

**BACHELOR OF ELECTRONIC ENGINEERING  
(COMPUTER ENGINEERING) WITH HONOURS**

# **YEAR 1**

**YEAR 1  
SEMESTER 1**

**UWS 10103 NATIONHOOD AND CURRENT DEVELOPMENT  
OF MALAYSIA**

**SYNOPSIS:**

This course will provide students a fundamental concept, the processes of formation and development of Malaysia. The topics covered include the concept of state, Malacca Kingdom, implication of imperialism and colonisation, spirit of patriotism and nationalism, independence and formation of Malaysia. Besides, students will also be exposed to the constitution of Malaysia, Malaysian Government System, Economic and Social Development Policy as the main policy in the national development. At the end of the course students will be able to appreciate the roles and responsibilities of a good citizen to the country.

**REFERENCES:**

1. Zahrul Akmal Damin, Fauziah Ani, Lutfan Jaes, Khairunesa Isa, Siti Sarawati Johar, Harliana Halim, Khairul Azman Mohd Suhaimy, Shamsaadal Sholeh Saad, Ku Hasnan Ku Halim dan Mohd Akbal Abdullah (2009). "Kenegaraan & Pembangunan Malaysia." Batu Pahat: Penerbit UTHM.
2. Ahmad Esa, Harliana Halim, Khairul Azman Mohd Suhaimy, Ku Hasnan Ku Halim, Marwan Ismail, Mohd Akbal Abdullah, Shamsaadal Sholeh Saad dan Zahrul Akmal Damin (2004). "Ikhtisar Sejarah Kenegaraan & Pembangunan Malaysia." Johor Bahru: Muapakat Jaya Percetakan Sdn. Bhd.
3. Kassim Thukiman (2002). "Malaysia: Perspektif Sejarah dan Politik." Skudai: Penerbit Universiti Teknologi Malaysia.
4. Nazaruddin Mohd Jali, Ma'rof Redzuan, Asnarulkhadi Abu Samah dan Ismail Mohd Rashid (2005). "Pengajian Malaysia." Petaling Jaya: Prentice Hall.
5. Ruslan Zainudin, Mohd Mahadee Ismail dan Zaini Othman (2005). "Kenegaraan Malaysia." Shah Alam : Fajar Bakti.

## **UWA 10102 ISLAMIC STUDIES**

### **SYNOPSIS:**

This course explains about Islamic concept as ad deen. It discusses the study of al-Quran and al-Hadith, Aqidah ahl al-Sunnah wa al Jamaah, trends of aqidah's doctrine, the growth of fiqh's mazhab, the principles of muamalah, Islamic criminal law, the ethics of work in Islam, issues in Islamic Family law, and current issues

### **REFERENCES:**

1. Harun Din, (Dr.), (2001), *Manusia Dan Islam*, Kuala Lumpur: Dewan Bahasa dan Pustaka.
2. Ismail Hj. Ali, (1995), *Pengertian dan Pegangan Iktikad yang benar: Ahli Sunnah Wal Jamaah*: Kuala Lumpur: Penerbitan al-Hidayah
3. Mustafa Abd. Rahman, (1998), *Hadith Empat Puluh*, Kuala Lumpur: Dewan Pustaka Fajar.
4. Mustafa Hj. Daud, (1995), *Konsep Ibadah Menurut Islam*, Kuala Lumpur: Dewan Pustaka dan Bahasa.
5. Paizah Hj. Ismail, (1991), *Undang-undang Jenayah Islam*, Kuala Lumpur: Dewan Pustaka Islam, Angkatan Belia Islam Malaysia.

## **UWA 10202 MORAL STUDIES**

### **SYNOPSIS:**

This course explores the introduction to moral concepts, some aspects related to the morality and its importance in our daily lives, some western moral theories, moral values in great religions of the world, morality and ethics in professional careers and contemporary moral issues.

### **REFERENCES:**

1. Eow Boon Hin. (2002). *Moral Education*. Longman.
2. Ahmad Khamis. (1999). *Etika Untuk Institusi Pengajian Tinggi*. Kuala Lumpur. Kumpulan Budiman
3. Mohd Nasir Omar (1986). *Falsafah Etika; Perbandingan Islam dan Barat*. Kuala Lumpur. JPM.

4. Hussain Othman. (2009). *Wacana Asasi Agama dan Sains*, B. Pahat. Penerbit UTHM.
5. Hussain Othman, S.M. Dawilah Al-Edrus, Berhannudin M. Salleh, Abdullah Sulaiman, (2009). *PBL Untuk Pembangunan Komuniti Lestari*, Batu Pahat, Penerbit UTHM.

#### **UQ\* 1\*\*01 CO-CURRICULUM I**

##### **SYNOPSIS:**

Kursus ini ditawarkan dalam pelbagai bentuk aktiviti pilihan untuk pelajar peringkat Sarjana Muda dan Diploma. Lapan bidang aktiviti yang ditawarkan adalah Pengucapan Awam, Keusahawanan, Sukan, Khidmat Komuniti, Kesukarelawanan, Kepimpinan, Kebudayaan dan Daya Usaha dan Inovasi.

#### **UWB 11202 MALAY LANGUAGE**

##### **SYNOPSIS:**

This course is designed for students to learn the basic of Bahasa Melayu. 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 Bahasa Melayu.

##### **REFERENCES:**

1. Asmah Hj. Omar. (2005). *Susur Galur Bahasa Melayu*. DBP : KL
2. Asmah Hj. Omar. (2003). *Nahu Melayu Mutakhir*. DBP : KL
3. Abdul Hamid Mahmood. (1992). *Menguasai Ejaan Bahasa Malaysia Dengan Cepat*. DBP: KL
4. Abdul Hamid Mahmood. (1998). *Menguasai Ejaan Bahasa Melayu*.DBP : KL
5. Edward S. King. (1998). *Speak In Malay*. Times Publication : KL

**UWB10101 ENGLISH FOR ACADEMIC PURPOSES**

**SYNOPSIS:**

English for Academic Purposes focuses on fulfilling students' academic requirements such as the acquisition of reading, writing, speaking and listening skills in English. The course also provides opportunities for students to acquire note taking and study skills. 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 wide range of academic activities.

**REFERENCES:**

1. n.a (2004). Koleksi Kertas Soalan MUET Oktober 2003. Kuala Lumpur : Pearson Malaysia.
2. Ng. K. S. et al. (2000). Study Skills for the Malaysian University English Test. Kuala Lumpur : Federal Publication.
3. Pfeiffer, W.S. (2000) Technical Writing: A Practical Approach. New Jersey. Prentice Hall.
4. Teoh, S. A. & Zainab Mohd. Noor (2000). Test-Taking Strategies for MUET. Kuala Lumpur : Penerbit Fajar Bakti.
5. Walker, E. (2004) Grammar Practice. Kuala Lumpur. Pearson Education Malaysia.
6. Zuraidah Mohd. Don et al. (2000). Excel in MUET (2nd edition). Kuala Lumpur : Penerbit Fajar Bakti.

**BWM10103 ENGINEERING MATHEMATICS I**

**SYNOPSIS:**

**Limits and Continuity:** Techniques of finding limits. Continuity. **Differentiation and Applications:** Techniques of differentiation: product rule, quotient rule. Chain rule. Implicit differentiation. Higher derivatives. Differentiation of implicit functions, parametric equations and inverse functions. Applications: rates of change, maximum and minimum problems, sketching rational functions. **L'Hopital's Rule:** Indeterminate form of type  $0/0$ ,  $\infty/\infty$ ,  $0 \cdot \infty$ ,  $0^0$ ,  $\infty^0$ ,  $1^\infty$ ,  $\infty - \infty$ . **Integration:** Techniques of integration: integration by substitution, integration by parts, integrating rational functions,

integrating power of trigonometric functions, rational functions of sine and cosine, integrating hyperbolic functions and integration by trigonometric and hyperbolic substitution. **Further Differentiation and Integration and Applications:** Derivatives and integrals involving inverse trigonometric and hyperbolic functions. Applications: arc length, surface area of revolution, curvature. **Power Series:** Convergence test. Conditional and absolute convergence. Power series: Taylor and Maclaurin series. Differentiation and integration of power series.

#### **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. Larson, R. E., Hostetler, R. P., Edward, B. H. (2002). "Calculus with Analytic Geometry." 6<sup>th</sup> Ed. USA: Houghton Mifflin Company.
5. Goldstein, Larry, Lay, David, Schneider, David. (2004). "Calculus and its Applications. Upper Saddle River, NJ : Pearson Education.
6. Stroud, K. A. (2005). "Engineering Mathematics." 5<sup>th</sup> Ed. London: Macmillan Press Ltd.

#### **BEC10102 COMPUTER PROGRAMMING**

##### **SYNOPSIS:**

This course is intended to provide a study of programming concept through the use of a high level programming language such as C++. Students will learn to design, code, debug, test and document well-structured programs based on technical and engineering problems. Topic covered; Software Development Method, programming language basics, data types , input and output operations, the use of arrays, string, pointers and structures, file processing handling and advance applications.

**REFERENCES:**

1. Delores M. Etter, Jeanine A. Ingber. "Engineering Problem Solving with C++", 2th. Edition. Prentice-Hall, 2007.
2. Jeri R. Hanly, Elliot B. Koffman. "Problem Solving and Program Design in C", 4th. Edition. Addison-Wesley, 2004.
3. Katupitiya, Jayantha, Bentley, Kim. "Interfacing with C++", Springer, 2006.
4. Jeri R. Hanly, Elliot B. Koffman. "C Programming for Engineers", 2nd Edition, Addison-Wesley, 2004.
5. H. M. Deitel and P. J. Deitel, "C: How to Program", 4th Edition, Prentice-Hall, 2004
6. James L. Antonakos and Kenneth C. Mansfield, "Structured C for Engineering and Technology", 4th Edition, Prentice-Hall, 2001.
7. Hutchings et al, "Interfacing with C", 1st Edition, Butterworth-Heinemann, 2000

**BEE10202 ENGINEER AND SOCIETY**

**SYNOPSIS:**

This course concerns with the profession of engineers, engineers' role and professional bodies governing the profession. Relationship of engineering and organization, and society at large are covered in this course. Ethics and professionalism cover the code of ethics and moral reasoning. Emphasis is given to the ethical issues in engineering practice; also intellectual property and anti-corruption concept. Next are the responsibilities of engineers and their rights at workplace and team work. Commitment in providing service is taught which involves safety, environmental and global issues. Last are the engineering acts, regulations and standards.

**REFERENCES:**

1. Mike W. Martin, Ethics in Engineering, 4<sup>th</sup>. Ed. McGraw Hill, 2005.
2. Roland Schinzinger and Mike W. Martin, Introduction to Engineering Ethics, McGraw Hill, 2000.



3. Charles B. Fleddermann, *Engineering Ethics*, 2nd Edition, Prentice Hall 2004
4. John D. Kemper and Billy R. Sanders, *Engineers and Their Profession*, 5<sup>th</sup> Ed. Oxford University Press, 2001
5. Daniel A. Vallerio, P. Aarne Vesilind, *Socially Responsible Engineering : Justice in Risk Management*, John Wiley, 2006
6. Stephen F. Johnston, J. Paul Gostelow and W. Joseph King, *Engineering and Society : Challenges of Professional Practice*, Prentice Hall, 2000
7. B. S. Dhillon, *Engineering Safety : Fundamentals, Techniques and Applications*, World Scientific, 2003
8. Morton E. Winston and Ralph D. Edelbach, *Society, Ethics and Technology*, Thomson, 2006
9. Mohd Janib Johari, *Etika Profesional*, Penerbit UTM, 2001.
10. Abdul Rahim Abdul Manaf, *Alam Jurutera*, Penerbit Universiti Malaya, 2005
11. *Registration of Engineers Act 1967 (Act 138) and Regulations*, Lembaga Penyelidikan Undang-Undang, International Law Books Services, 2001
12. *Electricity Supply Act 1990 and Subsidiary Legislations*
13. *Contract Act 1950 (Revised 1974)*
14. *Occupational Safety and Health Act 1994*

### **BEL10103 ELECTRIC CIRCUITS**

#### **SYNOPSIS:**

The first course covering basic theory of circuit analysis. Topics include basic electrical circuit theory and laws, electrical circuit analysis techniques and concepts, energy storage elements, network theorems, review of techniques to solve simultaneous equations, nodal and mesh circuit analysis, dependent sources, Thevenin's and Norton's equivalent circuits, maximum power transfer, solution of first and second order networks to switched DC inputs, natural responses, AC circuit steady-state response analysis, steady state power calculations in circuit analysis. Computer assisted analysis of electrical circuits. This course has an integrated laboratory.

**REFERENCES:**

1. Basic Engineering Circuit Analysis, 8<sup>th</sup> Ed.; J. David Irwin; John Wiley & sons ; 2005.
2. Fundamentals of Electric Circuits; Alexander, C. K. ; Sadiku, M.N.O.; McGraw-Hill International Editions; 2007.
3. Electric Circuits ; James W. Nilsson and Susan A. Riedel ; Prentice-Hall; 2008
4. Engineering Circuit Analysis, William H Hayt, Jack E Kemmerly, McGraw Hill, 2002
5. Introduction to Electric Circuits, Richard C. Dorf & James A. Svoboda; John Wiley & Sons; 2004
6. Schematic's Capture with PSpice, 2<sup>nd</sup> Edition, Prentice-Hall International, Inc ; Marc E Herniter, 2000.
7. Introductory circuits for electrical and computer engineering ; James W. Nilsson and Susan A. Riedel ; Prentice-Hall 2002

**YEAR 1  
SEMESTER 2**

**UQ\*1\*\*01 CO-CURRICULUM II**

**SYNOPSIS:**

*Kursus ini ditawarkan dalam pelbagai bentuk aktiviti pilihan untuk pelajar peringkat Sarjana Muda dan Diploma. Lapan bidang aktiviti yang ditawarkan adalah Pengucapan Awam, Keusahawanan, Sukan, Khidmat Komuniti, Kesukarelawanan, Kepimpinan, Kebudayaan dan Daya Usaha dan Inovasi.*

**UWS 10202 ETHNICS RELATIONS**

**SYNOPSIS:**

This course focuses on the concept of ethnic relations and its practices in the Malaysian society. Class discussions cover the fundamental of ethnic relations and the history of the construction of a plural society. The Malaysia Constitution will be covered as a core of living in the society. Discussions will be further conducted into detail on the linkages between ethnicity and development in social, political and economic aspects based on top-down and bottom-up approaches by the government and society.

**REFERENCES :**

1. Shamsul Amri Baharuddin (2007). "Modul Hubungan Etnik." Shah Alam: Universiti Teknologi MARA.
2. Zaid Ahmad, Ho Hui Ling, Sarjit Sing Gill dll (2006). "Hubungan Etnik di Malaysia." Shah Alam : Oxford Fajar Sdn. Bhd.
3. John Rex (1985). "Hubungan Ras Dalam Teori Sosiologi." Kuala Lumpur : Dewan Bahasa dan Pustaka..
4. Lembaga Penyelidikan Undang-undang (2003). "Perlembagaan Persekutuan : (hingga 15hb.Ogos 2003)." Petaling Jaya : International Law Book Services.
5. Nazaruddin Mohd Jali, Ma'rof Redzuan, Asnarulkhadi Abu Samah dan Ismail Mohd Rashid (2005). "Pengajian Malaysia." Petaling Jaya: Prentice Hall.

**UWS 10303 MALAYSIAN STUDIES AND CULTURE**

**SYNOPSIS:**

This course will provide students in depth understanding of Malaysia from various perspectives. Topics to be discussed include Malaysia in relation to its history, achievement and international affairs. In addition, students will also be exposed to the ethnic composition of the country, culture and heritage. Teaching and learning process enables student to acquire knowledge and appreciates the reality of life in Malaysia through experiential learning.

**REFERENCES:**

1. Abdul Halim Nasir (2004). "Mosque Architecture in the Malay World." Bangi : Penerbit Universiti Kebangsaan Malaysia.
2. "Ensiklopedia Sejarah Kebudayaan Melayu." (1998). Kuala Lumpur : Dewan Bahasa dan Pustaka
3. Khoo Kay Kim (2001). "Malay Society: Transformation and Democratisation." Kelana Jaya : Pelanduk Publications.
4. Nazaruddin Mohd. Jali (2003). "Malaysian Studies : Nationhood and Citizenship." Petaling Jaya : Pearson Prentice Hall.
5. Yahaya Ismail (1989). "The Cultural Heritage of Malaysia." Kuala Lumpur : Dinamika Kreatif Sdn. Bhd.

**UWB10202 EFFECTIVE COMMUNICATION**

**SYNOPSIS:**

This course emphasizes on task- based learning 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 interview.

## 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.
6. Eisenberg, A. (1992). *Effective technical communication*. 2<sup>nd</sup> ed. New York: McGraw Hill.

**BWM10303**

**ENGINEERING MATHEMATICS IIE**

**PREREQUISITE: PASSED BWM10103 (ENGINEERING MATHEMATICS I)**

## SYNOPSIS:

**First Order Differential Equation:** Formation. Methods of solution: separating the variables, homogeneous, linear and exact. Initial value problem. Application: electric circuit. **Second Order Linear Differential Equation with Constant Coefficients:** Methods of solution: method of undetermined coefficient and method of variation of parameter. Application of second order linear differential equation with constant coefficients in electric circuit. **System of First and Second Order Differential Equations:** Eigen value and eigen function. **Laplace Transform:** Definition. Linearity. First shift theorem. Multiplying by  $t$ . Unit step function and Delta function. Second shift theorem. **Inverse Laplace Transform:** Definition and properties. Convolution theorem. Solve initial and boundary value problems for linear differential equation with constant coefficients which involve unit step function, Dirac Delta function and periodic function. **Fourier Series:** Fourier series in interval period  $2\pi$ . Odd and even function. Fourier series in interval  $(-l, l)$ . Half range series. Introduction of Fourier transform. **Series Solution for**

**Differential Equation:** Power series method. Legendre polynomial. Bessel equation.

**REFERENCES:**

1. Abd. Wahid Md. Raji, Mohd Nor Mohamad. (2008). *Differential Equations for Engineering Students*. Malaysia: Comtech Marketing Sdn. Bhd.
2. Kuldeep Singh. (2003). *Engineering Mathematics through Applications*. New York: Industrial Press.
3. Peter V. O'Neil. (2003). *Advanced Engineering Mathematics*. Thomson Brooks/Cole.
4. Phang, C., Phang, P. (2007). *Engineering Mathematics II BSM 1933 (Learning Module)*. Malaysia: UTHM Publication.
5. Robert J. Lopez. (2001). *Advanced Engineering Mathematics*. Boston: Addison Wesley.
6. Stroud, K. A., Booth, D. J. (2007). *Advanced Engineering Mathematics*. 4<sup>th</sup> Ed. USA: Palgrave Macmillan.
7. Stroud, K. A., Booth, D. J. (2007). *Engineering Mathematics*. 6<sup>th</sup> Ed. USA: Palgrave Macmillan.

**BEL10203 ANALOG ELECTRONICS**

**PREREQUISITE: BEL10103 ELECTRIC CIRCUITS**

**SYNOPSIS:**

This course provides the student with the basic knowledge necessary to understand the operation and application of semiconductor devices in discrete electronic circuits. The course covers an introduction to the semiconductor theory. Emphasis is on the basic electronic semiconductor devices such as the diode, the bipolar junction transistor (BJT), the field-effect transistor (FET). Device models are developed to aid in circuit analysis and design. Biasing, small-signal and large signal analysis and the principles employed in the design of electronic circuits are included. Analytical, graphical, and computer tools are used to explain the basic building blocks of analog circuits.

Topics also include Frequency Response of BJT and JFET, multistage amplifiers, cascade and cascode configurations, Darlington pair, Differential amplifier, Power amplifiers: class A, B and AB.

**REFERENCES:**

1. Electronic Devices and Circuit Theory, 9th Edition; R.Boylestad, L. Nashelsky; Prentice Hall; 2006.
2. Microelectronics Circuit Analysis and Design, 3<sup>rd</sup> Ed.; Donald A. Neamen; McGraw Hill, 2007.
3. Electronic Devices, Thomas L. Floyd, 7<sup>th</sup> Ed., Prentice Hall, 2005.
4. Electronic Principles, Albert Paul Malvino, 7<sup>th</sup> Ed., McGraw Hill, 2007.
5. Introductory Electronics Devices and Circuits, Conventional Flow Version, 7<sup>th</sup> Edition; Robert T.Paynter; Prentice Hall; 2006.
6. Electronic Devices and Circuits; 5th Edition, Theodore F. Bogart, Jeffrey S. Beasley and Guillermo Rico, Prentice Hall; 2004.
7. Thomas L. Floyd, Electronics Fundamentals: Circuits, Devices and Applications, 5<sup>th</sup> Ed., Prentice Hall, 2001.
8. Microelectronics Circuits, 5<sup>th</sup> Ed.; Adel S. Sedra and Kenneth C. Smith; Oxford University Press, 2004.

**BEE10403 ELECTRICAL TECHNOLOGY**

**PREREQUISITE: BEL10103 ELECTRIC CIRCUITS**

**SYNOPSIS:**

Electrical principles are an important aspect of an electrical engineering study that involves the basic operations and the characteristic of the various dc and ac electrical circuitry and electrical machines. In general when a study of the electrical technology, the student will be able to tackle problems in examination or in the actual electrical industrial environment with regard to various areas such as the single phase and three phase electrical circuits, electromagnetism, magnetic circuits, the resistor, inductor and capacitor as an electrical devices or component, and the dc and ac electrical machines.

**REFERENCES:**

1. Edward Hughes, Electrical Technology; Longman, 1977.
2. Theodore Wildi, Electrical Machines, Drives and Power Systems; Prentice Hall, 2006

3. Chapman Stephen J., *Electric Machinery and Power System Fundamentals*; McGraw-Hill, 2002.
4. Edward Hughes, *Hughes Electrical and Electronic Technology*, 9<sup>th</sup> Ed., Prentice Hall, 2005.
5. J. B. Gupta, *Electrical Technology*, S. K. Kataria, 2004.

## **BEE10501 ELECTRICAL ENGINEERING PRACTICES**

### **SYNOPSIS:**

The subject is developed to give the required knowledge regarding electrical wiring and installation. It will develop the capability of carrying out electrical wiring activities up to a certain level of competency. The topics covered are the domestic wiring and installation, industrial wiring and installation. In the designing of electronic circuits' aspects, OrCAD will be used as it will help in making the schematic entry, doing FPGA synthesis, digital, analog, mixed-signal simulation and printed circuit board layout. PLC will be used to provide the programming knowledge for the controlling of the basic and advance automation system.

### **REFERENCES:**

1. Hj. Md. Nasir Hj Abd Manan, *Panduan Pendawaian Elektrik Dometik*, I.E.E Edisi 16, BS7671:1992 Pindaan 2, 1997, 2004.
2. Bill Atkuison, *Electrical Installation Designs*, 3<sup>rd</sup> Edition, Blackwell Pub., 2002.
3. Ray C. Mullin, *Electrical Wiring – Residential*: Delmar Publisher Inc, 2002.
4. Geoffrey Stokes, *A Practical Guide to the Wiring Regulations*, BS 7671, Oxford: Blackwell Scientific, 2002.
5. Roger L. Brauer, *Hoboken, Safety and Health for Engineers*, NJ: John Wiley, 2006.
6. E. G. Patterson, *Lighting Systems*, London: Thomson Learning, 2001.
7. Brian Scaddan, *IEE Wiring Regulations Explained and Illustrated*, Oxford: Newnes, 2001.
8. Brian Scaddan, *IEE Wiring Regulations: Design and Verification of Electrical Installations*, Oxford: Newnes, 2002.
9. Robert D. L. Smith & Stephen L. Herman, *Electrical Wiring Industrial*, Australia: Thomson Learning, 2002.



## **YEAR 2**

**YEAR 2  
SEMESTER 1**

**UWB20302 TECHNICAL WRITING**

**PREREQUISITE: PASSED UWB 10202 EFFECTIVE  
COMMUNICATION**

**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 and analytical report. In order to 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. Prior to that, students will also be trained to polish up their skills in narrative and descriptive essays using accurate grammar, vocabulary and sentence structure.

**REFERENCES:**

1. Finkelstein, J. (2008). *Pocket Book of technical writing*. 3<sup>rd</sup> ed. Singapore: McGraw Hill.
2. Kolin, P. C. (2006). *Successful writing at work*. Concise ed. USA: Houghton Mufflin Company.
3. Salbiah Seliman et. al. (2004). *English Communication for learners in engineering*. Malaysia: Prentice Hall.
4. Lakshmy Anantha Krishnan et. al. (2003). *Engineering your report: From start to finish*. Singapore: Prentice Hall.
5. Gerson, S. J. & Gerson, S. M. (2003). *Technical writing: Process and product*. 3<sup>rd</sup> ed. New Jersey: Prentice Hall.
6. Eisenberg, A. (1992). *Effective technical communication*. 2<sup>nd</sup> ed. New York: McGraw Hill.
7. Dorothy Cheung et. al. (1999). *Report writing for engineering students*. 2<sup>nd</sup> ed. Singapore: Prentice Hall.

**BWM20403**

**ENGINEERING MATHEMATICS III**

**PREREQUISITE:** PASSED BWM 10103 (ENGINEERING MATHEMATICS I)  
PASSED BWM10303 (ENGINEERING MATHEMATICS IIE)

**SYNOPSIS:**

**Functions of Several Variables:** Domains, ranges, contour line, level curves and 3D-graphs. Partial derivatives and chain rules. Mixed derivatives. Total differentials and exact differentials. Local and absolute extreme values of functions of two variables. **Multiple Integrations:** Double integrals: Areas and volumes. Double integrals in polar coordinates. Surface areas. Triple integrals: Volumes. Triple integrals in cylindrical and spherical coordinates. Center of mass, center of gravity and inertial moments. **Vector-valued Functions:** Definition and graphs. Differentiations and integrations. Tangent vectors, normal vectors, arc length and curvature. Motion in a plane curve. Directional derivatives and gradients of functions of two variables. **Vector Calculus:** Line integrals of scalar and vector field. Independence of path and conservative vector field. Green Theorem. Surface integrals of scalar and vector field. Gauss's Theorem and Stokes Theorem.

**REFERENCES:**

1. Abd Wahid Md Raji, Phang Chang, Phang Piau, (2007) Engineering Mathematics III BSM2913. Penerbit UTHM. (Learning Module)
2. Howard Anton, Irl Bivens, Stephen Davis (2002). Calculus (7<sup>th</sup> Edition). New York:
3. John Wiley. Straud, K.A. (1996). Further Engineering Mathematics (3<sup>rd</sup> Edition). England: Macmillian Publication
4. Robert T. Smith, and Roland B. Minton (2007). Calculus Early Transcendental Function (3<sup>rd</sup> Edition). New York: McGraw-Hill.
5. James Stewart (2003). Calculus. USA. Thomson Learning Inc.
6. George B. Thomas, Jr and Ross L. Finney (1996). Calculus and Analytic Geometry (9<sup>th</sup> Edition). New York: Addison Wesley.

## **BPK20802 ENTREPRENEURSHIP**

### **SYNOPSIS:**

*Kursus ini memberi pendedahan kepada pelajar tentang aspek asas keusahawanan. Kursus ini meliputi empat modul utama iaitu pemupukan budaya keusahawanan, peluang dan rancangan perniagaan, praktikum keusahawanan dan pembentangan laporan aktiviti keusahawanan.*

### **REFERENCES:**

1. Kementerian Pengajian Tinggi (2007) 'Asas Pembudayaan Keusahawanan'. Penerbit UUM;.
2. Marc J. Dollinger. – 3<sup>rd</sup> ed. (2003), 'Entrepreneurship; Strategic and Resources'. Prentice Hall Pearson Malaysia Sdn. Bhd.
3. UiTM Entrepreneurship Study Group (2004), 'Fundamentals of Entrepreneurship' Prentice Hall Pearson Malaysia Sdn. Bhd.
4. Carol Yip (2007) 'Smart Money-User' Kanyin Publication.
5. Agensi Kaunseling and Pengurusan Kredit (2009) 'Money Sense-Getting Smart with Your Money. 2<sup>nd</sup> Edition
6. Agensi Kaunseling and Pengurusan Kredit (2009) 'Celik Wang-Pengurusan Wang secara Bijak
7. Ministry of Domestic Trade & Consumer Affairs, [www.kpdnhep.gov.my](http://www.kpdnhep.gov.my)
8. Personal Money (the Edge Magazine), [www.theedgemalaysia.com](http://www.theedgemalaysia.com)
9. Agensi Kaunseling and Pengurusan Kredit (AKPK), [www.akpk.org.my](http://www.akpk.org.my)

## **BEL20303 DIGITAL ELECTRONICS**

### **SYNOPSIS:**

This subject is the first course in digital electronics. Beginning with representing physical values in digital form using binary, octal and hexadecimal numbering system, conversion between these numbering systems, also representation of values in codes such as BCD and Gray. This is followed by representing negative

values in binary, binary arithmetic and BCD addition. Basic logic gates and symbols are introduced as well as Boolean expressions, truth tables and timing diagrams. Combining basic gates to implement certain function, and analyzing circuits to obtain its Boolean expression, simplify using Boolean theorem and Karnaugh-map approach. In digital arithmetic, adder circuits are introduced, starting from half adder, full adder and the design of the carry look ahead adder and BCD adder. Then, on to MSI logic circuits such as encoder, decoder, multiplexer and demultiplexer. Memory elements such as latches and flip-flops are introduced followed by flip-flop applications in counters and registers. ADCs and DACs are also included. The final topic is on integrated circuit family characteristic and technology.

#### **REFERENCES:**

1. Digital Fundamental, J. Floyd, Merrill MacMillan, 2006.
2. Digital System, Principles and Application, J. Tocci, Prentice Hall, 2006
3. Logic and Computer Design Fundamentals, M. Morris Mano, Charles R. Kime, 2<sup>nd</sup> Ed., Prentice Hall, 2001.
4. Introduction to Digital System, Milos D. Ercegovac, Thomas Lang and Jaume H. Moreno, John Wiley, 1999.
5. Digital Fundamentals with VHDL, Floyd, Prentice Hall, 2003.

#### **BEF25503 POWER SYSTEMS**

##### **SYNOPSIS:**

This subject is arranged to provide students understanding of electrical power systems. Basically, this course is divided into three major parts: fundamental of single-phase and three-phase power distributions, utility power system structures, and industrial power systems. The essential basic knowledge of single-phase and three-phase power systems will be covered at the beginning of the course. Subsequently, electric utility system comprises all the apparatus used in the generation, transmission, and distribution of electric energy will be provided. Finally, introduction to the industrial power system will be made together with a range of technical issues that might be happened during the design and utilisation of electrical energy.

**REFERENCES:**

1. Theodore Wildi. Electrical Machines, Drives, and Power Systems (6th Edition), Pearson Education International, 2006.
2. King Alexander C & Knight William. Uninterruptible Power Supplies and Standby Power Systems, McGraw-Hill, 2003.
3. Dugan Roger C, McGranaghan M F, Santoso S and Beaty H Wayne. Electrical Power Systems Quality (2nd Edition), McGraw-Hill, 2003.
4. R.B. Theodore. Electrical Systems Design, Prentice Hall, 2003.
5. T.A. Short. Electric Power Distribution Equipment and Systems, Taylor & Francis Group, 2006.
6. A. Emadi, A. Nasiri, and S.B. Bekiarov. Uninterruptible Power Supplies and Active Filters, CRC Press, 2005.
7. K. Pethebridge and I. Neeson. Electrical Wiring Practice (Volume 2 – 6th Edition), McGraw-Hill, 2002.
8. IEE Wiring Regulations (17th Edition BS 7671: 2008), BSI, 2008.
9. Hadi Saadat. Power System Analysis (2nd Edition), Prentice Hall, 2004.

**BEE20801 ELECTRONICS ENGINEERING LABORATORY I**

**SYNOPSIS:**

To give students hands-on experience in understanding the material presented in the following subjects:

- BEL10203 Analog Electronics
- BEL 20203 Digital Electronics

**REFERENCES:**

1. R.Boylestad, L. Nashelsky; Electronic Devices and Circuit Theory, 9th Edition; Prentice Hall; 2006.
2. Donald A. Neamen; Microelectronics Circuit Analysis and Design, 3<sup>rd</sup> Ed.; McGraw Hill, 2007.

3. Thomas L. Floyd, Electronic Devices, 7<sup>th</sup> Ed., Prentice Hall, 2005.
4. J. Floyd, Digital Fundamental, Merill MacMillan, 2006.
5. J. Tocci, Digital System, Principles and Application, Prentice Hall, 2006
6. M. Morris Mano, Charles R. Kime, Logic and Computer Design Fundamentals, 2<sup>nd</sup> Ed., Prentice Hall, 2001.

## **BEC20702 DATA STRUCTURES AND ALGORITHMS**

**PREREQUISITE: BEC10102 COMPUTER PROGRAMMING**

### **SYNOPSIS:**

This course is intended to provide a study of data structures and many associated algorithms with C. Students will learn fairly comprehensive abstract data types, analyzing the algorithm, code, debug, test and document well-structured programs based on technical and engineering problems. Topic covered; Fundamentals of algorithms, data abstraction, stack, recursion and queues, lists, searching, trees, hashing, priority queues, sorting and graph algorithms.

### **REFERENCES:**

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 3<sup>rd</sup> Edition, Addison Wesley, 2006.
2. Micheal T. Goodrich, Roberto Tamassia and David Mount, "Data Structures and Algorithms in C++", John Wiley & Sons, 2004.
3. Shi-Kuo Chang. "Data Structures and Algorithms". World Scientific Publishing, 2003.
4. Malik, D.S. "Data Structures using C++", Cambridge: Course Technology, 2003.
5. Yedidyah Langsam, Moshe J Angenstein, Aaron M Tenenbaum. "Data structures using C and C++", Englewood Cliffs, New Jersey: .Prentice-Hall, 1996.
6. N. Guruprasad. "Data Structures using C", 2nd Edition. Chennai: Scitech Publications, 2006.

**YEAR 2  
SEMESTER 2**

**UWA10302 ISLAMIC AND ASIAN CIVILISATION**

**SYNOPSIS:**

The course discusses the introduction of civilization, its development, the interaction between civilizations; the Islamic civilization, Islam in the Malay civilization; Indian and Chinese civilizations as well as contemporary civilization issues and also the principles of Islam Hadhari.

**REFERENCES:**

1. Ahmad Hakimi Khairuddin dan Faridah Che Husain. (2006). Isu-isu Kontemporari Dalam Tamadun Islam dan Tamadun Melayu, dalam *Tamadun Islam dan Tamadun Melayu*. Siri Teks Pengajian Tinggi. Kuala Lumpur: Penerbit Universiti Malaya
2. Ibnu Khaldun, Muqaddimah Ibnu Khaldun.
3. Huntington, S. *The Clash of Civilizations and the Remaking of the World Order*.
4. Mahyuddin Hj. Yahaya, (1998). *Tamadun Islam*, Shah Alam: Penerbit Fajar Bakti Sdn. Bhd.
5. Iddaikkadar. N.M. (1979). *Latar Belakang Kebudayaan Hindu*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

**BWM 30602 ENGINEERING MATHEMATICS IV**

**SYNOPSIS:**

Solution of nonlinear equations: Bisection, secant, and Newton Raphson method. Solution of linear systems of equations: Gaussian elimination, LU decomposition, Thomas, and Gauss-Seidel method. Interpolation and polynomial approximation: Newton's divided-difference, Lagrange and cubic spline. Numerical Differentiation: Taylor series expansion. Numerical Integration: Simpson and Gauss quadrature method. Eigen Values: Power method. Ordinary Differentiation Equations: Solution of Initial-Value Problems by Taylor Series, Euler, Huen,



Runge-Kutta methods. Solution of Boundary-Value Problems by finite difference method. Partial Differentiation Equations: Explicit and implicit method using finite difference method. Finite-element Method: Finite-element application in one dimension heat flow.

#### REFERENCES:

1. Nafisah Md Kamaruddin, *et. al.* 2008. *Numerical Method*.
2. D. V. Griffiths, I. M. Smith. 2006. *Numerical methods for engineers*, 2<sup>th</sup> Edition. Boca Raton, FL: Chapman & Hall.
3. J. N. Sharma. 2004. *Numerical methods for engineers and scientists*, Pangbourne:
4. Alpha Science International.
5. (3) Jaan Kiusalaas. 2005. *Numerical methods in engineering with MATLAB*, Cambridge: Cambridge University Press.
6. John H. Mathews, Kurtis D. Fink. 2004. *Numerical methods using MATLAB*, 4<sup>th</sup> Edition. US Upper Saddle River, NJ: Pearson Education.
7. Laurene Fausett. 2002. *Numerical methods using mathCAD*, Upper Saddle River, New Jersey.
8. (6) Steven C. Chapra, Raymond P. Canale. 2002. *Numerical methods for engineers: with software and programming applications*, 4<sup>th</sup> Edition. Boston: McGraw-Hill.

#### BPK30902 ENGINEERING ECONOMY

##### SYNOPSIS:

*Ekonomi kejuruteraan merupakan satu bidang kajian yang mengaitkan beberapa aspek ekonomi semasa membuat keputusan kejuruteraan. Aspek tersebut melibatkan penilaian kos dan faedah bagi projek teknikal yang dicadangkan. Konsep asas yang digunakan ialah nilai wang-masa, dan teknik yang berkaitan dengan pengkompaunan, pendiskaunan, dan konsep kesetaraan. Beberapa kaedah digunakan untuk menentukan sama ada sesuatu pelaburan itu menguntungkan atau tidak iaitu kaedah PW, FW, AW, IRR dan kaedah faedah-kos.*

##### REFERENCES:

1. Blank, L.T., A. Tarquin (2008): *Basics of Engineering Economy*, International ed., McGraw-Hill, New York,
2. Mohamad Sirin, R. (2007): *Teori Asas Ekonomi Kejuruteraan*, Cetakan Awal, Fakulti Pengurusan Teknologi, KUITTHO. Malaysia.
3. Sullivan W.G, Wicks E.M. & Luxhoj J.T, (2006). *Engineering Economy*, 13<sup>th</sup> Edition, Prentice Hall Inc.
4. Chan S. Park, (2007). *Contemporary Engineering Economics*, 4<sup>th</sup> Edition, Pearson International Edition.

## **BEB20303 ELECTROMAGNETIC FIELDS AND WAVES**

**PREREQUISITE: BWM20403  
(ENGINEERING MATHEMATICS III)**

### **SYNOPSIS:**

Explanation on electromagnet; Explanation on vector analysis, Electromagnetism, Electrostatic; Charge, Charge density, Coulomb's Law, Flux density, Potential difference, Gauss's law, Electrical energy, Capacitance, Magnetostatic, Biot-Savart's law, Ampere's Circuit law, Magnetic force, Magnetic material, Magnetic circuit, Induction, Transformer, Time-Varying fields; Faraday's law, Lenz's law, Maxwell equations, Electromagnetic wave equations: Polarization, Acceleration, Frequency, Power, Wave reflection at normal incidence plane and oblique plane.

### **REFERENCES:**

1. Element of Electromagnetic, Matthew M.O.Sadiku, 3<sup>rd</sup> Edition, Oxford University Press, 2001 (Repr. 2003).
2. Fundamentals of Applied Electromagnetics, Fawwaz T. Ulaby, Prentice Hall, 2004.
3. Electromagnetics for Engineers, Fawwaz T. Ulaby, Pearson Education, 2005.
4. Engineering Electromagnetics, William H. H, McGraw-Hill, NY, 2005.
5. Electromagnetics, Edward J. Rothwell and Michael J. Cloud, CRC Press, 2001.
6. Introductory Electromagnetics, Zoya Popovic and Branko D. Popovic, Prentice Hall, New Jersey, 1999.

**BEM22003 INSTRUMENTATION AND CONTROL SYSTEMS**

**PREREQUISITE: BWM10303  
(ENGINEERING MATHEMATICS II)**

**SYNOPSIS:**

This subject is about the analysis, design and application of instrumentation and process control system. The subject is organized in 7 (seven) chapters. The outline of the subject is as follows: Chapter 1 presents an introduction to electrical instrumentation. Chapter 2 deals with digital oscilloscope and function generator. Chapter 3 gives introduction to control system. Chapter 4 discuss the mathematical modelling of dynamic system. Chapter 5 presents time domain analysis. Chapter 6 explains the controllers in process control including parameters tuning and controller setting. Chapter 7 discusses control system instrumentations. Finally, Chapter 8 presents measurement system application

**REFERENCES:**

1. *Principles and Practice of Automatic Process Control*; C.A. Smith and A. Corripio, John Wiley, 2006.
2. *Principles of Measurement System, 4<sup>th</sup> Ed.*; J.P. Bentley, Pearson Prentice Hall, 2005.
3. *Process Control Instrumentation Technology, 7<sup>th</sup> Ed.*; C.D. Johnson, Prentice Hall, 2003.
4. *Modern Control Engineering, 4<sup>th</sup> Ed.*; K. Ogata, Prentice Hall, 2002.
5. *Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting*; R.G. Gupta, McGraw Hill, 2001.
6. *Process Control, Designing Processes and Control System for Dynamic Performance, 2<sup>nd</sup> Ed.*; T.E. Marlin, McGraw-Hill, 2000.
7. *Process/Industrial Instruments and Control Handbook*; G.K. McMillan, McGraw-Hill, 1999.
8. *Industrial Control Handbook, 3<sup>rd</sup> Ed.*; A. Parr, Newnes, 1998.
9. *Process Instrumentation Applications Manual*; B. Cornell, McGraw-Hill, 1996.

**BEE20901    ELECTRONICS ENGINEERING LABORATORY  
II**

**SYNOPSIS:**

This subject comprises of practical implementation for the subject of Power System, and Instrumentation and Control System. Various experiments under this subject will covers generator and transformer, overhead line, short circuits asymmetrical analysis, protection system, power factor correction, error in measurement, basic usage of oscilloscope, sinusoidal waveform, measuring phase and frequency using oscilloscope, application of digital oscilloscope, signal generator and frequency counter three-phase inverter, position control system, speed control system and servo system.

**REFERENCES:**

1. Theodore Wilde, Electrical Machines, Drives and Power System; Pearson Educational International, 2006.
2. Nise, N. S., Control Systems Engineering 4<sup>th</sup> Edition; John Wiley, 2004.
3. Hadi Saadat, Power System Analysis; Prentice-Hall, 2004.
4. C.D. Johnson, Process Control Instrumentation Technology, 7<sup>th</sup> Ed.; Prentice Hall, 2003.
5. E. Acha, V. G Agelidis, O. Anaya-Lara, T. J. E Millwer, Control in Electrical System; Newnes, 2002.
6. Dorf, R. C., Bishop R. H., Modern Control Systems 10<sup>th</sup> Edition; Prentice Hall, 2005.
7. Ogata, K., Modern Control Engineering 4<sup>th</sup> Edition; Prentice Hall, 2002.

**BEC20702    OBJECT ORIENTED PROGRAMMING**

**PREREQUISITE:    BEC20702 DATA STRUCTURES AND  
ALGORITHMS**

**SYNOPSIS:**

This course is intended to provide a study of Object Oriented Programming (OOP) concept through the use of a high level programming language using JAVA. Students will learn Object-Oriented Analysis and Design(OOAD) strategy and problem solving, basic structure of JAVA Program, method, objects & classes, array and string, inheritance and polymorphism and GUI & database programming.

**REFERENCES:**

1. Liang, Y. Daniel; "Introduction to Java programming"; 6<sup>th</sup> Edition; Prentice Hall, 2007.
2. H. M. Deitel and P. J. Deitel, "JAVA: How to Program", 5<sup>th</sup> Edition, Pearson Education 2005
3. Stephen J. Chapman; "JAVA for Engineers and Scientist"; Prentice Hall, 2003.
4. Bishop & Bishop. " Java Gently for Engineers & Scientist", 1<sup>st</sup> Edition, Addison-Wesley 2000.
5. K. Barclay & J. Savage. "OBJECT ORIENTED DESIGN with UML and JAVA". Butterworth-Heinemann. 2004.
6. Lewis & Loftus, "Java Software Solutions: Foundations of Program Design", 5<sup>th</sup> Edition, Pearson Addison Wesley, 2005
7. Walter Savitch," Absolute Java", Addison Wesley, 2004

## **YEAR 3**

**YEAR 3  
SEMESTER 1**

**UWB10\*02 FOREIGN LANGUAGE**

• **UWB10802 FRENCH LANGUAGE**

**SYNOPSIS:**

This course is designed for students to learn the basic of French 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 French language.

**REFERENCES:**

1. Girardet, Jacky et Cridlig, Jean-Marie, (1996). **Méthod de français: PANORAMA 1**. Paris: CLE International.
2. Hatier, (1995). **Le Nouveau Bescherelle Complete Guide 12 000 French Verbs**. Paris: LIBRAIRIE HATIER.
3. Kaneman-Pougatch, Massia et al, (1997). **Méthod de français: Café Crème 1**. Paris: HACHETTE F.L.E..
4. Grégoir, Maïa et al, (1995). **Grammaire Progressive du Français** avec 500 exercices. Paris: CLE International.
5. Miquel, Claire Leroy et al, (1995). **Vocabulaire Progressive du Français** avec 250 exercices. Paris: CLE International.

• **UWB10902 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. Nur Zakiah binti Amir Hamzah, (2010). **Guten Tag !**, Pejabat Penerbit UTHM.
2. Angela Wilkes. (2006). **GERMAN FOR BEGINNERS**, London: Usborne Publishing Ltd.
3. Aufderstrasse. (1998). **Themen Neu 1**, Lehrwerk fuer Deutsch als Fremdsprache.
4. Dr. Albert H. Small. (1991). **German â la Cartoon**. German Grammar through Cartoons.
5. Oxford University Press (2006). First Edition 2006-**Oxford Beginner's German Dictionary**.

## • UWB11002 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. Surie Network, (1998): **Minna no Nihongo – Main text book**, First Publish. 3A Corporation Tokyo.
2. Surie, Network (2000): **Minna no Nihongo – Hyōjunmondaishyū**, First Publish. 3A Corporation Tokyo.
3. Surie Network, (2009): **Minna no Nihongo – Translatition and Grammatical Notes in English (Asian Edition)**, Eighth Edition. 3A Corporation Tokyo.
4. The AOTS, (1977): **Shin Nihongo no Kiso – Japanese Kana Workbook**, First Publish: 3A Corporation Tokyo.



- **UWB11102 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. Liang An Xiang. (2002). EPH Publishing (M) Sdn. Bhd. K.L.
2. Shi Yun. (2002). EPH Publishing (M) Sdn. Bhd. K.L.
3. Claudia Ross & Jing-heng Sheng Ma. (2006). Routledge. London.
4. Dr.Lim Choon Bee. (2005). Universiti Putra Malaysia Press. Serdang.
5. Hui Jin Chang. (2002). United Publishing House (M) Sdn.Bhd. K.L.
6. Claudia Ross. (2002). Press of Ohio. USA.
7. Duan Duan Li & Yanping Xie. (2002). Press of Ohio. USA.

- **UWB11202 BAHASA MELAYU**

**SYNOPSIS :**

This course is designed for students to learn the basic of Bahasa Melayu. 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 Bahasa Melayu.

**REFERENCES:**

1. Asmah Hj. Omar. (2005). **Susur Galur Bahasa Melayu.** DBP : KL
2. Asmah Hj. Omar. (2003). **Nahu Melayu Mutakhir.** DBP : KL

3. Abdul Hamid Mahmood. (1992). **Menguasai Ejaan Bahasa Malaysia Dengan Cepat**. DBP: KL
4. Abdul Hamid Mahmood. (1998). **Menguasai Ejaan Bahasa Melayu**.DBP : KL
5. Edward S. King. (1998). **Speak In Malay**. Times Publication : KL
6. Edward S. King. (1998). **Write In Malay**. Times Publication : KL
7. Ismail Dahaman. (1996). **Pedoman Ejaan Rumi Bahasa Melayu**. DBP. KL
8. John Parry & Sahari Sulaiman. (1985). **Malay in 3 Weeks**. Times Publication : KL

- **UWB11302 SPANISH LANGUAGE**

**SYNOPSIS:**

This course is designed for students to learn the 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: **Hola! Hablo español** First Edition Batu Pahat: Penerbit UTHM.
2. Joy Renjilian - Burgay, Ana Beatriz Chiquito y Susan M. Mraz: **Caminos**.
3. Salina Husain : **Vamos a aprender español lengua extranjera**.
4. Gail Stein: **The Complete IDIOT'S GUIDE to Learning Spanish on Your Own Second Edition**.
5. Irwin Stern : **Ultimate SPANISH revised and update**.
6. Julianne Dueber : **Spanish Vocabulary** by Barron's Educational Series, Inc.
7. Oxford University Press (1997). Second Edition 2000- **The Pocket Oxford Spanish Dictionary**
8. Collins Dictionary: **Español>Inglés, English>Spanish** - New Edition

• **UWB11402 ARABIC LANGUAGE**

**SYNOPSIS:**

This course is designed for students to learn the basic 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 language.

**REFERENCES:**

1. Mohd Hisyam Abdul Rahim; Ahmad Sharifuddin Mustapha; Mohd Zain Mubarak. (2008). *Bahasa Arab UMR 1312*. Batu Pahat: Penerbit UTHM.
2. Mohd Hisyam bin Abdul Rahim. (2005). *Senang Berbahasa Arab*. Batu Pahat: Penerbit KUiTTTHO.
3. Ab. Halim Mohammed; Rabiya Hajimaming; Wan Muhammad Wan Sulong. (2007). *Bahasa Arab Permulaan*. Serdang: Penerbit UPM.
4. Mohd Khairudin Khudri. (2006). *Akar Umbi Pembelajaran Bahasa Arab*. Kajang: One Touch Creative.
5. Sini, Mahmud Ismail; Abd Aziz, Nasif Mustapha; Husayn, Mukhtar. T.th. *al-'Arabiyyah Lil Nashiin, Kitab al-Tilmiz*. al-Mamlakah al-Saudiah: Idarah al-Kutub al-Madrasiyah, Wizarah al-Taalim.
6. Ahmad Hassan. (1995). *Pelajaran Bahasa Arab Untuk Orang Bukan Arab*. Kota Bharu: Pustaka Aman Press.
7. Hashim Hanafiah. (1981). *Al- Lughah al-Arabiyyah*. Kuala Lumpur: Percetakan Watan.

**BEE31202 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 solving problems and making decisions in the future. In this course, students will be exposed to various creativity and problem solving techniques.

Some of the skills to be covered throughout the course are problem solving, techniques in creativity and techniques in innovation.

#### **REFERENCES:**

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

#### **BWM 20502 ENGINEERING STATISTICS**

**PREREQUISITE: PASSED BWM10103 (ENGINEERING MATHEMATICS I)**

#### **SYNOPSIS:**

**Random Variables** : Discrete and continuous random variables, probability distribution functions, cumulative distribution functions, expected values and variance. **Special Probability Distributions** : Binomial distribution, Poisson distribution, means and variances, Poisson approximation to Binomial distribution, normal distribution, standard normal distribution, normal approximation to Binomial distribution. **Sampling Distribution** :

Sampling distribution of single mean, sampling distribution of the difference between two means, sampling distribution test:  $t$ , chi-square and  $F$  distribution. **Estimation** : Point estimate, confidence interval for single mean, difference between two means, single variance and ratio of two variances. **Hypothesis Test** : Type 1 and type 2 errors, hypothesis test for single mean, difference between two means, single variance and ratio of two variances. **Simple Linear Regression** : Graphical method, simple linear regression model, least square method, hypothesis testing for intercept and slope, coefficient of determination, correlation coefficient.

#### **REFERENCES:**

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

#### **BEB31803 ELECTRONIC COMMUNICATION SYSTEMS**

##### **SYNOPSIS:**

This subject introduces the fundamentals in analog and digital communication systems. Comprises of analysis of signals and noise, generation of analog and digital modulation schemes, transmission lines, antenna and wave propagation as a part of a complete system in communication. Finally, the topic discussed relate with current application in communication systems.

##### **REFERENCES:**

1. Wayne Tomasi, Electronic Communication Systems: Fundamental Through Advanced 5<sup>th</sup> Ed., Pearson Prentice Hall, 2004.

2. Proakis, J. G., Salehi M., Communication System Engineering 2<sup>nd</sup> Ed, Pearson Prentice-Hall, 2002.
3. Couch, L. W., Digital and Analog Communication Systems, 7th Ed, Pearson Prentice-Hall, 2007.
4. Proakis, J. G. et al, Essential of Communication System Engineering, Pearson Prentice-Hall, 2005.
5. Simon Haykin, Communication System, 4<sup>th</sup> Ed, John Wiley and Sons, 2001.
6. Louis Frenzel, Communication Electronics, McGraw-Hill, 2001.
7. Ziemer, R. E., et. al., Principles of Communication, 5th Ed, John Wiley, 2002.

**BEL30403 ELECTRONICS CIRCUIT ANALYSIS AND DESIGN**

**PREREQUISITE: BEL10203 ANALOG ELECTRONICS**

**SYNOPSIS:**

Fundamental concepts of analog electronics and the application of these concepts to the design of analog circuits. Among the topics covered are the fundamentals of operational amplifiers: linear and non-linear operation; feedback and oscillators; Practical op-amp circuits: Instrumentation amplifier, active filters; regulated DC Power Supply. Focus is on the design of analog circuits through solving design-oriented problems and the design, implementation, and testing of analog circuits by means of computer simulation software.

**REFERENCES:**

1. Electronic Devices and Circuit Theory, 9th Edition; R.Boylestad, L. Nashelsky; Prentice Hall; 2006.
2. Microelectronics Circuit Analysis and Design, 3<sup>rd</sup> Ed.; Donald A. Neamen; McGraw Hill, 2007.
3. Microelectronics Circuits, 5<sup>th</sup> Ed.; Adel S. Sedra and Kenneth C. Smith; Oxford University Press, 2004.
4. Electronic Devices, 7<sup>th</sup> Ed. ; Thomas L. Floyd; Prentice Hall, 2005.

5. Electronic Principles, 7<sup>th</sup> Ed.; Albert Paul Malvino ; McGraw Hill, 2007.
6. Introductory Electronics Devices and Circuits, Conventional Flow Version, 7<sup>th</sup> Edition; Robert T. Paynter; Prentice Hall; 2006.
7. Electronic Devices and Circuits; 5th Edition, Theodore F. Bogart, Jeffrey S. Beasley and Guillermo Rico, Prentice Hall; 2004.
8. Electronics Fundamentals: Circuits, Devices and Applications, 5<sup>th</sup> Ed. ; Thomas L. Floyd ; Prentice Hall, 2001.

### **BEE31002 ELECTRONICS ENGINEERING LABORATORY III**

#### **SYNOPSIS:**

This laboratory give students hands-on experience in understanding the material presented in the following subjects:

- BEB30403 Communication Theory
- BEL30403 Electronic Circuit Analysis & Designs

#### **REFERENCES:**

1. Jeffrey S. Beasley, Gary M. Miller, Modern Electronic Communication, 9<sup>th</sup> Ed, Pearson Prentice Hall, 2008.
2. Wayne Tomasi, Electronic Communication Systems: Fundamental Through Advanced 5<sup>th</sup> Ed., Pearson Prentice Hall, 2004.
3. Couch, L. W., Digital and Analog Communication Systems, 7th Ed, Pearson Prentice-Hall, 2007.
4. Proakis, J. G. et al, Essential of Communication System Engineering, Pearson Prentice-Hall, 2005.
5. Ziemer, R. E., et. al., Principles of Communciation, 5th Ed, John Wiley, 2002.
6. Simon Haykin, Communication System, 4<sup>th</sup> Ed, John Wiley and Sons, 2001.
7. Louis Frenzel, Communication Electronics, McGraw-Hill, 2001.

**BEC30503    DIGITAL SYSTEM DESIGN**

**PREREQUISITE:    BEL20303 DIGITAL ELECTRONICS**

**SYNOPSIS:**

This course is intended to provide fundamental concepts in classical manual digital design and illustrate clearly the way of digital design using CAD tools. Students will learn to design, simulate, and verify digital circuit using Verilog language and implementation on FPGA technology. It is mostly focused on gate-level designs, however will also address one level of abstraction up (larger logic devices). Lab sections are heavily emphasis on learning Altera Quartus II CAD tools and the use of Verilog language in applications and FPGA which is the most appropriate technology for implementation nowadays.

**REFERENCES:**

1. Stephen Brown, Zvonko Vranesic. "Fundamentals of Digital Logic with Verilog Design", Mc-Graw Hill, 2003.
2. Weng Fook Lee. "Verilog Coding for Logic Synthesis", Wiley InterScience, 2003.
3. Randy H. Katz, Gaetano Borriello, "Contemporary Logic Design", 2<sup>nd</sup> Edition, Pearson International Edition, 2006
4. M. Morris Mano, "Digital Design", 3<sup>rd</sup> Edition, Prentice-Hall, 2002.
5. Ronald J. Tocci, Neal S. Widmer, and Gregory L. Moss, "Digital Systems: Principles and Applications", 9<sup>th</sup> Edition, Pearson Prentice-Hall, 2004.



**YEAR 3  
SEMESTER 2**

**BEE30103 ENGINEERING MANAGEMENT**

**SYNOPSIS:**

This course introduces engineers to the ways in which management principles are applied in engineering project and organization. Managing people and career opportunities as engineering manager. Management function: planning and forecasting, strategy formulation, decision making, organizing, leading and controlling. Quality Management. Project management and its activities. Resources Management, Financial Management, and Maintenance, Reliability and Safety Management are among the topics covered.

**REFERENCES:**

1. Lucy C. Morse and Daniel L Babcock, Managing Engineering and Technology. Prentice Hall, 2007
2. C. M. Chang, Engineering Management : Challenges in the New Millennium, Prentice Hall, 2005
3. Avraham Shtub, Jonathan F. Bard, Shlomo Globerson, Project Management : Processes, Methodologies and Economics, Prentice Hall, 2005
4. John V. Chelsom, Andrew C. Payne, Management for Engineers, Scientists and Technologists, John Wiley, 2004
5. Abdul Talib Bon, Pengurusan Kejuruteraan, Penerbit KUiTTTHO, 2004.
6. David L. Goetsch, Occupational Safety and Health for Technologists, Engineers and Managers, 5th ed. Prentice Hall, 2005
7. Occupational Safety and Health Act 1994

**BEB30603 DIGITAL SIGNAL PROCESSING**

**SYNOPSIS:**

This subject is to introduce and understand the main concepts of digital signal processing, review of discrete signal and system, characteristic and operation, discrete convolution, digital filter

design, sampling and quantization, discrete Fourier transform, z-transform, IIR and FIR digital filters, the implementation of digital filters, random process, spectrum estimation and DSP processor.

**REFERENCES:**

1. Digital Signal Processing: Principles, Algorithm and Applications, John G. Proakis, Dimitris G Manolakis, 4<sup>th</sup> Ed, Pearson Prentice Hall, 2007.
2. Analog and Digital Signal Processing, Ashok Ambardar, 2<sup>nd</sup> Edition, Thompson, 1999

**BEC30303 COMPUTER ARCHITECTURE AND ORGANISATION**

**SYNOPSIS:**

The subject is about the fundamentals of computer organization and architecture and relates these to contemporary design issues. The application of these concepts depends on the current state of the technology and the price/performance objectives of the designer. This syllabus is organized into eight chapters. The structure and functional of computer are covered in chapter 1 and chapter 2. The performance issues are also discussed in chapter 2. Chapter 3 through chapter 6 covered the major components of the computer systems. Architectural issue such as instruction sets design and data types are covered in chapter 7. While organizational issues such as pipelining also covered in chapter 8.

**REFERENCES:**

1. Andrew S. Tanenbaum. "Structured Computer Organization", 5<sup>th</sup> Edition. Pearson Prentice Hall-New Jersey. 2006.
2. Murdocca, Miles J; Heuring, Vincent P. "Principles of Computer Architecture", International Edition. Prentice Hall-New Jersey. 2000.
3. William Stallings. "Computer Organization & Architecture: Designing for Performance", 7<sup>th</sup> Edition. Pearson Prentice Hall-New Jersey. 2006.

4. Hamacher, Carl; Vranesic, Zvonko; Zaky, Safwat. "Computer Organization", 5<sup>th</sup> Edition. McGraw-Hill-Singapore. 2002.
5. Williams, Rob. "Computer Systems Architecture: A Networking Approach", Pearson Education-England. 2001.

## **BEE31102 ELECTRONICS ENGINEERING LABORATORY IV**

### **SYNOPSIS:**

To give students hands-on experience in understanding the material presented in the following subjects:

- BEC30303 Computer Architecture and Organization
- BEC30403 Microprocessor and Microcontroller

## **BEC30403 MICROPROCESSOR & MICROCONTROLLER**

**PREREQUISITE: BEL20303 DIGITAL ELECTRONICS**

### **SYNOPSIS:**

This course is intended to provide a study of the concept of microprocessor and microcontroller with an emphasis on programming skills; design, interfacing between microprocessor/microcontroller and other device, CPU architecture, organize and memory interfacing, bus concept, interrupt, communication interfacing and A/D conversion.

### **REFERENCES:**

1. Barry B. Brey, "INTEL Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium ProProcessor, Pentium II, III, 4, 7/E", Prentice Hall, 2005.
2. Mazidi, "PIC Microcontroller & Embedded Systems", Pearson, 2008.
3. A.V. Deshmukh, "Microcontrollers: Theory and Applications", McGrawHill, 2006.
4. Dogan Ibrahim, "PIC Basic: Programming and Projects", Oxford: Newnes, 2001.

5. Martin Bates, "Introduction to Microelectronic Systems: The PIC16F84 Micocontroller", London: Arnold, 2000.

## **BEC30803 DATABASE SYSTEMS**

### **SYNOPSIS:**

The general objective is to provide students with a broad background in database design, database languages, and database system implementation. The emphasis on the fundamental concepts of database management will provide you with the ability to accommodate a variety of database technology. The topics covered will also provide a firm foundation for further studying, designing, implementing, and effectively using database systems.

### **REFERENCES:**

1. Connolly, T and Begg, C. "Database System: A Practical Approach to Design, Implementation, and Management", 4<sup>th</sup>. Edition. Addison-Wesley , 2005.
2. Kroenke, D. M. "Database Processing: Fundamentals, Design, and Implementations", 8<sup>th</sup> Edition, Prentice-Hall, 2006
3. Churcher, C. "Beginning Database Design: From Novice to Professional", Apress. 2007
4. Elmasri and Navathe. "Fundamentals of Database Systems", 5<sup>th</sup> Edition, Addison-Wesley. 2007
5. Mannilo, M. V. "Database Design, Application Development, and Administration", 3<sup>rd</sup> Edition. McGraw-Hill, 2007.
6. Silberschatz, A., Korth, H. F., and Sudarshan, S. "Database System Concept", 5<sup>th</sup> Edition. McGraw-Hill, 2006.
7. Afyouni, H. A. "Database Security and Auditing: Protecting Data Integrity and Accessibility". Thomson, 2006.

**YEAR 3  
SEMESTER 3**

**BEE30304 INDUSTRIAL TRAINING**

**SYNOPSIS:**

Students are required to undergo industrial training in related field for 10 weeks in the organizations determined by faculty. They will be assessed both by their external and internal supervisors. They will also undergo training provided by companies as long as it suits the industrial training scope for Bachelor Degree.

**REFERENCE:**

1. Buku Log Latihan Industri UTHM. Pejabat Penerbit UTHM.

## **YEAR 4**

**YEAR 4  
SEMESTER 1**

**BEC40903 ASIC DESIGN**

**PREREQUISITE: BEC30503 DIGITAL SYSTEM DESIGN**

**SYNOPSIS:**

This subject introduces the concept and methods in digital system design especially on design, testing and implementation of digital ASIC. The course has a significant laboratory component to give some experience with the tasks of ASIC design and testing. The use of Altera Xilinx/Quartus II and Tanner Tools Pro as a design tool is for better understanding in this subject. The topics covered will also provide a firm foundation for further studying, designing, implementing as an ASIC or FPGA designer.

**REFERENCES:**

1. Michael D. Ciletti. "Advanced Digital Design with the Verilog HDL", Prentice Hall, 2003.
2. David R. Smith and Paul D. Franzon. "Verilog Styles for Synthesis of Digital Systems", Prentice Hall, 2000.
3. Thomas and Moorby, "The Verilog Hardware Description Language", 5th edition, Kluwer Academic, 2002.
4. Michael John Sebastian Smith. "Application-Specific Integrated Circuits", Addison-Wesley, 1997.
5. S. Sutherland, S. Davidman, P. Flake. "System Verilog for Design", Kluwer Academic, 2004.
6. Verilog2001, <http://www.asic-world.com/verilog/verilog2k>
7. Ben Cohen, Srinivasan Venkataramanan, Ajeetha Kumari. "System Verilog Assertions Handbook", VhdlCohen Pub., 2005.

**BEC41003 COMPUTER NETWORKS**

**SYNOPSIS:**

This subject is to provide a comprehensive understand on computer network utility. Student will learn the principle of networking, protocols needed, technology used and how to

managing a secured and reliable network. Topic covered are the overview of computer networking, TCP/IP and OSI protocol suite, Network Application, Transport Protocol, Internet Routing, Network and Link Layer, Internet Application and Network Security.

**REFERENCES:**

1. James F. Kurose and Keith W. Ross, "Computer Networking, A Top-Down Approach", 4<sup>th</sup> Edition, Addison Wesley, 2008.
2. Behrouz A. Forouzan, "Data Communication and Networking", 4<sup>th</sup> Edition, Mc Graw Hill, 2007.
3. William Stallings, "Cryptography and Network Security", 4<sup>th</sup> Edition, Prentice Hall, 2006.
4. Fred Halsall, "Computer Networking and the Internet", 4<sup>th</sup> Edition, Addison Wesley, 2005.
5. William Stallings, "Computer Networking with Internet Protocols and Technology", 1<sup>st</sup> Edition. Prentice Hall, 2004.

**BEC41103    ADVANCED MICROCONTROLLER**

**PREREQUISITE:    BEC30403 MICROPROCESSOR &  
MICROCONTROLLER**

**SYNOPSIS:**

This course is intended to provide a study of software and hardware concept through the use of assembly and C language for the interfacing purpose. Students will be introduced with the overview of microcontroller that had been taught before – history and features, PIC architecture and assembly language programming, branch, call and time delay loop, PIC I/O port programming, arithmetic, logic instruction and programs and Bank Switching, Table Processing, Macros and Modules. PIC programming in C will be introduced that is focused on data types and time delays, I/O programming, logic operation, data serialization, program ROM allocation and data RAM allocation in C. The others topic covered: PIC18F hardware connection and loader, timer, serial port programming, interrupt programming, lcd, keyboard, adc, dac, and sensor interfacing and data storage. Lastly, the chapter ended with motor control. All are program in assembly and C.



**REFERENCES:**

1. Muhammad Ali Mazidi, Rolin D. Mckinlay & Danny Causey "PIC Microcontroller and Embedded Systems Using Assembly and C for PIC18", 1<sup>st</sup> edition. Pearson International Edition, 2008
2. Tim Wilmshurst. "Designing Embedded Systems with PIC Microcontrollers Principles and Applications". 1st edition. Newnes. 2007.
3. Julio Sanchez, Maria P. Canton . "Microcontroller programming : the microchip PIC". 2007
4. Mike James. "Microcontroller Cookbook". 2001.

**BEC41202 NETWORKS AND ADVANCED MICROCONTROLLER LABORATORY**

**SYNOPSIS:**

To give students hands-on experience in understanding the material presented in the following subjects:

- BEC41003 Computer Networks
- BEC41103 Advanced Microcontroller

**BEE40602 FINAL YEAR PROJECT I**

**SYNOPSIS:**

Each student is required to carry out an individual project during his final year of study based on a topic selected from the subjects studied or a related engineering problem. This project is divided into two parts. Each student is expected to present his proposal and research plus a progress report during the first seminar of the final year project.

**REFERENCES:**

1. Guidelines for the Implementation of Final Year Project in the Faculty of Electrical and Electronics Engineering UTHM.
2. Guidelines for Thesis Writing.

**BEC4\*\*03 ELECTIVE I  
YEAR 4  
SEMESTER 2**

**BEC41302 OPERATING SYSTEMS**

**PREREQUISITE: BEC20702 OBJECT ORIENTED  
PROGRAMMING**

**SYNOPSIS:**

This course is intended to provide a clear description of the concepts of operating system. Topic covered; Introduction to operating system, process and scheduling, Memory management, Hardware management, Fail management, Security and Case study.

**REFERENCES:**

1. Silberschatz, A., "*Operating System Concepts*", 7th Edition, John Wiley & Sons, 2005
2. Modern Operating Systems, 3<sup>rd</sup> Ed.; Andrew S. Tanenbaum; Prentice Hall; 2005
3. W. Stalling, "*Operating Systems Internals & Design Principles*", 5th Edition, Pearson Education International, 2005.
4. Davis & Rajkumar, "*Operating Systems*", 6th Edition, Pearson Education International, 2005.
5. Deitel, Deitel & Choffnes, "*Operating Systems*", 3rd Edition, Pearson Education International, 2004.

**BEL20303 MULTIMEDIA ENGINEERING**

**SYNOPSIS:**

This course is intended to provide a study of multimedia engineering theory, practice and issues through the use of a multimedia system development, programming and authoring tools. Topic covered; Introduction to Multimedia, Multimedia Development and Authoring, Text Data Representations, Graphics and Image Data Representation, Colour in Image and Video, Video Data Representation, Digital Audio Data

Representation, Compression Algorithm, Image Compression Standard, Video Compression Techniques, MPEG Video Coding, Audio Compression Techniques, MPEG Audio Compression, Multimedia Networks Communication and Application.

**REFERENCES:**

1. A. C. M. Fong, S. C. Hui, "Multimedia engineering : a practical guide for internet implementation", Hoboken, N.J: Wiley-Interscience, 2006.
2. Ze-Nian Li, Mark S. Drew, "Fundamentals of Multimedia", Int. Edition. Pearson Prentice-Hall, 2004.
3. Syed Mahbubur Rahman, "Multimedia technologies : concepts, methodologies, tools and applications", London: Information Science Reference, 2008.
4. Nigel Chapman and Jenny Chapman, Digital Multimedia, Wiley, 2000.
5. Prabhat K. Andleigh, Multimedia Systems Design, Prentice hall 1995.
6. Jeffcoate, Multimedia in Practice – Technology and Applications, Prentice Hall, 1994.

**BEE40704 FINAL YEAR PROJECT II**

**PREREQUISITE: PASSED BEE40602 FINAL YEAR PROJECT I**

**SYNOPSIS:**

Each student is required to carry out an individual project during his final year of study based on a topic selected from the subjects studied or a related engineering problem. This project is divided into two parts. Each student is expected to present result of the final year project.

**REFERENCES:**

1. Guidelines for the Implementation of Final Year Project in the Faculty of Electrical and Electronics Engineering UTHM.
2. Guidelines for Thesis Writing.

**BEC4\*\*03 ELECTIVE II**

**BEC4\*\*03 ELECTIVE III  
ELECTIVE COURSES**

**BEC41503 ARTIFICIAL INTELLIGENCE**

**SYNOPSIS:**

This course is intended to provide students with a survey of different aspects of artificial intelligence (AI). A variety of approaches with general applicability will be developed. We will begin our study of AI with a look at knowledge representation formalisms and search techniques, the ultimate tools of most AI programs. Content areas include logic and theorem proving, game playing programs, planning, inheritance networks, genetic algorithms, and expert systems. Student will explore the design of AI systems which use learning to improve their performance on a given task. In addition to these topics, specific domains such as computer vision, natural language processing and robotic will be addressed.

**REFERENCES:**

1. Negnevitsky, M. "Artificial Intelligence A Guide to Intelligent Systems", 2<sup>nd</sup> Edition. Pearson Education Limited ,2005.
2. Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach", 2<sup>nd</sup> Edition, Prentice Hall, 2003.
3. Stuart Russell, Peter Norvig. "Artificial Intelligence A Modern Approach", 2<sup>nd</sup> Edition. Pearson Education Inc., 2003.
4. George F. Luger, "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", 5<sup>th</sup> Edition, Addison Wesley, 2005.
5. Christopher M. Bishop. "Pattern Recognition and Machine Learning", New York: Springer, 2006.

**BEC41603 COMPUTER SYSTEMS ENGINEERING**

**SYNOPSIS:**

This course is intended to provide a study of pc programming using assembly language and C. Students will learn to design, code, debug, test and document well-structured programs based on pc engineering problems. Topic covered; Assembly Language Programming on the IBM PC, Design and Interfacing of the IBM PC as regards; memory, Bus Interfacing, Video Adaptors, Data Communications, USB

**REFERENCES:**

1. Muhammad Ali Mazidi, Janice Mazidi. . "80x86 IBM PC and Compatible Computers: Assembly Language Design and Interfacing Vol.1 and II", 4<sup>th</sup>. Edition. Prentice Hall ,2003.
2. William Buchanan, Austin Wilson. "Advanced PC Architecture", Addison-Wesley, 2001
3. William Buchanan,. " Applied PC Interfacing, Communications and Graphics", Addison-Wesley ,2004.
4. Don Anderson, Dave Dzatko, "Universal Serial Bus Architecture", Addison-Wesley, 2001

**BEC41703 EMBEDDED SYSTEMS DESIGN**

**PREREQUISITE: BEC30403 MICROPROCESSOR & MICROCONTROLLER**

**SYNOPSIS:**

This subject introduces the design of embedded systems and its related technology by developing the underlying knowledge and skills appropriate to today's embedded systems in both hardware and software development. On the hardware side, it includes in-depth study both of microcontroller design and of the circuits and transducers to which the microcontroller must interface. On the software side, programming in both Assembly and C is covered. This culminates in the study of a Real Time Operating System (RTOS), representing the most elegant way that an embedded system can be programmed.

**REFERENCES:**

1. Designing Embedded Systems with PIC Microcontrollers: Principles and Applications, Tim Wilmshurst. Newnes, Oxford, 2007.
2. Embedded System Design: A Unified Hardware/Software Introduction, F. Vahid and T. Givargis. John Wiley & Son Inc. 2002.
3. Embedded Systems: Architecture, Programming and Design, Raj Kamal. McGraw Hill, 2003.

### **BEC41803 SOFTWARE ENGINEERING**

**PREREQUISITE: BEC20702 OBJECT ORIENTED PROGRAMMING**

#### **SYNOPSIS:**

The course will familiarize students with concepts in the field of software engineering. A broad view of the different ways in which software engineering is approached will be presented, with some focus on the issues of requirements engineering, interactive systems and user interface design. Students will become familiar with the issues involved in large-scale software development, the software life-cycle and its stages, CASE tools, object-oriented design and analysis, interactive systems design, and software maintenance, among others. A team design project will be assigned in which students will put the techniques to practice by designing a medium-scale software application for clients outside the class.

#### **REFERENCES:**

1. Ian Sommerville. "Software Engineering", 8<sup>th</sup> Edition. Addison-Wesley, 2007.
2. Stephen R. Schach. "Object Oriented Software Engineering", McGraw Hill, 2008.
3. Waman S. Jawadekar. "Software Engineering: Principles and Practice", McGraw Hill, 2004.
4. Carlo Ghezze, Mehdi Jazayeri, Dino Mandrioli. "Fundamentals of Software Engineering", 2<sup>nd</sup> Edition, Addison Wesley, 2003.
5. Hans Van Vliet. "Software Engineering: Principles and Practice", 2<sup>nd</sup> Edition, John Wiley and Sons, 2002.

## **BEC41903 COMPUTER SECURITY**

### **SYNOPSIS:**

The course will familiarize students with concepts in the field of computer security. The course covers principles of computer systems security. The students will discuss various attack techniques and how to defend against them. Topics include cryptography, network security practice, and system security. Course projects will focus on building reliable code.

### **REFERENCES:**

1. Alan G. Konheim "Computer Security and Cryptography", Hoboken, NJ: John Wiley, 2007.
2. Chuck Eastom. "Computer Security Fundamentals", Upper Saddle River, NJ: Pearson, 2006.
3. Dieter Gollmann. "Computer Security", 2<sup>nd</sup> Edition, Chichester: John Wiley, 2006.
4. Tony Bradley, "Essential Computer Security", Syngress Publishing Inc., 2006
5. William Stallings. "Cryptography and Network Security: Principles and Practice", 3<sup>rd</sup> Edition, Prentice Hall, 2003.

## **BEC42003 VLSI SYSTEMS DESIGN**

### **PREREQUISITE: BEC30503 DIGITAL SYSTEM DESIGN**

### **SYNOPSIS:**

The course will cover basic theory and techniques of digital VLSI design in CMOS technology. Topics include: CMOS devices and circuits, fabrication processes, static and dynamic logic structures, chip layout, simulation and testing, low power techniques, design tools and methodologies, VLSI architecture. Full-custom techniques will be used to design basic cells and regular structures such as data-path and memory. There is an emphasis on modern design issues in interconnect and clocking.

### **REFERENCES:**

1. Neil H.E. Weste and David Hariis, "CMOS VLSI Design: A Circuits and Systems Perspective", Third Edition, Addison Wesley (2005).
2. CMOS VLSI Design: A Circuits and Systems Perspective, 3rd Edition, Neil Weste, David Harris, Addison Wesley, 2003.
3. CMOS Digital Integrated Circuits: Analysis and Design, 3rd Edition, Sung-Mo Kang, Yusuf Leblebici, McGraw-Hill, 2002.
4. Chip Design for Submicron VLSI: CMOS Layout and Simulation, 1st Edition, John P. Uyemura, Thomson, 2005.

### **BEB30603 APPLIED ELECTROMAGNETICS**

**PREREQUISITE: BEB20303 ELECTROMAGNETIC FIELDS AND WAVES**

#### **SYNOPSIS:**

**Transmission line:** Basic Characteristics, Characteristic Impedance, Standing Wave Ratio, Load Matching, Smith Chart, Transient on Transmission Line

**Waveguide:** Propagation in Waveguide, Attenuation, Waveguide Component.

**Radio propagation:** Attenuation, Absorption, Reflection, Refraction, Diffraction, Interference, Fraunhofer region, Fresnel zone, Ionospheric Propagation, Tropospheric Propagation.

**EMC:** Introduction to EMC, Intersystem, Intrasystem, Radiated Emission, Radiated Immunity, Conducted Emission, Conducted Immunity, System Design for EMC, EMC Standards.

**Radar Sensors:** Basic Operation of a Radar System, Target Detection, Doppler Radar, Monopulse Radar.

#### **REFERENCES:**

1. Elements of Electromagnetics, Matthew N.O. Sadiku, 4<sup>th</sup> edition, Oxford University Press, 2007.
2. Fundamentals of Applied Electromagnetics, Fawwaz T. Ulaby, 5<sup>th</sup> edition, Prentice Hall, 2007.



3. Radio Communication, D.C. Green, 2<sup>nd</sup> edition; London, Longman; 2000.
4. Electronic Communication Systems Fundamentals Through Advance, 5<sup>th</sup> edition., W. Tomasi, Prentice Hall, 2004.
5. Antenna theory : analysis and design, Constantine A. Balanis, [John Wiley, 2005](#).
6. Introduction to Electromagnetic Compatibility, Clayton R. Paul, John Wiley, 1992.