011.
- Amirhossein Goharian, Ahmad Ramli Rashidi, Mohammed Rafiq Abdul Kadir, Mohamed Ruslan Abdullah & Mat Uzir B. Wahit, "Development of Novel Polymer Composite Beam Using Ultrasonic Welding Process for Acetabular Cup Prosthesis." Key Engineering Materials, 471-472, pg 945-950, 2011
- Syafiqah Saidin, Mohammed Rafiq Abdul Kadir, Noor Hayaty Abu Kassim & Eshamsul Sulaiman, "Effects of different implant- Abutment connections on the micromotion and stress distribution: Prediction of the formation of microgap." Journal of Dentistry, Accepted, In Press.
- Mohammed Rafiq Abdul Kadir, Ardiyansyah Syahrom & Andreas Öchsner, "Finite Element Analysis of Idealised Unit Cell Cancellous Structure Based on Morphological Indices of Cancellous Bone." Medical & Biological Engineering & Computing, 48(5), pg 497-505, 2010.

- Mohammed Rafiq Abdul Kadir, Nazri Kamsah & Alhamzee Idrose, "Analysis of Glenoid Fixation Features under Simulated Off-Centre Loading." European Journal of Scientific Research, 36(2), pg 318-325, 2009.
- Mohammed Rafiq Abdul Kadir & Nazri Kamsah, "The Effect of Bone Properties due to Skeletal Diseases on Stability of Cementless Hip Stems." American Journal of Applied Sciences, 6(12), pg 1988-1994, 2009.
- Mohammed Rafiq Abdul Kadir, Ulrich Hansen, Ralf Klabunde, Duncan Lucas & Andrew Amis, "Finite element modelling of primary hip stem stability: The effect of interference fit."Journal of Biomechanics, 41, pg 587-594, 2008.
- Fitdriyah Hussain, Mohammed Rafiq Abdul Kadir, Ahmad Hafiz Zulkifly, Azlin Sa'at, Azian Abd Aziz, K Gopal, Md.Golam Hossain& Tengku Kamarul Zaman Tengku Zainal Abidin, "Anthropometric Measurements of the proximal tibia in the Development of Implants for Total Knee Arthroplasty." Submitted to International Journal of Morphology.
- Mina Alizadeh, Mohammed Rafiq Abdul Kadir, Ali Fallahi Arezoodar, SR Kanthan, Malliga Raman Murali & Tengku Kamarul Zaman Tengku Zainal Abidin, "The Role of Crosslinking Improving the Stability of Posterior Instrumentation in Thoracolumbar Burst Fractures: A Finite Element Study." Submitted to Journal of Engineering in Medicine.
- Mohd Nazri Bajuri, Mohammed Rafiq Abdul Kadir, Malliga Raman Murali & Tengku Kamarul Zaman Tengku Zainal Abidin, "Biomechanical Analysis of Wrist Arthroplasty in Rheumatoid Arthritis: A Finite Element Analysis." Submitted to Biomechanics & Modeling in Mechanobiology.
- Mohd Nazri Bajuri, Mohammed Rafiq Abdul Kadir, Iskandar Mohd Amin & Andreas Öchsner, "Biomechanical Analysis of Rheumatoid Arthritis of the Wrist Joint." Submitted to Journal of Engineering in Medicine.

- Aisyah Ahmad Shafi, Mohammed Rafiq Abdul Kadir, Eshamsul Sulaiman & Noor Hayaty Abu Kasim, "The Effect of Implant-Abutment Material and Implant Thread Designs on Stress Distribution and Relative Micromotion." Submitted to Finite Element in Analysis and Design.
- Mohd Fadhli Miskon, Mohammed Rafiq Abdul Kadir, Mina Alizadeh, Azmi Baharudin, Shaharudin AR, Mohd Hisam MA & Nurul Azwa MN, "Adding Crosslink to a Posterior Long Construct for Thoracolumbar Burst Fracture: A Finite Element Analysis." Submitted to Archives of Orthopaedic and Trauma Surgery.
- Noor Hayaty Abu Kasim, Ahmed Madfa, Jamal Kashani, Mohammed Rafiq Abdul Kadir, Marhazlinda J, Rahbari R, Hamdi M & Basri Johan Jeet Abdullah, "Stress Distribution in Maxillary Central Incisors Restored with Various Types of Post Materials and Design." Submitted to Biomaterials.
- Muhammad Ikman Ishak, Mohammed Rafiq Abdul Kadir, Eshamsul Sulaiman & Noor Hayaty Abu Kasim, "Biomechanical Study of Fixed Implant-Retained Prosthesis Finite Element Analysis of the Influence of Different Surgical Approaches and Loading Conditions." Submitted to the International Journal of Oral and Maxillofacial Implants.
- Muhammad Ikman Ishak, Mohammed Rafiq Abdul Kadir, Eshamsul Sulaiman & Noor Hayaty Abu Kasim, "Biomechanical Study of Different Surgical Approaches of Zygomatic Implant to Treat Atrophic Maxilla Patients." Submitted to the International Journal of Oral and Maxillofacial Surgery
- Fitdriyah Hussain, Mohammed Rafiq Abdul Kadir, Ahmad Hafiz Zulkifly, Azlin Sa'at, Azian Aziz, K Gopal, Md. Golam Hossain & Tengku Kamarul Zaman Tengku Zainal Abidin, "Anthropometric Measurements of the Human Distal Femur: A Study of the Adult Malay Population." Submitted to the Knee.

- Nasrul Humaimi Mahmood and Che Ku Mohd Salahuddin Che Ku Long. "Smart electronic chess board using reed switch". Jurnal Teknologi Special Edition, No. 55, Mei 2011, pp. 41-52.
- N.Ramli, M.N.Ibrahim, M. Idroas, F.K.Che Harun, N.H.Mahmood. "Labview based driver for charge-coupled device linear image sensor". Jurnal Teknologi Special Edi tion, No. 55, Mei 2011, pp. 129-140.
- Nasrul Humaimi Mahmood, Ching Yee Yong, Rubita Sudirman, Camallil Omar, Kim Mey Chew. "Functional and Health Related Analysis in The Dicipline of Prosthet ics", International Journal of Advances in Engineering and Technology, Vol.1 Issue 3, July 2011. pp. 171-179.
- P. I. Khalid, J. Yunus, R. Adnan, M. Harun, R. Sudirman, N. H. Mahmood. "The use of graphic rules in grade one to help identify children at risk of handwriting difficulties." Research in Developmental Disabilities, 31, 2010, pp. 1685-1693.
- Abdul Hafidz, Sports : As an Appliance of Incorporation Toward Malaysia Society. Journal of Social Science Research 2010 Abdul Hafidz Grounded Theory : A Short Cut to Highlight a Researcher's Intellectuality. Journal of Social Science Research 2010.
- Puspa Inayat Khalid, Jasmy Yunus, Robiah Adnan, Extraction of dynamic features from hand drawn data for the identifica tion of children with handwriting difficulty, Research in De velopmental Disabilities, vol 31., pg 256-262, 2009.
- Akram Gasmelseed, Jasmy Yunus, "2-D FDTD Calculation of Specific Absorption Rate Of Hyperopic and Myopic Human -Eye: LabVIEW-based approach", Int.J. Biomedical Engineering Technology, Vol.1, No. 4, pg 382-394, 2008.
- Akram Gasmelseed, Jasmy Yunus, 'LabVIEW-based Planar Multilayred Model for Estimation of The Absorbed Energy Inside Biological Tissues," IEEE Antenna & Progpagation Magazine, Vol.50, No.2, April 2008, pp.152-158.

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List of selected conference publication;

- Naznin Sultana, Mohammed Rafiq Abdul Kadir, Fadzilah Adibah Abdul Majid & Norsamsiah Muhamad Wahab " In Vitro Degradation of Thin Films and Tissue Engineering Scaffolds based on Biodegradable Polymers." 2nd International Conference on Biotechnology Engineering (ICBioE 2011) Mohd Nazri Bajuri & Mohammed Rafig Abdul Kadir
- "Biomechanical Analysis on The Effect of Bone Graft of The Wrist After Arthroplasty." 5th International Conference on Biomedical Engineering, in conjunction with the 8th Asian Pacific Conference on Medical and Biological Engineering (APCMBE 2011)
- Jamal Kashani, Mohammed Rafiq Abdul Kadir & Zohreh Arabshahi "Finite Element Analysis of Different Ferrule Heights of Endodontically Treated Tooth." 5th International Conference on Biomedical Engineering, in conjunction with the 8th Asian Pacific Conference on Medical and Biological Engineering (APCMBE 2011)
- S.S.R. Koloor, Jamal Kashani & Mohammed Rafiq Abdul Kadir "Simulation of Brittle Damage for Fracture Process of Endodontically Treated Tooth." 5th International Conference on Biomedical Engineering, in conjunction with the 8th Asian Pacific Conference on Medical and Biological Engineering (APCMBE 2011)
- Mohammed Rafiq Abdul Kadir "Application of Computational Fluid Dynamics in Assessing the Hemodynamics in Abdominal Aortic Aneurysms." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742194, pp. 32-37.
- Mina Alizadeh, Mohammed Rafiq Abdul Kadir & Saturnino Saldanha, "Biomechanical Effects of Short Construct Spine Posterior Fixation, in Thoracolumbar Region with L1 Burst Fracture." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742280, pp. 454-459.

Mohd Nazri Bajuri & Mohammed Rafiq Abdul Kadir "Biocomputational Comparative Study of Rheumatoid Arthritis of the Wrist Joint before and after Arthroplasty; Carpal Stability Analysis." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742242, pp. 270-275.

Norsamsiah binti Muhamad @ Wahab, Fadzilah Adibah Abdul Majid & Mohammed Rafiq Abdul Kadir "Toxic Element Released from High and Low Carbon CoCrMo Alloy In- Vitro." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742224, pp. 180-183.

Fitdriyah Hussain, Mohammed Rafiq Abdul Kadir, Ahmad Hafiz Zulkifly, Azlin Sa'at & Azian Abd. Aziz "Three Dimensional Anthropometric Measurements of the Distal Femur and Proximal Tibia for the Malay Population." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742246, pp. 291-294.

Ali Fallahi Arezoodar & Mohammed Rafiq Abdul Kadir "Kinematic Analysis of High Flex knee Implant in Sagittal Plane before Manufacturing Real Prosthesis." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742281, pp. 460-465.

Nor Raihanah Abdull Rahim, Mohammed Rafiq Abdul Kadir & Eskandar @ Zulkarnain Hassan "Comparing the Effects of Laminotomy and Hemilaminectomy to the Spinal Segment." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742276, pp. 433-437.

Muhammad Ikman Ishak, Mohammed Rafiq Abdul Kadir, Eshamsul Sulaiman & Noor Hayaty Abu Kassim "Effects of Different Zygomatic Implant Body Surface Roughness and Implant Length on Stress Distribution." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742230, pp. 210-215.

- Syafiqah Saidin, Mohammed Rafiq Abdul Kadir, Eshamsul Sulaiman & Noor Hayaty Abu Kassim "Finite Element Analysis on Internal Hexagonal and Internal Conical Abutment." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742231, pp. 216-220.
- Raja Mohd Aizat Raja Izaham, Mohammed Rafiq Abdul Kadir & Darhaysham Al-Jefri Muslim "Screws Placement Effect on Locking Compression Plate (LCP) for Tibial Oblique Fracture Fixation." IEEE EMBS Conference on Biomedical Engineering & Sciences (IECBES 2010), art. No. 5742235, pp. 236-241.
- Abdul Halim Abdullah, Nor M.A.M., Saman A.M., Tamin, M.N.
 & Mohammed Rafiq Abdul Kadir "Effects of Prosthesis Stem Tapers on Stress Distribution of Cemented Hip Arthroplasty." AIP Conference Proceedings (2010), 1285, pp. 561-575.
- S. Izman, Mohammed Rafiq Abdul Kadir, Mahmood Anwar, E.M. Nazim, E.K. Khor & M. Konneh, "Effect of Pickling and Mechanical Surface Treatment Methods on Adhesion Strength of Ti Oxide Layer Formed on Titanium Alloy Substrate." 34th International Electronic Manufacturing Technology Conference, 2010.
- Mohd Yusof Baharuddin & Mohammed Rafiq Abdul Kadir, "Finite Element Study on the Micromotion of Cementless Total Hip Arthroplasty." IFMBE Proceedings, 31 IFMBE, pp. 605-607, 2010.
- Mohd Yusof Baharuddin & Mohammed Rafiq Abdul Kadir, "Finite Element Study on the Stability of Cementless Acetabular Cup." IFMBE Proceedings, 31 IFMBE, pp. 601-604, 2010.
- Ishkrizat Taib, Kahar Osman, Mohammed Rafiq Abdul Kadir & Mohd H. Padzillah, "Risk of Rupture Analysis for Advanced Level of AAA Under Combined Physiological and Physical Conditions." 2nd International Conference on Biomedical and Pharmaceutical Engineering, ICBPE 2009, Conference Proceedings art. No. 5384089.

Badreddin G.S.K., Kahar Osman & Mohammed Rafiq Abdul Kadir, "Numerical Modelling of Fusiform Aneurysm with High and Normal Blood Pressure." 3rd Asia International Conference on Modelling and Simulation, AMS 2009, art. No. 5071995, pp. 270-275.

Mohammed Rafiq Abdul Kadir, Kahar Osman & Ahmad Ihsan Zainudin, "The Use of Mechanical Interlock in Dental Prosthesis." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 457-460, 2008.

Mohammed Rafiq Abdul Kadir, Nazri Kamsah & Zaliha Aziz, "Eccentric Loading on the Tibial Plate After Knee Replacement." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 403-406, 2008.

Mohammed Rafiq Abdul Kadir, Nazri Kamsah & Mohd Azuwan Aminullah, "Finite Element Study of Metacarpophalangeal Joint Silicone Implants." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 420-423, 2008.

Mohammed Rafiq Abdul Kadir, Nazri Kamsah & Norhayanti Mohlisun, "Interface Micromotion of Cementless Hip Arthroplasty: Collared vs Non-collared Stems." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 428-432, 2008.

Mohammed Rafiq Abdul Kadir, Nazri Kamsah & Hakimah Shabudin, "Stability of Talus Component in Total Ankle Arthroplasty." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 453-456, 2008.

Mohammed Rafiq Abdul Kadir, Habibollah Haron, Nazri Kamsah & Norazhar Nordin, "Miniplates Orientation for Fracture Fixation of the Mandibular Condyle." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 438-441, 2008.

- Mohammed Rafiq Abdul Kadir, Ishkrizat Taib, Kahar Osman & Mohd Hafiz Abdul Hamid, "Blood Flow Simulation of Stented Aneurysm Model." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 398-402, 2008.
- Mohammed Rafiq Abdul Kadir, Nazri Kamsah & Muhsin Salim, "Effect of Metal backed Geometry on the Stability of Cementless Acetabular Cup." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 410-413, 2008.
- Mohammed Rafiq Abdul Kadir, Ardiyansyah Syahrom, Mohd Azrul Rais Yusof & Nazri Kamsah, "Micro-modeling and Analysis of Actual and Idealised Cancellous Structure." 4th International Conference on Biomedical Engineering, IFMBE Proceedings, 21 IFMBE (1), pp. 433-437, 2008.
- E.Supriyanto, T.A.Rahman, H.Satria, R.F.Malik and R.Ngah, Simulation f Emerency Prenatal Telemonitoring System in Wireless Mesh Network, Accepted in International Conference on Modeling, Simulation and Applied Optimization, IEEE UAE Section, Sharjah, UAE 2009.
- Mazlina Esa, Ikhwan Peranggi Pohan, Jasmy Yunus, Meandered -Gap Hairpin Lowpass Filter with Second and Third Harmonic Suppression", The 2009 International Symposium on Antennas and Propagation, ISAP 2009, Bnagkok, Thailand, October 20-23, 2009.
- E.Supriyanto, E.X.Lau, Automatic Image Quality Monitoring System for Low Cost Ultrasound Machine, Proceedings of the 5th International Conference on InformationTechnology and Technology and Application in Biomedicine, IEEE Catalog Number: CFP08ITA-CDR, ISBN: 978-1-4244-2255-5, China, May, 2008.

FACILITIES

A new FKBSK building will be completed in 2012 and equipped with 80 laboratories for teaching and research activities. Some of the laboratories are listed as follows:

List of new laboratory

- Biomedical Signal Processing
- Basic Medical Diagnostic Lab
- Biomedical Communication Lab
- Biomedical Instrumentation Lab
- Modeling & Simulation
- Biomedical Automation Lab
- Tissue Culture & Biocompatibility Lab
- Pbl & Cooperative Learning Lab
- Biocomputing Lab
- Medical Analysis & Simulation Lab
- Medical Ergonomics Lab
- DNA & Genetic Computing Lab
- Thermal Imaging Lab
- Biomedical Emectronic Lab
- PCB Lab
- Hearing Diagnostic Lab

Faculty of Health Science & Biomedical Engineering - Postgraduate Programmes

- Meeting Room
- Technician Room
- Mechanical Properties Lab
- Head Of Lab
- Motion Analyis Lab
- Biocomposite Lab
- Biofluid And Tribology
- Rapid Prototyping
- Sample Preparation Lab
- Machining Lab
- Metrology
- Isolated DAQ Room
- Nanotechnology Lab
- Neural Engineering Lab
- Electrical & Electronics Lab



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CAREER PROSPECTS

Biomedical engineering is one of the tough career options preferred by talented individuals in the area of engineering and medical sciences. There are enormous opportuinities in this field.

Biomedical engineers are employed in universities, in industry, in hospitals, in research faculties of educational and medical institutions, in teaching, and in government regulatory agencies. They often serve a coordinating or interfacing function, using their background in both the engineering and medical fields. In industry, they may create designs where an in-depth understanding of living systems and of technology is essential. They may be involved in performance testing of new or proposed products. Government positions often involve product testing and safety as well as establishing safety standards for devices.

In the hospital, biomedical engineer may provide advice on the selection and use of medical equipment, as well as supervising its performance testing and maintenance. They may also build customized devices for special health care or research needs. In research institutions, biomedical engineers supervise laboratories and equipment, and participate in or direct research activities in collaboration with other researchers with such backgrounds as medicine, physiology, and nursing. Some biomedical engineers are technical advisors for marketing departments of companies and some are in management positions.

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ADMISSION PROCEDURE

Students who are interested to join these programme must follow the following procedure.



For more information, please go to: www.sps.utm.my

CONTACT

FACULTY OF HEALTH SCIENCE AND BIOMEDICAL ENGINEERING

MAIN CAMPUS

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