



**Universiti Tun Hussein Onn Malaysia  
86400 Batu Pahat, Johor**



Information contained in this proforma is true at the time of printing and the University has the right to make any ammendment according to needs.

All rights reserved. No part of this proforma may be reproduced in any form or by any means, electronic, photocopying, recording, visual, or otherwise, without prior written permission of the Vice-Chancellor of Universiti Tun Hussein Onn Malaysia.

© Center for Academic Development and Training  
Universiti Tun Hussein Onn Malaysia  
Mac 2016

## Contents

### Contents

Foreword from the Vice-Chancellor	?
Foreword from the Deputy Vice-Chancellor (Academic and International)	?
Foreword from the Dean of Faculty of Civil and Environmental Engineering	?
University Vision	?
University Mission	?
University Education Philosophy	?
University Logo	?
University Board of Directors	?
University Senate Members	?
Faculty of Faculty of Civil and Environmental Engineering	?
Faculty Vision	?
Faculty Mission	?
Faculty Adjung Professors	?
Faculty Visiting Professors	?
Faculty External Examiners	?
Faculty Industrial Advisors	?
Faculty Staff Directory	?
Programme Aims	?
Programme Educational Objectives (PEO)	?
Programme Learning Outcomes (PLO)	?
Curriculum Structure	?
Synopsis of the University Courses	?
Synopsis of the Faculty Courses	?
Career & Further Education Prospect	?

## **Foreword from the Vice-Chancellor**

Salam Sejahtera and Warm Greetings

First of all, please allow me to take this opportunity to extend a warm welcome to our new undergraduates for the academic session of 2016/2017. Thank you for choosing to study at UTHM, and thank you for your faith in the quality of our academic programmes, which we believe would serve you well in your coming years of learning here at the University.

In the course of acquiring advanced knowledge and skills in your respective fields of choice, I hope you will find the University always eager to assist and support your pursuits. Your passion and enthusiasm should be further heightened as you journey towards completion of study and graduation, and I hope that you will leave the University a proud, learned high achiever.

The University is committed to provide the best higher education, especially in the area of engineering technology. Apart from regular review and revision of the programme contents to meet current industrial needs, UTHM is also constantly improving the facilities to ensure a dynamic and conducive learning environment for the students. As future graduates of the University, you are invaluable assets, i.e. human capital, to be groomed and transformed to leaders of tomorrow, for the nation and beyond. Your dreams drive you to work for the goal, and it is your very dreams which drive the University to be by your side every step of the way!

At the threshold of Phase 2 of the National Higher Education Strategic Plan (PSPTN), UTHM is prepared to march towards an era of high quality engineering technology education in particular, in line with the philosophy and aspirations of the Malaysian Technical University Network (MTUN). Built on the strengths of cutting-edge research in green technology and sustainable materials, research excellence contributes to keeping the teaching contents current and relevant with the market trends. The ball is now in your park, to make good of the lively melting pot of teaching and learning, research and development, innovation and commercialization, to soar high and achieve your dreams.

Last but not least, I wish you the very best in your undertaking at hand, and always bearing in mind your duties to your loved ones at home, the society and the nation. We look forward to watch you grow, just as many before you, into outstanding and respectable professionals in your chosen fields.

Thank you, and *bon voyage*. Let the journey begin!

**PROFESSOR DATUK DR. MOHD NOH DALIMIN**

Vice-Chancellor

Universiti Tun Hussein Onn Malaysia

## **Foreword from the Deputy Vice-Chancellor (Academic and International)**

Assalamualaikum Warahmatullahi Wabarakatuh and Warm Greetings

I would like to take this opportunity to express the utmost congratulations and well done to you as the new students whom have been successfully been selected to pursue studies at Universiti Tun Hussein Onn Malaysia for this 2015/2016 session.

I would also like to congratulate Center for Academic Development and Training that has successfully produced the proforma which will be used as a guide for students in planning the studies beginning from the first semester until the end of the studies at this University.

Detailed planning which is effectively implemented at every semester as well as early preparation of students before attending lectures is very important in ensuring the readiness of learning process. Apart from that, the preparation for co-curriculum program also is important in shaping the personality and social development of students.

I hope that the publication of this proforma can be fully utilized by you in planning your studies at the University and you are capable of obtaining the best results as well as attaining excellent success.

Last but not least, I would like to wish All the Best and I pray that you will achieve excellent success in your studies at the University and thus can contribute as the human capital towards religion, race and Nation development.

Thank you.

**PROFESSOR DR. WAHID BIN RAZZALY**

Deputy Vice-Chancellor (Academic and International)  
Universiti Tun Hussein Onn Malaysia

## **Foreword from the Dean of Faculty of Civil and Environmental Engineering**

Salam sejahtera and Salam 1Malaysia

I would like to congratulate all new students at the Faculty of Civil and Environmental Engineering (FoCEE) UTHM for the 2016/2017 academic session. All of you are very fortunate to be selected to enter this University, which is well-equipped with current infrastructure and conducive learning environment. Being selected to this university is a great privilege that should not be wasted. This is due to the fact that the education process at the tertiary level requires continuous effort and commitment so that the knowledge gained can produce students who are excellent in all aspects in accordance with the needs of industries and Nation.

In order to accomplish the University's mission which is to produce and train competitive professionals and technologists of high ethical values, you will be guided by qualified, committed, and responsible academic staff. FoCEE offers academic programmes based on advanced civil engineering field as well as focuses on sustainable environment for universal prosperity. To enhance students' understanding and creativity, the faculty provides laboratories equipped with the latest equipment and assisted by well-trained technicians. Students will also have to undergo practical work in the field relevant to the current industrial needs.

Therefore, you must take this opportunity to work extremely hard in order to achieve the aspirations of not only your parents but also the community and the country. Systematic planning of teaching and learning will produce outstanding graduates.

Thank you.

**ASSOC. PROF. DR. ABD. HALID BIN ABDULLAH**

Dean

Faculty of Civil and Environmental Engineering

Universiti Tun Hussein Onn Malaysia



### **Vision**

Towards a world class university in engineering, science and technology for sustainable development

### **Mission**

Universiti Tun Hussein Onn Malaysia (UTHM) is committed to generate and disseminate knowledge, to meet the needs of industry and community and nurturing creative and innovative human capital, based on tauhidic paradigm

### **University Education Philosophy**

The education and training in this university is a continuous effort to lead in the market oriented academic programmes. These programmes are student-focused and are conducted through experiential learning in order to produce well trained human resource and professionals who are catalysts for a sustainable development.

### **University Logo**

Logo of UTHM is the pride, identity and idealism of the members of UTHM community. UTHM logo displays a Proton, Book, Tiered Mortar Board, Book Rest and Shield.

The whole concept of the logo symbolises UTHM as an Institution of Higher Learning which supports the growth and development of knowledge at all levels in fields of Science and Technology.

**Blue** represents a close-knit circle of members of UTHM community which ensures the success and enhancement of its educational and research programmes and activities for the benefits of mankind.

**Red** symbolises the courage of UTHM in the exploration of new fields as the pioneer in science and technology applications, which reflects the spirit and self-esteem of the members of UTHM community.

#### *Symbolism*

Red	Courage
Blue	Co-operation/Loyalty
Silver	Quality/Prestige
Book Rest	Repository of knowledge
Proton	Science and technology
Book	Knowledge
Mortar board	Levels of study
Shield	Confidence

**Chancellor**

**Duli Yang Maha Mulia Sultan Ibrahim Ibni Almarhum Sultan Iskandar  
Sultan of Johor**

D.K., D.K. (Pahang), SPMJ, SSIJ, S.M.N., S.P.M.T., S.M.P.K., P.I.S.

**Pro-Chancellor I**

**Duli Yang Amat Mulia Tunku Ismail Ibni Sultan Ibrahim**

Tunku Mahkota of Johor

D.K., SPMJ, P.I.S

**Pro-Chancellor II**

**YBhg. Tan Sri Dr. Ali Hamsa**

Chief Secretary to the Government of Malaysia



## University Board of Directors

### Chairman

---

**Tan Sri (Dr.) Ir. Jamilus bin Md Hussin**

President/Chief Executive Officer  
KLIA Premier Holdings Sdn. Bhd

### Members

---

**Professor Datuk Dr. Mohd Noh Dalimin**

Vice-Chancellor  
Universiti Tun Hussein Onn Malaysia

**Tan Sri Dato' Sri Sufri bin Hj Mohd Zin**

Executive Chairman  
TRC Synergy Berhad

**Associate Professor Dr. Arham bin Abdullah**

Director  
Industrial Relation Division  
Ministry of Education Malaysia

**Datuk Dr. Pang Chau Leong**

Department of Skills Development  
Ministry of Human Resources

**Datuk Hj. Mohlis bin Jaafar**

Director General  
Department of Polytechnic

**Dato' Zainal Abidin bin Mat Nor**

Director  
Division of Remuneration Policy, Public Money and Services Division  
Ministry of Finance

**Mrs. Mazula binti Sabudin**

(Ahli Ganti Kementerian Pendidikan)  
Director  
Bahagian Pengurusan Kemasukan Pelajar  
Higher Education Division  
Ministry of Higher Education Malaysia

### Secretary

---

**Mr. Abdul Halim bin Abdul Rahman**

Registrar  
Universiti Tun Hussein Onn Malaysia

## Senate Members

### **Chairman**

---

**Professor Datuk Dr. Mohd Noh Dalimin**

Vice-Chancellor

### **Members**

---

**Professor Dr. Wahid bin Razzaly**

Deputy Vice-Chancellor (Academic and International)

**Professor Dr. Hashim bin Saim**

Deputy Vice-Chancellor (Research and Innovation)

**Associate Professor Dr. Asri bin Selamat**

Deputy Vice-Chancellor (Student Affairs and Alumni)

**Professor Dr. Ahmad Tarmizi bin Abd. Karim**

Assistant Vice Chancellor (Development, Facility Management and ICT)

**Professor Dato' Dr. Abdul Razak bin Hj. Omar**

Assistant Vice Chancellor (Industrial and Community Relation)

**Professor Dr. Noraini binti Kaprawi**

Dean Centre for Graduate Studies

**Associate Professor Dr. Abd Halid bin Abdullah**

Dean Faculty of Civil and Environmental Engineering

**Dr. Afandi bin Ahmad**

Dean Faculty of Electrical and Electronic Engineering

**Associate Professor Dr Shahrudin bin Mahzan @ Mohd Zin**

Dean Faculty of Mechanical and Manufacturing Engineering

**Associate Professor Sr. Dr. David Martin @ Daud Juanil**

Dean Faculty of Technology Management and Business

**Associate Professor Dr. Ahmad bin Esa**

Dean Faculty of Technical and Vocational Education

**Associate Professor Dr. Nazri bin Mohd Nawi**

Dean Faculty of Computer Science and Information Technology

**Associate Professor Dr. Mohamad Zaky bin Noh**

Dean Faculty of Science, Technology and Human Development

**Associate Professor Dr. Ishak bin Baba**

Dean Faculty of Engineering Technology

**Professor Dr. Ismail bin Abd Rahman**

Dean Centre for Diploma Studies

**Associate Professor Dr. Azme bin Khamis**

Dean Center for Academic Development and Training

**Puan Hajah Sarebah binti Warman (Acting)**

Director Centre for Co-Curricular and Culture

**Professor Ir. Dr. Amir Hashim Bin Mohd Kassim**

Faculty of Civil and Environmental Engineering

**Professor Dr. Sulaiman bin Hj Hassan**

Faculty of Mechanical and Manufacturing Engineering

**Professor Dr. Yusri bin Yusof**

Director of International office/Faculty of Mechanical and Manufacturing Engineering

**Professor Dr. Maizam binti Alias**

Faculty of Technical and Vocational Education

**Professor Dr. Jailani bin Md Yunos**

Faculty of Technical and Vocational Education

**Professor Dr. Hj. Mustafa bin Mat Deris**

Faculty of Computer Science and Information Technology

**Professor Dr. Rosziati binti Ibrahim**

Faculty of Computer Science and Information Technology

**Professor Datin Dr. Maryati binti Mohamed**

Faculty of Science, Technology and Human Development

**Professor Dr. Rosman bin Md. Yusoff**

Faculty of Science, Technology and Human Development

**Encik Abdul Halim bin Abdul Rahman**

Secretary/Registrar

**Mdm. Azizah binti Nasri**

Bursary (Acting)

**Mr. Haji Bharun Narosid bin Mat Zin**

Chief of Librarian

## Faculty of Civil and Environmental Engineering

### Faculty Vision

Aspires to lead the application of civil and environmental engineering knowledge in providing innovative and sustainable solutions for the benefits of mankind.

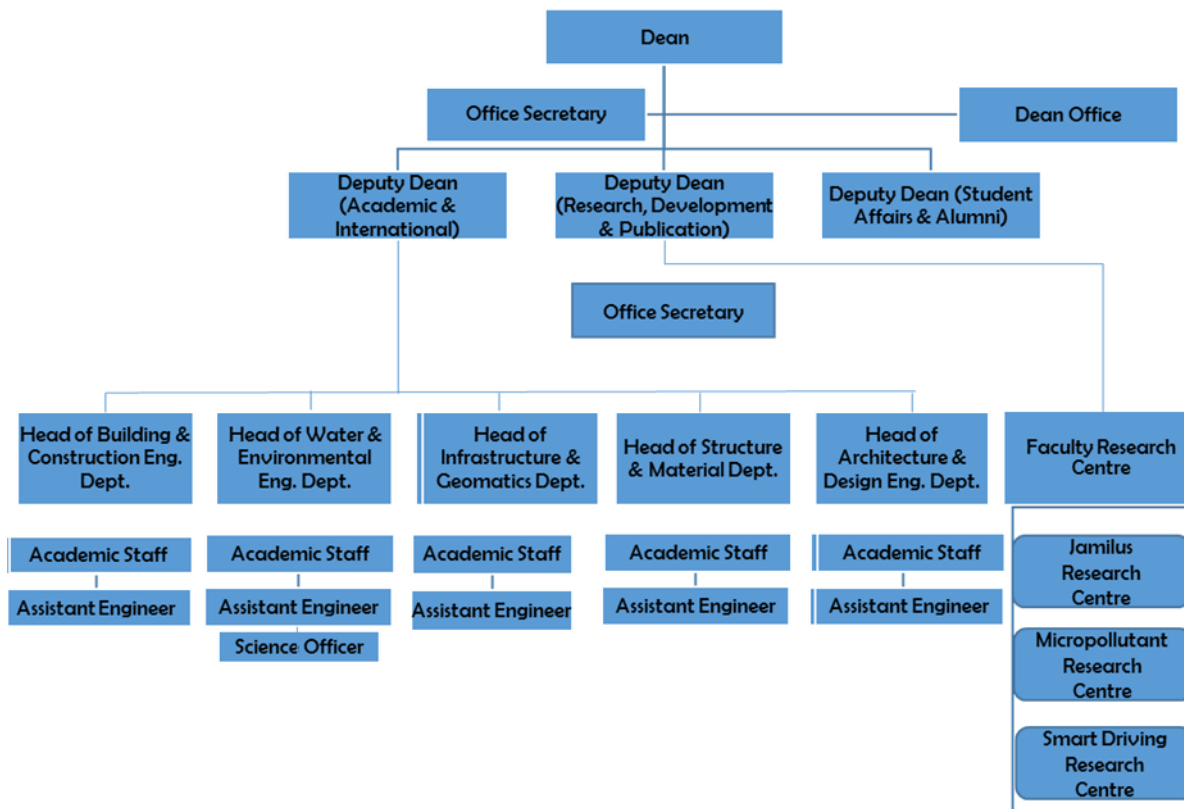
### Faculty Mission

To produce dan train professionals who are creative, innovative, competent and responsible to fulfill the societal and environmental needs in a progressive and sustainable manner

Faculty of Civil and Environmental Engineering (FoCEE) was established on May 1, 2004 when the university conducted a restructuring of faculties. FoCEE is the combination of two departments, i.e. the Civil Engineering Department of the Engineering Faculty and the Construction and Environmental Engineering Technology of the Engineering Technology Faculty. The Department of Engineering had existed since September 13, 1993 when the Polytechnic Staff Training Centre was established while the Department of Construction & Environmental Engineering Technology was established on September 30, 2000 when the Institut Teknologi Tun Hussein Onn (ITTHO) was upgraded to Kolej Universiti Teknologi Tun Hussein Onn (KUiTTHO) and then to Universiti Tun Hussein Onn Malaysia (UTHM).

FoCEE offers academic programmes to students at Bachelor and Postgraduate levels. FoCEE is established with the aim of conducting academic programmes specially designed towards the achievement of the Faculty vision and mission as well as conducting innovative research and development in accordance with the needs of the Nation. Apart from offering competitive academic programmes, FoCEE also serves as the reference centre in the field of environmental-friendly civil engineering and construction technology. The qualities and global competitiveness of the programmes offered by FoCEE are proven with the 5-year accreditation by the Board of Engineers Malaysia (full signatory status of the Washington Accord since June 18, 2009).

The faculty, consisted of five (5) departments is led by a Dean and assisted by three (3) Deputy Deans. Organisation chart of FoCEE is depicted as the diagram below.



No. Sijil: 510  
Ruj. EAC: BEM/008/0100/M (006)



**LEMBAGA JURUTERA MALAYSIA**  
(Penandatanganan Penuh Washington Accord mulai 18 Jun 2009)

**SIJIL AKREDITASI**

DENGAN INI MEMPERAKUKAN BAHAWA KURSUS PENGAJIAN

**BACHELOR OF CIVIL ENGINEERING  
WITH HONOURS**

*(4-Year Programme after STPM)*


YANG DIKENDALIKAN OLEH:

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

TELAH MENDAPAT PENGIKTIRAFAN RASMI BAHAWA KELAYAKAN  
AKADEMIK YANG DIANUGERAHKAN ADALAH SELARAS DENGAN  
STANDARD DAN KUALITI YANG TELAH DITETAPKAN OLEH  
LEMBAGA JURUTERA MALAYSIA

**PERAKUAN BAGI GRADUAT  
TAHUN 2012 HINGGA 2016 SAHAJA**



  
.....  
DATO' SRI Ir. Dr. JUDIN BIN ABDUL KARIM  
Yang DiPertua

  
.....  
Ir. HIZAMUL-DIN AB. RAHMAN  
Pendaftar

*Penganugerahan Perakuan Akreditasi ini tertakluk kepada peraturan-peraturan dan syarat-syarat yang dinyatakan di sebelah.*

Tarikh Perakuan Dikeluarkan: 18.10.2011

## **Faculty Visiting Professors**

### **Associate Professor Ir. Adnan bin Zulkipli**

Deputy Dean  
Academic and Students Affairs  
Universiti Malaysia Pahang  
Kuantan, Pahang

## **Faculty Industrial Advisors**

### **Ir. Shazri bin Shuib**

Director  
SKAZ Consultancy

### **Dr. Mohd Pauze Bin Mohamad Taha**

Director of Research Technology

### **Ir. Dr. Mohd Asbi bin Othman**

Managing Director  
Mohd Asbi & Associates  
Civil and Structure Consulting Firm

### **Ir. Dr. Kamarul Anuar Mohamad Kamar**

Ketua  
Bahagian Pembangunan dan Inovasi

### **Ar. Hj. Mustapha Bin Mohd Salleh**

Pengarah Utama  
Aliran Interiors Sdn. Bhd

## Faculty Staff Directory

### Administration

#### Dean

##### **Associate Professor Dr. Abd Halid bin Abdullah**

Ph.D (Construction) (Heriot-Watt Univ.) (UK), MSc. (Building Technology) (USM), BSc. (Architectural Studies) (Univ. Winsconsin-Milwaukee) (USA), Dip. Edu. (Hons.) (Sultan Abdul Halim Teachers College)

#### Office Secretary

##### **Mdm. Noorhayati binti Othman**

Dip. (UiTM)

#### Deputy Dean (Academic and International)

##### **Associate Professor Dr. Mohd Irwan bin Juki**

Ph.D (Civil Eng.) (UiTM), MEng. (Structure) (UTM), BEng. (Hons.) (Civil) (UTM)

#### Deputy Dean (Research and Development)

##### **Associate Professor Dr Mohd Haziman Bin Wan Ibrahim**

Ph.D (Civil Engineering) (USM), MEng. (Civil) (UTHM), BEng. (Hons) (Civil) (UiTM), Dip. (Civil Engineering) (ITM)

#### Deputy Dean (Student Affairs and Alumni)

##### **Associate Professor Dr Aeslina Binti Abdul Kadir**

Ph.D (Civil Engineering) (RMIT Univ.), MEng. (Civil-Environmental Management) (UTM), BSc. (Env. Science) (UKM)

#### Office Secretary

##### **Mdm. Juliana binti Mohd Sapuan**

Dip. (Management & Office Technology) (UiTM)

#### Senior Assistant Registrar

##### **Mr. Shamsulkhairi bin Md Salleh**

BSc. Econ. (UUM)

#### Senior Assistant Administrative Officer (Academic)

##### **Mdm. Siti Hasnah binti Hud**

Dip. (Public Administration) (UiTM)

#### Assistant Administrative Officer (Post Graduate)

##### **Mr. Rosmaidi bin Shahal**

STPM (Pusat Tuisyen Afdzal, Kluang)

#### Assistant Administrative Officer (Finance & Development)

##### **Mdm. Latifah binti Mohd Nasir**

Dip. (Internataional Business) (PSA)

#### Assistant Information Technology Officer

##### **Mdm. Faizah @ Rashidah binti Dahari**

Dip. (Computer Science) (UiTM)

#### Administrative Assistant (Operational & Clerical)

##### **Mdm. Ruzaimah binti Kamat**

SPM (SM Tun Sardon Rengit)

#### Administrative Assistant (Operational & Clerical)

##### **Mdm. Rafpidah binti Sarji**

STPM (SM Tun Sardon Rengit)

#### Senior Administrative Assistant (Operational & Clerical)

##### **Mr. Encik Mohd Rawi Bin Deris**

STPM (Maktab Sultan Ismail)

#### Administrative Assistant (Operational & Clerical)

##### **Mr. Abdul Hadi bin Mohamed Zainal**

SPM (SMK Dato' Onn, Batu Pahat)

**Senior Administrative Assistant (Operational & Clerical)**

**Mdm. Norsaliza binti Salleh**

SPM (SMK Tun Ismail, Pt. Raja)

**Administrative Assistant (Operational & Clerical)**

**Mr. Mohd Nazri bin Safri**

SPM (SMK Munsyi Sulaiman, Batu Pahat)

**Assistant Accountant**

**Mr. Mohd. Khairul Anuar bin Kamaruddin**

SPM (SMK Dato Bentara Luar, Batu Pahat)

**Assistant Engineer**

**Mr. Mohd Khairi bin Zainal**

Dip. Kej. Elektronik Perhubungan (Politeknik Ibrahim Sultan Johor Bahru)

**Office General Assistant**

**Mr. Muhamad Zuri Iskandar bin Idris**

SPM (SMK Dato Sri Amar Diraja Muar)



## ***Department of Structure and Material Engineering***

### **Academic Staff**

#### **Dr. Ahmad Zurisman bin Mohd Ali**

Ph.D (Concrete Engineering) (Swinburne Univ.of Technology), MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM), Dip (Civil Engineering) (UTM)

#### **Head of Department**

#### **Professor Ir. Dr. Abdul Aziz bin Abdul Samad**

Ph.D (Structure) (Univ. Manchester, UK), MSc. (Structure) (Univ. Strathclyde, UK), BSc. (Civil Engineering) (Univ. Glasgow, UK), Dip. (Civil Engineering) (UTM)

#### **Associate Professor Dr. Mohd Irwan bin Juki**

Ph.D (Civil Engineering) (UiTM), MEng. (Structure) (UTM), BEng. (Hons.) (Civil) (UTM)

#### **Associate Professor Dr. Mohd Haziman Bin Wan Ibrahim**

Ph.D (Civil Engineering) (USM), MEng. (Civil) (UTHM), BEng. (Hons) (Civil) (UiTM), Dip. (Civil Engineering) (ITM)

#### **Associate Professor Dr. David Yeoh Eng Chuan**

Ph.D (Civil Engineering) (Univ. of Canterbury), MEng. (Civil) (UTM), BSc. (Hons.) (Civil Engineering) (UTM), Dip. Ed. (UTM), Cert. (Civil Engineering) (PUO)

#### **Associate Professor Dr. Noridah binti Mohamad**

Ph.D (Civil Engineering) (UTM), MEng. (Civil-Structure) (USM), BEng. (Civil) (Pacific Univ., California, USA), Dip. Ed. (UTM)

#### **Dr. Muhammad Nizam bin Zakaria**

Ph.D (Civil Engineering) (Saga Univ.), MEng. (Civil) (Saga Univ., Japan), BEng. (Civil) (Saga Univ., Japan)

#### **Dr. Mohd Hilton bin Ahmad**

Ph.D (Univ. of Surrey, UK), MSc. (Structural Eng. & Construction) (UPM), BEng. (Civil) (UM)

#### **Dr. Noorwirdawati binti Ali**

Ph.D (Civil Engineering) (UTHM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Dr. Norashidah binti Abd Rahman**

Ph.D (Civil Engineering) (Univ. of Nottingham, UK), MEng. (Structure) (UTM), BEng. (Hons.) (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Dr. Nor Hayati binti Abd Ghafar**

Ph.D (Civil Engineering) (Univ. Of Canterbury), MEng. (Civil-Structure) (UTM), BSc. (Structural Engineering) (UKM)

#### **Dr. Norwati binti Jamaluddin**

Ph.D (Structure) (Univ. of Leeds, UK), MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Dr. Nurazuwa binti Md Noor**

Ph.D (Civil Engineering) (Kyushu Univ.), MSc. (Structural Engineering and Construction) (UPM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM), Cert. (Civil Engineering-Construction) (PKB)

#### **Dr Nur Hafizah Binti Abd Khalid**

Ph.D (Civil Engineering) (UTM), MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Dr. Shahiron bin Shahidan**

Ph.D (Civil Engineering) USM, MSc. (Structural Engineering & Construction) (UPM), BEng. (Hons.) (Civil) (UNISEL)

#### **Dr. Shahrul Niza bin Mokhatar**

Ph.D (Civil Engineering) (Kyushu Univ., Japan), MEng. (Civil-Structural) (UTM), BEng. (Hons.) (Civil) (UTHM), Dip. Ed. (Civil Engineering) (UTHM)

**Dr. Siti Radziah binti Abdullah**

Ph.D (Civil Engineering) (Monash Univ), BEng. (Hons.) (Civil) (KUiTTHO), Dip. Ed. (Civil Engineering) (UTM)

**Dr. Zainorizuan bin Mohd Jaini**

Ph.D (Civil and Computational Engineering) (Univ. of Swansea, UK), MSc. (Finite Element & Computer Modelling) (Univ. Wales, UK), BEng. (Hons.) (Civil Engineering) (UTHM)

**Mr. Ahmad Fahmy bin Kamarudin**

MSc. (Civil Engineering-Structures) (UiTM), BEng. (Hons.) (Civil) (UTHM)

**Mr. Koh Heng Boon**

MEng. (Structure) (UTM), BEng. (Hons.) (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mr. Mohamad Hairi bin Osman**

MEng (Civil) (UTHM), BEng. (Civil-Construction) (UTHM)

**Mr. Mohammad Soffi bin Md Noh**

MSc. (Structural Engineering & Construction) (UPM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mr. Mohd Khairy bin Burhanudin**

MEng (Civil) (UTHM), BEng. (Civil) (UTHM)

**Mr. Sallehuddin Shah bin Ayop**

MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM)

**Mdm. Masni binti A. Majid**

MEng. (Civil) (UTM), BSc. (Civil Engineering and Education) (UTM)

**Mdm. Noor Azlina binti Abdul Hamid**

MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM)

**Mdm. Norfaniza binti Mokhtar**

MEng (Civil) (UTHM), BEng. (Civil) (UTM)

**Mdm. Norhafizah binti Salleh**

MSc. (Civil Engineering-Structure) (UiTM), BEng. (Civil-Timber Technology) (UTHM)

**Mdm. Tuan Norhayati binti Tuan Chik**

MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM)

**Mdm. Sharifah Salwa binti Mohd Zuki**

BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Wan Amizah binti Wan Jusoh**

MSc. (Civil Engineering-Structure) (UiTM), BEng. (Civil Engineering) (UiTM), Dip. (Civil Engineering) (UiTM)

**Mdm. Zalipah binti Jamellodin**

MEng. (Civil-Structure) (UTM), BEng. (Civil) (UTM)

**Academic Staff**

**Dr. Mohd Adib bin Mohammad Razi**

Ph.D (Civil Engineering) (UiTM), MEng. (Hydraulics & Hydrology) (UTM), BEng. (Civil) (UTM), Dip. (Civil Eng.) (UTM)

**Head of Department**

**Professor Ir. Dr. Amir Hashim bin Mohd Kassim**

Ph.D (Hydrology & Water Resources) (Univ. Birmingham, UK), MSc. (Hydrology & Water Resources) (Colorado State Univ., USA), BEng. (Civil) (Univ. Strathclyde, UK), Dip. (Civil Eng.) (UTM)

**Professor Hj. Ab Aziz bin Abdul Latiff**

MEng. (Environmental) (UTM), PGCert. (High-Rise Building) (Chisholm Institute of Technology, Melbourne), PGCEd. (MPPPP), BSc. (Civil Eng.) (Salford Univ., UK)

**Professor Dr. Ahmad Tarmizi bin Abdul Karim**

Ph.D (Civil & Structural Eng.) (UKM), MEng. (Environmental Eng.) UTM, PGCE (TTTC), BSc. (Eng. Sci.) (UTK, Tennessee, USA)

**Associate Professor Dr. Aeslina binti Abd. Kadir**

Ph.D (Civil Engineering) (RMIT Univ.), MEng. (Civil-Environmental Management) (UTM), BSc. (Env. Science) (UKM)

**Associate Professor Dr. Norzila binti Othman**

Ph.D (Civil Eng.) (UiTM), Master (Technology Management) (UTM), BSc. (Ecology) (UM)

**Associate Professor Dr. Tan Lai Wai**

Ph.D (Civil Engineering-Computational Fluid Dynamics) (McGill Univ., Canada), MEng. (Hydraulics and Hydrology) (UTM), BEng. (Civil) (UTM), Dip. (Civil Eng.) (POLIMAS)

**Associate Professor Dr. Zawawi bin Daud**

Ph.D (Environmental Eng.) (USM), M.Eng. (Civil Eng.) (UTM), BSc. (Civil Eng.) (UTM), Dip. (Civil Eng.) (PUO), Dip. Education (UTM), Cert. (Civil Eng.) (PUO)

**Dr. Hartini binti Kasmin**

Ph.D (Hydrology and Water Resources) (Univ. Sheffield, UK), MEng. (Hydrology and Water Resources) (UTM), BEng. (Civil) (UTM)

**Dr. Mohamad Faizal bin Tajul Baharuddin**

Ph.D (Civil Engineering) (UM), MEng. (Water Resources) (UTM), Bachelor in Applied Geology (UM)

**Dr. Mohd Azlan Bin Mohd Yusoff**

Ph.D (Hydro Informatic) (USM), MSc (Sustainable River Management) (USM), BSc (Civil Engineering) (USM)

**Dr. Mohd Hairul Bin Khamidun**

Ph.D (Civil Eng.) (UTM), MSc. (Water Resources Eng.) (UPM), BSc (Civil Engineering) (USM)

**Dr. Mohd Shalahuddin bin Adnan**

Ph.D (Urban and Environmental Engineering) (Kyushu Univ., Japan), Master in Geological Engineering (Gadjah Mada Univ., Yogyakarta), BEng. (Civil) (USM)

**Dr. Muhammad Salleh Bin Haji Abustan**

Ph.D (Civil Eng.) (Kyoto Univ), MEng. (Civil-Environmental Management) (USM), BSc. (Civil Eng.) (USM)

**Dr. Nor Amani Filzah binti Mohd Kamil**

Ph.D (Civil Engineering) (UTM), MEng. (Environmental Management) (UTM), BEng. (Civil) (UTM)

**Dr. Nur Shaylinda binti Mohd Zin**

Ph.D (Water & Waste Water Eng.) (USM), (Environmental Management) (UTM), BEng. (Civil) (UiTM), Dip. (Civil Eng.) (UiTM)

**Dr. Radin Maya Saphira binti Radin Mohamed**

Ph.D (Environmental Eng.) (Murdoch University, Perth) , MEng. (Civil) (UTHM), BSc. (Industrial Chemical) (UTM)

**Dr. Sabariah binti Musa**

Ph.D (Urban Storm Water Management) (USM), MEng. (Civil-Hydraulics & Hydrology) (UTM), BEng. (Civil) (UTM), Dip. (Civil Eng.) (PPD), Cert. (Survey Engineering) (MLVK)

**Dr. Siti Nazahiyah binti Rahmat**

Ph.D (Civil Engineering) (RMIT UNIVERSITY), MEng. (Hydrology and Water Resources) (UTM), BEng. (Civil) (UTM), Dip. (Civil Eng.) (UTM)

**Mr. Mohd Baharudin bin Ridzuan**

MEng. (Civil) (UTHM), BEng. (Civil-Structure) (UKM)

**Mr. Wan Afnizan bin Wan Mohamad**

MSc. (Water Engineering) (UPM), BEng. (Hons.) (Civil) (UTM), Dip. (Civil Eng.) (UTM)

**Mr. Zulkifli bin Ahmad**

MEng. (Environment) (UKM), BEng. (Hons.) (Civil) (USM), Dip. (Civil Engineering) (ITM), Cert. Ed. (MPKI)

**Mdm. Azra Munirah binti Mat Daud**

MEng. (Civil-Environmental) (UTM), BEng. (Civil) (UTM)

**Mdm. Nor Aliza binti Ahmad**

MSc. (Water Engineering) (UPM), BEng. (Civil) (UTM), Dip. (Civil Eng.) (ITM)

**Mdm. Hjh. Roslinda binti Seswoya**

MEng. (Civil) (UTM), BEng. (Hons.) (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Nur Aini binti Mohd Arish @ Arshad**

MEng. (Civil) (UTHM), BSc. (Civil Engineering and Environmental) (UKM)

**Mdm. Nur Adila binti Ab. Aziz**

MSc. (Civil and Environmental Eng.) (UTHM), BSc. (Civil Eng.) (UTHM)

**Mdm. Zarina binti Md Ali**

MSc. (Water Resources Eng.) (UPM), BEng. (Agriculture) (UPM)

## ***Department of Infrastructure Engineering and Geomatic***

### **Academic Staff**

#### **Dr. Aziman bin Madun**

Ph.D (Geotechnical Engineering & Engineering Geology) (Univ of Birmigham, UK), MSc. (Geotechnical Engineering) (UPM), BSc. (Geology) (UKM)

#### **Head of Department**

#### **Professor Emeritus Dato' Dr. Hj. Ismail bin Hj. Bakar**

Ph.D (Geotechnical Engineering) (Univ. Bradford, UK), MSc. (Geotechnical Engineering) (Louisiana State Univ., USA), BSc. (Civil Engineering) (Louisiana State Univ., USA), Dip. (Civil Engineering) (ITM)

#### **Professor Dr. Mohd Idrus bin Hj. Mohd Masirin**

Ph.D (Highway & Transportation Engineering) (Univ. East London, UK), MSc. (Highway & Transportation Engineering) (Univ. East London, UK), BEng. (Civil) (Univ. Han Yang, Seoul), Dip. (Civil Engineering) (UTM)

#### **Associate Professor Dr. Adnan bin Zainorabidin**

Ph.D (Geotechnical Engineering) (Univ. of East London, UK), MEng. (Civil) (UTM), BEng. (Civil) (UTHM), DPLI (Edu). (UTHM), Cert. (Civil Engineering) (PPD)

#### **Associate Professor Dr. Mohamad Yusri bin Aman**

Ph.D (Asphalt Technology) (USM), MEng. (Civil) (UTHM), BEng. (Civil) (UPM), Cert. (Civil Engineering-Construction) (PUO)

#### **Associate Professor Dr. Mohd Ezree bin Abdullah**

Ph.D (Civil Engineering) (UTHM), MEng. (Highway & Transport Engineering) (UTM), BEng. (Civil) (UTHM)

#### **Associate Professor Dr. Munzilah binti Md Rohani**

Ph.D (Transportation) (Univ. of Southampton, UK), MEng. (Traffic and Highway) (UTM), BEng. (Civil) (UTM)

#### **Associate Professor Nawawi bin Jusoh**

MSc. (Remote Sensing) (UTM), BSc. (Geology & Topography) (Univ. Wales, Swansea, UK), Dip. (Land Surveying) (UTM)

#### **Ir. Dr. Raha Binti Abd Rahman**

Ph.D (Highway & Traffic Engineering) (UTM), MEng. Highway & Traffic Engineering) (UPM), BEng. (Civil) (UPM)

#### **Dr Alvin John Lim Meng Siang**

Ph.D (Geotechnical Engineering) (UTHM), BEng. (Civil Engineering) (UTHM)

#### **Dr. Basil David Daniel**

Ph.D (Transportation Engineering) (University Of Canterbur), MSc. (Highway and Transportation Engineering) (UPM), BEng. (Civil) (UM)

#### **Dr. Kamaruddin bin Ambak**

Ph.D (Transportation Engineering) (UKM), MSc. (Highway and Transportation Engineering) (UPM), BSc. (Civil Engineering) (UTM), Cert. (Civil Engineering) (PKB)

#### **Dr. Khairul Nizar bin Mohd Yusof**

Ph.D (Geotechnical Engineering) (Univ. of Leeds, UK), MEng. (Geotechnics) (UTM), BEng. (Hons.) (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Dr. Mohd Effendi bin Daud**

Ph.D (Civil Engineering) (Nagoya Univ., Japan), MSc. (Land Surveying) (UTM), BSc. (Land Surveying) (UTM), Dip. (Land Surveying) (UTM)

#### **Dr. Mustaffa bin Anjang Ahmad**

Ph.D (City Planning) (Univ. of Saga, Japan), MSc. (Land Surveying) (UTM), BSc. (Land Surveying) (UTM)

#### **Dr. Nor Azizi bin Yusof**

Ph.D (Geotechnical Engineering) (Univ. Sheffield, UK), MEng. (Engineering Geology) (UTM), BEng. (Hons.) (Civil) (UTM)

**Dr. Saiful Azhar bin Ahmad Tajudin**

Ph.D (Geotechnical Engineering) (Univ of Birmigham, UK), MEng. (Geotechnics) (UTM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Dr. ING. Joewono Prasetijo**

Ph.D/Dr.-ING. (Traffic and Transportation Engineering) (Ruhr-Universität Bochum, Germany), M.Sc (Road and Transportation Engineering) (IHE-Delft University of Technology, Netherlands), BEng. (Civil) (Univ. of Tanjungpura, Indonesia)

**Mr. Sr. Abd. Sukor bin Sarif**

MSc. (Geomatic Engineering) (UTM), BSc. (Hons.) (Land Surveying) (UTM)

**Mr. Ahmad Raqib bin Ab Ghani**

MSc. (Highway and Transport Engineering) (USM), BEng. (Hons.) (Civil Engineering) (USM)

**Mr. Anuar bin Mohd Salleh**

MSc. (Land Surveying) (UTM), BSc. (Land Surveying) (UTM)

**Mr. Faizal bin Pakir**

MEng (Civil) (UTHM), BEng. (Civil) (UTHM), Dip. Ed. (Civil Engineering) (UTHM)

**Mr. Felix Ling Ngee Leh**

MEng. (Civil-Geotechnics) (UTM), BSc. (Civil Engineering) (UTHM)

**Mr. Khairul Nizam bin Mohd Yunus**

MEng. (Civil-Transportation & Highway) (UTM), Bachelor in Land Surveying (UTM), Dip. (Survey Science & Geomatic) (UiTM)

**Mr. Mohd Fairus bin Yusof**

MEng. (Geotechnics) (UTM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mr. Mohd Hazreek bin Zainal Abidin**

MEng. (Civil-Geotechnics) (UTM), BEng. (Civil) (UiTM), Dip. (Civil Engineering) (UiTM)

**Mr. Saifullizan bin Mohd Bukari**

MSc. (Land Surveying) (UTM), BSc. (Land Surveying) (UTM), Dip. (Land Surveying) (PUO)

**Mr. Mustafa Kamal bin Shamsudin**

MEng. (Geotechnics) (UTM), BEng. (Civil) (UTM)

**Mr. Mohammad Nasir bin Mohamad Taher**

MEng (Civil) (UTHM), BEng. (Hons.) (Civil) (UTHM)

**Mr. Mohd Firdaus bin Md. Dan @ Azlan**

MEng (Civil) (UTHM), BEng. (Civil) (UTHM), Dip. Ed. (Civil Engineering) (UTHM)

**Mr. Mohd Khaidir bin Abu Talib**

MEng. (Civil-Engineering) (UKM), BEng. (Civil-Engineering) (UKM), Dip. (Civil)(PPD)

**Mdm. Marliana Azura binti Ahmad Puzi**

MEng. (Civil) (UTM), BSc. (Civil Engineering) (UPM)

**Mdm. Noorliyana binti Omar**

MEng. (Highway & Traffic) (UTM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Nursitihazlin binti Ahmad Termida**

MEng. (Highway & Transportation) (UPM), BEng. (Civil) (UTHM)

**Mdm. Nurul Hidayah binti Mohd Kamaruddin**

MEng (Civil) (UTHM), BEng. (Civil) (UTHM), Dip. Ed. (Civil Engineering) (UTHM)

**Mdm. Rashidah binti Adon**

MEng. (Civil) (UTHM), BEng. (Civil-Construction) (UTHM)

**Mdm. Rosnawati binti Buhari**

MEng. (Civil) (UTHM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Zaihasra binti Abu Talib**

MEng. (Geotechnics) (UTM), BEng. (Civil) (UNIMAS)

**Mdm. Salina binti Sani**

Dip. (Building Services) (POLISAS)

## ***Department of Building and Construction Engineering***

### **Academic Staff**

#### **Dr. Riduan bin Yunus**

Ph.D (Construction and Project Management) (QUT, Australia), MEng. (Construction Management) (UTM), BEng. (Civil Engineering) (UTM)

#### **Head of Department**

#### **Professor Dr. Ismail bin Abdul Rahman**

Ph.D (Building Energy) (Univ. Manchester), MSc. (Building Services Eng.) (Heriot-Watt Univ., Edinburgh), BEng. (Hons.) (Civil) (UTM), Dip. (Civil Eng.) (UTM)

#### **Dr. Fajaruddin bin Mustakim**

Ph.D (Civil Engineering) (Nagoya Inst Of Tech.), Eng MSc. (Construction Management) (UTM), BEng. (Hons.) (Civil) (UiTM), Dip. (Civil Engineering) (PKB), Cert. (Civil Engineering) (PPD)

#### **Dr. Nor Haslinda binti Abas**

Ph.D (Property, Const & Project Mgmt) (RMIT), MEng. (Civil & Structure) (UTM), BEng. (Civil) (UTHM)

#### **Dr. Noor Yasmin binti Zainun**

Ph.D (Civil and Building Eng.) (Loughborough Univ., UK), MEng. (Civil-Construction Management) (UTM), BEng. (UTM), ADP3 (ITM)

#### **Dr. Sasitharan A/I Nagapan**

Ph.D (Civil Engineering) (UTHM), MEng. (Civil Engineering) (KUiTTTHO), BEng. (Civil Engineering) (KUiTTTHO)

#### **Dr. Siti Hidayah binti Abu Talib**

Ph.D (Environment Eng.) (USM), MEng. (Civil Engineering) (USM), BEng. (Civil Engineering) (USM)

#### **Ir Mohd Norazam Bin Yasin**

MEng. (Civil Engineering) (UTM), MEng. (Civil Engineering) (Coventry Univ.), Dip. (Civil Engineering) (PKB), Dip. (Civil Engineering) (PKB)

#### **Mr. Ahmad Syukri bin Mohd Nasir**

BEng. (Civil Engineering) (UTM)

#### **Mr. Hairuddin bin Mohammad**

MEng. (Civil) (UTM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (PKB)

#### **Mr. Isham bin Ismail**

MEng (Civil) (UTHM), BEng. (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Mr. Mohd Azuan bin Zakaria**

MEng (Civil) (UTHM), BEng. (Civil) (UTM)

#### **Mr. Mohd Hafizal bin Hanipah**

MEng (Civil) (UTHM), BEng. (Civil) (UTHM)

#### **Mr. Syed Burhanuddin Hilmi bin Syed Mohamad**

MSc. (Structural Engineering & Construction) (UPM), BSc. (Building) (UTM), Dip. (Quantity Surveying) (UTM)

#### **Mr. Nik Mohd Zaini bin Nik Soh**

BEng. (Civil) (UiTM)

#### **Mr. Rahmat bin Muslim**

BEng. (Hons.) (Civil) (UTM), Dip. (Civil Engineering) (UTM)

#### **Mr. Mohamad bin Ismail**

Cert. (Furniture Making) (MLVK) (Seneca College, Canada), Cert. (Building Services) (Maktab Perguruan Teknik)

#### **Mdm. Emedya Murniwaty binti Samsudin**

MSc. (Integrated Construction Project Management) (UiTM), BEng. (Civil) (UTHM)



**Mdm. Hasniza binti Abu Bakar**

MEng. (Civil) (UTHM), BEng. (Hons.) (Civil Engineering) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Junaidah binti Jailani**

MSc. (Building Technology) (USM), BEng. (Civil) (UiTM), Dip. (Civil Engineering) (UiTM)

**Mdm. Mardhiah binti Zawawi**

MSc. (Construction Management) (UTM), BEng. (Civil) (UTM)

**Mdm. Noorli binti Ismail**

MEng. (Civil) (UM), BEng. (Civil) (UiTM)

**Mdm. Hannifah binti Tami**

BEng. (Civil & Structural) (UKM), Dip. (Civil Engineering) (POLISAS), Cert. (Civil-Construction) (POLISAS)

**Mdm. Siti Khalijah binti Yaman**

BEng. (Civil Engineering) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Sushilawati binti Ismail**

BEng. (Civil Engineering) (UTM), Dip. (Civil Engineering) (UTM)

**Mdm. Tong Yean Ghing**

BEng. (Civil) (UTHM)

## ***Department of Architecture & Design Engineering***

### **Academic Staff**

#### **Dr. Azeanita binti Suratkon**

Ph.D (Construction Management) (Chiba University) (Japan), MSc. (Construction Management-Project Management) (Heriot-Watt Univ., UK), BSc. (Building) (UTM), Dip. (Quantity Surveying) (UTM)

#### **Head of Department**

#### **Associate Professor Dr. Abd Halid bin Abdullah**

Ph.D (Construction) (Heriot-Watt Univ.) (UK), MSc. (Building Technology) (USM), BSc. (Architectural Studies) (Univ. Winsconsin-Milwaukee) (USA), Dip. Edu. (Hons.) (Sultan Abdul Halim Teachers College)

#### **Associate Professor Dr. Lokman Hakim bin Ismail**

Ph.D (Architecture & Building Eng.) (Building Energy & Environment) (Univ. Liverpool), MEnv. (Waste Management) (UPM), BSc. (Hons.) (Housing, Building & Planning) (Building Eng.) (USM)

#### **Associate Professor Dr. Hj. Zainal Abidin bin Akasah**

Ph.D (Architecture) (UTM), MSc. (Building Technology) (USM), Bachelor (Technology & Education in Civil Eng.) (UTM), Dip. (Architecture) (UTM), Cert. (Civil Eng.) (PUO)

#### **Dr. Hazrul bin Abdul Hamid**

Ph.D (Statistics/Environmental Engineering) (USM), Master of Statistic (UPM), Dip in Education (Mathematics) (IPD)

#### **Ar. Sudin bin A. Ghafar**

Bachelor of Architecture (Univ. Oklahoma)

#### **Mr. Izudinshah bin Abd Wahab**

MSc. (Landscape Architecture) (USM), Bachelor of Architecture (USM), BSc. (Housing, Building & Planning) (USM)

#### **Mr. Hanafi bin Rahmat**

Master of Architecture (Univ. New South Wales), Bachelor of Architecture (Univ. New South Wales)

#### **Mr. Abdul Zaki bin Abdul Wahid**

Bachelor of Architecture (Univ. Oita), MEng. (Architecture Engineering) (Univ. Oita)

#### **Mdm. Hanita binti Yusof**

Master of Architecture (Architectural Computing) (Univ. New South Wales), Bachelor (Landscape Architecture) (UTM), Dip. (Architecture) (UTM)

#### **Mdm. Nor Azizah binti Adnan**

MSc. (Construction Management) (UTM), Bachelor of Interior Architecture (UiTM), Dip. of Interior Design (UiTM)

#### **Mdm. Nur Nasuha binti Abd Salam**

Master of Architecture (Univ. New South Wales), Bachelor of Architecture (Univ. New South Wales)

## **Technical Staff**

**Mr. Kasim bin Sebli**

Cert. (Civil-Road and Water Works) (PUO)

**Mdm. Aziah binti Abu Samah**

Dip. (Building Services & Maintenance) (UiTM), Cert. (Building Services) (POLIMAS)

**Mdm. Jalilah binti Mokhtar**

Dip. (Civil Engineering) (POLIMAS), Cert. (Civil Engineering-Building) (PSA)

**Mdm. Norita binti Samsudin**

Dip. (Civil Engineering) (PPD), Cert. (Civil Engineering) (POLISAS)

**Mdm. Norkama Azura binti Dolah**

Dip. (Building Services Engineering) (POLIMAS), Cert. (Building Services Engineering) (POLIMAS)

**Mdm. Nurul Adila binti Jablan**

Dip. (Building Services) (POLISAS), Cert. (Building Services) (POLISAS)

**Mdm. Siti Fadzilah binti Kasno**

Dip. (Civil Engineering) (PPD), Cert. (Civil Engineering) (PKM)

**Mr. Abdul Rahim bin Shamsudin**

Cert. (Architecture) (PUO)

**Mr. Afandi bin Abu Bakar**

Cert. (Civil Engineering-Construction) (POLISAS)

**Mr. Amran bin Abd. Rahman**

Cert. (Civil Engineering) (PKM)

**En. Azuan bin Poharan @ Bunari**

Cert. (Building Services Engineering) (PSA)

**Mr. Idris bin Abdul Hamid**

Cert. (Vocational Studies) (Muar)

**Mr. Mohd Azwan bin Busu**

Cert. (Highway Engineering) (PKB)

**Mr. Mohd Bahtiar bin Mohd Basri**

Cert. (Civil Engineering-Construction) (POLISAS)

**Mr. Mohd Ayob bin Sahlan**

Cert. (Architecture) (PUO)

**Mr. Osman bin Abd Rahman**

Cert. (Civil Engineering-Surveying) (PUO)

**Mr. Razali bin Slamet**

Cert. (Quantity Surveying) (POLIMAS)

**Mr. Sabari bin Wahab**

Cert. (Civil Engineering - Construction) (PUO)

**Mr. Sahidin bin Ghazali**

Cert. (Land Surveying) (POLISAS)

**Mr. Sariman bin Ahmad**

Cert. (Civil Engineering) (PUO)

**Mr. Suhaimi bin Harun**

Cert. (Civil Engineering-Road and Water Works) (PKB)

**Mr. Shaiful Hisham bin Saaban**

STPM (Dato Menteri Air Hitam, Batu Pahat)

**Mdm. Asmah bin Ibrahim**

Cert. (Civil Engineering-Construction) (POLISAS)

**Mdm. Hazliana binti Padalilah**

Cert. (Civil Engineering) (PKM)

**Mdm. Roslina binti Jamil**

Cert. (Civil Engineering-Construction) (PSA)

**Mdm. Sharifah Zuhriah binti Syed Fadzil**

Cert. (Civil Engineering-Construction) (POLIMAS)

**Mdm. Zamra binti Jasman**

Cert. (Civil Engineering) (PUO)

**Programme Name**

Bachelor of Civil Engineering with Honours

**Programme Aims**

The aim of the Bachelor of Civil Engineering with Honours is to ensure that graduates will have a fundamental civil engineering knowledge, problem solving skills, and team working skills in order to be employed by various organizations, including governmental agencies, consulting/design firms, construction firms, laboratories, developer and higher institutions.

**Programme Educational Objectives (PEO)**

These are the PEOs for Bachelor of Civil Engineering with Honours:

<b>No</b>	<b>PEO Statement</b>
PEO 1	Knowledgeable and technically competent in civil engineering discipline in-line with the industry requirement.
PEO 2	Effective in communication and demonstrate good leadership quality in an organization.
PEO 3	Capable to solve civil engineering problems innovatively, creatively and ethically through sustainable approach.
PEO 4	Able to demonstrate entrepreneurship skills and recognize the need of lifelong learning for successful career advancement.

## Programme Learning Outcomes (PLO)

These are the PLOs for Bachelor of Civil Engineering with Honours:

PEO	Key Idea	Description	Primary domain type
1.	<b>Engineering Knowledge (K)</b>	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to the solution of complex civil engineering problems.	Cognitive
2.	<b>Practical / Technical Skills/ Modern Tool Usage (PS)</b>	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex civil engineering activities, with an understanding of the limitations.	Psychomotor
3.	<b>Communication Skills (CS)</b>	Communicate effectively on complex civil engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	Affective
4.	<b>Critical Thinking and Problem Solving / Investigation (CTPS)</b>	Conduct investigation into complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	Cognitive
5.	<b>Individual and Team Work (TW)</b>	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings	Psychomotor
6.	<b>Life Long Learning (LL)</b>	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	Affective
7.	<b>Entrepreneurship Skills (ES)</b>	Self motivate and enhance entrepreneurship skills for career development	Psychomotor
8.	<b>Ethics and Professionalism Values (ET)</b>	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	Affective
9.	<b>Leadership Skills / Project Management and Finance (LS)</b>	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	Psychomotor
10.	<b>Design / Development of Solutions (DDS)</b>	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	Cognitive
11.	<b>Problem Analysis (PA)</b>	Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.	Cognitive
12.	<b>Environment and Sustainability (ESus)</b>	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.	Affective
13.	<b>The Engineer and Society (ESoc)</b>	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.	Affective

## Curriculum

Table 1. Summary of curriculum for Bachelor of Civil Engineering with Honours (BFF)

Year	Semester	Course Code	Courses	Credit	Total
1	I	UWB 10102	Academic English	2	17/18
		UWS 10103/202	* Nationhood and Current Development of Malaysia/ Ethic Relation	3/2	
		UWA 10102 /202/302	* Islamic Studies / Moral Studies/ Islamic and Asian Civilisation	2	
		BFC 10502 / UQ* 1xxx2	* Civil Engineering Materials / Foreign Language	2	
		UQ* 1xxx1	Co-Curriculum I	1	
		BFC 13903	Civil Engineering Mathematic I	3	
		BFC 10103	Static and Dinamic	3	
	BFC 10202	Nature Conservation	2		
	II	UWS 10103/202	* Nationhood and Current Development of Malaysia/ Ethic Relation	3/2	17/18
		UWA 10102 /202/302	* Islamic Studies / Moral Studies/ Islamic and Asian Civilisations	2	
		BFC 10502 / UQ* 1xxx2	* Civil Engineering Materials / Foreign Language	2	
		UWB 10202	Effective Communication	2	
		BFC 14003	Civil Engineering Mathematic II	3	
		BFC 10303	Engineering Drawing and CAD	3	
BFC 10403		Fluids Mechanics	3		
2	I	UWB 20302	Technical Writing	2	17
		BFC 20601	Material and Fluid Laboratory	1	
		UQ*1xxx1	Co-Curriculum II	1	
		BFC 23702	Creativity and Innovation	2	
		BFC 24103	Civil Engineering Mathematic III	3	
		BFC 20703	Engineering Geomatic	3	
		BFC 20802	Computer Programming	2	
	BFC 20903	Mechanics of Material	3		
	II	BFC 24203	Civil Engineering Mathematic IV	3	17
		BFC 21002	Construction Engineering	2	
		BFC 21103	Hydraulic	3	
		BFC 21201	Hydraulic and Mechanics of Materials	1	
		BFC 21303	Engineering Geology	3	
BFC 21403		Structural Analysis	3		
BFC 21702	Geotechnics I	2			
III	BFC 21502	Geomatics Practice	2	2	
3	I	BFC 34303	Statistics of Civil Engineering	3	16
		BFC 31602	Contract and Estimation	2	
		BFC 34402	Geotechnics II	2	
		BFC 31802	Highway Engineering	2	
		BFC 31901	Geotechnic and Structure Laboratory	1	
		BFC 32002	Hydrology	2	
		BFC 32102	Reinforced Concrete Design I	2	
	BPK 20802	Entrepreneurship	2		
	II	BFC 32302	Traffic Engineering and Safety	2	14
		BFC 32403	Environmental Engineering	3	
		BFC 32501	Transportation and Environmental Engineering Laboratory	1	
		BFC 32602	Mechanical and Electrical System	2	
		BFC 32703	Sustainable Construction Engineering	3	
BFC32803	Reinforced Concrete Design II	3			
III	BFC 32904	Industrial Training	4		

Year	Semester	Course Code	Courses	Credit	Total
4	I	BFC 43003 BFC 43103 BFC 43201 BFC 43502 BFC 43402 BPK 30902	Structural Steel and Timber Design Foundation Engineering Civil Engineering Software Occupational Safety and Health Final Year Project I Engineering Economy	3 3 1 2 2 2	15
		BFC 43604 BFC 43303 BF* 4XY03 BF* 4XY03 BF* 4XY03	Final Year Project II Intergrated Design Project Elective I Elective II Elective III	4 3 3 3 3	16
<b>Total Credit</b>				<b>136</b>	

Table 2. List of elective courses in Bachelor of Civil Engineering with Honours (BFF)

Field	Code of courses	Elective courses	Credit
Structure and Material	BFS40103	Advanced Structure Analysis	3
	BFS40303	Prestressed Concrete Design	3
	BFS40603	Concrete Technology	3
	BFS40903	Advanced Structure Design	3
	BFS41003	Finite Element Analysis	3
Environmental	BFK40303	Advanced Timber Structural Design	3
	BFA40103	Environmental Management	3
	BFA40203	Design of Water Supply	3
	BFA40303	Solid Waste and Hazardous Waste Management	3
Water Resources	BFA40403	Design of Waste Water Engineering	3
	BFW40103	Water Resources Engineering	3
	BFW40303	Coastal and Harbour Engineering	3
	BFW40403	Groundwater Engineering	3
Geotechnic	BFW40503	Urban Stormwater Management	3
	BFG40103	Advanced Foundation	3
	BFG40203	Advanced Geotechnic	3
Transportation	BFG40403	Geo-Synthetic	3
	BFT40203	Pavement Engineering	3
	BFT40303	Transportation Engineering	3
	BFT40503	Advanced Traffic Engineering	3
Building	BFT40603	Road Safety Engineering	3
	BFB40603	Building Services I	3
	BFB40703	Building Services II	3
	BFB40803	Building Construction	3
Construction	BFB40903	Building Maintenance	3
	BFP40103	Construction Planning and Scheduling	3
	BFP40203	Project Financial Management	3
	BFP40403	Construction Plant Management	3
	BFP40503	Structure Rehabilitation and Repair	3
	BFP40603	Industrialized Building System	3



## **UWB10100 Foundation English**

---

### **Synopsis**

This course focuses on essential English grammar skills and introduces language learning with a focus on grammatical terminology, concepts and exercises. It provides opportunities for students to acquire basic grammar knowledge to complement the acquisition of English language. In addition, students' oral and written skills will be reinforced and they would be able to use English for a wide range of academic activities.

### **References**

1. Koh, S.L. & Tan, S. L. (2003). *Grammar made easy*. Petaling Jaya: Prentice Hall. [PE1112.K63 2003]
2. Milon, N. (2002). *Mastering English the easy way: The all in one guide to Basic English grammar*. Subang Jaya, Selangor: Pelanduk Publications. [PE1097 .N36 2002]
3. Werner, P.K. & Spaventa, L. (2002). *Mosaic 1: Grammar*. New York: McGraw-Hill. [PE1128.W472 2002 N1]
4. Werner, P.K. & Spaventa, L. (2002). *Mosaic 2: Grammar*. New York: McGraw-Hill. [PE1128.W48 2002]
5. Fuchs, et al. (2001). *Grammar Express:for self study and classroom use*. New York: Longman. [PE1114.F83 2001]
6. Schoenberg, I.E. (1994). *Focus on Grammar: a basic course for reference and practise*. New York: Addison-Wiley. [PE1128 .S24 1994]

## **UWB10102 Academic English**

---

### **Synopsis**

This course focuses on fulfilling students' academic requirements such as the acquisition of reading, writing, listening and speaking skills in English. The course also concurrently provides opportunities for students to acquire basic grammar knowledge to complement the acquisition of English language. Students will be reinforced on aspects of English language oral and written skills that are most relevant to them in their academic work. By the end of the course, students should be able to use English for a wide range of academic activities.

### **References**

1. Abd. Aziz, A et al. (2005). *English for Academic Communication*. Kuala Lumpur: McGraw Hill Malaysia. PE1128.A2 .E53 2005
2. Kaur, H.(2005). *Explore MUET*. Kuala Lumpur: Fajar Bakti Sdn. Bhd.
3. Koh, S.L. (2005). *MUET Moments: Malaysia University English Test*. Selangor: Pearson. PE1128 .K63 2005
4. Richards, C. (2009). *Longman Text MUET: A Strategic Approach*. Petaling Jaya: Pearson Malaysia. PE1128 .K97 2009

## **UWS10103 Nationhood and Current Development of Malaysia**

---

### **Synopsis**

This course discusses on the fundamental concept, process of formation, and development of Malaysia. It includes Malay Sultanate of Malacca Empire, imperialism and colonialism, patriotisme and nationalism, the independence and formation of Malaysia, Constitution of Malaysia, government system of Malaysia, main policies in national development, roles and responsibilities of a citizen, and the success and challenges of Malaysia.

### **References**

1. Mohd. Ashraf Ibrahim (2004). *Gagasan Bangsa Malayan yang Bersatu 1945-57*. Bangi: PENERBIT UKM. [DS597 .M37 2004]
2. Nazaruddin Mohd Jali, Ma'rof Redzuan, Asnarulkhadi Abu Samah dan Ismail Mohd Rashid (2005). *Pengajian Malaysia*. Petaling Jaya: Prentice Hall. [DS596.6 .P46 2001 N2]
3. Noor Aziah Mohd. Awal (2003). *Pengenalan kepada Sistem Perundangan di Malaysia*. Petaling Jaya: International Law Book Services. [KPG68 .N66 2003]
4. Ruslan Zainudin, Mohd Mahadee Ismail dan Zaini Othman (2005). *Kenegaraan Malaysia*. Shah Alam: Fajar Bakti. [JQ715 .R87 2005]
5. Andaya, B.W. and Andaya, L.Y. (1982). *A History of Malaysia*. London: Macmillan. [DS 596.A52 2001]

## **UWS10202 Ethnic Relation**

---

### **Synopsis**

This course focuses on the conceptual and practicality of the ethnic relation in Malaysia community. The discussions comprise of fundamental concepts of ethnic relation and the history of the construction of a plural society, constitution as the core of the societal life, relationship between development and the ethnicity in the aspects of economy, politics and social based on the government and society top-down and bottom-up approaches.

### References

1. Lembaga Penyelidikan Undang-undang (2003). *Perlembagaan Persekutuan*. Petaling Jaya: International Law Book Services. [KPG 1744.51963.A3.A4 2003 rw]
2. Mansor Mohd Noor, Abdul Rahman Abdul Aziz & Mohamad Ainuddin Iskandar Lee (2006). *Hubungan Etnik di Malaysia*. Petaling Jaya: Prentice Hall. [DS595.m37 2006]
3. Nazri Muslim & Nasruddin Yunus (2006). *Hubungan Etnik*. Selangor: Fulson Trading Co. [UTHM Library request]
4. Shamsul Amri Baharuddin (2007). *Modul Hubungan Etnik*. Shah Alam: Universiti Teknologi MARA. [Modul Hubungan Etnik]
5. Zaid Ahmad, Ho Hui Ling, Sarjit Sing Gill, Ahmad Tarmizi Talib, Ku Halim Ku Arifin, Lee Yok Fee, Nazri Muslim & Ruslan Zainuddin (2006). *Hubungan Etnik di Malaysia*. Shah Alam: Oxford Fajar Sdn. Bhd. [UTHM Library request]

---

### UWA10102 Islamic Studies

#### Synopsis

This course explains about Islamic concept as ad-deen. It discusses the study of al-Quran and al-Hadith, Sunnism, schools of Islamic theology, development of schools of Fiqh, principles of muamalat, Islamic Criminal Law, Islamic work ethics, issues in Islamic family law and current issues.

#### References

1. Harun Din (2001), *Manusia dan Islam*. Kuala Lumpur: Dewan Bahasa dan Pustaka. (BP174. M36 1990)
2. Ismail Haji Ali, (1995), *Pengertian dan Pegangan Iktikad yang Benar: Ahli Sunnah Wal Jamaah*: Kuala Lumpur: Al-Hidayah. (BP166.78. P46 1995)
3. Mustafa Abdul Rahman (1998), *Hadith 40*, Kuala Lumpur: Dewan Pustaka Fajar. (BP135. A2 M87 1998)
4. Mustafa Haji Daud (1989), *Institusi Kekeluargaan Islam*, Kuala Lumpur: Dewan Pustaka dan Bahasa. (BP188.3. F3.M87 1989)
5. Paizah Haji Ismail (1991), *Undang-undang Jenayah Islam*, Kuala Lumpur: Dewan Pustaka Islam, Angkatan Belia Islam Malaysia. (BP144. P35 1991)

---

### UWA10202 Moral Studies

#### Synopsis

This course explains on concepts of moral, aspects of moral and its importance in daily lives, Western moral theories and moral values of great religions of the world, moral values in work and current moral issues.

#### References

1. Ahmad Khamis. (1999). *Etika untuk Institusi Pengajian Tinggi*. Kuala Lumpur. Kumpulan Budiman. (LC 315 .M3 .A35 1999)
2. Eow Boon Hin. (2002). *Moral Education*. Longman. (LC 268 .E48 2008)
3. Hussain Othman, S.M. Dawilah Al-Edrus, Berhannudin M. Salleh, Abdullah Sulaiman, (2009). *PBL untuk Pembangunan Komuniti Lestari*. Batu Pahat: Penerbit UTHM. (LB 1027.42 P76 2009a)
4. Hussain Othman. (2009). *Wacana Asasi Agama dan Sains*. Batu Pahat: Penerbit UTHM. (BL 240.3 H87 2009a)
5. Mohd Nasir Omar (1986). *Falsafah Akhlak*. Bangi: Penerbit UKM. (BJ 1291 .M524 2010)

---

### UWA10302 Islamic and Asian Civilisations

#### Synopsis

This course discusses on the introductory to civilization, its development, interaction between civilizations, the Islamic civilization, Islam in Malay civilization; contemporary civilization issues and the principles of Islam Hadhari.

#### References

1. Saifullah Mohd Sawi (2009), *Sejarah dan tamadun Islam di Asia Tenggara*, Shah Alam Karisma Publications, [BP63.A785 .S24 2009]  
Sazelin Arif, (2007), *Tamadun Islam dan tamadun Asia*, Shah Alam, Selangor: McGraw Hill. [BP190.5 .T35 2007]
3. Abu al-Fida al Hafiz Ismail ibn Kathir; penterjemah Zaidah Mohd Nor [et al.], (2005), *Sejarah tamadun Islam Ibn Kathir*, Kuala Lumpur: Dewan Bahasa dan Pustaka. [DS36.85.I32 2005 v.1]
4. Mohd Liki Hamid, (2003), *Pengajian Tamadun Islam*, Bentong: PTS Publications. [DS36.85 .P46 2003]
5. Lok, Chong Hoe, (1998), *Tamadun Cina: Falsafah, Pandangan Hidup dan Aspek-Aspek kesenian*, Kuala Lumpur: Pusat Pembangunan dan Pendidikan Komuniti (CEDC) dan Sekretariat Falsafah dan Sains Islam. Universiti Sains Malaysia. [DS721.L64 1998]

## **BFC10502 Civil Engineering Material**

---

### **Synopsis**

Civil Engineering materials have an important role to play for sustainable construction. This course introduces students various types of civil engineering materials including its classification, properties, laboratory testing, manufacturing process and applications in civil engineering. Scope of study includes cement, aggregates, concrete, bricks and masonry, timber, steel and other construction materials.

### **References**

1. William P. Spence; Construction Materials, Methods and Techniques, Second Edition: Thomson 2007.
2. M. S. Mamlouk, J. P. Zaniewski; Materials for civil and construction engineers; Pearson Prentice Hall, 2006.
3. H. Zhang; Building Materials in Civil Engineering; Woodhead Publishing Limited, 2010.
4. J. Khatib; Sustainability of Construction Materials; Woodhead Publishing Limited, 2009.
5. E. V. Amsterdam; Construction Materials for Civil Engineering 4<sup>th</sup>. Edition; Juta & Co Ltd.; 2008.

## **UQ\*1xxx1 Co-Curriculum I**

---

### **Synopsis**

This course is offered in the form of multiple choice of activities for Diploma students and undergraduates. Three categories of activities offered are Sports and Recreational, Club/ Associations and Uniform Bodies.

## **BFC13903 Civil Engineering Mathematics I**

---

### **Synopsis**

This course covers basic engineering mathematics: functions, limit and continuity; Differentiation: derivative of single variable functions, chain rule, L'Hopital rule and extremum value problem; Integration: integration as antiderivative, techniques of integration and the applications.

### **References**

1. Abd. Wahid Md. Raji, Hamisan Rahmat, Ismail Kamis, Mohd Nor Mohamad & Ong Chee Tiong (2003). *Calculus for Science and Engineering Students*. Malaysia: UTM Publication.
2. Anton, H., Bivens, I., Davis, S. (2005). *Calculus*. 8<sup>th</sup> Ed. USA: John Wiley & Sons, Inc.
3. Smith, R. T., Minton, R. B. (2006). *Calculus: Concept & Connection*. New York: McGraw-Hill.
4. Goldstein, Larry, Lay, David, Schneider, David. (2004). *Calculus and its Applications*. Upper Saddle River, NJ: Pearson Education.
5. Stroud, K. A. (2005). *Engineering Mathematics*. 5<sup>th</sup> Ed. London: Macmillan Press Ltd.

## **BFC10103 Static and Dynamic**

---

### **Synopsis**

The fundamental concepts of equilibrium with different types of forces, work and energy are essential in solving static and dynamic structure element. The principles knowledge of static and dynamic such momentum, friction and gravity are widely used in our real life. This course introduces students to apply Newton's Law and understand the basic knowledge of centroid and gravity of a body. Scope of the study includes moment and couples, center of gravity, moment of inertia of a body and impulse and momentum of a rigid body.

### **References:**

1. Costanza, Francesco; Engineering Mechanics: Statics and Dynamics, McGraw-Hill; 2010. (Call no. UTHM library: TA350 .C67 2010)
2. Bedford, Anthony; Engineering mechanics: statics and dynamics; 5<sup>th</sup> Edition, 2005. (Call no. UTHM library: TA350 .B42 2005)
3. Beer, Ferdinand P.; vector mechanics for engineers: static and dynamics, 9<sup>th</sup> Edition, McGraw-Hill, 2009. (Call no. UTHM library: TA350 .V42 2009)
4. R.C. Hibbeler; Engineering mechanics: static and dynamics, 11<sup>th</sup> Edition, Pearson, 2007. (Call no. UTHM library: TA350 .H52 2007)
5. Norashidah Abd Rahman, Noorli Ismail, Mohd Hilton Ahmad, Module Static and Dynamic, 2<sup>nd</sup> Edition, 2009.

## **BFC10202 Nature Conservation**

---

### **Synopsis**

Nature conservation is the wise management and utilisation of natural renewable resources in a sustainable manner to ensure the maintenance of biodiversity. There is an increasing awareness that the conservation of the world's natural resources is vital for human survival. This course introduces students to nature conservation and understanding impacts of human activities on environment. Scope of study includes the need to maintain a good natural environment, introduction to the principles and practice of conservation and responsibility to maintain the environment.

### **References**

1. Richard, K.L. & Courtney, J.W. (2009). *Conservation for New Generation*, Redefining Natural Resources Management. Washington Island. (Shelf no. S936 .C66 2009 )
2. Scott, P. and Charles, W.F. (2008). *Conservation biology. Evolution in action*. New York Oxford University Press. (Shelf no. QH75 .C65 20080)
3. Dan, G & John, A. (2006). *Nature conservation*. New York, Springer. (Shelf no. QH75 .N37 2006)
4. Miller, G.T. Jr. (2006) *Environmental Science: Working with the earth* Belmont, CA: Thomson Learning (GE105.N545 2006)
5. Miller, G.T. Jr. (2005) *Living in the environment: Principles, connections and solutions* Pacific Grove, CA: Thomson (G E105.N544 2005)

### **UWB10202 Effective Communication**

---

#### **Synopsis**

This course emphasizes on task-based approach and focuses on developing students' delivery of speech in oral interactions and presentations. Importance is given on mastery of self-directed learning, teamwork, research, oral presentations, reasoning and creativity. This course also enables students to acquire knowledge and skills necessary for conducting and participating in meetings, including writing of meeting documents. Students will also be exposed to the techniques of conducting interviews.

#### **References**

1. Cheesebro, T, O'Connor, L. & Rios, F. (2007). *Communication skills: preparing for career success* (3rd ed.) Upper Saddle River, NJ: Pearson.
2. Davies, W.J. (2001) *Communication skills: a guide for engineering and applied science student* (2nd ed.). London: Prentice Hall.
3. Joan van Emden, L. (2004). *Presentation skills for students*. New York: Palgrave Macmillan.
4. Richard Johnson-Sheehan (2005). *Technical Communication Today*. New York: Pearson.
5. Salbiah Seliman et. al. (2004). *English Communication for learners in engineering*. Malaysia: Prentice Hall.

### **BFC14003 Civil Engineering Mathematics II**

#### **Pre-requisite: BFC13903 Civil Engineering Mathematics I**

---

#### **Synopsis**

The course covers the basic concepts of differential equations (first order and second order linear differential equations) and their methods of solution. Applications to civil engineering are emphasized. An introduction to power series and Fourier series are also included.

#### **References**

1. Abd. Wahid Md. Raji, Mohd Nor Mohamad. (2009). *Differential Equations for Engineering Students*. Malaysia: Comtech Marketing Sdn. Bhd.
2. James, Glyn. (2004). *Advanced Modern Engineering Mathematics*. 3<sup>rd</sup> Ed. England. Prentice Hall.
3. Peter V. O'Neil. (2003). *Advanced Engineering Mathematics*. Thomson Brooks/Cole.
4. Stroud, K. A., Booth, D. J. (2007). *Advanced Engineering Mathematics*. 4<sup>th</sup> Ed. USA: Palgrave Macmillan.
5. Stroud, K. A., Booth, D. J. (2007). *Engineering Mathematics*. 6<sup>th</sup> Ed. USA: Palgrave Macmillan.

### **BFC10303 Engineering Drawing and CAD**

---

#### **Synopsis**

This course introduces students to use both manual and AutoCAD in producing Civil Engineering Drawing. The aim is to impart technical drawing skills and apply the acquired knowledge and understanding in carrying out civil and structural engineering detail drawings as well as an initial technical drawing works using AutoCAD Software. Scope of study includes Geometric Construction, Introduction to AutoCAD Level 1 and CAD application in Civil and Structural Engineering Drawing.

#### **References**

1. Arshad N. Siddiquee, Zahid Akhtar Khan and Mukhtar Ahmad, *Engineering drawing with a primer on AutoCAD*, Prentice-Hall, 2004. [TA174.S52 2004]
2. Cecil Jensen, Jay D. Helsel, Dennis R. Short, *Engineering Drawing and Design*, McGraw-Hill, 2008. [T353 .J46 2008]
3. David A. Madsen, David P. Madsen and J.Lee Turpin, *Engineering Drawing and Design*, Delmar Thomson Learning, 2007. [T353 .M325 2007]
4. Douglas Smith and Antonio Ramirez, *Technical drawing 101 with AutoCAD: a multidisciplinary curriculum for the first semester*, Prentice Hall, 2009. [T385.S64 2009]
5. Mark Dix & Paul Riley, *Discovering AutoCAD 2008*. Prentice Hall, 2008. [T385 .D62 2008]

## **BFC10403 Fluid Mechanics**

---

### **Synopsis**

Basic principles of fluid mechanics help engineers to study and analyze all sorts of fluid-related problems, ranging from statics and dynamics of fluid to flow in pipe networks. This course introduces students to the principles of fluid mechanics and application of the concept to typical civil engineering problems including flow in pipes, fluid measurement, and computation of fluid forces. Scope of study includes Properties of Fluids: concept of fluid mechanics, definition of fluids, properties of fluids; Hydrostatic Pressure and Buoyancy: pressure head, pressure measurements, hydrostatic force on plane surfaces, buoyancy and stability; Basic Fluid Equations: continuity, momentum and energy equations, applications of Bernoulli equation, flow measurements, forces of fluids; Flow in Pipes: Reynolds number, Hagen-Poiseuille and Darcy-Weisbach equations, friction loss, minor losses; Pipe Network: hydraulic and energy grade lines, fluid flow in pipes, flow in series and parallel pipes, Hardy-Cross method; Dimensional Analysis and Similarity: basic dimensions, Buckingham theorem, dimensionless numbers, geometric, kinematic and dynamic similarities.

### **References**

1. White, F. M. (2011). *Fluid Mechanics*, 7th ed. New York: McGraw-Hill. Call number: TA357.W44 2011.
2. Cengel, Y. A. & Cimbala, J. M. (2010). *Fluid Mechanics: Fundamentals and Applications*, nd ed. Boston, MA: McGraw-Hill. Call number: TA357.C46 2010.
3. Crowe, C. T. (2010). *Engineering Fluid Mechanics*, 9th ed. Chichester: John Wiley. Call number: TA357.E53 2010.
4. Munson, B. R., Young, D. F. & Okiishi, T. H. (2010). *Fundamentals of Fluid Mechanics*, 6th ed. Hoboken, NJ: John Wiley. Call number: TA357. M86 2010.
5. Janna, W. S. (2010). *Introduction to Fluid Mechanics*, 4th ed. Boca Raton: CRC Press. Call number: TA357.J36 2010.
6. Cimbala, J. M. & Cengel, Y. A. (2008). *Essentials of Fluid Mechanics: Fundamentals and Applications*. New York: McGraw-Hill. Call number: TA357.C54 2008.

## **UWB 10602 French Language**

---

### **Synopsis**

This course is designed for students to learn the basic of French. Students are exposed to the skills of listening, reading, speaking and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using French.

### **References**

1. Booth, Trudie Maria, 2008. French Verbs Tenses. McGraw-Hill. Call no.: PC 2271, U66 2008.
2. Heminway, Annie, 2008. Complete French Grammar. McGraw-Hill. Call no.: PC2112, H45 2008
3. Price, Glanville, 2003. A Comprehensive French Grammar. Blackwell Publishing. Call no.: PC2112. P74, 2003.
4. Hatier, 1995. Le Nouveau Bescherelle Complete Guide 12 000 French Verbs. Paris: Librairie Hatier.
5. Kaneman-Pougatch, Massia et al, 1997. Méthod de français: Café Crème 1. Paris: Hachette F.L.E.

## **UWB10702 German Language**

---

### **Synopsis**

This course is designed for students to learn the basic German language. Students are exposed to the skills of listening, reading, speaking, and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using German language.

### **References**

1. Astrid Henschel, 2006. German Verb Tenses. New York: McGraw-Hill. [PF3301. H46 2006]
2. Gabriele Kopp, Siegfried Büttner, 2004. Planet 1: Deutsch für Jugendliche: Kursbuch. Ismaning: Germany: Hueber Verlag. [PF3129. K664 2004]
3. Gabriele Kopp, Siegfried Büttner, 2004. Planet 1: Deutsch für Jugendliche: Arbeitsbuch. Ismaning: Germany: Hueber Verlag. [PF3129. K664 2004]
4. Heiner Schenke, 2004. Basic German: a grammar and workbook. London: Routledge. [PF3112.5. 35 2004]
5. Robert Di Donato 2004. Deutsch, Na Klar! Boston: McGraw-Hill. [PF3112. D36 2004]

## **UWB10802 Japanese Language**

---

### **Synopsis**

This course is designed for students to learn the basic Japanese language. Students are exposed to the skills of listening, reading, speaking, and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using Japanese language.

### **References**

1. M. Rajendran, (1991). Malay Japanese English Dictionary, Petaling Jaya: Pelanduk Publications. [PL5125 .R34 1991rd]
2. Rosmahaili Azrol Abdullah, (2008) : Bahasa Jepun (UMJ 1312): Learning Module (2<sup>nd</sup> Edition), Batu Pahat: Penerbit UTHM. [PL539.3 .R67 2008a]
3. Surie Network, (2000). Minna no Nihongo: Kaite Oboeru, Tokyo: 3A Corporation. [PL539.3 .M56 2000].
4. Surie Network, (1998). *Minna no Nihongo: Main Textbook - Shokyu 1*, Tokyo: 3A Corporation. [PL539.3 .M574 1998]
5. Surie, Network (2010). *AE Minna no Nihongo 1-1 Elementary: Main Textbook*, Tokyo: 3A Corporation. [TK7885.7 .V44 2000r]

### **UWB10902 Mandarin Language**

---

#### **Synopsis**

This course is designed for students to learn the basic of Mandarin. Students are exposed to the skills of listening, reading, speaking and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using Mandarin Language.

#### **References**

1. Lim Hong Swan, Yeoh Li Cheng, 2010. *Mandarin Made Easy Through English*. Batu Pahat: Penerbit UTHM. [PL1129.E5 .L554 2009 a]
2. Liping Jiang (2006). *Experiencing Chinese*. China: Higher Education Press. [PL1129.E5 .T59 2006]
3. Kang Yuhua (2007). *Conversational Chinese 301:Vol. 2*. China: Beijing Language and Culture University Press. [PL1121.C5 .K364 2007]
4. Liu Xun (2010). *New Practical Chinese Reader: textbook*. China: Beijing Language and Culture University Press. [PL1129.E5 .L58 2010]

### **UWB11002 Malay Language**

---

#### **Synopsis**

This course is designed for students to learn the basic Malay language. Students are exposed to the skills of listening, reading, speaking, and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using Malay language.

#### **References**

1. Asmah Hj. Omar (1985). *Kamus Ayat*. Eastview. PL5091 .A85 1985 rd  
Asmah Hj. Omar. (1993). *Susur Galur Bahasa Melayu*. DBP : KL. PL5127 .A85 1993N1
2. Asmah Hj. Omar. (1993). *Nahu Melayu Mutakhir*. DBP: KL. PL5137 .A85 1993
3. Ainun Mohd.(2011). *Tesaurus Bahasa Melayu*. PTS Professional Publishing. PL5123. A364 2011
4. Nik Safiah Karim (2008). *Tatabahasa Dewan*. DBP. PL5108 .T37 2008 r
5. Kamaruddin Saad. (2009). *105 Karangan Bahasa Melayu UPSR*. Minerva Publishing. PL 5108 KAM 2009

### **UWB11102 Spanish Language**

---

#### **Synopsis**

This course is designed for students to learn basic Spanish language. Students are exposed to the skills of listening, reading, speaking, and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using Spanish language.

#### **References**

1. Nurul Sabrina Zan, (2010). *Hola! Hablo español*. First Edition Batu Pahat: Penerbit UTHM. PC4445 .N72 2010 a
2. Salina Husain, (2005). *Vamos a aprender español lengua extranjera*. Batu Pahat: Penerbit UTHM. PC4121 .S24 2005 a
3. Bey, Vivienne (2004). *Spanish verbs drills*. Mc. Graw Hill. PC4271 .B49 2004
4. Terrell, Tracy D. (2003). *Dos mundos*. Mc. Graw Hill. PC4129.E5 .D67 2003
5. O'Connor, Niobe (2002). *Caminos 1*. Nelson Thornes. PC4121 .O36 2002

### **UWB11202 Arabic Language**

---

#### **Synopsis**

This course is designed for students to learn the basic of Arabic. Students are exposed to the skills of listening, reading, speaking and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using Arabic.

### References

1. Mohd Hisyam Abdul Rahim; Ahmad Sharifuddin Mustapha; Mohd Zain Mubarak. 2008.
2. *Bahasa Arab UMR 1312*. Batu Pahat: Penerbit UTHM. (NO RUJUKAN: PJ6115 .M445 2008 a)
3. Mohd Hisyam bin Abdul Rahim. 2005. *Senang Berbahasa Arab*. Batu Pahat: Penerbit KUITTHO. (NO RUJUKAN: PJ6115 .M44 2005 a)
4. Ab. Halim Mohammed; Rabiyyah Hajimaming; Wan Muhammad Wan Sulong. 2007. *Bahasa Arab Permulaan*. Serdang: Penerbit UPM. (NO RUJUKAN: PJ6065 .A32 2007)
4. Fuad Ni'mat. 1973. *Mulakhass qawa'id al-lughatul 'arabiyyah*. Damsyik: Darul Hikmah. (NO RUJUKAN: PJ5161 .F62 1973)

### **UWB11302 Javanese Language**

---

#### Synopsis

This course is designed for students to learn the basic Javanese language. Students are exposed to the skills of listening, reading, speaking, and writing with basic vocabulary, grammar and structure. Students are also exposed to the real daily situations which will help them to communicate using Javanese language.

#### References

1. Majendra, Maheswara (2010). *Kamus lengkap Indonesia-Jawa, Jawa-Indonesia/Majendra Maheswara*. Pustaka Mahardika. XX(131732.1)
2. Yrama, Widya (2008). *Cara belajar membaca dan menulis huruf jawa, jilid 1*. Yrama Widya. Publication info:, 2008 XX(131738.1)
3. Yrama, Widya (2008). *Cara belajar membaca dan menulis huruf jawa, jilid2*. Yrama Widya .Publication info:, 2008 XX(131739.1)
4. Budhi Santosa, Iman. (2010). *Nguri-uri peribasan Jawi = Melestarikan peribahasa Jawa*. Intan Pariwara. XX(131751.1)
5. Purwanto, Eko (2011). *Pepah Bahasa Jawi. Cara mudah belajar cepat dan tuntas bahasa Jawa*. Diva press. XX(131748.1)

### **UWB20302 Technical Writing**

---

#### Synopsis

This course introduces students to report writing skills needed at tertiary level. Students will learn basic report writing skills such as proposals, progress report, informational and analytical report. In order do this, they will learn how to collect data using questionnaires. The data collected will be analyzed, transferred into graphic forms and presented orally and in writing. Based on the analysis of data, students will be able to draw conclusions and make recommendations.

#### References

1. Dorothy Cheung et. al. (1999). *Report writing for engineering students*. 2nd edition, Singapore: Prentice Hall. PE1475 .R46 1999 N3
2. Finkelstein, J. (2008). *Pocket Book of technical writing*. 3rd ed. Singapore: McGraw Hill. T11 .F56 2008
3. Gerson, S. J. & Gerson, S. M. (2003). *Technical writing: Process and product*. 3rd ed. New Jersey: Prentice Hall. PE1475 .G47 2000
4. Kolin, P. C. (2006). *Successful writing at work*. Concise ed. USA: Houghton Mufflin Company. PE1408 .K64 2009
5. Lakshmy Anantha Krishnan et. al. (2003). *Engineering your report: From start to finish*. Singapore: Prentice Hall. T11 .E64 2006

### **BFC 20601 Material and Fluid Laboratory**

---

#### Synopsis

The application of material and fluid testing in Civil Engineering is compulsory in construction field. This course introduces students to implement some testing which is studied and related to subject Materials of Civil Engineering and Fluid Mechanics. Scope of study in Material Test consists of 6 tests including concrete, steel, wood and brick test. Fluid Test consists of 6 tests including jet striking test, flow test, Bernoulli's Theorem and friction test.

#### References

1. Mamlouk, Michael S; *Materials for civil and construction engineers*; Prentice Hall, 2011. XX(125852.1)
2. Shan, Somayaji; *Civil engineering materials*; Prentice Hall, 2001. TA403 .S66 2001 N1
3. Young, J. Francis; *The science and technology of civil engineering materials*; Prentice Hall, 1998. TA403 .S44 1998 N2
4. Jackson, Neil, Dhir, Ravindra K.; *Civil engineering materials*; Hampshire: Palgrave, 1996. TA403 .C58 1996
5. Finnemore, E. John; *Fluid mechanics with engineering applications*; McGraw-Hill, 2002. TA357 .F56 2002 N1
6. Fimmemore, E. John Franzini, Joseph B.; *Solution manual to accompany fluid mechanics with engineering applications*; McGraw-Hill, 2002. TA357 .F553 2002 ca

7. Street, Robert L. Watters, Gary Z. Vennard, John K; Elementary fluid mechanics; John Willey & Son, 1996. QA901 .V45 1996 N2

---

### **UQ\*1xxx1 Co-Curriculum II**

---

#### **Synopsis**

This course is offered in the form of multiple choice of activities for Diploma students and undergraduates. Three categories of activities offered are Sports and Recreational, Club/ Associations and Uniform Bodies.

---

### **BFC23702 Creativity and Innovation**

---

#### **Synopsis**

This course focuses on developing a creative person who will eventually think strategically, creatively and critically. The knowledge and skills acquired throughout the course will later be applied by the students in creative problems solving (CPS) and making decisions in the future. In this course, students will be exposed to various creative thinking and problem solving techniques, creative and innovative skills.

#### **References**

1. Bernacki, E. 2002. Wow! That's a Great Idea!. Singapore : Prentice Hall.
2. Ceserani, J. & Greatwood, P. 1995. Innovation and Creativity. London : Kogan Page.
3. Ceserani, J. & Greatwood, P. 2001. Innovation and Creativity. New Delhi : Crest Publishing House.
4. Clegg, B. & Birch, P. 2002. Crash Course in Creativity. London : Kogan Page.
5. De Bono, E. 1998. Edward De Bono Supermind Pack: Expand Your Thinking Power with Strategic & Mental Exercise. DK Publishing Incorporated.
6. De Bono, E. (2003). Serious Creativity 1: Lateral Thinking Tools, Techniques and Application. Singapore : Allscript Books.
7. De Bono, E. (2003). Serious Creativity 2: Lateral Thinking Tools, Techniques and Application. Singapore : Allscript Books.
8. Lumsdaine, E., Lumsdaine, M. & Shelnut, J. W. 1999. Creative Problem Solving and Engineering Design. USA: McGraw-Hill.
9. Tanner, D. 1997. Total Creativity. APTT Publications.

---

### **BFC24103 Civil Engineering Mathematics III**

**Pre-requisite: BFC13903 Civil Engineering Mathematics I**

---

#### **Synopsis**

This course introduces the function of several variables, which covers function, limit and continuity, partial derivative; multiple integral, line integral and surface integral; vector valued function, directional derivative, gradient, divergence, curl and implicit derivative; Green Theorem, Stokes Theorem and Gauss Theorem.

#### **References**

1. Abd Wahid Md Raji, Phang Chang, Phang Piau, (2007). *Engineering Mathematics III* BSM2913. Penerbit UTHM. (Learning Module)
2. Robert T. Smith, and Roland B. Minton (2007). *Calculus Early Transcendental Function* (3<sup>rd</sup> Edition). New York: McGraw-Hill.
3. James Stewart (2003). *Calculus*. USA. Thomson Learning Inc.
4. Howard Anton, Irl Bivens, Stephen Davis (2002). *Calculus* (7<sup>th</sup> Edition). New York:
5. John Wiley. Straud, K.A. (1996). *Further Engineering Mathematics* (3<sup>rd</sup> Edition). England: Macmillian Publication

---

### **BFC20703 Engineering Geomatic**

---

#### **Synopsis**

Surveying or geomatic is important knowledge since their early civilization. In early geomatic knowledge was applied in reconciling the property boundary within the neighborhood. Nowadays, survey technology has developed fast and widely used in civil engineering work. Among others are in site planning, construction and highway maintenance, railroad planning, building and bridge construction, dam construction, drainage works, water supply and sewage system, and so forth. The scope of engineering geomatic includes traverse survey, leveling work, a detailed engineering survey, route survey, and earthwork volume calculation.

#### **References**

1. Kavanagh, B.F. and Glenn Bird S.J.; Surveying: Principles & Applications, 6<sup>th</sup> Edition; Prentice Hall, USA; 2009. (TA545.K37 2009)
2. Kavanagh, B.F.; Surveying with construction application; Prentice Hall, USA; 2010. (TA625.K38 2010)
3. Paul R. Wolf and Charles D. G.; Elementary Surveying-An Introduction to Geomatics; 10<sup>th</sup> Edition; Prentice Hall; 2002. (TA545.W64 2002)
4. Stephen V. E.; A guide to understanding land surveys, Hoboken, NJ: J. Wiley; 2009. (TA551.E87 2009)



5. Watson, P.; Surveying and Engineering: Principles and Practice; Francis 10<sup>th</sup> Edition, Addison Wesley; 2008. (TH438.S97 2008)

---

### **BFC20802 Computer Programming**

---

#### **Synopsis**

As a fundamental subject, this course will equip the students with theory and practice on problem solving techniques by using the structured approach. Students will be required to develop programs using C++ programming language under windows platform, in order to solve simple to moderate problems. They will be familiarized with the pre-processor instructions, constants and variables, data types, input and output statements, text files, control structures: sequential, selection and loop, built-in and user-defined functions, one dimension and two dimension array, and structure.

#### **References**

1. Walter Savitch, Problem Solving with C++, 7th edition. 2009. Pearson (Addison-Wesley).
2. Y. Daniel Liang, Introduction to Programming with C++. 2007. Pearson Education.
3. Leslie Robertson, Simple Program Design: A Step-by-Step Approach, 5th edition. 2006. Thomson.
4. H.M Deitel, P.J Deitel. C++ How to Program, 5th edition. 2005. Pearson Education.
5. Mohd. Aizaini Maarof, Logik Pengaturcaraan Komputer, 2006. Penerbit Universiti Teknologi Malaysia.
6. Faculty of Computer Science and Information Systems, Programming Technique I - C++ Workbook (English - Malay), 3rd edition, 2009.

---

### **BFC20903 Mechanics of Materials (Pre-requisite: BFC10103 Static dan Dynamic)**

---

#### **Synopsis**

Mechanics is the body of knowledge that deals with the relationships between forces and the motion of points through space, including the material space. Material science is the body of knowledge that deals with the properties of materials, including their mechanical properties. This course introduces students to simplify the affect of material and geometric properties when the structure is loaded with outside and internal forces. Scope of this course includes the analysis and design of structural members subjected to axial loads, torsion and bending, as well as such fundamental concepts as stress and strain, deflections of beams, behaviour of columns and statically determinate plane truss.

#### **References**

1. Ferdinand P. Beer, E. Russell Johnston, John T. Dewolf, David F. Mazurek, 6<sup>th</sup> Edition (Global Edition) Mechanics of Materials, McGraw-Hill Boston, MA:, 2012. (TA405 .M45 2009)
2. Hibbler, R.C., Mechanics of Materials, 9<sup>th</sup> Edition, Pearson, 2013. (TA405 .H47 1994)
3. James M. Gere, Barry J. Goodno; Mechanics of Materials, Wadsworth/ Cengage Learning, New York: 2009. (TA405 .G47 2004)
4. Ansel C. Ugural; Mechanics of Materials, Hoboken, NJ: John Wiley, 2008. (TA405 .U48 1991)
5. William F. Riley, Leroy D. Sturges and Don H. Morris.; Mechanics of Materials, Wiley Hoboken, NJ: John, 2007. (TA405 .R54 2007)
6. James M. Gere; Mechanics of materials, Thomson Australia:, 2006. (TA405 .G47 2009)

---

### **BFC24203 Civil Engineering Mathematics IV (Pre-requisite: BFC13903 Civil Engineering Mathematics I)**

---

#### **Synopsis**

This course covers numerical solutions to solve nonlinear equations, system of linear equations, polynomials; numerical differentiation and integration, eigen value, ordinary differentiation and partial differentiation equations, and an introduction to one dimensional finite element problem.

#### **References**

1. D. V. Griffiths, I. M. Smith. (2006). *Numerical methods for engineers*, 2<sup>th</sup> Edition. Boca Raton, FL: Chapman & Hall.
2. J. N. Sharma. (2004). *Numerical methods for engineers and scientists*, Pangbourne: Alpha Science International.
3. Jaan Kiusalaas. (2005). *Numerical methods in engineering with MATLAB*, Cambridge: Cambridge University Press.
4. John H. Mathews, Kurtis D. Fink. (2004). *Numerical methods using MATLAB*, 4<sup>th</sup> Edition. US Upper Saddle River, NJ: Pearson Education.
5. Laurene Fausett. (2002). *Numerical methods using mathCAD*, Upper Saddle River, New Jersey.

## **BFC21002 Construction Engineering**

---

### **Synopsis**

The construction industry is continually adopting new and improves technologies for increasing productivity and quality to meet present and future needs of human kind. Construction engineering addresses the needs of improving the technology through application of fundamental of science and engineering. This course introduces students to identify various types of construction components, issues and method to lay a solid foundation in all areas of construction engineering. Scopes of study are building sub-structure, super structure, formwork, handling concrete and utilities scope of works.

### **References**

1. R.L. Peurifoy et al, Construction Planning, Equipment and Methods, 6<sup>th</sup> Edition. Mc Graw Hill, 2002. Call number : TH145.P48 2011 /2002
2. S.W. Nunnally, Construction Methods and Management, 5<sup>th</sup> Edition, Prentice Hall, 2001. TH145.N86 2011 / 2007/ 2004/ 2001
3. Tim Howarth, Paul Watson, Construction Safety Management, 2009, TH443. H68 2009
4. Roger Greeno (2004). Building Construction Handbook, 5<sup>th</sup> Edition; London: Butterworth-Heinemann. TH151. C58 2004/ 2001
5. Gil L. Taylor, Construction Codes and Inspection Handbook, 2006, TH 439 2006
6. Frederick S. Merrit, Jonathan T, Ricketts. . Building Design and Construction Handbook,2006, TH439.T39 2006

## **BFC21103 Hydraulics**

---

### **Synopsis**

In Civil Engineering Hydraulics, the understanding of fluid properties and behavior in different civil engineering applications, such as flow of water through canals for irrigation, hydraulic structure and the application of pump and turbine are of importance. This course introduces students to the application of principles of fluid mechanics in civil, water and environmental engineering, especially hydraulic structures such as channel and weir. Scopes of study include introduction to open channel flow, uniform and non-uniform flows in open channel, specific energy and control section, and hydraulic structures and machinery.

### **References**

1. Chow, V. T. (1975). *Open-Channel Hydraulics*. Auckland: McGraw-Hill. [TC175 .C56 1975]
2. Subramanya, K. (2009). *Flow in Open Channels*. Boston: McGraw-Hill. [TC175 .S92 2009]
3. Jain, S. C. (2001). *Open-Channel Flow*. New York: John Wiley. [TC175 .J34 2001]
4. French, R. H. (1985). *Open-Channel Hydraulics*. New York: McGraw-Hill. [TC175 .F78 1985]
5. Sturm, T. W. (2001). *Open Channel Hydraulics*. Boston: McGraw-Hill. [TC175 .S78 2001]
6. Chanson, H. (2004). *The Hydraulics of Open Channel Flow: An Introduction*. Amsterdam: Elsevier. [TC175 .C42 2004]

## **BFC21201 Hydraulics And Mechanics Of Material Laboratory**

---

### **Synopsis**

The application of hydraulic and mechanics of material testing in civil engineering is commonly applied in this course to help the student in making a clear understanding about the relationship between the theory and experimental findings. Hydraulics testing consists of 4 tests which include basic hydrology and infiltration rate tests, flow in open channel test, Pelton and Francis turbine tests, series and parallel pump tests. Material mechanics testing consists of 5 tests which include shear force in a beam, bending moment in a beam, force in a statically determinate cantilever truss, buckling of struts, span deflection.

### **References**

1. James M. Gere. (2006). *Mechanics of materials*. Australia: Thomson. Call number: TA405 .G47 2006
2. Lencastre, A. and Holmes, P. (1987). *Handbook of Hydraulic Engineering*. Chichester: Ellis Horwood. Call number: TC145 .L43 1987
3. Bruce R. Munson, Donald F. Young and Theodore H. Okiishi. (2006). *Fundamentals of Fluid Mechanics*. 5<sup>th</sup> Edition; John Wiley & Sons. Call number: TA357 .M86 2002 n.1
4. R.C. Hibbeler. (2002). *Structural Analysis [multimedia]*, 5<sup>th</sup> Edition; Prentice Hall, USA. Call number: TA645 .H52 2002 CD1
5. R.C. Hibbeler. (1997). *Mechanics of Materials*. 3<sup>rd</sup> Edition. Prentice Hall, USA. Call number: TA405 .H43 1997
6. Ned.H.C.Hwang and Robert J. Houghtalen. (1996). *Fundamentals of Hydraulic Engineering System*. 3<sup>rd</sup> edition. Prentice Hall, USA. Call number: TC160 .H83 1996

## **BFC21303 Engineering Geology**

---

### **Synopsis**

Engineering geology is a subfield of geological study concerning about the geological inputs and the uses of the information to solve the engineering problems. This subject apply the geologic sciences to engineering practice for the purpose of assuring that the area geologic factors affecting the design and construction of engineering works are recognized and adequately provided for. This subject gives the exposure to the students to investigate and provide geologic and geotechnical recommendations, analysis, and design associated with human development. The scope of this course are introduction and background of earth geology, the formation processes of earth structures, formation, classification and characteristics of rock engineering, the scale of geology time and the application of the stratigraphy, structural geology and the principle of rock mechanics.

### **References**

1. Plummer & Carlson. Physical Geology. 12<sup>th</sup> Ed. New York, McGraw Hill, 2008. (QE28.2 .P58 2003).
2. Chernicoff and Whitney. An Introduction to Physical Geology. 4<sup>th</sup> Ed. New Jersey; Pearson; 2007 (QE28.2 .C43 2007).
3. Duncan C. Wylie and Christopher W. Mah. Rock Slope Engineering:Civil and mining. 4<sup>th</sup> Ed. New York: Spon Press; 2004 (TA706 .W94 2004).
4. Bell F.G. Engineering Geology. Butterworth-Heinemann; 2007 (TA705 .B44 2007).
5. Terry R. West; Geology Applied to Engineering; Waveland Pr Inc; 2010 (TA705 .W47 1995 N1).
6. Bell F.G.; Engineering Geology and Construction; Taylor & Francis; 2004 (TA705 .B44 2004).
7. Noel Simons, Bruce Menzies and Marcus Matthews; Soil and Rock Slope Engineering. 1<sup>st</sup> Ed. London. Thomas Telford Publishing; 2001 (TA710 .S55 2001).
8. Kolymbas D.; Tunneling and Tunnel Mechanics: A Rational Approach to Tunneling. Germany; Springer; 2005 (TA805 .K64 2005).
9. Hoek E, Kaiser P.K, Bawden W.F; Support of Underground Excavations in Hard Rock. 4<sup>th</sup> Ed. Rotterdam; A. A Balkema; 2000 (TA740 .H64 2000).

## **BFC21403 Structural Analysis**

### **(Pre-requisite: BFC20903 Mechanics of Materials)**

---

### **Synopsis**

Structural analysis is one of the important aspect need to be studied before designing the structure. This course introduces student to the concept of structural analysis of elastic and inelastic behavior of trusses, beams, columns and frames. Scope of the study includes deformable of statically determinate and indeterminate structure, influence line, plastic analysis and elastic instability.

### **References**

1. Hibbeler, R.C.; Structural Analysis; 6<sup>th</sup> Edition"; Prentice Hall; USA; 2006. 1000121614
2. Kenneth M. Leet, Chia-Ming Uang and Anne M. Gilbert; Fundamentals of Structural Analysis; 3th Edition; Mac-Graw Hill; 2008. 1000189343
3. Jack C. McCormac; Structural Analysis: Using Classical and Matrix Methods; Wiley; 4th edition; 2007. 1000214234
4. Kassimali.A.; Structural analysis; Thomson; 4<sup>th</sup> Edition; 2005.1000178024
5. A. Ghali, A. M. Neville and T. G. Brown; Structural Analysis: A Unified Classical And Matrix Approach; Spon; 2009. 1000231126

## **BFC21702 Geotechnic 1**

---

### **Synopsis**

Geotechnical engineering is the branch of civil engineering concerned with the engineering behavior of earth materials. Geotechnical engineering includes investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered. This course introduces to student basic properties of soil, classification of soil and also behaviour of soil. Student also can analyze problem occur in soil and proposed solution for each problem. The scopes of this course are composition and soil classification, soil compaction, permeability, soil shear strength and in situ stresses.

### **References**

1. Das, Braja M. (2007), "Principles Of Geotechnical Engineering, (7<sup>th</sup> Edition)", Thomson, Canada. (Library shelf number: TA 710.D37 2010)
2. Budhu, M. (2007), "Soil Mechanics & Foundations (2<sup>nd</sup>. Edition)", John Wiley & Sons, Inc., United States of America. (Library shelf number: TA 710.B83 2007)
3. Shroff, Arvind V. and Shah, Dhananjay L. (2003), "Soil Mechanics and Geotechnical Engineering", A. A. Balkema, Netherlands. (Library shelf number: TA 710.S57 2003)
4. Coduto, Donald P., Yeung, Man-Chung, and Kitch, William A. "Geotechnical Engineering: Principles and Practices", Upple Saddle River, Pearson. (Library shelf number: TA 705.C82 2011)

5. Ishibashi, Isao, and Hazarika, Hemanta, "Soil Mechanics Fundamentals", Boca Raton: CRC Press. (Library shelf number: TA 710.I83 2011)

### **BFC21502 Geomatic Practice**

---

#### **Synopsis**

The course contains basic and advance skill practice which applied intensively in certain period of time. Student will be expose to real work condition and latest instrument and the proper work procedure in geomatic field which related to civil engineering project. The practice also enhances the student softskills. Scope of study include horizontal control survey, vertical control survey, detail plan production, design the development plan and setting out.

#### **References**

1. Kavanagh, B.F. and Glenn Bird S.J.; Surveying: Principles & Applications, 6<sup>th</sup> Edition; Prentice Hall, USA; 2009. (TA545.K37 2009)
2. Kavanagh, B.F.; Surveying with construction application; Prentice Hall, USA; 2010. (TA625.K38 2010)
3. Paul R. Wolf and Charles D. G.; Elementary Surveying-An Introduction to Geomatics; 10<sup>th</sup> Edition; Prentice Hall; 2002. (TA545.W64 2002)
4. Stephen V. E.; A guide to understanding land surveys, Hoboken, NJ: J. Wiley; 2009. (TA551.E87 2009)
5. Watson, P.; Surveying and Engineering: Principles and Practice; Francis 10<sup>th</sup> Edition, Addison Wesley; 2008. (TH438.S97 2008)

### **BFC34303 Civil Engineering Statistics**

**(Pre-requisite: BFC13903 Civil Engineering Mathematics I)**

#### **Synopsis**

This course covers a review on descriptive statistics, probability, random variables and probability distributions, special probability distributions, sampling and estimation theory, significance testing, Chi-square and distribution-free tests, linear regression and correlation and analysis of variance (ANOVA).

#### **References**

1. Norziha Che Him et al. (2009). *Engineering Statistics* (BSM 2922) First Edition. Pusat Pengajian Sains, UTHM
2. Nafisah @ Kamariah et. al. (2004). *Engineering Statistics*. Second Edition. Pusat Pengajian Sains, KUiTTHO.
3. Quek Suan Goen, Leng Ka Man & Yong Ping Kiang. (2004). *Mathematics STPM*. Federal Publications, Selangor.
4. John E. Freund. (1999). *Mathematical Statistics*. Sixth Edition. Prentice-Hall, New Jersey.
5. Robert D. Mason. (1994). *Statistics: An Introduction*. Saunders. College Publisher, Texas.

### **BFC31602 Contract and Estimation**

---

#### **Synopsis**

Understanding in construction and contract laws and contract administration procedures in building construction is essential in order to ensure the success of project. This course introduces students to the construction law, contract law and common contract administration procedures in building and civil engineering projects. This course will also equip the students with knowledge in preparing cost estimation for projects. Scopes of study includes introduction to construction industry and contract management; introduction to construction and contracts laws including elements and discharge of contract and remedies for breach of contract; construction contract procedures; classification of construction contracts; cost estimation and quantity measurement; and price rate calculation.

#### **References**

1. Ahamad, A. and Khairuddin, A. R. (2003). Pengukuran kuantiti bangunan (berserta contoh kerja berdasarkan SMM2)/Measurement of building works with worked examples based on SMM2. Petaling Jaya, Selangor: Prentice Hall. [TH435 .A32 2003]
2. Ahamad, A. (2005). Anggaran kos kerja bangunan: berdasarkan SMM2. Petaling Jaya, Selangor: Pearson/Prentice Hall. [TA682.26 .A32 2005]
3. Ahmad, S. A. A. (1996). Principles of the law of contract in Malaysia. Kuala Lumpur, Malaysia: Malayan Law Journal Sdn. Bhd.[KPG810 .S93 2003]
4. Malaysia. 2001. Contracts Act 1950 (Act 136), Contracts (amendment) Act 1976 (A 329); & Government Contracts Act 1949 (Act 120): as at 1st December 2001. Petaling Jaya, Selangor Darul Ehsan: International Law Book Services. [KPG804.5195 .A4 2001 rw N1]
5. Cawangan Kontrak & Ukur Bahan, Ibu Pejabat JKR Malaysia. (2010). Buku panduan pentadbiran kontrak kerja raya, edisi ketiga. Kuala Lumpur: Ibu Pejabat JKR Malaysia.

6. Lim, Chong Fong. 2004. The Malaysian PWD form of construction contract. Petaling Jaya, Selangor, Malaysia: Sweet & Maxwell Asia. [K891.B8 .L55 2004]
7. Muhammad, F. Y. (2006). Soal jawab undang-undang kontrak. Pahang: PTS Professional. [KPG810 .M42 2006]
8. The Institution of Surveyors, Malaysia. (2000). Malaysian standard method of measurement of building works, second edition. Petaling Jaya, Selangor: The Institution of Surveyors, Malaysia.

### **BFC34402 Geotechnic II** **(Pre-requisite: BFC34402 Geotechnic 1)**

---

#### **Synopsis**

Geotechnical engineering is the branch of civil engineering concerned with the engineering behavior of earth materials. Geotechnical engineering includes investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered. This course focusing in design of geotechnical structure. Student also can analyze problem occur in soil and proposed solution for each problem. The scopes of this course are fundamental properties, flow in soil, stress in soil, slope stability and consolidation & settlement.

#### **References**

1. Das, Braja M. (2007), "Principles Of Geotechnical Engineering, (7<sup>th</sup> Edition)", Thomson, Canada. (Library shelf number: TA 710.D37 2010)
2. Budhu, M. (2007), "Soil Mechanics & Foundations (2<sup>nd</sup>. Edition)", John Wiley & Sons, Inc., United States of America. (Library shelf number: TA 710.B83 2007)
3. Shroff, Arvind V. and Shah, Dhananjay L. (2003), "Soil Mechanics and Geotechnical Engineering", A. A. Balkema, Netherlands. (Library shelf number: TA 710.S57 2003)
4. Coduto, Donald P., Yeung, Man-Chung, and Kitch, William A. "Geotechnical Engineering: Principles and Practices", Upple Saddle River, Pearson. (Library shelf number: TA 705.C82 2011)
5. Ishibashi, Isao, and Hazarika, Hemanta, "Soil Mechanics Fundamentals", Boca Raton: CRC Press. (Library shelf number: TA 710.I83 2011)

### **BFC31802 Highway Engineering**

---

#### **Synopsis**

This Highway Engineering course is intended for undergraduate students in civil engineering. The course will provide an essential engineering knowledge in highway engineering which covering the entire necessary fundamental needed for practitioners at the entry level to industry. This course introduces students to applications of highway engineering as part of civil engineering design, construction and maintenance works. In line with its main task, the scope of this course covers central topics which ensuring an adequate grasp of theoretical concepts of highway materials, pavement design, highway construction, highway drainage and pavement maintenance.

#### **References**

1. Garber N.J, Hoel L.A., Traffic and Highway Engineering (3<sup>rd</sup> Edition), California, Brooks/Cole, 2002. TE145 .G37 2009
2. Wright P.H & Dixon K.K., Highway Engineering (7<sup>th</sup> Edition), John Wiley & Sons (New York), 2004. TE145 .W74 2004
3. Flaherty C.A., The Location, Design, Construction & Maintenance of Pavements (4<sup>th</sup> Edition), Butterworth Heinemann, United Kingdom, 2002. TE145 .H53 2002
4. Rogers M, Highway Engineering (2<sup>nd</sup> Edition), Blackwell Publishing. United Kingdom. 2008. TE145 .R64 2003 n.1
5. Huang, Yang H., Pavement Analysis and Design (2<sup>nd</sup> Edition), Pearson, Prentice Hall, USA, 2004. TE251 .Y36 2003

### **BFC31901 Geotechnic and Structure Laboratory**

---

#### **Synopsis**

Laboratory tests and field tests are normally required during any phase of a construction project to ensure quality assurance and that project is being done according to specifications. The testing is performed to reduce risk associated with poor materials also, it provides reasonable engineering assurance to the project owner that the materials and construction methods meet the project specifications. This course introduce to the student procedure according to specific standard for geotechnical and structural laboratory test. The scopes of the course are soil classification, permeability, shear strength, consolidation, on site soil density measurement for geotechnical laboratory test. For structural laboratory test consists of influence line, statically determinate space frame, statically indeterminate truss and plastic analysis.

## References

1. Budhu, M. (2007), "Soil Mechanics & Foundations (2nd. Edition)", John Wiley & Sons, Inc., USA. TA710 .B83 2007
2. Das, Braja M. (2005), "Fundamentals of Geotechnical Engineering (2nd. Edition)", Thomson, Canada. TA775 .D37 2005
3. Das, Braja M. (2007), "Principles Of Geotechnical Engineering, Adapted International Student Edition", Thomson, Canada. TA710 .D37 2010
4. Robert W. Day (2001), "Soil Testing Manual". TA710.5 .D39 2001
5. Liu Evert (2003), "Soil Properties Testing, Measurement and Evaluation", TA710 .C43 2003

## **BFC32002 Hydrology**

---

### Synopsis

Hydrology is the study of the earth water including their movement, chemistry and distribution. In civil engineering, hydrology applies scientific knowledge and mathematical principles to solve water-related problems in society regarding quantity, quality and availability. This course introduces students to physical processes of hydrology, measurement and collection of data, model conceptualization, data analysis and design synthesis. Scope of study includes Basic Concept of Hydrology: introduction to hydrology, hydrologic cycle and water balance, hydrological data; Precipitation: introduction, rainfall depth and intensity, precipitation data analysis; Evaporation, Transpiration and Infiltration: factors of meteorology, evaporation, transpiration and evapotranspiration, methods of evapotranspiration assessment of Penman and Thornthwaite, infiltration capacity, factors of infiltration i.e. infiltration index; Characteristics and Modelling of Surface Runoff: catchment area, catchment characteristics, river flow determination, intensity-duration-frequency curve, runoff determination, peak flow estimation; Analysis of Hydrograph: runoff components, hydrograph separation, unit hydrograph, application of unit hydrograph; Flood Control: flood and river control, flood frequency analysis, level-pool routing; Groundwater: introduction, one-dimensional groundwater steady flow, well hydraulic.

### References

1. Mays, L. W. (2007). *Water Resources Sustainability*. New York: McGraw-Hill. Call number: TC405.W37 2007.
2. Chin, D. A. (2006). *Water-Resources Engineering*, 2nd ed. Upper Saddle River, NJ: Prentice Hall. Call number: TC145.C44 2006.
3. Prakash, A. (2004). *Water Resources Engineering: Handbook of Essential Methods and Design*. Reston, VA: ASCE Press. Call number: TC145.P73 2004.
4. McCuen, R. H. (2005). *Hydrologic Analysis and Design*, 3rd ed. Upper Saddle River: Prentice Hall. Call number: TC145.M38 2005.
5. Parr, N. M., Charles, J. A. & Walker, S. (ed) (1992). *Water Resources and Reservoir Engineering*. London: Thomas Telford. Call number: TC145.W38 1992.
6. Department of Irrigation and Drainage Malaysia (2000). *Urban Stormwater Management Manual for Malaysia*. Kuala Lumpur: Dept. of Irrigation and Drainage. Call number: TD657.U72.M3 2000.

## **BFC32102 Reinforced Concrete Design 1** **(Pre-requisite: BFC21403 Structural Analysis)**

---

### Synopsis

Reinforced concrete is a composite material made of concrete and steel is widely used to construct the building structures. Plain concrete possesses high compressive strength but little tensile strength. However, steel reinforcement possesses high tensile strength. Therefore, by combining concrete and steel, reinforced concrete attains high utility and versatility. This course introduces students to limit state design for reinforced concrete structures. Scope of study includes introduction to reinforced concrete design, flexure and shear design, checking for deflection, cracking and detailing. Finally is the design for reinforced concrete beams and solid slabs.

### References

1. H. Gulvanessian, J. A. Calgaro and M. Holicky. Designers' guide to EN 1990: Eurocode: Basis of Structural Design. London: Thomas Telford, 2002. (TA658 .G84 2002).
2. H. Gulvanessian, Paolo Formichi, J.A. Calgaro. Designers guide to Eurocode 1: Actions on Buildings: EN1991-1-1 and -1-3 to -1-7. London: Thomas Telford, 2009. (TA658.2 .G84 2009).
3. Bill Mosley, John Bungey and Ray Hulse. Reinforced Concrete Design to Eurocode 2. Palgrave Macmillan. 6<sup>th</sup> edition. 2007. (TA683.2 .M68 2007).
4. Bill Mosley, John Bungey & Ray Hulse. Reinforced Concrete Design to Eurocode 2. Palgrave Mamillan. 6<sup>th</sup> edition. 2007. (TA683.2 .M68 2007).
5. Prab Bhatt, T.J. MacGinley and Ban Seng Choo; Reinforced Concrete: Design Theory and Examples. Taylor & Francis. 3<sup>th</sup> , 2005. (TA683.2 .M33 2005).

## **BPK20802 Entrepreneurship**

---

### **Synopsis**

This course covers various topics related to basic entrepreneurship including introduction to entrepreneurship, entrepreneur's characteristics and motivation, screening business environment and opportunity, formation of business and managing business. Students will also be exposed to real business.

### **References**

1. Charles E. Bamford, Garry D. Bruton (2011). Entrepreneurship: a small business approach. New York: McGraw-Hill. Call number HD62.5 .B35 2011
2. Schaper M., Volery, T, Weber, P., Lewix, K., (2011). Entrepreneurship and small business; 3<sup>rd</sup> Asia-Pacific Edition. John Wiley & Son. Call number HD2341 .E57 2011
3. Hisrich, R.D., Peter, M.P., Shepherd, D.A., (2010). Entrepreneurship, 8<sup>th</sup> Edition. McGraw Hill. Call number HD62.5 .H57 2010
4. Donald F. Kuratko, Richard M. Hodgetts. (2007). Entrepreneurship: theory, process, practice, 7<sup>th</sup> Edition. Mason: Thomson South-Western. Call number HB615 .K87 2007
5. John. B., Tidd. J., (2011). Innovation and entrepreneurship. 2<sup>nd</sup> Edition. Chichester, West Sussex, UK Call number HD53 .B48 2011

## **BFC32302 Traffic Engineering And Safety (Pre-requisite: BFC34303 Civil Engineering Statistic)**

---

### **Synopsis**

Traffic Engineering and Safety is a branch of civil engineering dealing with the design, operation and management of transportation facilities including safety. The design aspects of transportation engineering include the sizing of transportation facilities such as Highway Capacity Analysis. Operations and management involve traffic engineering, so that vehicles move smoothly on the road or track. Highway design involves the consideration of three major factors which are human, vehicular, and roadway and how these factors interact to provide a safe highway. Hence, this course will provide an essential engineering knowledge in traffic engineering and safety which covering the entire necessary fundamental needed for practitioners at the entry level to industry. This course introduces students to applications of traffic engineering and safety as part of civil engineering design and construction to accommodate the future demand and enhance road safety. Scope of study includes the importance of traffic engineering and safety, traffic flow elements and multilane highway capacity analysis, geometric design, traffic safety, road safety audit, traffic management and control, and intersection design.

### **References**

1. Garber, N.J., Traffic and Highway Engineering. 2009. (TE145 .G37 2002; TE145 .G37 2009)
2. Roess, R.P., Traffic Engineering. 2004. (HE355 .M65 2004)
3. Mannering, F.L., Principles of Highway Engineering and Traffic Analysis. 2013. (TE147 .M36 2005; TE145 .M36 2009; TE145 .M36 2013)
4. Slinn, M., Traffic Engineering Design: Principles and Practice. 1998. (HE333 .S54 1998 N1)
5. Currin, T.R., Introduction to Traffic Engineering: A Manual Data Collection and Analysis. 2013. (HE333 .C87 2001; HE333 .C87 2013)

## **BFC32403 Environmental Engineering**

---

### **Synopsis**

Environmental engineering focuses on the examination of the impact of environmental issues towards public health and environment. The course introduces students to environmental effects on energy consumption and human activities to environment, water pollution and wastewater treatment. Scopes of study includes population and economic growth, environmental chemistry, microbiology and ecology. Natural water purification, water treatment and supply and solid waste management.

### **References**

1. Davies, M.L et. al. Principles of Environmental Engineering and Science; McGraw Hill; 2009. (Item barcode: 1000211878 ; shelf number: TD145 .D38 2009)
2. Edward S. Rubin. Introduction to Engineering & the Environment. Mc Graw Hill; 2001 (Item barcode: 1000020547 ; Shelf number: TA170 .R83 2001 N4)
3. Eugene R. Weiner. Applications of Environmental Chemistry; A practical Guide for Environmental Professionals; Lewis Publishers; 2000. (Item barcode: 1000050227 ; Shelf number: TD193 .W44 2000 n1)
4. Bishop P.L. Pollution Prevention: Fundamentals and Practice; McGraw Hill; 2000. (Item Barcode: 1000025540 ; Shelf number: TD897 .B57 2000)
5. Metcalf and Eddy; Wastewater Engineering: Treatment and Reuse; revised by George Tchobanoglous, Franklin L. Burton and H. David Stensel; McGraw Hill 4<sup>th</sup> Edition 2003. (Shelf number: TD645 .W38 2003)

## **BFC32501 Transportation and Environmental Engineering Laboratory**

### **Synopsis**

Laboratory tests and field tests are normally required during any phase of a construction project to ensure quality assurance and that project is being done according to specifications. This Transportation and Environmental Engineering Laboratory course is intended for undergraduate students in civil engineering. The course will provide an essential engineering knowledge and methods in transportation and environmental engineering which covering the entire necessary fundamental needed for practitioners at the entry level to industry. This course introduces students to applications of transportation and environmental engineering as part of civil engineering design, construction and maintenance works. In line with its main task, the scope of this course covers central topics which ensuring an adequate grasp of theoretical concepts and applications on Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Solid (TS), Suspended Solids, Total Dissolved Solid (TDS), Jar Test, Bacteria Count, pH, conductivity, turbidity, dissolved oxygen, Spot Speed Study, Multilane Highway Capacity Analysis, Penetration and Softening Point Test, Flakiness and Elongation Index test, Aggregate Impact Value, and California Bering Ratio Test (CBR).

### **References**

1. Davis, M.L., Masten, S.J., Principles of environmental engineering and science; McGraw Hill, 2004. (TD145 .D38 2009)
2. Salvato, J.A., Nemerow, N. L., and Agardy, F.J. Environmental engineering; John Wiley, 2003. (TD145 .S34 2003)
3. Roberts, A.E., Water Quality Control Handbook; McGraw Hill, 2000. (TD420 .A45 2000 N3)
4. Warren, V., Water Supply and Pollution Control; Prentice Hall, 2005. (TD353 .V54 2009)
5. Jabatan Kerja Raya Malaysia, Standard Specification for Road Works, Ibu Pejabat JKR, Kuala Lumpur, 2008 (available in laboratory FKAAS).

## **BFC32602 Mechanical and Electrical System**

### **Synopsis**

Mechanical and electrical system is the engineering of the internal environment and its impact on a building. It essentially brings buildings and structures to life. This course introduces students to design, installation, operation and monitoring of the mechanical, electrical and public health systems required for the safe, comfortable and environmentally friendly operation of modern buildings. Scope of study includes scope and impact of M&E, fundamental of building physic, ventilation, fire safety, electrical and water supply.

### **References**

1. William K.Y. Tao. 2009. Mechanical and Electrical Systems in Buildings, 2<sup>nd</sup> Edition. Prentice Hall. New Jersey. Call Number: TH6010 .T36 2005.
2. David V. Chadderton. 2000. Building Services Engineering, 3<sup>rd</sup> Edition. E & FN SPON. London. Call Number: TH6010 .C42 2000.
3. Roger Greeno. 2007. Building Services, Technology and Design. Pearson, London. Call Number: TX955 .G73 1997.
4. F.Hall & Roger Greeno. 2009. Building Services Handbook, Incorporating Current Building & Construction Regulations, 5<sup>th</sup> Edition. Butterworth Heinemann. Call Number: TH151 .H34 2009.
5. Benjamin Stein. 2000. Building Technology (Mechanical and Electrical). John Wiley. Call Number: TH6010 .S83 1997.

## **BFC32703 Sustainable Construction Management**

### **Synopsis**

The construction industry is regarded as an essential and highly visible contributor to the process of growth of one country. Nevertheless, the adverse impacts to the environment lead to a growing realization and acceptance throughout the world that there is a need for a more responsible approach to the environment. This course introduces students to overall planning, co-ordination and control of a project from inception to completion aimed at meeting a client's requirements in order to produce a functionally and financially viable project that will be completed on time within authorized cost and to the required quality and environmental standards. Scope of study includes sustainable construction management, sustainable construction technical guidelines, sustainable building management, management concept, project organization, planning and scheduling project, project time control, project cost system, project cost control, sources management and risk management.

### **References**

1. Kopec, David Alan (2009); Health, sustainability, and the built environment. New York: Fairchild Books, 2009. Call number : TH880 .K66 2009
2. Brandon, P. S., Lombardi, Patrizia (2011); Evaluating sustainable development in the built environment. Hoboken, NJ: Wiley-Blackwell, 2011. Call number: HT241 .B72 2011



3. Charles J. Kibert (2008); Sustainable construction: green building design and delivery. Hoboken, NJ: John Wiley, 2008. Call number : TH880 .K52 2008
4. Thomas E. Glavinich (2008); Contractor's guide to green building construction: management, project delivery, documentation and risk reduction. Hoboken, NJ : John Wiley, 2008. Call number: TH880 .G52 2008
5. M. Regina Leffers (2010); Sustainable construction and design. Boston: Prentice-Hall, 2010. Call Number : TH880 .L43 2010

**BFC32803 Reinforced Concrete Design II**  
**(Pre-requisite: BFC32102 Reinforced Concrete Design 1)**

---

**Synopsis**

This course is continuation from BFC 3142/BFC32102 (Reinforced Concrete Design I) and mainly focuses on reinforced concrete design. This course introduces students to the of reinforced concrete structures design according to the relevant code of practices. Scope of study includes analysis of frame structure, column design, staircase design, footing design and retaining wall design.

**References**

1. Prab Bhatt, T.J. MacGinley, and Ban Seng Choo; Reinforced Concrete: Design Theory and Examples, Taylor & Francis; 3 edition; 2006
2. Lawrence Marin and John Purkiss; Concrete Design to EN 1992 , Second Edition; Butterworth-Heinemann; 2006.
3. R.S. Narayanan & A. Beeby; Designers' Guide to EN1992-1-1 and EN1992-1-2; Thomas Telford; 2005.
4. Tony Threlfall; Good Concrete Guide 9 – Designed and Detailed Eurocode 2; British Cement Association; 2006
5. Bill Mosley, John Bungey and Ray Hulse. Reinforced Concrete Design to Eurocode 2. Palgrave Macmillan. 6th edition. 2007. (TA683.2 .M68 2007).

**BFC32904 Industrial Training**

---

**Synopsis**

Students are required to do the industrial training for the period of 10 weeks in the field of civil engineering in the approved organizations by the university. Every student will be evaluated by the faculty and industrial supervisor. In this program students are expected to be trained in systematic and structured way in the disciplines of civil engineering such as designing, constructing, human resources planning, engineering management, cost preparation, entrepreneurship, consultancy and research. Students are also trained in the aspects of work safety and health as well as ethics in the industry. Students shall be given the opportunity to involve directly in the aspects of management, planning, budget preparation, important documents preparation, supervising or maintenance of a project which depend on their availability in industry. Students shall involve in the work place with certain constraints that benefited them in improving their mental and physical fitness.

**BFC 43003 Structural Steel and Timber Design**  
**(Pre-requisite: BFC21403 Structural Analysis)**

---

**Synopsis**

The application of steel and timber structures in Civil engineering is widely used especially for the purposes of rapid construction, higher strength to weight ratio, ease modification, aesthetic value, etc. This course introduces students to simplified elastic design and plastic design of steelwork elements to BS 5950: Part 1: 2000, whereas permissible stress designs for timber structural elements by using MS 544: Part 2: 2001. Scope of study includes introduction to steelwork and timber designs, the design concepts and processes by incorporating an acceptable margin of safety, serviceable and economic.

**References**

1. Chanakya Arya, Design of Structural Elements; Concrete, Steelwork, Masonry and Timber Designs to British Standard and Eurocodes, 2nd Ed., Taylor and Francis Group, 2009. (TA658 .A79 2009)
2. Mohd Hanim Osman, Abdul Karim Mirasa and Ahmad Baharuddin Abd. Rahman, Solution to problems in structural steel design to: BS 5950: part 1: 2000, Universiti Teknologi Malaysia, 2008. (TA684 .M42 2008)
3. Hassan Al Nageim; Steel Structures Practical Design Studies, Taylor & Francis Ltd; 3rd Rev Ed edition; 2005.( TA645 .H37 2005)
4. MS 544: Part 2: 2001; Code of Practice For Structural Use of Timber; SIRIM, Malaysia, 2001.(Closed Access)
5. Jack Porteous and Abdy Kermani, Structural timber design to Eurocode 5, Blackwell, 2007. (TA666 .P67 2007)

### **BFC 43103 Foundation Engineering (Pre-requisite: BFC 34402 Geotechnic II)**

---

#### **Synopsis**

Foundation is an important element of sub-structure that transfers loads from superstructure to the ground or subsoil. A proper design of foundations will ensure the stability of the superstructure such as buildings and geotechnical structures such as retaining walls and excavations. This course introduces students to the procedures and methods of data collection for foundation design purposes, types and design of foundations as well as improvement methods to the weak soils. Scopes of study includes theory of bearing capacity and design of shallow and deep foundation, types and design of retaining structures, soil investigation procedures and soil improvement.

#### **References**

1. Joseph E. Bowles; Foundation Analysis and Design; The McGraw Hill Co.; 1996 (Library shelf number: TA 775.B68 1996)
2. Manfred R. Haunsmann; Engineering Principles of Ground Modification; McGraw Hill; 1990 (Library shelf number: TA 710.H34 1990)
3. Shamsar Prakash; Pile Foundations in Engineering Practice; Jon Wiley and Sons, Inc.;1990 (Library shelf number: TA 780.P72 1990)
4. Braja M Das; Principles of Foundation Engineering; Brooks/Cole Publishing Co.;2007 (Library shelf number: TA 775.D37 2011)
5. Muni Budhu; Soil Mechanics and Foundations; Hoobeken, NJ: John Wiley; 2007 (Library shelf number: TA 710.B83 2007)

### **BFC 43201 Civil Engineering Software (Pre-reqiaite: BFC32703 Sustainable Construction Management)**

---

#### **Synopsis**

The civil engineering software such Esteem, Staad-Pro and Primavera are essential in civil engineering project. The ability in increasing the performance of project scheduling makes this technology important to understand by civil engineer. This course introduces students to applications of civil engineering software starts from the beginning in planning the project schedule until to produce the final result of designing civil project. Scope of the study includes the techniques and variables required in using the reinforced concrete design software: Esteem, analysis and structure design software: Staad Pro, project management software: primavera project planner, Sdr Mapping and Road Design Software, Geotechnical Engineering Software: Geo Slope & Plaxis.

#### **References**

1. Primavera Project Planner Reference Manual; Version 3.0; Primavera System, Inc.; USA, 2001.
2. Construction Scheduling with Promavera Enterprise; Marchman and Anderson; Clifton Park, NY, 2003; TH438.4M37 2003
3. Esteem Structural Analysis, Design & Detailing Softwares User Manual; Esteem Innovation Sdn. Bhd.; 2001.
4. STAAD. Pro 2001 Getting Started Manual; Research Engineers, Intl.; USA; 2001.
5. HEC-RAS Software User Guide; Hydrologic Engineering Center; USA; 2006.
6. Road Geometric Design Software User Guide;
7. WASDA Software User Guide;
8. Brinkgreve, R.B.J.; Plaxis Finite Element Code for Soil and Rock Analyses; A.A. Balkema Publishers, Netherlands, 2002.

### **BFC32202 Engineer and Society**

---

#### **Synopsis**

Engineers work to develop economic and safe solutions to practical problems, by applying mathematics, scientific knowledge and ingenuity while considering technical constraints. The work of engineers is the link between perceived needs of society and commercial applications. This course introduces the student the importance of engineer in society and role of engineer in different sector. The scope of the course are introduction to engineer & society, engineering and organisation, relationship of humanisation in engineering management, research and development, engineer and private sector and professional talk.

#### **References**

1. Babcock D.L. Managing Engineering and Technology – An Introduction to Management for Engineers, Prentice Hall; Englewood Cliffs, NJ,2002.( TA190 .32 2002)
2. Mike W. Martin & Roland Schinzinger; Ethics In Engineering, McGraw Hill, New York.2010. (TA157 .M37 2010).
3. V.K. Narayanan Managing Technology and Innovation for Competitive Advantage, Prentice Hall. 2001. (T49.5 .N37 2001)
4. Bertens, K. Etika dan moral : untuk pengajian tinggi, 2003. (BJ1185 .B47 2003)

5. Alcorn, P. A., Practical ethics for a technological world, Cincinnati, OH: Prentice-Hall, 2001 (BJ159. A42 2001 N1)

### **BFC 43502 Occupational Safety and Health**

---

#### **Synopsis**

This course introduces students to knowledge and skills in occupational safety and health in workplace. Scopes of the study include: Health and Safety Management- OSHA 1994 (Act 514), construction regulation, safety and health management, and safety and health culture; Risk assessment- legal aspect of risk assessment, and risk assessment process; Safety hazards and controls- slips, trips, and falls, caught-in or -between objects, struck by objects, fire and explosions, transportation and vehicle related accidents, confined space, electrical hazards and mechanical handling; Health hazards- chemical hazards, physical hazards, biological hazards, and ergonomics and repetitive strain injuries; and Incident/Accident investigation and reporting- accident causation models, incident investigations, incident analysis and data collection, and incident reporting.

#### **References**

1. Occupational Safety and Health Act and Regulations. MDC Publishers Printer Sdn. Bhd. 2001. Call number: KPG1390.M34 2001 rw N2.
2. Factories and Machinery Act & Regulations. MDC Publishers Printer Sdn. Bhd. 2001. Call number: KPG1390.A31967 .A4 2001 rw N1.
3. Ismail Bahari (2006). Pengurusan Keselamatan dan Kesihatan Pekerjaan. Edisi ke-2.. McGraw Hill Education (Malaysia). Call number: T55.I85 2006.
4. Davies, V. J. and Tomasin K. (2006). Construction Safety Handbook. 2<sup>nd</sup> ed. London: Thomas Telford. Call number: TH443.R43 2006.
5. Anton, Thomas J. (2009). Occupational Safety and Health Management. 3<sup>rd</sup> ed. New York: McGraw-Hill. Call number: T55.A57 1989.

### **BFC 43402 Final Year Project 1**

---

#### **Synopsis**

Final Year Project (FYP) is a form of training and exposure to engineering research undertaken by students independently and systematically under the guidance of a supervisor selected among academicians. The project focuses on a particular field of knowledge, the use of principles and related concepts and the application of techniques dealing with complex yet relevant engineering problems. Students are required to carry out the project individually. The project consists of 2 phases, i.e. FYP 1 and FYP 2, which are conducted consecutively in the final year of the program. Two credit hours are assigned to FYP 1 and four credit hours are assigned to FYP 2.

For this course, students are required to plan and organise the research project that will be executed in FYP 2 and determine the expected results. Students will have to identify the research aim and objectives, prepare the literature review, design the research methodology and draft a proposed work plan. At the end of this course, each student is required to submit a project proposal report. The report should comply with the prescribed format. The student is also required to present his/her project proposal in front of an examination panel.

#### **References**

1. Guidelines For The Implementation Of Final Year Project, Faculty of Civil and Environmental Engineering, Universiti Tun Hussein Onn Malaysia, 2013.
2. Ranjit Kumar, Research methodology: a step-by-step guide for beginners, Sage Publication, 2005
3. Donald H McBurney and Theresa L. White, Research Methods, Thomson Learning, 2007
4. Geraldine Wood, Research paper for dummies, Hungry Mind, 2002
5. John Creedy, Research without tears : from the first ideas to published output, Edward Elgar Publication, 2008.
6. Richard Fellow and Anita Lui, Research method for construction, Wiley Blackwell, 2008.

### **BPK 30902 Engineering Economic**

---

#### **Synopsis**

Engineering economy consists of: Introduction to Engineering Economics, fundamental cost concepts, cost estimation techniques, time value of money, project evaluation with the benefit-cost ratio method, risk analysis and project financing and allocations.

#### **References**

1. Blank, L.T., A. Tarquin (2008): *Basics of Engineering Economy*, International ed., McGraw-Hill, New York, Call Number TA 177.4 B524 2008
2. Mohamad Sirin, R. (2007): *Teori Asas Ekonomi Kejuruteraan*, Faculty of Technology Management KUiTTHO. Malaysia. Call Number: TA177.4 R67 2007

3. Sullivan W.G, Wicks E.M. and Koelling C.P, (2009). *Engineering Economy*, 14<sup>th</sup> Edition, Upper Saddle River, New Jersey, Pearson. Call Number: TA 177.4 S94 2009
4. Park, C. S. (2007). *Contemporary Engineering Economics*, 4<sup>th</sup> Edition, Upper Saddle River: New Jersey, Prentice Hall Call Number: TA177.4 P372 2007
5. John A.W, Kenneth E.C, David B.Pratt (2010), *Principles of engineering economic analysis*, 5th edition, Hoboken, NJ : John Wiley. Call Number: TA177.4 .W44 2010

**BFC43604 Final Year Project 2**  
**(Pre-requisite: BFC 43402 Final Year Project 1)**

---

**Synopsis**

Final Year Project (FYP) is a form of training and exposure to engineering research undertaken by students independently and systematically under the guidance of a supervisor selected among academicians. The project focuses on a particular field of knowledge, the use of principles and related concepts and the application of techniques dealing with complex yet relevant engineering problems. Students are required to carry out the project individually. The project consists of 2 phases, i.e. FYP 1 and FYP 2, which are conducted consecutively in the final year of the program. Two credit hours are assigned to FYP 1 and four credit hours are assigned to FYP 2.

For this course, students are required to execute the project that was proposed in the previous semester (FYP 1). All the data collected will have to be analysed using appropriate methods, and the research findings, conclusions and recommendations will have to be communicated. At the end of course, each student is required to submit a technical paper and a final report. The paper and report must comply with the prescribed formats. The student is also required to present his/her project in front of an examination panel.

**References**

1. Guidelines For The Implementation Of Final Year Project, Faculty of Civil and Environmental Engineering, Universiti Tun Hussein Onn Malaysia, 2013.
2. Ranjit Kumar, *Research methodology: a step-by-step guide for beginners*, Sage Publication, 2005
3. Donald H McBurney and Theresa L. White, *Research Methods*, Thomson Learning, 2007
4. Geraldine Wood, *Research paper for dummies*, Hungry Mind, 2002
5. John Creedy, *Research without tears: from the first ideas to published output*, Edward Elgar Publication, 2008.
6. Richard Fellow and Anita Lui, *Research method for construction*, Wiley Blackwell, 2008

**BFC43303 Integrated Design Project**  
**(Pre-requisite: BFC21403 Structural Analysis)**

---

**Synopsis**

Civil engineering graduates are expected to work in the design of various projects which require technical competency and skills of managerial, organisational, communicative and team working. The projects usually are multidisciplinary such as encompassing such as surveying, geotechnics, hydraulics, structure and environmental engineering. This course is design to develop those skills and competency through a group project involving a number of major fields of civil engineering.

**BFS40103 Advanced Structure Analysis**  
**(Pre-requisite: BFC 20903 Mechanics Of Material / BFC 21403 Structural Analysis)**

---

**Synopsis**

Advanced Structural Analysis covers the discussion of the various aspects of modern structural analysis, ranging from elementary continuum mechanics theory to advanced analysis using the matrix method. The text is geared towards practical engineering problems and attempts to cover essential analysis considerations and techniques present in the daily work of the experienced professional. Scope of the study includes analysis on indeterminate structure, introduction to finite element, elastic and inelastic stability of columns, yield line theory and plastic theory.

**References**

1. Johnson, D (2000), *Advanced Strcutural Mechanics 2<sup>nd</sup> Edition*, Thomas Telford, TA645 .J63 2000
2. Boresi, Arthur P.,(2003), *Advanced Mechanics of Material*, Sixth Edition, John Wiley & Sons, TA405 .B67 2003
3. Chen W. F and Han D. J (2007), *Plasticity for Structural Engineers*, Springer Verlag New York, TA418.14 .C33
4. Zienkiewicz O.C and Taylor R.C (1991), *The Finite Element Method*, Volume 1 and Volume 2, 4<sup>th</sup> Edition, McGraw-Hill, TA640.2 .Z54
5. Paz, M (1991), *Structural Dynamics: Theory and Computations*, Von Nostrand Reinhold New York

### **BFS40303 Prestressed Concrete Design** **(Pre-requisite: BFC 32803 Reinforced Concrete Design II)**

---

#### **Synopsis**

Concrete construction method has evolved throughout the history of mankind. Many methods were discovered accordingly to the purpose of a building and at the same time improving its' aesthetic value. Prestressed method is an idealization which allows a structure withstand a tremendous amount of force while maintaining its shape by using the advantages of steel reinforcement which has a high tensile properties applied in the concrete structure. This course introduces students to the method of prestressed concrete construction with the guidance of the code of practice. Scope of study includes the principle and prestressed method, advantages and disadvantages of prestressed structures, prestressed systems, stress limit and materials, prestressed losses- short and long term losses. Also, analysis and design of simply supported and continuous beam, basic inequality equations, sizing, Magnel diagram, design of tendon profile, ultimate limit state design, ultimate resistance moment, shear design, end-block design, short and long term deflection and composite construction are included in this course.

#### **References**

1. Antoine E. Naaman; Prestressed Concrete Analysis and Design: Fundamentals; Techno Press; 2nd edition; 2004. (TA683.9)
2. Benaim, Robert; The design of prestressed concrete bridges: concepts and principles; Taylor & Francis; 2008. (TG340. B46 2008)
3. Mosley, W. H.; Reinforced concrete design to Eurocode 2 (EC2); Macmillan press; 1996. (TA683 .M67 1996).
4. Shunran Takahashi; Basic design of prestressed concrete structures for engineers; Civil Engineering Department, Politeknik Shah Alam; 2000. (TA683. S58 2000)
5. R.I. Gilbert ; Design of Prestressed Concrete; E and FN Spon; 1997. (TA683.9. G54 1990)

### **BFS40603 Concrete Technology** **(Pre-requisite : BFC 10502 Civil Engineering)**

---

#### **Synopsis**

Concrete is the most widely used composite material in the construction industry. This course exposes student to the advancement of concrete engineering and different concrete mix design methods. The scope of this course includes concrete durability, chemical attack and corrosion mechanisms. Besides that, lightweight concrete, blended cement concrete, special concrete, concrete mix design and concrete repair are covered.

#### **References**

1. Michael S. Mamlouk, John P. Zaniewski; Material for Civil and Construction Engineers, 2nd Edition; Prentice Hall, USA 2006. (TA403 .M36 2011)
2. C. L. Page and M. M. Page; Durability of concrete and cement composites; Woodhead Publishing Limited; 2007. (TA440. D87 2007)
3. Zhang, Haimie; Building Materials in Civil Engineering; Woodhead Publishing Limited, 2011.
4. (TA 403. Z42 2011)
5. P. Kumar Mehta, Paulo J. M. Monteiro; Concrete: microstructure, properties, and materials; McGraw-Hill, 2006. (TA439 .M43 2006)
- A. M. Neville, J. J. Brooks; Concrete Technology Edition 2; Pearson Education, Limited, 2010. (TA439. N46 2010)
6. ACI Design Handbook (Metric), American Concrete Institute, 2010 (130728.1)
7. Kosmatka, Steven H. Michelle L. Wilson. Design and control of concrete mixtures: the guide
8. to applications, methods, and materials, 2011. (128769.1)
9. Concrete repair manual: two volume set Edition:3rd ed. American Concrete Institute, 2008 (128804.1)

### **BFS40903 Advanced Structure Design** **(Pre-requisite: BFC 32803 Reinforced Concrete Design II / BFC 43003 Structural Steel And Timber Design)**

---

#### **Synopsis**

Reinforced concrete is one of the most commonly composite materials used for building structures. Reinforced concrete has the advantage of being formed into any desired shape most conveniently. Meanwhile, steel and steel-concrete composite structures are widely used especially for the purposes of rapid construction and as the industrialized building system. This course introduces students to the design of advanced reinforced concrete, steel and steel-concrete composite structures according to the relevant code of practice. Scope of study includes introduction of seismic design, water retaining structure, advanced slab, concrete wall, plate girder, composite beam and slab and steel connections.

### **References**

1. Prab Bhatt, T.J. MacGinley, and Ban Seng Choo; Reinforced Concrete: Design Theory and Examples, Taylor & Francis; 3<sup>rd</sup> edition; 2005, TA683.2M33 2005
2. L. J. Morris, D. R. Plum: Structural Steelwork Design to BS5950: TH1611 .M67 1996
3. Bill Mosley, Ray Hulse: Reinforced concrete design to Eurocode 2: TA683.2 .M68 2007
4. W. H. Mosley, J. H. Bungey and R. Hulse: Reinfor concrete design: TA683.2 .M67 1999
5. Dennis Lam, Thien-Cheong Ang and Sing-Ping Chiew; Structural Steelwork Design To Limit State Theory; Elsevier Butterworth Heinemann; 3<sup>rd</sup> edition; 2004. TA684. L35 2004

### **BFS41003 Finite Element Analysis (Pre-requisite: BFC21403 Structural Analysis)**

---

#### **Synopsis**

The application timber as structural material in Civil engineering is widely used especially for the purposes of rapid construction, higher strength to weight ratio, ease of erection, aesthetic value, etc. This course introduces students to the design of engineered timber structures using laminated veneer lumber and glued laminated lumber. The basics to timber design are required in this course. Scope of study includes flexural member design, timber slab system design, compression member design, tension member with axial load design, combined member with axial load and flexural load design, connection design, and introduction to Eurocode 5.

#### **References**

1. J. G. Easley and A. M. Waas, Analysis of Structures: An Introduction Including Numerical Methods, 1st Edition, John Wiley & Sons, Sussex, 2011. (TA647.E37).
2. D. Menon, Advanced Structural Analysis, 1st Edition, Alpha Science, Oxford, 2009. (TA645.M464).
3. T. R. Chandrupatla and A. D. Belegundu, Introduction to Finite Elements in Engineering, 4th Edition, Pearson, New Jersey, 2012. (TA347.C46).
4. O. C. Zienkiewicz, R. L. Taylor and J. Z. Zhu, The Finite Element Method: Its Basis and Fundamentals, 7th Edition, Butterworth-Heinemann, Oxford, 2013. (TA640.2. Z535).
5. O. C. Zienkiewicz, R. L. Taylor and D. D. Fox, The Finite Element Method for Solid and Structural Mechanics, 7th Edition, Butterworth-Heinemann, Oxford, 2013. (TA640.2. Z54).
6. J.N. Reddy, An Introduction to Finite Element Method, 3rd Edition, McGraw Hill, New York, 2006. (TA347.F5.R43).
7. D. L. Logan, A First Course in the Finite Element Method, 2nd Edition, Thomson, Toronto, 2012. (TA347.F5.L64).
8. C. V. G. Vallabhan, Finite Element Method for Engineers: From Theory to Practice, 1st Edition, Alpha Science, 2011. (TA347.F5.V34).

### **BFK40303 Advanced Timber Structural Design**

---

#### **Synopsis**

The application timber as structural material in Civil engineering is widely used especially for the purposes of rapid construction, higher strength to weight ratio, ease of erection, aesthetic value, etc. This course introduces students to the design of engineered timber structures using laminated veneer lumber and glued laminated lumber. The basics to timber design are required in this course. Scope of study includes flexural member design, timber slab system design, compression member design, tension member with axial load design, combined member with axial load and flexural load design, connection design, and introduction to Eurocode 5.

#### **References**

1. MS 544: 2001; Code of Practice For Structural Use of Timber; SIRIM, Malaysia
2. BS 6399: Part 1: 1986; Design Loading For Buildings - Code of Practice For Dead and Imposed Loads.
3. MS 1553: 2002, Code of Practice on Wind Loading for Building Structure; SIRIM, Malaysia
4. Chu, Yue Pun; Timber Design Handbook; FRIM, Kuala Lumpur; 1997, (SD97.M3 .M34 1997 no. 42).
5. Abdy Kermani; Structural Timber Design; Blackwell Sciece; UK; 1999, (TA666 .K47 1999).

### **BFA 40103 Environmental Management**

---

#### **Synopsis**

Environmental management focuses on the examination of the impact of environmental issues towards public health and environment. The course introduces students to environmental management system, environmental auditing, and environmental assessment including EIA Scopes of study include introduction to environmental management, environmental management issues, waste minimization, environmental management system (EMS), environmental audit, effect of transportation on environment, environmental impact assessment.

#### **References**

1. Eddie N. L-N; Environmental management, sustainable development and human health; Boca Raton, FL: CRC; 2009. RA565 .E58 2009.

2. Carroll, B. and Turpin, T.; Environmental impact assessment handbook: a practical guide for planners, developers and communities; 2<sup>nd</sup> Ed. Thomas Telford; 2009. TD194.58.G7 .C37 2009
3. Munier, N.; Multicriteria Environmental Assessment: A Practical Guide; Kluwer Academic Publishers; 2004. TD194.6 .M86 2004
4. Lawrence D. P.; Environmental Impact Assessment: Practical Solutions to Recurrent Problems; John Wiley and Sons, Inc.; 2003. TD194.6 .L38 2003
5. Eccleston, C. H.; Environmental Impact Statements: A Comprehensive Guide to Project and Strategic Planning; John Wiley and Sons, Inc.; 2000. TD194.55 .E22 2000 N1

### **BFA 40203 Design of Water supply**

---

#### **Synopsis**

This course introduces students to establish the knowledge and understanding in water treatment processes, distribution and reticulation of water supply system. Design works include population estimate, water use, water demand, intake work, pumping requirement, and material and size of pipes. Scope of study includes covers of coagulation, flocculation, settling, filtration and disinfection processes. Water distribution, pumping, storage tank and reticulation systems are designed according to requirement and projection.

#### **References**

1. Viessman Jr. W and Hammer, M. J.; Water Supply and Pollution Control; Prentice Hall, 2005.
2. The Malaysian Water Association; MWA Design Guidelines for Water Supply Systems; Kuala Lumpur The Malaysia Water Association; 2005.
3. Hammer, M.J.; Water and Wastewater Technology; 5<sup>th</sup> Edition; Pearson Education, 2004.
4. Qasim S.R., Motley E.M. and Guang Zhu; Waterworks Engineering – Planning, Design and Operation; Prentice Hall; 2000
5. Peavy, H.S., et al.; Environmental Engineering; McGraw Hill; 1990.
6. Crittenden, J.; Water Treatment: Principles and Design. John Wiley, 2005.
7. Hendricks D.; Water treatment unit processes: physical and chemical. Taylor & Francis, 2006.

### **BFA 40303 Solid and Hazardous Waste Management**

---

#### **Synopsis**

This course introduces students to establish the knowledge and understanding on the components of solid and hazardous waste. Scope of study includes sources, classification, composition, characteristics, generation, storage, collection, transfer and transport, and disposal of solid waste in landfill. Management and control are covered of leachate and gas, landfill closure and rehabilitation, incineration and combustion, waste reduction, reuse and recycle. Hazardous waste covers of characteristics, generation, collection, transportation, treatment technology, treated residual, disposal, rehabilitation of site polluted.

#### **References**

1. Gaur, R. C., Basic Environmental Engineering, New Age International; 2008.
2. Cheremisinoff, N.P. Handbook of solid waste management and waste minimization. 2003. Butterworth-Heinemann.
3. Tchobanoglous, G., Kreith, F.; Handbook of Solid Waste Management; McGraw Hill; 2002.
4. Vesilind, P.A; William, A.R; Debre, R; Solid waste engineering; 2002, Brook Cole.
5. Kanti L. Shah; Basics of Solid and Hazardous Waste Management Technology; Prentice Hall; 2000.
6. Kiely, G.; Environmental Engineering; McGraw Hill; 1998.
7. Davis, M.L.; Introduction to Environmental Engineering; McGraw Hill; 2<sup>nd</sup> Ed.; 1991.

### **BFA 40403 Design of Waste Water Engineering**

---

#### **Synopsis**

Design of wastewater engineering involved in analyzing and process of design systems and technology wastewater treatment through sustainable approaches. This course introduces students to establish the knowledge and understanding in planning, design and operation of wastewater treatment. Scope of study includes of wastewater characteristics, fundamentals design of physical operations and primary treatment unit. Secondary treatments are covered on biological processes including suspended and attached growth for aerobic and anaerobic process. Design of wastewater treatment systems include activated sludge processes, biofilm processes, anaerobic digestion processes, advanced wastewater treatment system, disinfection, and sludge disposal and reuse.

#### **References**

1. Karia G.L., Christian, R.A. Wastewater treatment: concepts and design approach. Prentice-Hall. 2006. (Shelf number: TD745 .K37 2006)
2. Metcalf and Eddy; Wastewater Engineering: Treatment and Reuse; revised by George Tchobanoglous, Franklin L. Burton and H. David Stensel; McGraw Hill 4<sup>th</sup> Edition 2003. (Shelf number: TD645 .W38 2003)

3. Hammer, M.J.; Water and Wastewater Technology; 5<sup>th</sup> Edition; Pearson Education, 2004. (Shelf number: TD345 .H35 2004.
4. Davies, M.L et. al. Principles of Environmental Engineering and Science; McGraw Hill; 2009. (Item barcode: 1000211878 ; shelf number: TD145 .D38 2009)
5. Edward S. Rubin. Introduction to Engineering & the Environment. Mc Graw Hill; 2001 (Item barcode: 1000020547 ; Shelf number: TA170 .R83 2001 N4)

**BFW 40103 Water Resources Engineering**  
**(Pre-requisite: BFC 21103 Hydraulics / BFC 32002 Hydrology)**

---

**Synopsis**

Water resources engineering involved in analyzing and managing the quantity and quality of water in natural and developed systems. This course introduces students to establish the knowledge and understanding in planning, design and operation of water resources projects with emphasis on hydrology and hydraulic structures. Scope of study includes introduction to water resources engineering, stream flow estimation methods, stream flow estimation by using urban storm water management manual (MSMA), rainfall-runoff modelling, flood control and mitigation, dam and spillways, flood routings, statistic and probability in water resources management, agriculture and irrigation development.

**References**

1. Mays L.W. (2001). *Water Resources Engineering*. New York: John Wiley. Nombor panggilan: TC169.M39 2001 N1
2. Patra K.C. (2008). *Hydrology and Water Resources Engineering*, 2<sup>nd</sup> Edition. Oxford: Alpha Science International Ltd. Nombor panggilan: GB661.2.P37 2008
3. Chin D.A. (2006) *Water Resources Engineering*, 2<sup>nd</sup> Edition. Prentice Hall New York. Nombor panggilan: TC145.C44 2006
4. Brutsaert W., (2005). *Hydrology: An Introduction*. Cambridge University Press. Nombor panggilan: GB661.2 .B78 2005
5. Department of Irrigation and Drainage Malaysia. (2000). *Urban Stormwater Management Manual for Malaysia*. Kuala Lumpur: Dept. of Irrigation and Drainage, 2000. Nombor panggilan: TD657.U72 .M3 2000 v.1

**BFW 40303 Coastal and Harbour Engineering**

---

**Synopsis**

Coastal and harbour engineering relates to the principles of wave engineering and its concepts and theories regarding to waves and the basic design factors. Scope of study includes Introduction to Coastal Engineering: definition, coastal engineering activities, management of coastal engineering, coastal monitoring and control techniques; Characteristics of Waves: introduction, definition of wave parameters, types of waves, theory of waves, phenomena of tides and nearshore currents; Linear and Nonlinear Wave Theories: introduction, wave parameter analysis, Stokes, Korteweg de Vries and Boussinesq, cnoidal, solitary wave theories; Wind-Generated Wave: introduction, wave generation, statistics analysis; Wave Transformation Process: wave shoaling, breaking, refraction, diffraction, reflection; Coastal Structures: definition, types of coastal structures, effects of waves, wind and seawater towards coastal structure, beach nourishment, coastal protection structure designs; Harbour Designs: impact and effects on coastal area, basic factors of harbour engineering designs, harbour designs and planning, harbour development and design procedures.

**References**

1. Kim, Y. C. (ed.) (2010). *Handbook of Coastal and Ocean Engineering*. Hackensack, NJ: World Scientific. Call number: TC330.H37 1990.
2. Kamphuis, J. W. (2010). *Introduction to Coastal Engineering and Management*, 2nd ed. NJ: World Scientific. Call number: TC205.K35 2010.
3. Shibayama, T. (2009). *Coastal Processes: Concepts in Coastal Engineering and Their Application to Multifarious Environment*. Singapore: World Scientific. Call number: TC205.S54 2009.
4. Dean, R. G. & Dalrymple, R. A. (2002). *Coastal Processes with Engineering Applications*. New York: Cambridge University Press. Call number: TC205.D42 2002.
5. French, P. W. (2001). *Coastal Defences: Processes, Problems and Solutions*. New York: Routledge. Call number: TC330.F73 2001.

**BFW 40403 Groundwater Engineering**  
**(Pre-requisite: BFC 21103 Hydraulics / BFC 32002 Hydrology)**

---

**Synopsis**

Water from beneath the ground has been exploited for domestic use, livestock and irrigation since the earliest times. Successful methods of bringing the water to the surface have been developed and groundwater use has grown consistently ever since. This course introduces students to the functions and terminology requisite to the study of groundwater engineering. Scope of study includes Introduction to Groundwater Engineering:



history, groundwater utilization in Malaysia, hydrologic cycle, influence of soil characteristics, vertical distribution of groundwater, zone of aeration and saturation; Movement of Groundwater: Darcy law, groundwater characteristics, types of aquifer, groundwater flow, unsteady groundwater flow, tracers of groundwater; Groundwater Hydraulics: one-dimensional steady flow, steady radial flow into a well, unsteady radial flow in confined and unconfined aquifers; Water Well: hole test and bore log, shallow well construction, deep well drilling, well installation and construction, well tests, pumping equipment; Groundwater Contamination: contamination, sources and effect, contamination weakness, distribution of below ground contamination, assessment of contamination potential, monitoring groundwater quality; Groundwater Management: concept of basin management, water balance, investigation of groundwater basin, data collection and field works, basin management with conjunctive use; Techniques of Groundwater Model: porous media model, analog model, electrical analog model, digital computer model; Groundwater Subsurface Investigation: drill test, water level measurement, geophysics, resistivity, spontaneous potential, lighting, temperature, compass, conductivity-liquid log.

### References

1. Mohammad Karamouz, Ahmadi, A. & Akhbari, M. (2011). *Groundwater Hydrology: Engineering, Planning, and Management*. Boca Raton: CRC Press. Call number: TC176.M52 2011.
2. Taniguchi, M. & Holman, I. P. (2010). *Groundwater Response to Changing Climate*. Leiden; New York: Taylor & Francis. Call number: XX(131116.1) Being catalogued.
3. Younger, P.L. (2007). *Groundwater in the Environment: An Introduction*. Malden, MA: Blackwell. Call number: GB1003.2.Y68 2007.
4. Montgomery, J. H. (2007). *Groundwater Chemicals: Desk Reference*. Boca Raton, FL: CRC Press. Call number: TD426.M66 2007 r.
5. Todd, D. K. & Mays, L. W. (2005). *Groundwater Hydrology*. Hoboken, NJ: John Wiley. Call number: GB1003.2.T624 2005.

### **BFW 40503 Urban Stormwater Management (Pre-requisite: BFC 21103 Hydraulics / BFC 32002 Hydrology)**

---

### Synopsis

Stormwater hydrology is an area of hydrological practice that is aimed at managing both the quantity and quality of runoff from urban environments. Stormwater management main goal is to protect the natural water cycle and ecological system by the introduction of local source control, flow attenuation and treatment in natural or mostly constructed biological systems, such as ponds, wetlands and treatment facilities. This course introduces students to the importance of stormwater drainage systems for establishing sustainable urban development. Scope of study includes Introduction to Urban Storm Water Management: perspective in Malaysia, processes of environment, management of storm water, design of acceptance criterion, institution and framework of regulation, authority requirement and documentation; Processes of Plan: introduction, framework of plan, strategic plan, master plan, alternatives of management; Fundamental Design and Runoff Estimation: introduction, concept of hydrology design, fundamental of hydraulic, design rainfall, estimation of runoff, flow and routing, estimation of contaminant, transport and retention; Runoff Quantity Control: principles of quantity control, detention, retention; Runoff Conveyance: roof, property drainage and stormwater inlets, pipe and open drains, culvert, engineered waterways and hydraulic structures; Best Management Practices on Runoff Quality Controls: post construction - source and treatment control, during construction - construction sediments.

### References

1. Department of Irrigation and Drainage Malaysia. (2000). *Urban Stormwater Management Manual for Malaysia*. Kuala Lumpur: Dept. of Irrigation and Drainage, 2000. Nombor panggilan: TD657.U72 .M3 2000 v.1
2. McCuen R. H. (2005). *Hydrologic Analysis and Design*, 3<sup>rd</sup> Edition. Prentice Hall. Nombor panggilan: TC145 .M38 2005
3. Mays L.W. (2001). *Water Resources Engineering*. New York: John Wiley. Nombor panggilan: TC169 .M39 2001 N1
4. Patra K.C. (2008). *Hydrology and Water Resources Engineering*, 2<sup>nd</sup> Edition. Oxford: Alpha Science International Ltd. Nombor panggilan: GB661.2 .P37 2008
5. Chin D.A. M (2006). *Water Resources Engineering*, 2<sup>nd</sup> Edition. Prentice Hall New York. Nombor panggilan: TC145 .C44 2006
6. Rogers M, Highway Engineering, 1st Edition, Blackwell Publishing, United Kingdom, 2003. (TE145 .R64 2003 n.1)

## **BFG40103 Advanced Foundation Engineering** **(Pre-requisite: BFC 43103 Foundation Engineering)**

---

### **Synopsis**

Foundations, the structural element transfers not only static loads but also dynamic and seismic loads from superstructures to the ground. The design and analysis of bearing capacity and stability of foundations and other geotechnical structures can be performed using numerical analysis concepts as advanced analytical tools. This course introduces students to numerical analysis concepts in designing foundations and various geotechnical structures subjected to static and dynamic loadings. Scopes of study include numerical methods in geotechnical engineering and their application in designing foundations and retaining structures, design of foundations and geotechnical structures subjected to dynamic loadings.

### **References**

1. C.S. Desai, Numerical Method in Geotechnical Engineering, McGraw Hill, 1987. (TA703.5.157 2001)
2. David M. Potts, Finite Element analysis in Geotechnical Engineering, Thomas Telford, 1999. (TA347.F5.P67 1999)
3. Joseph E. Bowles, Foundation Analysis and Design, McGraw-Hill, 1996. (TA775.B68 1996)
4. Manfred R. Hausmann, Engineering Principles of Ground Modification, McGraw-Hill, 1990. (TA710.H34 1990)
5. Shamsar Prakash, Pile Foundation in Engineering Practice, John Wiley and Son, 1990. (TA780.P72 1990)

## **BFG40203 Advanced Geotechnical** **(Pre-requisite: BFC 33802 Geotechnic II)**

---

### **Synopsis**

Advanced geotechnical is advanced conceptual, physical and numerical models in predicting the response of soil to changes in load and analyzing unsaturated soil. This course introduces the student to the latest techniques in certain major areas of geotechnical engineering. In this course students are exposed to advanced knowledge as well as statistical and numerical techniques and the modeling of stress and strain in soil. The scopes of the course are introduction to characteristics of soils, theories of unsaturated soils, critical state soil mechanics, soil modeling theory, simulation and modeling with analytical computer software.

### **References**

1. Atkinson, J. H. (1993) 'An Introduction to the Mechanics of Soils and Foundations Through Critical State Soil Mechanics', McGraw-Hill Book Company. (TA710 .A843 1993)
2. David, M.W. (1990), "Soil Behaviour and Critical State Soil Mechanics", Cambridge University Press, UK. (TA710 .W66 1990 N1)
3. David, M.W. (2004), "Geotechnical Modelling", Spon Press, New York, USA. (TA710 .W66 2004)
4. Fredlund, D.G. and Rahardjo, H. (1993), "Soil Mechanics for Unsaturated Soils", John Wiley & Sons, Inc., USA. (TA710.5 .F73 1993)
5. Lu, N. and Likos, W.J. (2004), "Unsaturated Soil Mechanics", John Wiley and Sons, Inc., USA. (TA710 .N56 2004).

## **BFG 40403 Geosynthetics Design**

---

### **Synopsis**

Geo-synthetics is the term used to describe a range of synthetic products used to aid in solving some geotechnical problems. Geo-synthetics are available in a wide range of forms and materials, each to suit different end uses. These products have a wide range of applications and are currently used in many civil and geotechnical engineering. This course introduces to student different types and applications of geo-synthetic. The scope of this course is introduction to geo-synthetic, usage and design of geo-synthetic as filter and erosion controller, usage and design of geo-synthetic in drainage system, usage and design of geo-synthetic as separator material, usage and design of geo-synthetic as soil reinforcement material and the application of software.

### **References**

1. Rowe, R. K. (Ed.), (2001), "Geotechnical and Geoenvironmental Engineering Handbook", Kluwer Academic Publishers, Boston, USA. (TA705 .G46 2001 r N1)
2. Dixon, N., Smith, D. M., Greenwood, J. R. and Jones, D. R. V. (2003), "Geosynthetics: Protecting the Environment", Thomas Telford Publ., London, England. (TA455.G46 2003)
3. Koerner, R. M. (2005), "Designing With Geosynthetics", 5th Edition, Pearson Prentice Hall Publ., Upper Saddle River, New Jersey, USA. (TA455 .G44 .K63 2005)
4. Shukla, S. K. and Yin, J.-H. (2006), "Fundamentals of Geosynthetic Engineering", Taylor and Francis Publishers, London, England. (TA455 .G44 S58 2006)
5. Sarsby, R. W. Ed. (2007), "Geosynthetics in Civil Engineering", Woodhead Publishing Ltd., Cambridge, England. (TD171.9 .G47 2006)

**BFT 40203 Pavement Engineering**  
**(Pre-requisite: BFC 31802 Highway Engineering)**

---

**Synopsis**

A good pavement contributes to a large extent to the quality of road and airport. A road or airport cannot function properly unless its pavement provides adequate, smooth and serviceable support for the load imposed by traffic at all times. This course introduces students to the principles of mechanistic-empirical approach in pavement analysis and design for new and existing pavement of road and airfield. Scope of study includes mechanistic models of pavement, mechanistic characterization of pavement materials, evaluation of pavement structural condition and pavement management system.

**References**

1. Huang, Yang H., Pavement Analysis and Design, 2<sup>nd</sup> Edition, Pearson, Prentice Hall, USA, 2003. TE251 .Y36 2003
2. Papagiannakis, A.T., and E.A. Masad, Pavement Design and Materials, John Wiley & Sons (New York), 2008. TE250 .P36 2008
3. Shahin, M.Y., Pavement Management for Airports, Roads, and Parking Lots, (2<sup>nd</sup> Edition) Springer Science+Business Media (New York), 2005. TE250 .S53 2005
4. Flaherty C.A., The Location, Design, Construction & Maintenance of Pavements, Butterworth Heinemann, United Kingdom, 2002. TE145 .H53 2002
5. Jabatan Kerja Raya Malaysia, Interim Guide To Evaluation And Rehabilitation Of Flexible Road Pavements, Ibu Pejabat JKR, Kuala Lumpur, 1994. TE220 .I57 1994

**BFT 40303 Transportation Engineering**  
**(Pre-requisite: BFC 32302 Traffic Engineering And Safety)**

---

**Synopsis**

Transportation Engineering is a branch of civil engineering dealing with the design of transportation facilities. The design aspects of transportation engineering include the design of railway, air and water transportation facilities. This course will provide an essential engineering knowledge in transportation engineering which covering the entire necessary fundamental needed for practitioners at the entry level to industry. This course introduces students to applications of transportation engineering as part of civil engineering design and construction to accommodate the future demand. Scope of study includes the introduction to transportation engineering, design of railway transportation facilities, design of air transportation facilities and design of water transportation facilities.

**References**

1. Paul H. Wright, Norman J. Ashford and Robert J. Stammer, Jr., Transportation Engineering; Planning and Design, 4<sup>th</sup> Edition, John Wiley & Sons, New York, USA, 1998. - TA1145 .W75 1998
2. Horonjeff, R., FX McKelvey, WJ Sproule, SB Young: Planning and Design of Airports (5<sup>th</sup> edition), McGraw Hill 2010. - TL725.3.P5 .P52 2010
3. Thoresen, CA: Port Designer's Handbook: Recommendations and Guidelines. Thomas Telford London, 2003. - TC205 .T56 2003
4. American Railway Engineering and Maintenance-of-Way Association: Manual for railway engineering 2011. Landover, MD: AREMA, 2011. - TF145 .A43 2011 ca (didapati dalam bentuk CD dan buku (4 volume))
5. Garber N.J, Hoel L.A., Traffic and Highway Engineering, 4<sup>th</sup> Edition, University of Virginia, Cengage Learning, 2009. - TE145 .G37 2009

**BFT 40503 Advanced Traffic Engineering**  
**(Pre-requisite : BFC 32303 Traffic Engineering And Safety)**

---

**Synopsis**

This Advanced Traffic Engineering course is intended for undergraduate students in civil engineering. This course will provide essential engineering knowledge in traffic engineering, which covers the fundamentals required for practitioners at the entry level to the industry. The scope of study includes advanced theories, concepts and practices in traffic flow modelling, quantifying arterial road performance, intersection traffic control systems and evaluation, and application of software in traffic engineering.

**References**

1. Garber, N.J., Traffic and Highway Engineering (TE145 .G37 2002; TE145 .G37 2009)
2. Roess, R.P., Traffic Engineering (HE355 .M65 2004)
3. Mannering, F.L., Principles of Highway Engineering and Traffic Analysis (TE147 .M36 2005; TE145 .M36 2009; TE145 .M36 2013)
4. Slinn, M., Traffic Engineering Design: Principles and Practice (HE333 .S54 1998 N1)
5. Currin, T.R., Introduction to Traffic Engineering: A Manual Data Collection and Analysis (HE333 .C87 2001; HE333 .C87 2013)

## **BFT 40603 Road Safety Engineering** **(Pre-requisite: BFC 32302 Traffic Engineering And Safety)**

---

### **Synopsis**

Road Safety is a global issue that faced by all countries in the world. Road safety problem has been handled by implementing the accident reduction and prevention techniques. Road accident is defined as a multi-factor event which mainly consists of human, environment and vehicle factors. This course introduces students to the engineering of road safety in term of crash, countermeasures and evaluation. Scope of study includes introduction to road safety, data collection, crash investigation, analysis and diagnosis, implementation of road safety improvement and evaluation, and lastly road safety audit stage 1 to stage 4. Evaluation will cover both the effectiveness of road safety project as the accident reduction technique and road safety audit as the accident prevention technique.

### **References**

1. Garber N.J, Hoel L.A., Traffic and Highway Engineering, 3rd Edition, California, Brooks/Cole, 2009 - TE145 .G37 2009
2. IKRAM & TRL; Interim Guide on Identifying, Prioritising and Treating Hazardous locations on roads in Malaysia; 1995.
3. JKR, Road Safety Audit: Guidelines For the Safety Audit Of Roads and Road Projects in Malaysia. 2002.
4. NCHRP Research Results Digest 220, Transportation Research Board; Strategies for Improving Roadside Safety, 1997.
5. Road Engineering Association of Malaysia (REAM), Road Safety Audit Training Programme 2008, 2008. (CD-ROM and Buku) - TE228 .R62 2008
6. Robertson, H.D., Hummer, J.E., dan Nelson, D.C.; *Manual of Transportation Engineering Studies*, New Jersey: Prentice Hall; 1994.

## **BFB40603 Building Services I**

---

### **Synopsis**

The construction industry has been increase drastically with the new design concepts and new building typologies to provide human comfort and satisfaction in the way they live and work. This course assists students to justify the services and environmental factors for indoor comfort and satisfaction. Scope of study includes heat transfer, air conditioning system, psychrometric chart, user circuits, building electrical system, lift and escalator.

### **References**

1. S. Don Swenson. 2004. HVAC: Heating, Ventilating and Air-Conditioning; 3<sup>rd</sup> Edition. American Technical Publishers. Call Number : TH7012. S93 2004
2. William K.Y. Tao. 2005. Mechanical and Electrical Systems in Buildings, 2<sup>nd</sup> Edition. Prentice Hall. New Jersey. Call Number : TH6010. T36 2005
3. David V. Chadderton. 2007. Building Services Engineering, 3<sup>rd</sup> Edition. E & FN SPON. London. Call Number : TH6010. C42 2007
4. F.Hall. 2009. Building Services Handbook, Incorporating Current Building & Construction Regulations, 5<sup>th</sup> Edition. Butterworth Heinemann. Call Number : TH151. H34 2009
5. Benjamin Stein. 2000. Mechanical and Electrical Equipment for Buildings, 9<sup>th</sup> Edition. John Wiley & Sons. Inc. New York. Call Number : TH6010. S74 2000 N1.

## **BFB 40703 Building Services II**

---

### **Synopsis**

Acoustical engineers apply science and fundamental concepts, along with complex mathematical analysis, to control sound for a variety of applications. The primary goal of acoustical engineering is the reduction of unwanted sounds, which is referred to as noise control. Sound can have significant impacts on human health and well being, and is therefore important to control. Noise control principles are implemented into technology and design in a variety of ways. This course assists students to justify the aural and visual for indoor comfort and satisfaction. Scope of study includes sound, acoustic concepts, loudness and vibration control, lighting principles, day lighting and artificial lighting.

### **References**

1. Randall F. Barron. 2003. Industrial Noise Control and Acoustics; Marcel Dekker. Inc; New York. Call Number : TD892. B37 2003.
2. David V. Chadderton. 2007. Building Services Engineering, 5<sup>th</sup> Edition; Taylor & Francis; London. Call Number : TH6010. C42 2007

3. Benjamin Stein. 2000. Mechanical And Electrical Equipment for Buildings, 9<sup>th</sup> Edition; John Wiley & Sons. Inc; New York. Call Number : TH6010. S74 2000 N1.
4. Derek Phillips. 2000. Lighting Modern Buildings; Architectural Press; Auckland. Call Number : TH7703. P54 2000 N1
5. Eberhard Hansler. 2004. Acoustic Echo and Noise Control: A Practical Approach; John Wiley. Call Number : TK5102.98. H36 2004

### **BFB 40803 Building Construction**

---

#### **Synopsis**

The construction industry is continually adopting new and improves technologies for increasing productivity and quality to meet present and future needs of human kind. Construction engineering addresses the needs of improving the technology through application of fundamental of science and engineering. This course introduces students to various types of building construction components and method to lay a solid foundation in all areas of building construction engineering. Scopes of study are site investigation, building setting out, earthwork, sub-structure, super-structure, finishing and infrastructure.

#### **References**

1. Roger Greeno (2004). Building Construction Handbook, 5<sup>th</sup> Edition; London: Butterworth-Heinemann.(TH151 C58 2004)
2. S.W.Nunnally (2001). Construction Methods and Management, 5<sup>th</sup> Edition; Prentice Hall. (TH145 N86 2001)
3. John R. Illingworth (2000). Construction Methods and Planning, 2<sup>nd</sup> Edition; Spon Press. (TH153 I54 2000)
4. Sidney M. Levy (2000). Construction Building Envelope and Interior Finishes; McGraw-Hill.(TH2235 C49 2000)
5. Clive Thomas Cain (2003). Building Down Barriers: A guide to Construction Best Practice; Spon Press. (HD9715 C35 2003)

### **BFB 40903 Building Maintenance**

---

#### **Synopsis**

This course introduces students to basic principles in building maintenance. The aim is to generate knowledge and understanding of basic principles, design process and management system in building maintenance. Scope of study include introduction to building maintenance, information management, maintenance organization, building life cycle cost, equipments and building defects, maintenance planning and contract.

#### **References**

1. Barrie Chanter; Building Maintenance Management, 2<sup>nd</sup> Edition; Blackwell; 2006.
2. Richard D. Palmer; Maintenance Planning And Scheduling Handbook, 2<sup>nd</sup> Edition; McGraw-Hill; 2006.
3. Lindley R. Hinggens; Maintenance Engineering Handbook, 6<sup>th</sup> Edition; McGraw-Hill; 2002.
4. Daryl Mather; The Maintenance Scorecard; Creating Strategic Advantage; Industrial Press; 2005.
5. Eberhard Hansler. 2004. Acoustic Echo and Noise Control: A Practical Approach; John Wiley.

### **BFP 40103 Construction Planning And Scheduling**

---

#### **Synopsis**

The application of construction planning and scheduling in Civil engineering is widely used to achieve an organized construction project, through a proper planning, monitor, and control methods through the whole construction stages. This course introduces students to Work Breakdown Structure, Planning and Scheduling Method, Controlling Method, Resource Leveling, Crashing Program, and Programme Evaluation And Review Technique (PERT). Scope of study includes the definition, objective, and basic principles of planning and scheduling, by incorporating scheduling techniques in general.

#### **References**

1. Clough, R.H dan Sears, S.K; Construction Project Management (4th Ed.); New York: John Wiley, 2000. Call Number : TH438. C63 2000.
2. Clough, R.H dan Sears, S.K; Construction Project Management: A Practical Guide To Field Construction Management (5th Ed.); New York: John Wiley, 2008. Call Number : TH438. S42 2008.
3. Gould, F.E dan Joyce, E.N; Construction Project Management (3rd Ed.); Upper Saddle River: Prantice Hall, 2009. Call Number : TH438. G68 2009.
4. Oberlander, G.D; Project Management for Engineering and Construction (2nd Ed); Boston: Mc Graw Hill, 2000. Call Number : TA190. O23 2000.
5. Patrick, C.; Construction Project Planning and Scheduling; Upper Saddle River: Prantice Hall, 2004. Call Number : TH438.4. P37 2004.
6. Hinze, Jimmie W; Construction Planning and Scheduling, (3rd Ed.); Upper Saddle River. Pearson, 2008. Call Number : TH438.4. H56 2008.

7. Saleh Mubarak; Construction Project Scheduling and Control (2nd Ed.; New Jersey: John Wiley, 2010. Call Number :TH 438.4.M82 2010

### **BFP 40203 Construction Equipment Management**

---

#### **Synopsis**

Construction equipment plays a significant role especially in civil engineering projects and infrastructure related works. The role of equipment in the construction activities for different type of site condition is very crucial. Construction equipment has helped man to allow automation of work by allowing faster production, more efficient work and more uniformity of end products quality. This course introduce students to types of construction plant or equipment use for different construction works and stages. Scope of study includes earth works, excavators, pile drivers, loaders, dozers, scrapers, cranes, compaction equipment and process, graders, rock excavation, concrete equipment, bituminous equipment, equipment economics, equipment maintenance and safety, system design and plant layout.

#### **References**

1. Edward Allen; Fundamentals of Building Construction; Fourth Edition, John Wiley & Sons, 2004. Call Number: TH145. A44 2004
2. Nunnally S.W.; Managing Construction Equipment; 2<sup>nd</sup> Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jersey; 2000. Call Number : TA213. N86 2000
3. Roy Chudley; Advanced Construction Technology; Fourth Edition, Prentice-Hall, Dorchester, Dorset; 2006. Call Number : TH145. C484 2006.
4. Robert L. Peurifoy, Construction Planning, Equipment and Methods; 8<sup>th</sup> Edition, McGraw-Hill Company; 2011. Call Number : TH145.P48 2011
5. Gransberg, Douglas D., Construction Equipment Management for Engineers, Estimators and Owners. Boca Raton, 2006. Call Number : TA213. G72 2006

### **BFP 40403 Structure Repair and Rehabilitation**

---

#### **Synopsis**

The application of repair and rehabilitation techniques in Civil engineering is recently used especially for the purposes of nature of distress detection, structural defect investigation procedures, methods for repair works, etc. This course introduces students to the structural defects and causes and also typical investigation procedures which are commonly used in routine inspection. Scopes of study includes causes of structural defects, investigation techniques, Non Destructive method tests, repair methods and techniques, repair work evaluation and case study.

#### **References**

1. Zongjin Li et al, Structural Renovation in Concrete; Spon Press, London, 2009.
2. James Douglas and Bill Ransom, Understanding Building Failures; 3<sup>rd</sup> Edition, Taylor & Fransic, London and New York, 2007.
3. John H. Bungey, Steve G. Millard, Michael G. Grantham, Testing of concrete in structures; 4<sup>th</sup> Edition, New York: Taylor & Francis, 2006.
4. Gongkang Fu, Inspection and Monitoring Techniques for Bridges and Civil Structures; London: Woodhead, 2005.
5. Ravindra K. Dhir, M. Roderick Jones and Li Zheng, Repair, rejuvenation and enhancement of concrete; London: Thomas Telford, 2002.

### **BFP 40503 Project Financial Management**

---

#### **Synopsis**

Construction industry is normally focusing on three items, namely time, quality and cost. However, there are many contributing factors that may lead to those items such as manpower, materials, machineries, and so on. Nevertheless, most young engineers are not well verse with the concept of financial which may lead to the optimization of cost (apart from time and quality) in a construction. Thus, financial aspect is one of the critical key of success in a project. Therefore, several basic understanding and concepts of project's financial is in dire need to be exposed and shared with our young engineers. This course introduces students to the applications of financial approaches in a construction project. Besides that, the introduction of several useful softwares such as MS Project, Life Cycle Cost Analysis and Monte Carlo Analysis would surely add advantages to the respective students. Scope of study includes the concept, structure and function of macro economy; project's decision making in financial term; arrangement of financial plan; managing risk and uncertainty in engineering project; financial risks, life cycle cost; and cash flow management.

#### **References**

1. Block, Stanley B., Geoffrey A. Hirt; Foundations of Financial Management (13<sup>th</sup> Edition) Boston: McGraw-Hill; 2003. Call Number : HG4026 .B56 2009

2. Brigham, Eugene F., Houston, Joel F., Fundamental of Financial Management (4<sup>th</sup> Edition) Standford: Thomson Learning, 2002. Call Number : HG4026 .B74 2004
3. Ng, David S.H; Financial Management Strategy; Selangor: Pelandok Publication, 2003. Call Number : HG4026.N4 2003
4. Rolffe, Peacock et al; Financial Management; French Forest: Prentice Hall, 2003. Call Number : HG4026.F56 2003 n1
5. Pandey, I.M., Financial Management, (10th Edition), 2010. Vikas, New Delhi. Call Number: HG5702. P36 2010.

### **BFP 40603 Industrialized Building System**

#### **Synopsis**

Prefabricated construction is known as an industrialized building system (IBS) in Malaysia. Building production in a controlled environment offers many advantages. This course is designed to provide exposure to students on the IBS concepts, advantages and disadvantages, roadmap of IBS and the application of IBS in the construction industry. It also highlighted IBS scoring system, principal of modular coordination, buildability, construction joints and tolerances in IBS implementation. The students are required to complete a project to enhance their knowledge on subject matter.

#### **References**

1. Elliott, Kim S.; Precast concrete structures; Oxford : Butterworth Heineman; 2002; Call Number :TA683.7 .E44 2002 N1
2. Richardson, J G.; Precast concrete production; London : Cement and Concrete Association; 1973; Call Number :TA444 .R53 1973
3. Levitt, M.; Precast concrete : materials, manufacture, properties and usage; New York :
4. Taylor and Francis; 2008; Call Number : TA439 .L48 2008
5. Gibb, Alistair G. F.; Off-site fabrication : prefabrication, pre-assembly and modularization; Latheronwheel : Whittles; 1999; Call Number : TH1098 .G52 1999
6. Smith, Ryan E.; Prefab architecture : a guide for to modular design and construction ; Hoboken, N.J. : John Wiley & Sons; 2010; Call Number : NA8480 .S65 2010
7. Minguet, Josep Maria; Contemporary green prefab: industrialized & kit architecture; Singapore; Page One Pub.; 2012; Call Number : NA7145 .C66 2012
8. Staib, Gerald; Components and systems modular construction : design structure new technologies; Basel : Birkhauser, 2008; Call Number : TH1098 .S72 2008
9. Lembaga Pembangunan Industri Pembinaan Malaysia; CIS 18:2010 Manual for IBS Content Scoring System; Perpustakaan Begara Malaysia; Kuala Lumpur; 2010.
10. Ministry of Works, Malaysia; Roadmap for Industrialised Building System (IBS) in Malaysia 2011-2015; Construction Industry Development Board; Kuala Lumpur; 2010.

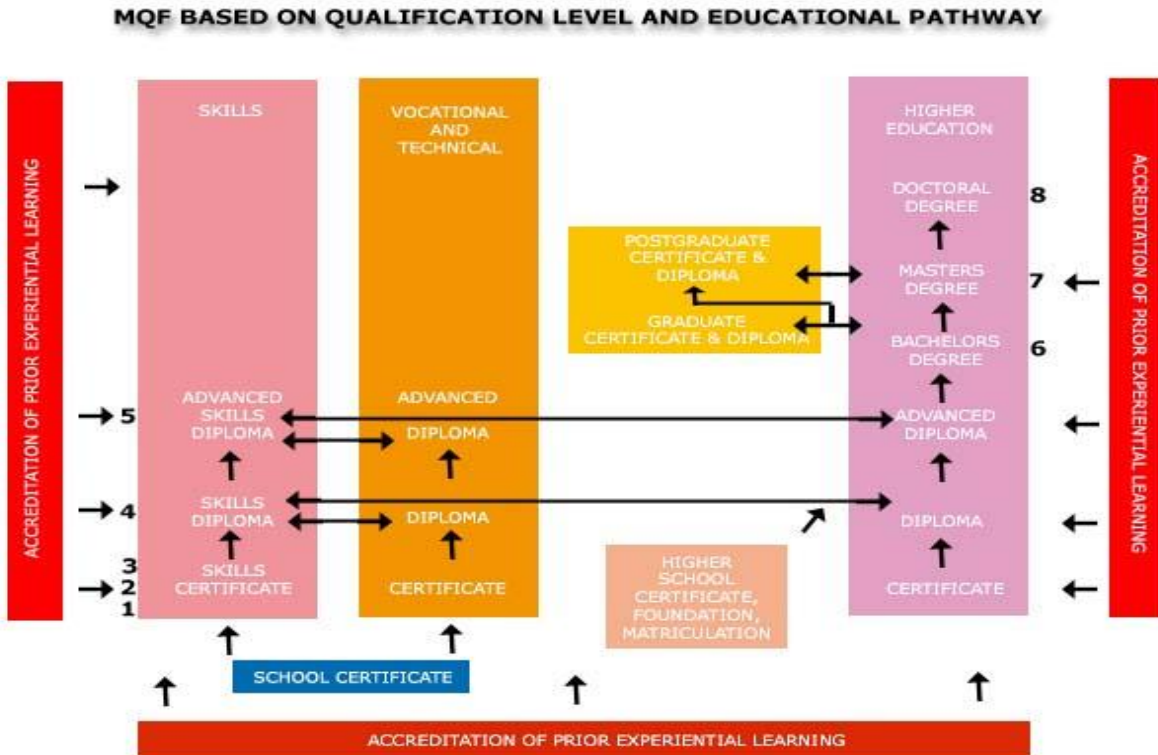
## Career and Further Education Prospect

### Career in Civil Engineering

Civil engineering is arguably one of the oldest engineering disciplines. It deals with the design, construction, and maintenance of the physical and natural built environment, including buildings, roads, bridges, dams, and canals. It is a wide ranging profession, including different sub-disciplines, structural engineering, materials science, geotechnical engineering, water resources, surveying, and transportation engineering.

Civil engineering offers many opportunities as well as the satisfaction of helping to improve and enhance public quality of life in many settings. Career in civil engineering: Project Engineers, Surveyors, Project Coordinator, Traffic Engineer, Geotechnic Engineer, Hydrology Engineer, Researchers and Academicians.

### Further Education Pathway:



Source: Malaysian Qualification Framework



**MALAYSIAN QUALIFICATIONS FRAMEWORK:  
QUALIFICATIONS AND LEVELS**

MQF Levels	Sectors			Lifelong Learning
	Skills	Vocational and Technical	Higher Education	
8			Doctoral Degree	Accreditation of Prior Experiential Learning (APEL)
7			Masters Degree	
			Postgraduate Certificate & Diploma	
6			Bachelors Degree	
			Graduate Certificate & Diploma	
5	Advanced Diploma	Advanced Diploma	Advanced Diploma	
4	Diploma	Diploma	Diploma	
3	Skills Certificate 3	Vocational and Technical Certificate	Certificate	
2	Skills Certificate 2			
1	Skills Certificate 1			

Source: Malaysian Qualification Framework

+



Center for Academic Development and Training  
Universiti Tun Hussein Onn Malaysia  
86400 Batu Pahat, Johor Darul Ta'zim  
[www.uthm.edu.my](http://www.uthm.edu.my)

+