Course Work Study Plan

Year	Semester	Course Code	Course Name	Credit	Total
1	I	UQI 10102 / UQI 10202	Islamic Studies / Morale Studies	2	20
		UQU 10103 / UQU 10303	Nationhood and Current Development of Malaysia* / Malaysian Studies and Culture**	3	
		UQ* 1**01	Co-Curriculum I	1	
		UHB10100	English for Higher Education	2	
		BWM 12203	Mathematics for Engineering Technology I	3	
		BNR 15002	Creativity and Innovation	2	
		BNR 22502	Occupational Safety and Health	2	
		BNR 10203	Electrical Principles I	3	
		BNR 13402	Electrical Laboratory I	2	
	II	UQI 11202	Falsafah dan Isu Semasa	2	18
		UQU 10702	Penghayatan Etika dan Peradaban	2	
		UQ* 1**01	Co-Curriculum II	1	
		UWB 10*02 / UWB 11002	Foreign Language* / Malay Language**	2	
		BWM 12303	Mathematics for Engineering Technology II	3	
		BNR 17003	Engineering Mechanics	3	
		BNR 10303	Electrical Principles II	3	
		BNR 23502	Electrical Laboratory II	2	
2	I	UHB 20102	Essential Academic English	2	18
		BWM 22502	Statistic for Engineering Technology	2	
		BNR 20803	Computer Programming	3	
		BNR 20903	Electronic Communication System	3	
		BNR 27103	Electronic Principles I	3	
		BNR 27302	Measurement and Instrumentation	2	
		BND 25603	Electro-pneumatic Technology Laboratory	3	
	II	BNR 26002	Entrepreneurship	2	19
		BNR 20603	Electromagnetic Technology	3	
		BNR 21703	Microprocessor and Microcontroller	3	
		BND 21102	Electrical power Application Laboratory	2	
		BNR 25403	Digital Electronics	3	
		BNR 27203	Electronic Principles II	3	
		BNR 27403	Computer Aided Design (CAD)	3	
3	I	UHB 30102	English for Technical Purposes	2	18
		BNR 36502	Engineering Economy	2	
		BNR 37502	Control System	2	
		BNR 37602	Technology Design Project	2	
		BND 31303	Power Electronic	3	
		BND 32103	PLC Programming & Application Laboratory	3	
		BND 35703	Electrical Machine and Drives	3	
		BND 35801	Industrial Maintenance Technology	1	
	II	BNR 32803	Bachelor Degree Project I	3	18
		BNR 37703	Management and Professional Ethics	3	
		BND 32603	Industrial Communication Systems	3	
		BND 35503	Microcontroller Application	3	
		BND 43003	Industrial Robotic	3	
		BND 3**03	Elective 1	3	
4	I	UHB 40102	English for Occupational Purposes	2	19
		BNR 43505	Bachelor Degree Project II	5	
		BND 43403	Computer Integrated Manufacturing Laboratory	3	
		BND 45903	Industrial Automation System	3	
		BND 4**03	Elective 2	3	
		BNx 4**03	Elective 3	3	
	II	BNR 46112	Industrial Training	12	12
Total Credits					**142**

* Local student only *(Pelajar tempatan sahaja)*

** International student only *(Pelajar antarabangsa sahaja)*

Elective Courses

Elective	Course Code	Course Name	Credit
Elective 1	BND 36003 BND 36103	Industrial Process Control Sensors and Actuators	3 3
Elective 2	BND 43703 BND 36203 BND 46303	Modern Control System Modelling and Simulation Analysis Image Processing and Vision System	3 3 3
Elective 3	BND 46403 BNE 44303 BNF 43603 B** 4*103 B** 4*203 B** 4*303 B** 4*403 UQU 40103	Industrial Revolution Energy Efficiency and Management Artificial Intelligence Introduction to Big Data Data Science and Applications Data Visualisation Data Optimisation and Machine Learning Professional @ Work	3 3 3 3 3 3 3 3

Courses Synopsis

UQI 10102 Islamic Studies / UQI 10202 Moral Studies

Synopsis

This course discusses the concept of morality, its moral aspects and its importance in daily life; Western moral theories as well as the pure values of the great religions of the world, morals in the workplace and finally the moral issues that happen today.

References

1. Eow Boon Hin. (2002). *Moral Education*. Longman. (LC268 .E48 2008)
2. Ahmad Khamis. (1999). *Etika Untuk Institusi Pengajian Tinggi*. Kuala Lumpur: Kumpulan Budiman. (LC315.M3 .A35 1999)
3. Mohd Nasir Omar. (1986). *Falsafah Akhlak*, Penerbit Universiti Kebangsaan Malaysia / 2010, Bangi. (BJ1291 .M524 2010).
4. Hussain Othman. (2009). *Wacana Asasi Agama dan Sains.*Batu. Pahat: Penerbit UTHM. (BL240.3 .H87 2009 a)
5. Hussain Othman, S.M. Dawilah Al-Edrus, Berhannudin M. Salleh, Abdullah Sulaiman, (2009). *PBL Untuk Pembangunan Komuniti Lestari.* Batu Pahat: Penerbit UTHM. (LB1027.42 .P76 2009)

UQU 10103 Malaysian Nationhood and Current Development

Synopsis

This course discusses the basic concepts, the process of formation and development of Malaysia. It covers the Malacca Sultanate Empire, imperialism and colonialism, nationalism and patriotism and independence and the formation of Malaysia. Apart from that, the Malaysian constitution and system of government as well as the main policies of national development are also touched on. Among others, the roles and responsibilities of citizens are also emphasized apart from the successes and challenges of Malaysia.

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. 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. Ruslan Zainudin, Mohd Mahadee Ismail dan Zaini Othman (2005). *Kenegaraan Malaysia*. Shah Alam: Fajar Bakti. (JQ715 .R87 2005)
4. Mohd. Ashraf Ibrahim (2004). *Gagasan Bangsa Malayan yang Bersatu* 1945-57. Bangi: Penerbit UKM. (DS597 .M37 2004)
5. Noor Aziah Mohd. Awal (2003). *Pengenalan kepada Sistem Perundangan di Malaysia*. Petaling Jaya: International Law Book Services. (KPG68 .N66 2003)
6. Andaya, B.W. and Andaya, L.Y. (1982). *A History of Malaysia*. London: Macmillan. (DS596 .A52 2001)
7. Abdul Aziz Bari (2002). *Majlis Raja-Raja*. Kuala Lumpur : Dewan Bahasa

dan Pustaka. (JQ1062.A58 .A39 2002)
8. Aziz Deraman (1992). *Tamadun Melayu dan Pembinaan Bangsa Malaysia*. Kuala Lumpur: Arena Ilmu Sdn. Bhd. (HN700.6 .A952 2000)

UQU 10303 Malaysian Studies and Culture

Synopsis

This course will provide students in basic 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. (NA4670 .A23 2004)
2. Andaya, B.W. and Andaya, L. Y. (1982). “A History of Malaysia.” London: Macmillan. (DS596 .A52 2001)
3. Nazaruddin Mohd. Jali (2003). “Malaysian Studies : Nationhood and Citizenship.” Petaling Jaya : Pearson Prentice Hall.
4. Yahaya Ismail (1989). “The Cultural Heritage of Malaysia.” Kuala Lumpur : Dinamika Kreatif Sdn. Bhd.
5. Francis Loh kok Wah dan Khoo Boo Teik (2002). Democracy in Malaysia. Cornwall: Curzon Press
6. Khoo Kay Kim (2001). “Malay Society : Tranformation and Democratisation.” Kelana Jaya : Pelanduk Publications
7. Mohamed Noordin Sopiee (1974). “From Malayan Union to Singapore Separation, Political Unification in the Malaysian Region, 1945-65.” Kuala Lumpur: University of Malaya Press. (DS597 .M56 2005)

UQI 11202 Philosophy & Current Issues

Synopsis

The course covers the relationship of philosophy with the Philosophy of National Education and Rukunegara. The use of philosophy as a tool to purify the culture of thought in life through art and methods of thinking as well as human concepts. The main topics in philosophy namely epistemology, metaphysics and ethics are discussed in the context of current issues. Emphasis is given to philosophy as the basis for inter-cultural dialogue as well as fostering common values. At the end of this course, students will be able to see the disciplines of knowledge as a comprehensive body of knowledge and related to each other.

References

1. Al-Attas, S.M. Naquib. (1991). *The Concept of Education in Islam.* Kuala Lumpur: ISTAC.
2. Al-Farugi, I.R. (1994). *Al-Tawhid: Its Implications for Thought and Life,* (2nd Ed.). Herndon: IIIT.
3. Phillips, D.C. (Ed.) (2014). *Encyclopaedia of Educational Theory and Philosophy,* (1st Ed.). SAGE Publication.
4. Dzulkifli, A.R. & Rosnani, H. (2019) *Pentafsiran Baharu Falsafah Pendidikan Kebangsaan dan Pelaksanaannya Pasca 2020.* Kuala Lumpur: IIUM Press.
5. Hospers, J. (1997). An Introduction to Philosophical Analysis, (4th Ed.). London: Routledge.
6. Mitchell, H.B. (2011). *Roots of Wisdom: A Tapestry of Philosophical Traditions,* (6th Ed.). Wadsworth: Cengage Learning.

7. Rosnani Hashim. (2017). *Revitalization of Philosophy and Philosophical Inquiry in Muslim Education.* Kull of Education, IIUM.

UQU 10702 Appreciation, Ethics & Civilisation

Synopsis

This course explains the concept of ethics from different civilization perspectives. It aims to identify the system, level of development, progress and culture of a nation in strengthening social cohesion. In addition, discussions related to contemporary issues in economic, political, social, cultural and environmental aspects from an ethical and civilization perspective will produce moral and professional students. The application of appropriate high-impact educational practices (HIEPs) is used to deliver this course. At the end of this course students will be able to relate ethics and civic-minded citizenship.

References

1. Shamsul Amri Baharuddin. (2012). Modul Hubungan Etnik Edisi Dua. Bangi: Institut Kajian Etnik. Universiti Kebangsaan Malaysia. [DS595 .M62 2007].
2. Wan Hashim Wan Teh. (2011). Hubungan Etnik di Malaysia. Kuala Lumpur: ITNM. [DS595.W36 2011].
3. Zaid Ahmad. (2010). Hubungan Etnik di Malaysia. Oxford Fajar: Shah Alam. [DS595 .H822010].
4. Tarikh kuatkuasa
5. Mohd. Ashraf Ibrahim. (2004).Gagasan Bangsa Malayan yang Bersatu 1945-57. Bangi : Penerbit UKM. [DS597.M37 2004]
6. Noor Aziah Mohd. Awal. (2003). Pengenalan kepada Sistem Perundangan di Malaysia. Petaling Jaya: International Law Book Services. [KPG68.N66 2003]

UWB 10602 French

Synopsis

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

References

1. Booth, Trudie Maria, 2008. *French Verbs Tenses*. McGraw-Hill. No. panggilan: PC 2271, U66 2008.
2. Heminway, Annie, 2008. *Complete French Grammar*. McGraw-Hill. No. panggilan: PC2112, H45 2008
3. Price, Glanville, 2003. *A Comprehensive French Grammar*. Blackwell Publishing. No. panggilan: 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.
6. Grégoir, Maïa et al, 1995. *Grammaire Progressive du Français* avec 500 exercices. Paris: CLE International.
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8. Capelle, Guy et Gidon, Noëlle, 1995. *Méthod de français: Le Nouvel Espaces 1*. Paris: Hachette F.L.E.
9. Hatier. 2002. *Le Nouveau Bescherelle12,000 French Verbs.* English ed. Paris: Librairie Hatier.

10. French Dictionary 1999. *The New Collins Robert* 5th ed. Paris: Harper Collins Publishers.

UWB 10702 German

Synopsis

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

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)

UWB 10802 Japanese Language

Synopsis

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

References

1. Rosmahalil dan rakan-rakan, (2014): UWB10802: Hiragana Learning Module, Batu Pahat: Penerbit UTHM.
2. Siti Hajar Bidin dan rakan-rakan, (2016): Japanese Language Level 1 (UWB10802): Learning Module, Batu Pahat: Penerbit UTHM.
3. Rosmahalil Azrol Abdullah, (2008): Bahasa Jepun (UMJ 1312): Learning Module (2nd Edition), Batu Pahat: Penerbit UTHM. (PL539.3 .R67 2008a)
4. Surie, Network (2010): AE Minna no Nihongo 1-1 Elementary: Main Textbook, Tokyo: 3A Corporation. (TK7885.7 .V44 2000r)
5. Surie, Network (2009): AE Minna no Nihongo 1-1 Elementary: Translation and Grammatical Notes, Tokyo: 3A Corporation. (PL539.3 .M567 2009)
6. Surie, Network (2009): AE Minna no Nihongo 1-2 Elementary: Main Textbook, Tokyo: 3A Corporation. (PL539.3 .M569 2009)
7. Surie, Network (2010): AE Minna no Nihongo 1-2 Elementary: Translation and Grammatical Notes, Tokyo: 3A Corporation. (PL539.3 .M57 2010)
8. The AOTS, (1977): Shin Nihongo no Kiso: Japanese Kana Workbook, Tokyo: 3A Corporation. (PL539.3 .S54 1977)

UWB 10902 Mandarin Language

Synopsis

This course is designed for students to learn basic Mandarin. Students are

exposed to the skills of listening, reading, speaking and writing with basic vocabulary, grammar and structure. Students are also exposed to real daily situations which will help them to communicate using Mandarin.

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 (2005). *Conversational Chinese 301*. China: Beijing Language and Culture University Press. (PL1121.C5 .K36 2005)
4. Kang Yuhua (2007). *Conversational Chinese 301:Vol. 2*. China:Beijng Language and Culture University Press. (PL1121.C5 .K364 2007)
5. Liu Xun (2010). *New Practical Chinese Reader: Textbook*. China: Beijing Language and Culture University Press. (PL1129.E5 .L58 2010)

UWB 11002 Malay Language

Synopsis

This course is designed for students to learn basic Malay language. Students are exposed to listening, reading, speaking, and writing skills with basic vocabulary, grammar and sentence structure. Students are also exposed to 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)
2. Asmah Hj. Omar. (1993). *Susur Galur Bahasa Melayu*. DBP : KL. (PL5127 .A85 1993 N1)
3. Asmah Hj. Omar. (1993). *Nahu Melayu Mutakhir*. DBP : KL. (PL5137 .A85 1993)
4. Ainun Mohd.(2011). *Tesaurus Bahasa Melayu*. PTS Professional Publishing. (PL5123 . A364 2011)
5. Nik Safiah Karim (2008). *Tatabahasa Dewan*. DBP. (PL5108 .T37 2008 r)
6. Kamaruddin Saad. (2009). *105 karangan bahasa melayu UPSR*. Minerva Publishing. (PL 5108 KAM 2009)

UWB 11102 Spanish Language

Synopsis

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

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)
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6. Vox modern Spanish and English dictionary:

English-Spanish/Spanish-English (1986) National Textbook. Co. XX
(131882.1)

UWB 11202 Arabic Language

Synopsis

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

References

1. Mohd Hisyam Abdul Rahim; Ahmad Sharifuddin Mustapha; Mohd Zain Mubarak. 2008. *Bahasa Arab UMR 1312*. Batu Pahat: Penerbit UTHM. (PJ6115 .M445 2008 a)
2. Mohd Hisyam bin Abdul Rahim. 2005. *Senang Berbahasa Arab*. Batu Pahat: Penerbit KUiTTHO. (PJ6115 .M44 2005 a)
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4. Fuad Ni'mat. 1973. *Mulakhass qawa'id al-lughatul 'arabiyyah*. Damsyik: Darul Hikmah. (PJ5161 .F62 1973)
5. Abdullah, Mustaffa Siti Rohaya Sarnap Siti Sujinah Sarnap. 2006. *Cara mudah belajar Bahasa Arab*. Singapore: Jahabersa. (PJ6106 .A22 2006)
6. Abu 'Amiir 'Izzat. 2008. *Kamus adik : bahasa Melayu-bahasa Inggeris-bahasa Arab*. Kuala Terengganu: Pustaka Darul Iman. (PJ6640 ABU 2008)
7. Mohd Azani Ghazali, Abdul Aziz Hassan @ Yahya. 2000. *Kamus ringkas Bahasa Melayu-Bahasa Arab*. Johor Bahru : Jahabersa. (PL5091.8 .A7 .M393 2000 rd)

UHB 10102 English For Higher Education

Synopsis

This course exposes students to English language learning in higher education and enhances their study skills. Students have opportunities to learn about using technological affordances in listening to lectures, note taking, library and internet research, conducting academic group discussions, preparing and delivering presentations, and writing an academic report. The course also provides opportunities for students to acquire learning skills that facilitate the transition to tertiary education. Aspects of English language oral and written skills that are most relevant to students in their academic work will be reinforced.

References

1. Agosti, M. (2008). Information access through search engines and digital libraries. Berlin: Springer. (Z699 .I534 2008)
2. Dunne, E. (1994). Talking and learning in groups. London: Routledge. (LC6519 .D86 1990 N1)
3. Fry, R. W. (1994). Take notes (2nd ed.). Hawthorne, NJ: Career Press. (LB2395.25 .F79 1994 n.1)
4. Galanes, G. J. (2013). Effective group discussion: Theory and practice (14th ed.). New York: McGraw-Hill. (HM736 .G34 2013)
5. Greasley, P. (2011). Doing essays and assignments: Essential tips for students. Thousand Oaks, CA: Sage Publication. (LB1047.3 .G73 2011)
6. Lim, P. L. (2014). Listening & notetaking skills 2 (4th ed.). Boston: National

Geograohic Learning. (PE1128 .L55 2014)
7. Roguski, C. (1990). Academic mini-lectures: A text listening and note taking practice. USA: Heinle and Heinle Publisher. (PE1122 .R63 1990 N1)
8. Van Blerkom, D. L. (2005). College reading and study strategies. Belmont, CA: Wadsworth. (LB2395.3 .V36 2005)

9. Wong, L. (2012). Essential study skills (7th ed.). Boston, MA: Wadsworth Cengage Learning. (LB1049 .W66 2012)
10. Zhang, F. (2012). Computer-enhanced and mobile assisted language learning: Emerging issues and trends. Hershey, PA: Information Science Reference. (P53.28 .C65 2012)

UHB 20102 Essential Academic English

Synopsis

This course enhances students' English language skills, emphasising listening and reading skills necessary for academic contexts. The course provides opportunities for students to learn the strategies to help them understand information from documentaries, lectures and paper presentations and develop analytical listening to differentiate between facts and opinions. This course also provides opportunities for students to develop skills to critically respond to academic materials such as journal articles.

References

1. Fairbairn, G. J. (2011). *Reading, writing and reasoning: A guide for students*. Maidenhead: Open University Press. (LB2395 .F34 2011)
2. Lewis, J. (2002). *Reading for academic success: Reading and strategies*. Boston: Houghton Mifflin. (LB2395.3 .L48 2002)
3. Mackay, I. (1995). *Listening skills* (2nd ed.). London: CIPD. (LB1065 .M32 1995)
4. Metcalfe, M. (2006). *Reading critically at university*. Los Angeles: Sage. (LB2395.3 .M47 2006)
5. Numrich, C.. (1995). *Consider the issues: Advanced listening and critical thinking skills* (2nd ed.). New York: Longman. (PE1128 .N85 1995 N2)
6. Shipside, S.. (2007). *Effective communication: Get your message across nd learn how to listen*. London: Dorling Kindersley. (HF5718 .S54 2007)
7. Smith, L. C. (2005). *Exploring content 1: Reading for academic success*. White Plains, NY: Longman. (PE1122 .S64 2004)
8. Wright, L. (2001). *Critical thinking: An introduction to analytical reading and reasoning*. Oxford: Oxford University Press. (B809.2 .W74 2001)

UHB 30102 English for Technical Purposes

Synopsis

This course aims to prepare students with the skills to write reports and express ideas or opinions competently. Students will be equipped with persuasive strategies that can be applied to writing technical reports. The course will also enable them to practise these techniques by drafting and collaborating to produce assigned tasks. The students are also expected to orally present their proposals and written reports before an audience or a panel of examiners.

References

1. Bogdan, R. C. (2007). *Qualitative research for education: An introduction to theory and methods* (5th Edition). Boston, MA: Pearson. (Call number: LB1028
.B63 2007)
2. Chandra, S. (2013). *Research methodology*. Oxford, U.K.: Alpha Science Intl

Ltd. (Call number: H62 .C42 2013)
3. Grix, J. (2010). *Information skills: Finding and using the right resources*. New York: Palgrave Macmillan.
4. Farquhar, J. (2012). *Case study research for business*. London, England:

Sage. (Call number: HD30.4 .F37 2012)
5. Hittleman, D. R. (2006). *Interpreting educational research: An introduction for consumers of research* (4th Edition). Upper Saddle River, NJ: Pearson. (Call number: LB1028 .H57 2006)
6. Newby, P. (2014). *Research methods for education* (2nd Edition). Abingdon: Routledge. (Call number: LB1028.N48 2014)
7. Neville, C. (2010). *The complete guide to referencing and avoiding plagiarism*. Maidenhead: Open University Press. (Call number: PN171.F56 .N48 2010)
8. Scruggs, T. E. (2006). *Applications of research methodology*. Oxford: Elsevier. (Call number: LC4704 .A66 2006)
9. Sekaran, U. (2013). *Research methods for business: A skill-building approach* (6th ed.). Chichester, West Sussex: Wiley. (Call number: HD30.4 .S44 2013) 10.Somekh, B. (2006). *Action research: a methodology for change and development*. Berkshire: Open University Press. (Call number: LB1028.24 .S65 2006)

UHB 40102 English for Occupational Purposes

Synopsis

This course employs a task-based learning approach and focuses on developing students' delivery of speech in oral interactions, job interviews and presentations. Particular emphasis will be given to promote the mastery of self-directed learning, team-work, research, oral presentations, reasoning and creativity. This course also enables students to acquire the knowledge and skills necessary for conducting and participating in meetings, which includes writing meeting documents and event proposals based on specific themes. Students will also be exposed to interview techniques.

References

1. Allen, J. G. (2004). *The complete Q and A job interview book* (4th Edition). Hoboken, NJ: John Wiley. (Call number: HF5549.5.I6 .A44 2004)
2. Badger, I. (2003). *Everyday business writing*. Essex: Pearson. (Call number: PE1115 .B327 2003)
3. Corfield, R. (2008). *Preparing the perfect job application: Application forms and letters made easy*. New Delhi: Kogan Page. (Call number: HF5383 .C67 2008)
4. Haynes, M. E. (2009). *Meeting skills for leaders: Make meetings more productive* (4th Edition). Rochester, NY: Axzo Press. (Call number: HD30.3 .H39 2009)
5. Leigh, J. (2004). *Successful CVs and job applications*. New York: Oxford University Press. (Call number: HF5383 .L44 2004)
6. Molinsky, S. J, & Bliss, B. (1994). *Day by day: English for employment communication* (1st Edition). Englewood Cliffs, NJ: Longman. (Call number: PE1128. M67 1994)
7. Peberdy, D. (2009). *Brilliant meetings: What to know, do and say to have fewer, better meetings*. Harlow: Prentice Hill. (Call number: HF5734.5 .P42 2009)
8. Wendleton, K. (2014). *Mastering the job interview and winning the game* (5th Edition). Boston: Cengage Learning. (Call number: HF5549.5.I6 .W46 2014)
9. Wrathall, J. (2011). *Event management: Theory and practice*. North Ryde, N.S.W: McGraw-Hill. (Call number: GT3405 .W72 2011)

UQ* 1xx01 Co-curiculum I

Synopsis

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

References

1. Jamaludin Badusah et al. (2009). Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi. Jabatan Pengajian Tinggi & Penerbit Universiti Putra Malaysia.

UQ* 1xx01 Co-curiculum II

Synopsis

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

References

1. Jamaludin Badusah et al. (2009). Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi. Jabatan Pengajian Tinggi & Penerbit Universiti Putra Malaysia.

BWM12203 Mathematics for Engineering Technology I

Synopsis

Limits and Continuity: Techniques of finding limits. L'Hopital's rule: indeterminate form of type 0/0, ¥/¥, 0 • ¥, 0^0, ¥^{0}, $1^{¥}$, ¥ – ¥. Continuity. **Differentiation and Applications:** Techniques of differentiation: product rule, quotient rule, chain rule. Implicit differentiation. Higher derivatives. Differentiation of implicit functions and parametric equations. **Integration:** Techniques of integration: integration by substitution, integration by parts, integrating rational functions, integrating power of trigonometric functions, integrating rational functions of sine and cosine and integration by trigonometric substitution. Further Differentiation and Integration by mathematical software. **Power Series:** Convergence test. Taylor and Maclaurin series. Differentiation and integration of power series. Applications of power series. **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.

References

1. Abd. Wahid Md. Raji, Hamisan Rahmat, Ismail Kamis, Mohd Nor Mohamad, Ong Chee Tiong. (2008). Calculus for Science and Engineering Students. Malaysia: UTM Publication. (QA303.3 .C34 2008 a)
2. Anton, H., Bivens, I., Davis, S. (2005). "Calculus." 8th Ed. USA: John Wiley &

Sons, Inc. (QA303 .A576 2005)
3. Nafisah@Kamariah Md Kamaruddin, Phang, Chang, Phang, Piau & Tay, Kim Gaik (2004). Numerical Method. 1st ed. Malaysia. UTHM. (QA297 .N854 2007

a)
4. Smith, Robert T. Minton, Roland B. (2006). Calculus: Concepts & Connections. Boston. McGraw-Hill. (QA303.2 .S64 2006)
5. Stroud, K. A. (2007). Engineering Mathematics. 5th Ed. London: Macmillan Press Ltd. (TA330 .S77 2007)

BWM 12303 Mathematics for Engineering Technology II

Synopsis

Introduction to Differential Equation: Definitions and terminology, Formation and solution of differential equation, Differential equation as mathematical model. **First Order Differential Equation:** Formation. Initial-value problem. Methods of solution: separating the variables, homogeneous, linear, exact and 4^{th} order Runge- Kutta. Applications: Newton's Law of cooling. **Second Order Linear Differential Equation with Constant Coefficients:** Homogeneous and non-homogeneous equation. Initial and boundary value problems Methods of solution: method of undetermined coefficients, method of variation of parameters and finite-difference method. Applications in mechanical motions includes free oscillations and force oscillations. **Laplace Transforms:** Definition. Linearity. First shift theorem. Multiplying by t^n. Unit step functions. Delta functions. Second shift theorem. **Inverse Laplace transform**: Definition and its properties. Convolution theorem. Solve initial and boundary value problems for linear differential equations with constant coefficients which involve unit step functions, Dirac Delta functions and periodic functions. **Numerical Solution of Differential Equations:** Initial-value problem: Euler method, Taylor series method, Fourth Order Runge-Kutta method. Boundary-value problem: finite- difference method.

References

1. Abd. Wahid Md. Raji, Mohd Nor Mohamad. (2009). Differential Equations for Engineering Students. Malaysia: Comtech Marketing Sdn. Bhd.
2. James, Glyn. (2011). Advanced Modern Engineering Mathematics. 4th Ed. England. Prentice Hall. (TA330 .A38 2011)
3. Stroud, K. A., Booth, D. J. (2007). Advanced Engineering Mathematics. 4th Ed. USA: Palgrave Macmillan. (QA39.3 .S77 2003)
4. Stroud, K. A., Booth, D. J. (2007). Engineering Mathematics. 6th Ed. USA: Palgrave Macmillan. (TA330 .S77 2007)
5. Chapra, S. C. and Canale R. P. (2011). Numerical Methods for Engineers. 6th Ed. Boston. McGraw-Hill. (TA345 .C47 2010)

BWM 22502 Statistics For Engineering Technology

Synopsis

This course introduces **Random Variables:** Discrete and continuous random variables, probability distribution functions, cumulative distribution functions 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, the 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, coefficient of determination, correlation coefficient.

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. Sounders. College Publisher, Texas.
6. Zarina Mohd Khalid et. al. (2012). Introductory Statistics for Engineering Student. Desktop Publisher.

BNR 15002 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. (HD53 .B47)
2. De Bono, E. (2003). *Serious Creativity 1: Lateral Thinking Tools, Techniques and Application.* Allscript Books, Singapore. (BF408 .D366)
3. De Bono, E. (2003). *Serious Creativity 2: Lateral Thinking Tools, Techniques and Application.* Allscript Books, Singapore. (BF408 .D367)
4. Ceserani, J. & Greatwood, P. (1995). *Innovation and Creativity*. Kogan Page, London. (HD58.8 .C47 1995)
5. Clegg, B. & Birch, P. (2002). *Crash Course in Creativity*. Kogan Page. (HD53 .C534 2002)
6. Lumsdaine, E., Lumsdaine, M. & Shelnut, J. W. (1999). *Creative Problem Solving and Engineering Design*. McGraw- Hill, USA. (BF408 .L85 1999)

BNR 22502 Occupational Safety and Health

Synopsis

This course introduces students to knowledge and skills in occupational safety and health in workplace. Scope of study includes Health, Safety and Environment Managements: introduction to OSH, OSHA 1994 (Act 514), FMA 1967, EQA 1974, occupational safety and health management system, safety, health and environment culture; Risk Management and Assessment: introduction to risk management, risk assessment techniques, HIRARC; Physical Injury & Controls: introduction to physical injury, construction work, electrical work,

mechanical work, chemical work; Health Hazards: introduction to health hazards & hygiene, chemical hazards, physical hazards, biological hazards,

hygiene; Accident Investigation & Reporting: introduction, accident investigation, investigations and causes of incident, incident analysis and data collection method.

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. 2nd ed. London: Thomas Telford. (Call number: TH443.R43 2006)
5. Anton, Thomas J. (2009). Occupational Safety and Health Management. 3rd ed. New York: McGraw-Hill. (Call number: T55.A57 1989)

BNR 26002 Entrepreneurship

Synopsis

This course cover 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. Johri, N. (2014). Entrepreneurship. New Delhi: Random
2. Hisrich, R.D. (2008). Entrepreneurship. Boston: McGraw Hill
3. Hisrich, R.D. (2014). Advanced introduction to entrepreneurship. Cheltenham: Edward Elgar
4. Rickets, M. (2002). The economics of business enterprise: an introduction to economic organisation and theory of the firm.

BNR 36502 Engineering Economy

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. Sullivan W.G, Wicks E.M. and Koelling C.P, (2012). *Engineering Economy*, 15th Edition, Upper Saddle River, New Jersey, Pearson. (Call number: TA 177.4 S94 2009)
2. Blank, L.T., A. Tarquin (2012): *Engineering Economy*, Seventh Edition, International ed., McGraw-Hill,
3. Blank, L.T., A. Tarquin (2008): *Basics of Engineering Economy*, International ed., McGraw-Hill, New York/. (Call number: TA 177.4 B524 2008)
4. Mohamad Sirin, R. (2007): *Teori Asas Ekonomi Kejuruteraan*, Faculty of Technolgy Management KUiTTHO. Malaysia. (Call number: TA177.4 R67

2007)

BNR 17003 Engineering Mechanics

Synopsis

Mechanics, the study of forces and physical bodies, underpins a very large proportion of all forms of engineering. A thorough understanding of mechanics is essential to any successful engineer. This course helps develop an understanding of the principles of statics and dynamics, and the ability to analyze problems in a systematic and logical manner, including the ability to draw free-body diagrams. The course will also develop the ability to analyze the statics of trusses, frames and machine and the dynamics of particles, systems of particles and rigid bodies.

References

1. Engineering Mechanics statics and dynamics by R. C. Hibbeler, McMillan Publication.
2. Mechanics for Engineers - Statics Fourth Edition, by F. P. Beer and E. R. Johnson, McGraw-Hill Publication.
3. Mechanics for Engineers - Dynamics Fourth Edition, by F. P. Beer and E. R. Johnson, McGraw-Hill Publication.
4. Engineering Mechanics statics and dynamics by J. L. Meriam and Craige, John Willey and Son's publication.
5. Engineering Mechanics by S. P. Timoshenko and D. H. Young, McGraw-Hill publication.

BNR 10203 Electrical Principles I

Synopsis

This course introduces the student with the passive and active components used in DC circuits. Study and practise the basic laws and method of analysis for DC circuits. Know the real application of DC circuits at workplace and measure an electric signals and test the electric components.

References

1. Dorf, Richard C., *Introduction to electric circuits*, 9th ed., Hoboken, NJ : Wiley, 2014.
2. Call Number TK454 .D67 2014
3. Bird, J. O., *Electrical and electronic principles and technology*, 5th ed., Routledge, 2014.Call number:TK146 .B57 2014.
4. Alexander, Charles K., *Fundamentals of electric circuits*, 5th ed., McGraw-Hill, 2013.Call number:TK454 .A43 2013.
5. E.Huges, *Electrical and Electronic Technology*11th edition. Essex: Pearson and PH, 2012. Call number:TK146 .H83 2012

BNR 10303 Electrical Principles II

Synopsis

The topics include a review of the sine and cosine wave, alternating voltage and current including complex numbers. These modules still focus on basic concepts, basic laws and methods of analysis for sinusoidal steady-state analysis and ac power analysis. Wye-delta connections for balanced and unbalanced three-phase systems, applications of transformer, resonance circuits and applications of filter circuits also covered.

References

1. Rizzoni, Giorgio, *Principles and Applications of Electrical Engineering*, 6th edition. McGraw Hill Education, 2016. (TK146 .R59 2016)
2. Dorf, Richard C., *Introduction to electric circuits*, 9th ed., Hoboken, NJ : Wiley, 2014. (TK454 .D67 2014)
3. Bird, J. O., *Electrical and electronic principles and technolog*y, 5th ed., Routledge, 2014. (TK146 .B57 2014)
4. Alexander, Charles K., *Fundamentals of electric circuits*, 5th ed., McGraw-Hill, 2013. (TK454 .A43 2013)
5. E.Huges, *Electrical and Electronic Technology* 11th edition. Essex: Pearson and PH, 2012. (TK146 .H83 2012.)

BNR 13402 Electrical Laboratory I

Synopsis

The course introduces the students with the basic concepts of electrical and electronic engineering and to expose the students towards the analysis of electrical and electronic circuits. Define and differentiate the fundamental of electrical and electronic circuits and laws.

References

1. Paynter, Robert T, *Introduction of Electricity*, Pearson Prentice Hall, 2011.
2. Balakrishnan, A., *Electrical Circuit Theory*, N. V. Publications, 2008
3. Alexander & Sadiku, *Fundamentals of Electric Circuits*, 3rd ed. McGraw Hill, 2007.
4. Floyd, Thomas L, Upper Sadle River, *Electrical Circuits Fundamentals*,NJ Pearson, 2007.
5. Boylestad, *Introductory Circuit Analysis*, 11th ed. Upper Sadle River,NJ Pearson 2007.
6. James W.Nilsson, Susan A.Riedel, *Electric Circuits,* 7th ed. Upper Sadle River, NJ Pearson 2005

BNR 23502 Electrical Laboratory II

Synopsis

This course provides students with the understanding of electronic workshops due to analog and digital electronic devices are widely used in industrial applications. The purpose of this course is to introduce the students with the basic concepts of electronic devices and to expose the students towards the analysis of analog and digital electronic circuits. ORCAD PSPICE software will be used to design and simulate the circuit, and the student will be introduced to the soldering skill, testing and troubleshooting the complete circuit.

References

1. Nixon, Mark. (2015). *Digital Electronics : A Primer : Introductory Logic Circuit Design*, World Scientific, Call Number: TK7868.D5 .N59 2015
2. Frenzel, Louis E. (2014). *Contemporary Electronics : Fundamentals, Devices, Circuits, and Systems*, McGraw Hill, Call Number: TK7816 .F75 2014
3. Bird, J. O. (2014). *Electrical and Electronic Principles and Technology*, Oxon : Routledge, Call Number: TK146 .B57 2014
4. Tiwari, Ankit. (2014). *Analog and Digital Electronic Circuit*, New Delhi:

Random, 2014. Call Number: TK7867 .T58 2014
5. Boylestad, Robert L. (2013). *Electronic Devices and Circuit Theory*, Upper Saddle River, N.J. : Pearson Prentice Hall. Call Number: TK7867 .B69 2013

6. Mitzner, Kraig. (2009). *Complete PCB Design using OrCAD Capture and PCB Editor*, Newnes, Call Number: TK7868.P7 .M57 2009

BNR 20603 Electromagnetic Technology

Synopsis

The topics include a review of the pertinent mathematical apparatus vector algebra, coordinate transformations and vector calculus before going into the topics of electrostatic fields produced by point charges, electric fields in material space, electrostatic boundary value problems, phenomenon of steady electric current, static magnetic field of steady electric currents, ferromagnetic materials, time-changing electric and magnetic fields, electromagnetic wave propagation, transmission lines, and an introduction to the use of numerical methods in solving electrostatics and magnetostatics problems.

References

1. Kodali and V. Prasad, Engi*neering Electromagnetic Compatibility: Principles, Measurement, Technologies, and Computer Models*, New York: IEEE Press, 2007.
2. Bansal and Rajeev, *Engineering Electromagnetic: Applications*, Taylor & Francis, 2006.
3. Guru, Bhag Singh, *Electromagnetic Field Theory Fundamentals* (2nd Edition), Cambridge University Press, 2004.
4. Owen, George E, *Introduction to Electromagnetic Theory*, Mineola, NY: Dover Publications, 2003.
5. Matthew N O Sadiku, *Electromagnetics (*2nd Edition), Sanders College Publishing, 2002.
6. Robert L. Boylestad, and Louis Nashelsky, *Introduction to Electricity, Electronics, and Electromagnetics*, Prentice Hall, 2002.

BNR 20803 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 wellstructured 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++, Prentice-Hall, 2008. (Call number: QA76.73.C153 .E874 2008)
2. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 4th. Edition. Addison-Wesley, 2004. (Call number: QA76.73.C15 .H364 2004)
3. Katupitiya, Jayantha, Bentley, Kim, Interfacing with C++, Springer, 2006. (Call number: QA76.73.C153 .K39 2006)
4. Jeri R. Hanly, Elliot B. Koffman, C Programming for Engineers, 2nd Edition, Addison-Wesley, 2004.

BNR 20903 Electronic Communication System

Synopsis

This course will cover the basic concepts in electronic communication system including the introduction to communication system, signal and noise, modulation schemes for analog and digital systems, signal transmission, antenna and communication systems applications.

References

1. Matthew N.O. Sadiku., Elements of Electromagnetics, New York: Oxford Universiti Press, 2014. Call Number QC760 .S324 2014
2. Louis E. Frenzel. Principles of Electronic Communication Systems. McGraw Hill. 2008. No. panggilan: TK5101 .F744 2008
3. Electronic Communication Systems. Roy Blake. Delmar/Thomson Learning. 2002. No. panggilan: TK5101 .B563 2002 N1
4. William Schweber. Electronic Communication Systems : A Complete Course. Prentice Hall. 2002. No. panggilan: TK5101 .S38 2002

BNR 21703 Microprocessor and Microcontroller

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 devices, CPU architecture, organize and memory interfacing, bus concept, interrupt, communication interfacing and A/D conversion.

References

1. Muhammad Ali Mazidi, Rolin D. Mckinlay, and Danny Causey, PIC Microcontroller and Embedded Systems Using Assembly and C for PIC18, Prentice Hall, 2008. No. Panggilan: TJ223.P76 .M394 2008
2. Barry B. Brey, “INTEL Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Prentium ProProcessor, Pentium II, III, 4, 7/E”, Prentice Hall, 2005. No. Panggilan: QA76.8.I2674 .B73 2006
3. Han-Way Huang, PIC Microcontroller: An Introduction to Software and Hardware Interfacing, Thomson-Delmar Learning, 2005. No. Panggilan: TJ223.P76 .H36 2005
4. A.V Deshmukh, “Microcontrollers: Theory and Applications”, McGrawHill, 2006. No. Panggilan: Tiada
5. Dogan Ibrahim, ”PIC Basic: Programming and Projects”, Oxford: Newnes, 2001. No. Panggilan: TJ223.P76 .I27 2001

BNR 25403 Digital Electronics

Synopsis

This course provides knowledge and understanding of basic combinational logic circuits and sequential logic systems as well as their applications. Related topics are digital concepts, numbering systems, logic gates, Boolean Algebra & Theorem, logic simplification, combinational logic circuit, digital arithmetic and combinational logic circuit functions (adders, comparators, decoders, encoder, multiplexers, demultiplexers). Developing an understanding of sequential logic systems and its applications. Related topics are monostable and bistable logic devices such as

latches and flip-flops; asynchronous and synchronous counters; shift registers and its applications.

References

1. Tocci, Ronald J., Widmer, Neal S., Moss, Gregory L. (2011). *Digital Systems : Principles and Applications*, 11th ed. Upper Saddle River, NJ. : Prentice Hall. (Call number: TK7868.D5 .T62 2011)
2. Nixon, Mark S. (2015). *Digital Electronics: A Primer: Introductory Logic Circuit Design*, London: World Scientific. (Call number: TK7868.D5 .N59 2015)
3. Tiwari, Ankit. (2014). *Analog and digital electronic circuit*, New Delhi: Random. (Call number: TK7867 .T58 2014)
4. Kharate, G. K. (2010). *Digital Electronics*. New Delhi: Oxford University Press. (Call number: TK7868.D5 .K42 2010)
5. Mandal, Soumitra K. (2010). *Digital Electronics: Principles and Applications*. New Delhi: Tata McGraw Hill. (Call number: TK7868.D5 .M36 2010)

BNR 27103 Electronic Principles I

Synopsis

This course introduces students to fundamental theories in diodes, BJT and FET working principle and its application. It will examine some key issues in basic construction of BJT and MOSFET amplifiers and switch with special focus on analysis through fixed, self and voltage divider-bias equivalent circuits. The course will also provide practice in carrying out a computer simulation of the BJT and FET circuits using Multisim/ PSpice software to practice self-assessment and interpretation of work by comparing analysis and simulation results.

References

1. Bird, J. O., Electrical and Electronic Principles and Technology, 5th ed., Milton Park, Abington, Oxon : Routledge, 2014. Call Number TK146 .B57 2014
2. Frenzel, Louis E., Contemporary Electronics : Fundamentals, Devices, Circuits, and Systems, New York, NY : McGraw Hill ; 2014. Call Number TK7816 .F75 2014
3. Alexander, Charles K., Fundamentals of electric circuits, 5th edition, McGraw- Hill, Call number: TK454 .A43 2013
4. Kal, Santiram, Basic Electronics : Devices, Circuits and IT Fundamentals, New Delhi : Prentice-Hall of India, 2012. Call Number TK7816 .K34 2012

BNR 27203 Electronic Principles II

Synopsis

This course provides a thorough foundation in analogue circuits as applied to systems used in generating, amplifying and in general processing signals which are continuous functions of time. The aims is to provide students with knowledge of the operational principles and practical limitations of analogue circuits at device and circuit level, as well as instructing them in the analysis and design of these circuits. All of the principles and techniques learned are applicable to the design of analogue systems on a wider scale.

References

1. Boylestad, Robert L.; Electronic devices and circuit theory 11th. Edition;

Pearson Prentice Hall, 2013; TK7867 .B69 2013
2. Thomas L. Floyd; Electronic Devices, 7th Ed. ; Prentice Hall, 2005; TK7870 .F53 2005
3. Frenzel, Louis E., Contemporary electronics : fundamentals, devices, circuits,

and systems; McGraw Hill; 2014; TK7816 .F75 2014
4. Kal, Santiram; Basic electronics: devices, circuits and IT fundamentals; Prentice-Hall of India, 2012; TK7816 .K34 2012
5. Bird, J. O. ; Electrical and electronic principles and technology 5th ed. ; Routledge, 2014; TK146 .B57 2014

BNR 27302 Measurement and Instrumentation

Synopsis

This course introduces students some of the metrological terminologies used in experimental methods, concept of metrology and its application. The course will also provide understanding of the standardization concept as the management system of standards and quality. The measurement technique for electrical quantity and analysis of the result according to ISO Guide will be introduce. Transducer operations, characteristic and functions will be studied, examined and analyzed.

References

1. Foreman, Matthew R, Instrumentation and Measurement : New York : Magnum Publishing, 2016, Call Number: T50 .I58 2016
2. Sheel, Satya, Instrumentation: Theory And Applications, Oxford: Alpha Science International Ltd., 2014, Call Number: TK7878.4 .S53 2014.
3. Garrett, Patrick H., Advanced Instrumentation and Computer I/O Design: Defined Accuracy Decision and Control with Process Applications, Hoboken, NJ: IEEE Press, 2013 Call Number:TK7887.5.G37 2013.
4. Placko, Dominique, Fundamentals of instrumentation and measurement, London : ISTE, 2007, Call Number: T50 .F87 2007
5. Kirk, Franklyn, Instrumentation, Hoboken, Homewood, IL : American Technical Publishers, 2005, Call Number:TA165 .I58 2005
6. Morris, Alan S., Measurement and instrumentation principles, Oxford : Butterworth-Heinemann, c2001, Call Number: TA165 .M67 2001

BNR 27403 Computer Aided Design

Synopsis

This course provides fundamentals on creating, editing and plotting of 2D Autocad drawings, adding text and dimensions to drawings, produce orthographic drawing, Introduction to three dimensional drawing, specifying user-defined coordinate systems, development of 3D drawings and models from engineering sketches and orthographic drawings, creating assembly and explode drawing for project drawing.

References

1. Paul Richard, Frank E. Puerta and Jim Fitzgerald (2009), “AutoCAD 2009 in 2D and 3D: A Modern Perspective”, Upper Saddle River, NJ: Pearson. T385 .R525
2. Khairul Anuar Hanafiah (2006), Lukisan Kejuruteraan Berbantu Komputer – Edisi Kedua, Universiti Teknologi Malaysia, Johor, Malaysia. TA174 .K42 2006
3. Jamaluddin Mohd Taib, Khairul Anuar Hanafiah dan Mohd Fadzli Daud (2006), Rekabentuk Berbantu Komputer – Asas Pemodelan, Universiti Teknologi Malaysia, Johor, Malaysia.
4. AutoCAD 2006, user guide.
5. John Wilson and Alan J. Kalameja (2003), Autocad 2002: 3D Modelling, A

BNR 37502 Control System

Synopsis

This course is to provide a comprehensive understand on control system that is essential in any field of engineering technology and science. Control system is an important and integral part of space-vehicle systems, robotic systems, modern manufacturing systems, and any industrial operation involving control of temperature, pressure, humidity, flow, etc. It is desireable that most engineers and scientists are familiar with theory and practice of control system.

References

1. Houpis, Constantine H. Linear control system analysis and design with MATLAB. Boca Raton [etc.] : CRC Press/Taylor and Francis Group, 2014. Call Number : TJ213 .H68 2014.
2. Nise, Norman S. Control Systems Engineering. Hoboken, NJ : John Wiley & Sons, Inc., 2011. Call Number : TJ213 .N57 2011.
3. Hishamuddin Jamaluddin. Introduction to Control Engineering. UTM Skudai : Penerbit UTM , 2011. Call Number : TJ213 .H58 2011.
4. Ogata, Katsuhiko. Modern Control Engineering. Upper Saddle River, NJ : Pearson/Prentice Hall, 2010. Call Number : TJ213 .O32 2010.
5. Dorf, Richard C. Modern control systems. Upper Saddle River, NJ : Pearson/Prentice Hall, 2008. Call Number : TJ216 .D67 2008.
6. Herlina Abdul Rahim. Pengenalan Sistem Kejuruteraan Kawalan, Skudai : Penerbit Universiti Teknologi Malaysia, 2004. Call Number : TJ213 .H47 2004.

BNR 37602 Technology Design Project

Synopsis

This course introduces students with the principles of integrated electrical and electronic engineering technology design project based on a topic selected from the courses studied or a related engineering technology problem. It involves teamwork, project management, engineering technology design, and technical presentation in a team environment. Each team is expected to address problem statement, in-depth survey, create layout design, build circuit diagram using any electrical or electronic softwares, create prototype, evaluation and revision of design towards engineering and technology problem solution. The students also have to ensure that the designed project meets a specified needs with appropriate consideration for public health and safety, cultural, societal, project management, economy, and environmental.

References

1. Dym, Clive L., Engineering design: a project-based introduction, 4th ed., New York: John Wiley, 2014, call number: TA174. D95 2014
2. G. Proteus, Matlab, Computer Lab, PCB Lab Dieter. Engineering Design, 3rd Edition. Boston: McGraw-Hill, 2013. Call Number: TA174. D53 2013
3. Ibrahim, Dogan, PIC microcontroller projects in C: basic to advanced, 2nd ed., Amsterdam: Newnes, 2014, call number: TJ223.P76. I276 2014
4. N. Cross. Engineering Design Methods, 3rd Edition. Chicester: John Wiley, 2008. Call Number: TA174 .C76 2008
5. M. N. Horenstein. Design Concepts for Engineers, 2nd Edition. Upper Saddle

River, NewJersey: Prentice Hall, 2006. Call Number: TA174 .H67 2006

BNR 37703 Management and Professional Ethics

Synopsis

This course provides exposure on professional ethics, philosophy and ethics theorem, values in professional ethics, responsible in giving services, client and third party obligation, obligation of profession, professional behavioral monitoring, current issues on professional ethics and technology management theory.

References

1. Martin, Mike W. Roland Schinzinger (2010) Introduction to engineering ethics. McGraw Hill. Call number: TA157 .M37 2010
2. Morel-Guimaraes, Laure (2005). Management of technology: key success factors for innovation and sustainable development. Call number: HD45 .M364 2005
3. Martin, Mike and Schinzinger, Roland. (2005). Ethics in Engineering, 4th ed. McGraw-Hill. Call number: TA157 .M37 2005
4. Mohd Janib Johari. (2001). Etika Professional. UTM. Call number: KE6533.4 .M63 2001
5. Morton E. Winston and Ralph D. Edelbach. (2012). Society, Ethics and Technology. 4th ed. Boston : Wadsworth Cengage Learning. Call number: T14.5 .S62 2012.
6. Gunn, Alastair S., Vesilind, P. Aarne. (2011). Hold Paramount: The Engineer's Responsibility to Society. 2nd ed. Stamford, CT : Cengage Learning. Call number: TA157 .G86 2011
7. Whitbeck, Caroline. (2011). Ethics in Engineering Practice and Research. Cambridge : Cambridge University Press. Call number: TA157 .W44 2011
8. Martin, Mike W. (2010). Introduction to Engineering Ethics. Boston, MA : McGraw-Hill. Call number: TA157 .M37 2010.
9. Vesilind, P. Aarne. (2010). Engineering Peace and Justice: The Responsibility of Engineers to Society. New York : Springer. Call number: TA157 .V474 2010 10.Machado, Carolina, Davim, J. Paulo. (2013). Management and engineering innovation. Hoboken, NJ : ISTE Ltd/John Wiley and Sons Inc. Call Number: HD45 .M44 2013.

BND 25603 Electro-pneumatic Technology Laboratory

Synopsis

To familiarize the students with the setup, symbol and function of each Pneumatic and Electro-Pneumatic components. Hence, they are able to detect and eliminate errors in simple electro-pneumatic controllers. On the other hand, could prepare them to learn more on measurement, setting and calculate characteristic electrical value. In addition, they are able to deal with work and safety instructions including mechanical safety, electrical safety and pneumatic safety.

References

1. Markus Pany, Sabine Scharf, Ralph-Christoph Weber, Electropneumatic Basic Level Workbook, Festo Didactic SE, 2017.
2. W.Haring, M.Metzger, R.C.Weber, Electropneumatics Advanced Level Workbook, Festo Didactic SE, 2015.
3. G. Prede, D. Scholz, Electropneumatics Basic Level, Festo Didactic GmbH & Co, 2002.

4. Parr, Andrew, Hydraulics and pneumatics: a technician's and engineer's guide, Butterworth-Heinemann, 2011. Call Number: TJ840 .P37 2011.
5. Stamatios Manesis, George Nikolakopoulos, Introduction to Industrial Automation, CRC Press. 2018.

BND 21102 Electrical Power Application Laboratory

Synopsis

This subject is arranged to give the students approaches regarding the laboratory works in basic electrical power application which combination of electrical wiring installation, motor control and electrical machines topology. Students will learn the correct methods of handling electrical equipment and techniques of analysing the wiring installation, motor control and electrical machines.

References

1. Mullin, Ray C., 2017, Electrical Wiring Commercial, Delmar Cengage Learning. [ebook]
2. Herman, Stephen L., 2015, Electric Motor Control, Cengage Learning. [Call Number : TK2851 .H47 2015]
3. Simmons, Phil, 2015, Electrical Grounding and Bonding (4th Edition), Cengage Learning. [Call Number : TK3227 .S55 2015]
4. Atkinson, Bill, 2013, Electrical Installation Design (4th Edition), John Wiley & Sons. [Call Number : TK3271 .A84 2013]
5. Senty, Steve, 2013, Motor Control Fundamentals, Delmar Cengage Learning. [Call Number : TK2511 .S46 2013]

BND 31303 Power Electronic

Synopsis

This subject discusses about the types of solid state switching components, the working of various types of converter circuits and the associated control circuits. It also touches on the principles of AC and DC motor speed control. The use of solid state components in handling high voltage DC is also dealt with. Lastly the applications of switching devices and examples in industry are being discussed.

References

1. Mandal, Soumitra Kumar, *Power Electronics*, McGraw Hill, 2014. (Call number: TK7881.15 .M36 2014)
2. Orlowska-Kowalska, Teresa, *Advanced and Intelligent Control in Power Electronics and Drives*, Springer, 2014. (Call number: TK7881.15 .A38 2014)
3. P. C. Sen, *Principles of Electric Machines and Power Electronics* (3rd Edition); John Wiley & Sons, 2014. (Call number: TK2000 .S46 2014)
4. Ferreira, Braham, *The Principles of Electronic and Electromechanic Power Conversion: A Systems Approach*, Hoboken,NJ 2014. (Call number: TK7881.15.F47 2014)
5. Bach, Seddik, *Power Electronic Converters Modelling and Control: With Case Study*, Springer,2014. (Call number: TK2796.B32 2014)
6. Theodeo Wildi, Electric Machines, Drives and Power Systems, 5th Edition, Prentice Hall, 2002. Call No.: TK2182 .W54 2006
7. V.R. Moorthi, *Power Electronics Devices, Circuits and Industrial Applications*, Oxford University Press, 2005. Call No.: TK7881.15 .M66 2005
8. Muhammad H. Rashid, *Power Electronics: Circuits, Devices, and Applications, Prentice Hall, 2004*. Call No.: TK7881.15 .M5 2004
9. Ned Mohan, William P. Robbins & Tore M. Undeland, *Power Electronics: Converters, Applications and Design*, John Wiley, 2003. Call No.: TK7881.15 .M63 2003

10.E. Acha, V.G. Agelidis, O. Anaya Lara & T.J.E Miller, *Power Electronic Control in Electrical System*, Newnes, 2002. Call No.: TK1007 .P68 2002.

BND 32103 PLC Programming and Application Laboratory

Synopsis

This course familiar the students with the basic technical skills and knowledge necessary to work with programmable logic controller (PLC) systems found typically in an industrial/manufacturing environment. The course covers the basic operation of OMRON PLC control systems. In the end of the course, the students are able to develop the PLC programming and troubleshoot the errors occurs during the implementation. In addition, they are able to deal with work and safety instructions.

References

1. Ebook W.Bolton, 2009. *Programmable Logic Controllers*, 5th Edition, United State of America, Elsevier Ltd.
2. Ebook Sumaiya Mashori, Hairulazwan Hashim, Herdawati Abdul Kadir, Mohamad Fauzi Zakaria, Rafidah Ngadengon @ Ngadungon, 2012. *Automation System and Robotics DEK3223 / DAE32503 Teaching and Learning Module*, 4th Edition.
3. Luqman Afendy bin Ahmad Kamal, 2019. *Training kit of Three Phase Motor Starters using Programming Logic Control*, Thesis UTHM.
4. Natasha Amira binti Abdul Rauf, 2019. *PLC CP1E Education Trainer.* Thesis UTHM, 2019. Chapman, Norm. 2010.

BND 32603 Industrial Communication Systems

Synopsis

This course covers the various kinds of industrial communication systems including their working principle and application. The course is organized in lecture and tutorial. This course covers topics on basic data communication and IP networks, industrial communication technology and systems, and SCADA.

References

1. Forouzan, A. Behrouz, Data Communications and Networking, New York, NY : McGraw-Hill, 2012. (Call number: TK5105 .F67 2012)
2. Bogdan, M. Wilamowski and J. David Irwin, Industrial Communication Systems, Boca Raton: Taylor & Francis, 2010. (Call number: TK5105.5 .I52 2010)
3. Gordon Clarke, Deon Reynders and Edwin Wright, Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems, Amsterdam: Elsevier, 2004. (Call number: TS158.6 .C52 2004)
4. Stallings, William, Data and Computer Communications, Boston : Pearson, 2014. (Call number: TK5105 .S73 2014)
5. Richard Zurawski, The Industrial Communication Technology Handbook, Boca Raton, FL: Taylor & Francis, 2005. (Call number: TK5105.5 .I54 2005)
6. Wayne Tomasi, Electronic Communications Systems: Fundamentals Through Advanced, Upper Saddle River, NJ: Pearson Education, 2004. (Call number: TK5101 .T65 2004)
7. David Bailey, Edwin Wright, Practical SCADA for Industry, Oxford: Elsevier, 2003. (Call number: TS158.6 .B34 2003)

BND 35503 Microcontroller Application

Synopsis

This course focuses on applications of microcontroller in automation system. Students will be taught and trained to design and develop the hardware circuit and

apply the high level language to perform a required task. This course will: (1) Introduce to microcontroller family and its language; (2) give a core concept of timers and interrupts; (3) describe an Analog to Digital Conversion (ADC) interface and applications; (4) design and implement the interface between Liquid Crystal Display (LCD) and navigation buttons; (5) portray the concept of motor control for brushed DC motor, stepper motor, and servo motor; (6) touch the popular serial communication protocol that are Universal asynchronous receiver transmitter (UART), Serial peripheral interface (SPI), Inter-integrated circuit (I2C), and Universal Serial Bus (USB).

References

1. Ibrahim, Dogan, PIC Microcontroller Project in C: Basic to Advanced, Newnes, 2014. (Call number: TJ223.P76 .I276 2014)
2. Barrett, Steven F., Arduino Microcontroller Processing For Everyone, Morgan and Claypool, 2013. (Call number: TJ223.P76 .B39 2013)
3. Jouaneh, Musa, Fundamentals of Mechatronics, Cengage Learning, 2013. (Call number: TJ163.12 .J68 2013)
4. Margush, Timothy S., Some Assembly Required : Assembly Language Programming with the AVR Microcontroller, CRC Press, 2012. (Call number: TJ223.P76 .M396 2012)
5. Sagar, D. Karuna, Microcontroller 8051, Alpha Science, 2011. (Call number: TJ213 .S23 2011)

BND 35703 Electrical Machine and Drives

Synopsis

This subject is arranged to give the students a strong understanding of the fundamentals and applications of electromechanical devices, namely transformers and electrical machines. Generally, electrical machine has two main functions, i.e. it could be act as a generator or as a motor. Among the contents of the syllabus are fundamentals of machinery principles, three phase circuits, transformers, AC and DC machines.

References

1. P.C. Sen, Principles of Electric Machines and Power Electronics (3rd Edition); John Wiley & Sons, 2014. (Call number: TK2000 .S46 2014)
2. Shaahin Filizadeh, Electric Machines and Drives: Principles, Control, Modeling, and Simulation, Boca Raton: CRC, 2013. (Call number: TK2211 .F54 2013)
3. Oleg Wasynczuk, Analysis of Electric Machinery and Drive Systems, Wiley 2013. (Call number: TK2181 .A52 2013)
4. Chapman Stephen J., Electric Machinery Fundamentals (5th Edition); McGraw- Hill, 2012. (Call number: TK2000 .C42 2012)
5. Teaching Module: Electric Machines and Drives (2nd Edition); UTHM, 2012.

BND 35801 Industrial Maintenance Technology

Synopsis

This course is arranged to furnish students with the understanding of industrial maintenance workshops due to aspects and types of maintenances especially in industrial maintenance applications. To give knowledge, comprehension and ability

to apply and analyze the problems focusing on industrial maintenance. Teaching the common-sense of industrial maintenance's troubleshooting techniques so that they can keep their facilities and equipment up and running smooth. Learning how to

protect from serious injury while doing preventive maintenance based on industrial maintenance.

References

1. Industrial maintenance, Brumbach, Michael E., Albany: Cengage Learning, 2014. (Call number: TS192 .B78 2014)
2. Plant equipment and maintenance engineering handbook, Richardson, Duncan C., New York: McGraw-Hill, 2014. (Call number: TS191 .R52 2014)
3. Couch, L. W., Digital and Anolog Communication Systems, 7th Ed, Pearson Prentice-Hall, 2007. (Call number: TK5101 .C68 2007)
4. Lean maintenance repair and overhaul : changing the way you do business, Srinivasan, Mandyam M., New York: McGraw-Hill, 2014. (Call number: TS191 .S74 2014)
5. Sustainable facility management : operational strategies for today, Fennimore, John P., Boston : Pearson, 2014. (Call number: TS155 .F46 2014)
6. Maintenance for industrial systems, Manzini, Riccardo, New York : Springer, 2010. (Call number: TS192 .M35 2010)

BND 43003 Industrial Robotic

Synopsis

This course provides the important information and knowledge of robotics technology. The contents of the course consist of fundamentals of robotics (introduction), kinematics, differential motions, robot dynamics and trajectory planning. The course also discusses the importance of actuator and sensor technologies as well as and safety requirements.

References

1. Introduction to Robotics Analysis, Systems, Applications, Saeed B. Niku, Prentice Hall, 2001.
2. Robotics, Man Zhihong, Prentice Hall, 2005.Legnani, Giovanni, (2012), Robotics : state of the art and future trends, New York : Nova Science Publishers. (Call number: TS191.8)
3. Robotic and Image Processing, Janakiraman, P.A., Tata McGraw-Hill, 1995.
4. Robotics, Mechatronics, and Artificial Intelligence: Experimental Circuit Blocks for Designers, Newton C. Braga, Boston: Newnes, 2002.
5. Advanced Robotics and Intelligent Machines, J. O. Gray and D. G. Caldwell, London: Institution of Electrical Engineers, 1996.
6. Engineering of Mind : an Introduction to the Science of Intelligent Systems, James S. Albus, Alexander M. Meystel , New York: John Wiley, 2001.

BND 43403 Computer Integrated Manufacturing Laboratory

Synopsis

This course introduce the students with the ability to use the techniques, skills of computerized 3-D software for mass property analysis, an understanding of the operating procedures and programming capabilities of machine tools, conversion of computer-generated geometry into a program to direct the operation of CNC machine tools, programming robots to handle materials in assembly-line operations and designing manufacturing work cells and tabletop factories to solve complex

problems that arise in integrating multiple pieces of computer-controlled equipment.

References

1. Neill Hughes (2013). CAD for the Workshop, New York : Crowood, Call No. TA174 .H83 2013.
2. Bajd, Tadej (2010), Robotics. Call No. TJ211 .R69 2010
3. Terry Bartelt (2006). Industrial Control Electronics: Devices, Systems and Applications. Clifton Park, NY : Thomson. Call No. TK7881 .B37 2006.
4. Terry L. M. Bartelt (2002). Lab Manual to Accompany Industrial Control Electronics: Devices, Systems and Applications. Australia : Delmar. Call No. TK7881 .B373 2002.
5. Michael J. Grimb (2001). Industrial control systems design. Chichester : John Wiley. Call No. TS155.8 .G75 2001.
6. Bob Mercer (2001). Industrial Control Wiring Guide. Oxford : Newnes. Call No. TK3271 .M47 2001.
7. E. A. Parr (2000). Industrial Control Handbook. Oxford : Newnes, 1998 (Rep. 2000). Call No. TS156.8 .P37 1998.

BND 45903 Industrial Automation System

Synopsis

A study of the applications of industrial automation systems, including identification of system requirements, equipment integration, motors, controllers, and sensors. Coverage of set-up, maintenance, and testing of the automated system. The purpose of this course is to provide the student with basic skills useful in identifying the concepts of automated machines and equipment and describe the terms and phrases associated with industrial automation. The student will perform preventative maintenance, identify or solve problems in machines, and other technologies. Performance will be satisfactory when student can demonstrate competence in maintaining and troubleshooting technology includes identifying, understanding, and performing routine preventative maintenance and service on technology; detecting more serious problems; generating workable solutions to correct deviations; and recognizing when to get additional help.

References

1. Industrial Automation: Hands On" by Frank Lamb (McGraw Hill Professional).
2. Industrial Automation and Process Control By: Jon Stenerson
3. PLC Programming for Industrial Automation By: Kevin Collins
4. Industrial Automation and Robotics: An Introduction By: A.K. Gupta, S.K. Arora, Jean Riescher Westcott
5. The Value of Automation: The Best Investment an Industrial Company Can Make By: Peter G. Martin

BNR 32803 Bachelor Degree Project I

Synopsis

Bachelor Degree Project is a systematic practical academic project utilising knowledge, skills, engineering technology concepts and problem solving techniques. This project could be:

1. Collaboration with related industries such as:
   a) Industrial Product / Process / System Development (Hardware / Software).
   b) Industrial Problems and Cases.
   c) Industrial Issues / Phenomenon.
2. Integrated multidiscipline projects such as:
   a) Combination of different discipline to achieve the required objectives.

b) Combination of different technology in product / process / system

development.
3. Problem-base projects such as:
   a) Previous case studies that require further investigations for continuous improvement.
   b) Problems and cases at works that experienced by the lecturers and engineers in the indutries.
   c) Problems and cases at works that experienced by the students during their internship program in the industries.

References

1. Buku Panduan Penulisan Thesis, UTHM.
2. Panduan Pelaksanaan Projek Sarjana Muda, UTHM.
3. Books, journals and other information which relates with the research project.

BNR 43505 Bachelor Degree Project II

Synopsis

Bachelor Degree Project II course is the continuation of Bachelor Degree Project I course. It is an important mechanism in teaching and learning process because it integrates all courses acquired in engineering technology. This course will also develop the student's capability to analyze, discuss and present the results of the project research clearly, effectively and confidently in both oral presentation and in Bachelor Degree Project report.

References

1. Buku Panduan Penulisan Thesis, UTHM.
2. Panduan Pelaksanaan Projek Sarjana Muda, UTHM.

Books, journals and other information which relates with the research project.

Electives

BND 36003 Industrial Process Control

Synopsis

This course provides an overall exposure to the technology of Industrial Process Control as widely seen in factories of all types both for discrete and continuous manufacturing. The course discusses a wide range of related topics from the advantage and architecture of process control systems, measurement systems including sensors and signal conditioning, discrete and continuous variable control systems, hydraulic, pneumatic and electric actuators, industrial communication and embedded computing in relation to the process control in industry application.

References

1. Industrial Process Control Systems, Second Edition (2018), by P. R. Dale, CRC Press.
2. Fundamental of Industrial Instrumentation and Process Control, (2015) by W. C. Dunn, McGraw Hill.
3. Fundamental of Automatic Process Control, by U. R. Chaudhuri and U. R. Chaudhuri, CRC Press.
4. Statistical methods for industrial process control, (1997) by D. Drain, CRC Press

5. Scada: Supervisory Control And Data Acquisition 4th Edition (2009), by S. A. Boyer, ISA: The Instrumentation, Systems, and Automation Society.

BND 36103 Sensors and Actuators

Synopsis

In this course, students will understand various strategies for sensing and actuating as well as knowledge of the classes of sensors and actuators available, their properties, manufacturing and the theory behind them. Students will learn how to interface common sensors and actuators to the data acquisation hardware, then develop software to acquire sensory data, process the data and actuate motors, soft actuators, LEDs, etc. for use in mobile robotics products. Along the way, students will learn to apply both analog-to-digital and digital-to-analog conversion concepts.

References

1. Ida, Nathan, Sensors, actuators, and their interfaces : a multidisciplinary introduction, Edison, NJ : SciTech Publishing, 2014, TA165 .I32 2014
2. Bishop, Robert H., Mechatronic systems, sensors, and actuators : fundamentals and modelling, Boca Raton : CRC, 2008, TJ163.12 .M425 2008
3. Pawlak, Andrzej, M.,Sensors and actuators in mechatronics : design and applications, Boca Raton, FL : Taylor & Francis, 2007. TJ163.12 .P38 2007
4. De Silva, Clarence W., Sensors and actuators : control systems instrumentation Boca Raton : Taylor & Francis, 2007, TJ213 .D74 2007
5. Brussel University. Faculty of Applied Sciences, Robotics actuators and sensors : mechanical and electronics design, Brentford : Elektor Electronics, 2005, TJ211 .R62 2005.

BND 43703 Modern Control System

Synopsis

A control system consists of interconnected components to achieve a desired purpose. These early systems incorporated many of the same ideas of feedback that are employed in modern manufacturing processes, alternative energy, complex hybrid automobiles, and sophisticated robots. A design process is presented that encompasses the establishment of goals and variables to be controlled, definition of specifications, system definition, modeling, and analysis. This course aims to expose the students to the theory and design method in control system using modern control principle and optimal control system.

References

1. Li, Han-Xiong, System design and control integration for advanced manufacturing, John Wiley and Sons, 2015. (Call number: TJ217.5 .L53 2015)
2. Houpis, Constantine H., Linear control system analysis and design with MATLAB, CRC Press/Taylor and Francis Group, 2014. (Call number: TJ213 .H68 2014)
3. Yedavalli, Rama K., Robust control of uncertain dynamic systems, Springer Science Business Media, 2014. (Call number: TJ217.2 .Y42 2014)
4. Karnopp, Dean C., System dynamics : modeling, simulation and control of mechatronic systems, Wiley, 2012. (Call number: TA168 .K37 2012)
5. Grosan, Crina, Intelligent systems : a modern approach, Springer, 2011. (Call

number: QA76.76.I58 .G76 2011)
6. Ogata, Katsuhiko. Modern Control Engineering. Upper Saddle River, NJ : Pearson/Prentice Hall, 2010. Call Number : TJ213 .O32 2010.

BND 36203 Modeling and Simulation

Synopsis

The subject intends to expose the students an adequate knowledge of the modelling technique of the major types of engineering system. It also provides a broad overview of the concepts of dynamics system and the systems approach and design of engineering systems. The classical differential equation models are emphasized based on a low-order linear system.

References

1. Modeling and Simulation of Dynamic Systems. 1st Edition, by Robert L. Woods and Kent L. Lawrence.
2. System Dynamics: Modeling and Simulation of Mechatronic Systems by Dean C Karnopp.
3. Analytical System Dynamics: Modeling and Simulation by Brian Fabien.
4. Dynamic Systems: Modeling, Simulation, and Control by Craig A Kluever.
5. System Dynamics: Modeling, Analysis, Simulation, Design by Ernest Doebelin

BND 46303 Image Processing and Vision System

Synopsis

Machine vision (MV) is the technology and methods used to provide imaging-based automatic inspection and analysis for such applications as automatic inspection, process control, and robot guidance, usually in industry. Machine vision is a term encompassing a large number of technologies, software and hardware products, integrated systems, actions, methods and expertise. Machine vision as a system engineering discipline can be considered distinct from computer vision, a form of computer science. It attempts to integrate existing technologies in new ways and apply them to solve real world problems. The term is the prevalent one for these functions in industrial automation environments but is also used for these functions in other environments such as security and vehicle guidance. The overall machine vision process includes planning the details of the requirements and project, and then creating a solution. During run-time, the process starts with imaging, followed by automated analysis of the image and extraction of the required information.

References

1. Image Acquisition and Preprocessing for Machine Vision Systems (SPIE Press Monograph)" by P K Sinha
2. Machine Vision Systems Integration (Critical Reviews , Vol 36) by BATCHELOR and B G Batchelor
3. Selected Papers on Industrial Machine Vision Systems (SPIE Milestone Series) by Paul F Whelan and Bruce G Batchelor
4. Heart of the Machine: Our Future in a World of Artificial Emotional Intelligence by Richard Yonck
5. Machine Vision Applications, Architectures, and Systems Integration IV: Conference : Papers by Susan Snell Solomon and Society of Photo-Optical Instrumentation.

BND 46403 Industrial Revolution

Synopsis

The world is at the onset of the Fourth Industrial Revolution and this revolution is very much driven by the smarts in automating decision making and processes. Advancements in IT has resulted in immense improvements in computational power

across nearly all electronic devices and enhanced capabilities in connecting the dots in an increasingly networked society. Digital platforms in the Cloud provides a perfect canvas for inventing new business models and for intelligent algorithms to analyse data and derive knowledge for operationalize use by cyber physical systems. This course provides a comprehensive coverage on, among others, the role of data, manufacturing systems, various Industry 4.0 technologies, applications and case studies. In particular, we also draw input from researchers and practitioners on what are the opportunities and challenges brought about by Industry 4.0, and how organisations and knowledge workers can be better prepared to reap the benefits of this latest revolution.

References

1. Jones, Eric L., Locating the industrial revolution : inducement and response, Hackensack, NJ : World Scientific, 2010. ISBN: 9789814295253. [HC253 .J66 2010].
2. Clark, Woodrow W., Sustainable communities design handbook : green engineering, architecture, and technology, Burlington, MA : Butterworth-Heinemann, 2010. [GE170 .C52 2010]
3. Chesney, K, The Victorian Underworld, Harmondsworth: Penguin, 1972.
4. Cole, G and Postgate, P, The Common People, London: Methuen & Co, 1966.
5. Deary, T, The Vile Victorians (Horrible Histories), London: Scholastic Children's Books, 1994.
6. Himmelfarb, G, The Idea of Poverty: England in the Early Industrial Age, London: Faber, 1984, pp 376–77.
7. Horn, P, The Victorian Town Child, Stroud: Sutton, 1997.
8. Hughes, A, The Diary of a Farmer's Wife, 1796–1797, Good Life Press, 2009.
9. Jamieson, A, The Industrial Revolution, London: Edward Arnold, 1982.
10. Kelly, N, Rees, R and Shuter, J, Britain 1750–1900 (Living through History), Oxford: Heinemann, 1998.
11. Mayhew, H, London Labour and the London Poor, London: Penguin, 1985 (originally published 1851).
12. Mingay, G, Rural Life in Victorian England, London: Heinemann, 1977.
13. Moss, P, History Alive 3 1789–1914, Oadby Leicester: Blond Educational, 1968.
14. Royston Pike, E, Human Documents of the Industrial Revolution in Britain, London: Routledge, 2006.
15. Smith, N, The Industrial Revolution (Events and Outcomes Series), London: Evans Brothers, 2002.
16. Williams, B, Victorian Britain (The Pitkin History of Britain), Andover: Jarrod, 2005.

BNE 44303 Energy Efficient and Management

Synopsis

This course covers a broad range of knowledge on current and potential future energy management systems, covering Malaysia energy policies and regulation, energy efficient management, energy conversion, and end-use technologies in energy management, with emphasis on meeting regional and global energy needs in the 21st century in a sustainable manner. Students will explore the energy end-use practices and consumption practices in Malaysia. In addition, students will learn a quantitative framework to aid in evaluation and analysis of energy audit and energy management system proposals.

References

1. Hsiao-Hwa Chen, Mohsen Guizani, “Next Generation Wireless System and

Network", John Wiley & Sons, Ltd, 2006. No Panggilan : TK5105.875.I57 .K87 2016
2. Leick, Alfred, "GPS satellite surveying," Edition: 4th ed., Hoboken : John Wiley, 2015. No Panggilan : TA595.5 .L44 2015.
3. Melvin, William L., "Principles of modern radar," Edison, NJ : SciTech Publishing, 2014. No Panggilan : TK6575 .P74 2014 v.3.
4. Bühlmann, Peter, "Handbook of big data," Boca Raton, FL : CRC Press, an imprint of the Taylor & Francis Group, 2016. No Panggilan : QA76.9.B45 .H36 2016.
5. Stutzman, Warren L., "Antenna theory and design," Edition: 3rd ed., Hoboken, NJ : Wiley, 2013. No Panggilan : TK7874.6 .S78 2013.
6. Grimm, Christoph (2013). Embedded systems for smart appliances and energy management. New York : Springer
7. Golusin, Mirjana (2013). Sustainable energy management. Amsterdam : Elsevier.
8. Moss, Keith J. (2006). Energy management in buildings. London : Taylor and Francis.
9. Klinghoffer, Naomi B. (2013). Waste to energy conversion technology. Philadelphia, PA : Woodhead Pub.
10. Malkina-Pykh, I. G. (2002). Sustainable energy : resources, technology and planning. Southampton, UK : WIT Press.
11. Kuglin, Fred, A. and Rosenabum, Barbara A. (2000). The supply chain network @ Internet speed : preparing your company for the E-commerce revolution. New York: AMACOM.

BNF 43603 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. Gordon, Brent M., "Artificial intelligence : approaches, tools, and applications" New York : Nova Science Publishers, 2011. (Call number: Q335.5 .A78 2011)
2. Negnevitsky, M. "Artificial Intelligence A Guide to Intelligent Systems", 3nd Edition. Pearson Education Limited ,2011. (Call number: QA76.76.E95 .N43 2011)
3. Stuart Rusell, Peter Norvig, "Artificial Intelligence: A Modern Approach", 2nd Edition, Prentice Hall, 2003. (Call number: Q335 .R97 2003)
4. Gorge F. Luger, "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", 6th Edition, Addison Wesley, 2009. (Call number: Q335 .L84 2009)

Industrial Training

BNR 46112 Industrial Training

Synopsis

Students are required to do the industrial training for the period of one regular semester (24 weeks) in engineering technological field according to the student's discipline in the approved organizations by the university. Every student will be evaluated by the faculty and industrial supervisor. In this programmed, students are expected to be trained in systematic and structured ways. 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 be directly involved in the aspects of operation of plants which depend on their availability in the industry. Students are expected to be involved in the workplace with certain constrains that benefited them in improving their mental and physical fitness.

References

1. Penerbit UTHM. 2008. Garis panduan latihan industri. Unit hubungan korporat dan industry (UHKI).