COURSE SYNOPSIS

Faculty of Food Science and Nutrition

BACHELOR OF FOOD SCIENCE WITH HONOURS

CODE BPKP	PROGRAMMES OFFERED
HS04	**Food Science & Nutrition**
HY07	**Food Technology & Bioprocessing**
HG09	**Food Service**

FACULTY CORE

NT10102 FUNDAMENTALS FOOD SCIENCE AND NUTRITION

The course will be focused on food requirement, function and source of nutrients in food, and quality and safety aspects of foods. The selected core subjects will be discussed in brief in other to give the students an overview on what is the field of food science/technology and nutrition all about.

References

Brown, J.E. 2014. Nutrition Now. 7th Edition. Australia: Wadsworth CENGAGE Learning.
Campbell-Platt, G. 2009. Food Science and Technology. Singapore: Wiley-Blackwell.
Murano, P.S. 2003. Understanding Food Science and Technology. Australia: Wadsworth CENGAGE Learning.
Roday, S. 2007. Food Science & Nutrition. New Delhi: Oxford University Press.
Smolin & Grosvener, 2010. Nutrition Science and Applications. 2nd Edition. USA: John Wiley & Sons, Inc.
Thompson, J. & Manore, M. 2013. Nutrition for Life. Boston: Pearson.
Williams, M.H. 2010. Nutrition for Health, Fitness, and Sport. 9th Edition. Boston: McGraw-Hill International Edition.

NT10402 ANALYSIS CHEMISTRY

Analytical chemistry is the branch of chemistry that deals with the measurement of chemical samples, both qualitative and quantitative. Analytical chemistry plays an important role in many aspects of chemistry, for example, medicinal, environmental, forensic, and manufacturing. In food, analytical chemistry finds many applications, for example, in the analyses for the essential nutrients, chemical composition, level of deterioration or contamination, and authenticity. Undoubtedly, analytical chemistry forms an important part of the competency that food scientists and technologists ought to develop.

References

Bruice, P. K. 2017. Organic Chemistry. 8th ed. United States of America: Pearson.
Wade, L. G. (Jr). 2014. Organic Chemistry. 8th ed. United States of America:Pearson.
Solomons, T. W. G., Fryhle, C. B. & Snyder, S. A. 2014. Organic Chemistry. 11th ed. United States of America: John Wiley & Sons.
Carey, F. A. & Giuliano, R. M. 2016. Organic Chemistry. 10th ed. United States of America: McGraw-Hill. Klein, D.2012. Organic Chemistry. United States of America: John Wiley & Sons.
Smith, J. G. 2014. Organic Chemistry. 4th ed. United States of America: McGraw-Hill.

NT10202 GENERAL PHYSICS

A clear understanding of the basics of physics, i.e. the study of physical quantities, theories and calculations in translational and rotational motions, types and concepts in energy. This course will expose some background on the behavior of fluids. It will also include sections in thermal physics as well as vibration and wave.

References

Vuille, C., Serway, R.A. & Faughn, J.S. 2009. College Physics.
Edition. Brooks/Cole Cengage Learning, Canada.ISBN-10: 0-495-55498-7.
Nicholas J. Giordano, 2010. College Physics: Reasoning and relationships. International student edition.
Brooks/Cole Cengage Learning, Canada. ISBN-13: 987-0-534-46244-4
David Halliday, Robert Resnick & Jearl Walker, 2008. Fundamentals of Physics, 8th Edition. Wiley. ISBN: 978-0-471-75801-3.
Frederick J. Bueche & David A. Jerde, 2008. Principles of Physics. 9th Edition. McGraw Hill, US.

NT10902 ORGANIC CHEMISTRY

This course will discuss the principles of organic chemistry and the chemical reactions found in many applications including food systems. This course includes the naming, classification, structure, use and reactions of each class/group of natural and synthetic organic compounds. The mechanisms of reactions will be given attention.

References

Bruice, P. K. 2014. Organic Chemistry. 7th ed. United States of America: Pearson. Wade, L. G. (Jr). 2013. Organic Chemistry. 8th ed. United States of America:Pearson.
Solomons, T. W. G., Fryhle, C. B. & Snyder, S. A. 2014. Organic Chemistry. 11th ed. United States of America: John Wiley & Sons.
Carey, F. A. & Giuliano, R. M. 2013. Organic Chemistry. 9th ed. United States of America: McGraw-Hill. Klein, D. 2012. Organic Chemistry. United States of America: John Wiley & Sons.
Smith, J. G. 2011. Organic Chemistry. 3rd ed. United States of America: McGraw-Hill.

NT11202 CALCULUS

This course provides a strong basic concepts and foundations in calculus. Thus, this course providing the necessary background knowledge for students. Student will be able to develop the ability to use analytic and graphic techniques to solve problems involving calculus.

References

Larson, R. & Edwards, B.H. 2012. Calculus, 9th Edition. Singapore : Brooks/Cole Cengage Learning Stewart, J. 2009. Calculus. 6th Ed: Brooks/Cole, Cengage Learning.
Anton, H., Bivens, I. C. & Davis, S. 2010. Calculus : Late Transcendentals, 9th Edition. John Wiley & Sons (Asia) Pte Ltd Verberg D., Purcell E. J. & Rigdon S. E. 2007. Calculus ninth edition. Pearson. United State of America.
Smith R.T, Minton R.B. 2007.Calculus. McGraw-Hill: New York.
Peter Kuhfitting. 2006. Technical Calculus with Analytic Geometry. Thomson: Australia.

NT10802 BIOCHEMISTRY

This course discusses the important biomolecules and their chemistries in reactions that facilitate the processes in living organisms. This includes amino acids, proteins, enzymes, and carbohydrates. The structures, functions, mechanisms, kinetics and control of these components are discussed. The ATP energy generation and the electron transfer chain in carbohydrate metabolism involving the glycolysis, the citric acid cycle, and the oxidative phosphorylation processes are also discussed.

References

Campbell, M. K. & Farrell, S. O. 2012. Biochemistry, 7th ed. United States of America: Brooks/Cole.
Appling, D. R., Anthony-Cahill, S. J. & Mathews, C. K. 2016. Biochemistry – Concepts and Connections. Global Edition.
Essex, United Kingdom: Pearson.
Voet, D. & Voet, J. G. 2011. Biochemistry. 4th ed. United States of America: John Wiley & Sons. Garrett, R. H. & Grisham, C. M. 2013. Biochemistry. 5th ed. United States of America: Brooks/Cole.
Moran, L. A., Horton, H. R., Scrimgeour, K. G. & Perry, M. D. 2012. Principles of Biochemistry. 5th ed. United States of America: Pearson.

NT31103 FOOD SENSORY EVALUATION

Sensory evaluation of foods is widely used in the field of Food Science and Technology for food quality control, assurance and product development. It is the measuring of food attributes through a complex sensation that results from the interaction of our senses such as taste, smell, touch and hearing when food is eaten. In addition, the concepts, principles and protocol of widely used sensory evaluation techniques will be explained. These include discriminative tests, descriptive tests and affective tests. Data collection and statistical analysis will be discussed in order to obtain accurate

References

Aminah, Abdullah. 2000. Prinsip Penilaian Sensori, Bangi: UKM.
Kemp, S. E., Hollowood, T. & Hort, J. 2009. Sensory Evaluation: A Practical Handbook. United Kingdom: Wiley-Blackwell Lawless, H.T. & Heymann, H. 2010. Sensory Evaluation of Food: Principles and Practices. 2nd Ed. New York: Springer. Meilgaard, M., Civille, G.V. & Carr, B.T. 2007. Sensory Evaluation Techniques. 4th Ed. Boca Raton, Florida: CRC Press.

NT21103 STATISTICS

This course discusses basic statistical concepts including parametric and non-parametric tests. The practical component includes demonstrations and tutorials on statistical analyses using software. The software used is SPSS, version 14, which is one of the common statistical software used in academic research and industries. Students will be exposed to the use of syntax in statistical analyses.

References

Armitage, P., Berry, G. & Matthews, J.N.S. 2001. *Statistical methods in medical research*. 4th ed. Oxford. Blackwell Sciences.
Coakes, S.J. & Steed, L. 2007. SPSS version 14.0 for Windows. *Analysis without anguish*. Australia: John Wiley & Sons. 274 pages.
Einspruch, E.L. 2005. *An introductory guide to SPSS® for Windows ®,* second edition. SAGE publications Inc., California, USA.
McKillup, S. 2005. *Statistics explained: an introductory guide for life scientists*. Cambridge University Press, Cambridge, UK. Mohd. Noor, M. I. 1995. *Asas statistik dan penyelidikan perubatan*. Kuala Lumpur: Dewan Bahasa dan Pustaka. 178 pages. Ooi, Y.B.H. 2007. Statistics for food, nutritional and health sciences. Including SPSS user guide with syntax for analyses. Lecture notes (salinan pra-penerbitan, terhad kepada pelajar SSMP yang berdaftar sahaja).
Paulson, D.S. 2008. *Biostatistics and microbiology*: A survival manual. Springer Science + Business Media, New York, USA. Swinscow, T.D.V & Campbell (eds.). 2002. *Statistics at square one*. 10th ed. British Medical Association. Useful little "cookbook", good for quick reference. Available online at: http://www.bmj.com / collections / statsbk / 160 pages. Zar, J.H. 1999. *Biostatistical analysis.* 4th edition. Prentice Hall International, Inc.

NT21303 PHYSICAL PROPERTIES OF FOODS

A course discuss on those properties of foods that lend themselves to description and quantification by physical means. It is an introduction course exposing students to various physical properties of food, including the thermal, surface, optical, mechanical (rheological), electrical and geometrical properties. The definitions, theory and principles, methods of determination, as well as effects on food products are also discussed under relevant topics. This course also provides fundamental knowledge required in understanding advance courses, such as Unit Operation in Food Processing and Food Engineering.

References

Arana, I. 2012. *Physical Properties of Foods: Novel Measurement Techniques and Applications (Contemporary Food Engineering)*. Boca Raton: CRC Press.
Bourne, M. 2002. *Food Texture and Viscosity. Concept and Measurement.* 2nd Edition. London: Academic Press.
Figura, L.O. & Teixeira, A.A. 2007. *Food Physics: Physical Properties – Measurement and Application.* London: Springer. Karel, M. & Lund, D.B. 2003. *Physical Principles of Food Preservation*. 2nd Edition. New York: Taylor & Francis. MacDougall, D.B. 2002. *Colour in Food: Improving Quality.* Cambridge: Woodhead Pub.
Sahin, S. & Gulum, S. 2006. *Physical Properties of Foods*. New York: Springer.

NT20703 FOOD ANALYSIS & INSTRUMENTATION

This course introduces students to the importance of food analysis as chemical compositions of foods are used to determine the nutritive value, functional characteristics & acceptability of the food products. Students will be taught on preparation of chemicals & instruments to conduct the analyses. Analytical errors including those arising from impurity of chemicals, instruments & methods used will also be discussed. Students will learn how to report their laboratory results, findings & calculations. Proximate analyses, as well as the theory & suitable methods to determine moisture, ash, protein, lipid, carbohydrate, mineral and vitamin contents will also be explained. Students will also be exposed to specific instruments including AAS, GC, HPLC, etc., to analyse specific or basic components that make up our major food components.

References

AOAC, 2000. *American Official Analytical Chemists*. 16th Edition. Washington D.C.: Association of Analytical Chemists. Christian, G.O. and O'rielly J.E. 1986. *Instrumental Analysis.* 2nd Edition
King, R.D. 1978. *Development In Food Analysis Techniques - 1*. Applied Science. London
Nielsen, S.S. 2003. *Food Analysis*. Third Edition. New York: Kluwer Academic / Plenum Publishers. Nitise wojo, P. 1996. *Instrumentasi Dalam Analisis Makanan*. Bangi:Penerbit UKM.
Pomeranz,Y. 1994. *Food Analysis: Theory and Practice*. London: Chapman and Hall Publication. Suzzane, S. N. 2010. *Food Analysis (Food Science Text Series)*. Springer
Suzzane, S. N. 2010. *Food Analysis Laboratory Manual (Food Science Text Series)*.
Springer Leo, M.L.N. & Fidel, T. 2013. *Food Analysis by HPLC*. 3rd. Edi. CRC Press.
Micheal, H.T. & Charles, L.O. 2014. *Physical Methods in Food Analysis (Acs Symposium series).* American Chemical Society.
Leo, M.L.N. & Fidel, T . 2012. *Handbook of Analysis of Active Compounds in Functional Foods*. CRC Press

NT20903 FOOD CHEMISTRY AND BIOCHEMISTRY

This course covers introduction to the major food components such as water, carbohydrate, lipid, protein and other minor components, namely vitamins and minerals. Students will be exposed to the chemistry aspect, classification, characteristics and functional properties of each of the components. Fundamental knowledge of enzyme and food pigments will be taught. Basic biochemistry reactions and metabolisms relate to the major food components will also be discussed.

References

Akoh, C.C. & Min, D.B. (ed.) 2008. Food Lipids Chemistry, Nutrition, and Biotechnology. 3rd Ed. Boca Raton: CRC Press Taylor & Francis Group. [QP751.F647 2008]
Belitz, H.-D., Grosch, W. & Schieberle, P. 2009. Food Chemistry. 4th revised and extended Ed. Garching: Springer. [TX 545.B3513 2009]
Damodaran, S., Parkin, K.L. & Fennema, O.R. (ed.). 2008. Fennema's Food Chemistry. 4th Ed. Boca Raton: CRC Press Taylor & Francis Group. [TX 541. F65 2008]
McWilliams, M. 2005. Foods Experimental Perspectives. 5th Edition. Pearson Prentice Hall, New Jersey. [TX 531.M38] Simpson, B.K., Nollet, L.M.L, Toldra, F., Benjakul, S., Paliyath, G. & Hui, Y.H (ed.) 2012. Food Biochemistry and Food
Processing. 2nd Ed. Wiley-Blackwell, USA.
Vaclavik, V.A. & Christian, E.W. 2003. Essentials of Food Science. 2nd Edition Kluwer Academic/Plenum Publishers, New York. [TX 531.V33]
Voet, D., Voet, J.G. & Pratt, C.W. 2008. Fundamentals of Biochemistry. John Wiley & Sons, New York. [QD 415.V63]

NT30903 FOOD PROCESSING & PRESERVATION

This course will discuss about the principles and techniques of food processing and preservation such as freezing, drying,heat treatment, and so on. Students are required to understand the advantages and disadvantages for each of the preservation method. The effects of processing on food products (that affect the consumer acceptance) and the latest technology and development in food processing and preservation also being discussed.

References

Brown, Martyn (2008): Chilled Foods –A Comprehensive Guide (3rd Edition). Woodhead Publishing
Dennis R. Heldman, Richard W. Hartel (1998). Principles of Food Processing. An Aspen Publication. New York.
Fellows, P.J. (2000). Food Processing Technology: Principles and Practice 2nd Edition. West Sussex: Ellis Horwood Limited. Hosahalli, R. & Michele M. (2006). Food processing: Principles and Applications. CRC Press.
Norman N. Potter & Joseph H. Hotchkiss (1995). Food Science. Chapman and Hall.
Russell, N.J. & Gould, G.W (2003). Food Preservatives 2nd Edition. New York: Kluwer Academic/Plenum Publisher.

NT20203 FOOD MICROBIOLOGY

The course discusses basic principles of food microbiology, which include scope of study, classification of microorganisms, existing of micro flora in various foods and their source of contamination. Factors affecting the growth of microorganism that lead to either food spoilage or food poisoning are also discussed. An understanding to these factors is helpful in designing methods to control or stimulate their growth. Students will have the opportunity to learn a wide variety of microbiological methods normally used in quality control and safety evaluation of foods. The control of microorganisms especially food borne pathogens by various food preservation techniques and processing are also being highlighted. Apart from the detrimentally effects to food and human health, many of these microorganisms are used in the production of food and food ingredients. A series of laboratory exercises are designed to provide student with the opportunity to develop skills in isolation, identification and enumeration of the major groups of microorganisms associated with foods and food products.

References

Adams M.R., Moss, M.O. & McClure, P. 2015. Food microbiology. 4th Edition. Cambridge: Royal Society of Chemistry.
Erkmen, O & Bozoglu, T.F. 2016. Food microbiology: principles into practice. West Sussex: John Wiley & Sons
Jay, J.M., Loessner, M.J & Golden, D.A. 2005. Modern food microbiology. 7th edition. New York: Aspen Publisher.
Montville, J.T.,Matthews,K.R. & Kniel,K.E.2012 Food microbiology:an introduction. 3rd edition. Washington: ASM Press.
Ray, B. & Bhunia, A. 2014. Fundamental food microbiology. 5th edition. Boca Raton: CRC Press
Stuart, H. 2013. Essential microbiology. 2nd edition. Oxford: Wiley-Blackwell.
Tortora, G. J., Funke, B. R., & Case, C. L. 2012. Microbiology: An introduction. 11th edition. San Francisco: Benjamin Cummings

NT20803 POST HARVEST HANDLING TECHNOLOGY

The course teaches subjects related to the causes, principles and practices that result in food losses and appropriate methods to reduce post harvest losses in both the developed and developing countries in terms of technologic usage. The structure, composition and biophysical and biochemical changes in fruits and vegetables will be discussed. Factors that influence the quality of fruit and vegetable during storage will also be discussed. This course will also provide exposure to students on the technology of post harvest handling of cereals, koko, legumes, dairy products, meat, chicken and fish.

References

Dellino, C.V.J. 1990. *Cold and Chilled Storage Technology* London: Blackie Academic & Professional.
Ismail, Noryati dan Cheah Poh Bee. 1998. *Lepas Tuai: Satu Pengenalan fisiologi dan Pengendalian Buah-buahan dan Sayur-sayuran*. Penerbit: USM. Terjemahan: Will, R.B.H., McGlasson, W.B., Graham, D., Lee, T.H. and Hall, E.G. Australia: New South Wales University Press.
Moeljantto. 1992. *Pengawetan dan pengolahan hasilan perikanan*. Jakarta: Penebar Swadaya.
Nagy, S. and Shaw, P.E. 1980 *Tropical and Sub-tropical fruits: composition, Properties and uses.* AVI Publishing Inc Westport, Connecticut.
Pantatico, E.B.1975. *Post harvest physiology, handling and utilisation of tropical And sub-tropical fruits and vegetables.*
Westport, Connecticut: AVI Publishing Co., Ltd
Potter, N.N. and Hotchkins, J.H. 1995 *Food Science*. New York: Chapman and Hall. Ray Herren. 1994. *The Science of Animal Agriculture*. Delmar Publisher Inc.
Saadiah A. Shafie. 1995. *Asas Teknologi Biji benih* Kuala Lumpur: Dewan Bahasa dan Pustaka. Smith, J. 1991. *Food Additive User's Handbook.* London: Blackie Academic & Professional.
Thompson, A.K. 1996. *Postharvest Technology of Fruits and Vegetable.* Westport, Connecticut: AVI Publishing Co., Ltd. Vickie, A.V. 1998. *Essential of Food Science*. New York: Chapman and Hall.

NT30503 RESEARCH METHODS AND SCIENTIFIC WRITING

This course discusses various experimental designs, and various stages in research studies from proposing a study to presenting its findings. Health and safety, study information, volunteer consent and ethics would also be discussed. This course should preferably be taken after NT10003 (Statistics).

References

Bower, J. A. (2013). Statistical Methods for Food Science: Introductory procedures for the food practitioner. 2nd edition.Blackwell Publishing Ltd.
Dean, A. & Voss, D. 1999. Design and Analysis of Experiments. New York: Springer.
Kuehl R.O. 2000. Design of Experiments: Statistical Principles of Research Design and Analysis. 2nd ed. Singapore: Du xbury Press.
Garis Panduan Gaya Penulisan Pascasiswazah. 2008. Kota Kinabalu: Pusat Pengajian Pascasiswazah, UMS.
Noorzan Mohd Noor. 2011. Writing Research & Thesis Proposals: Guidelines & Examples. Shah Alam: University Publication Centre (UPENA), UiTM.
Rea, L.M. & Parker, R.A. 2005. Designing & Conduction Survey Research: A Comprehensive Guide. San Francisco: John Wiley & Sons, Inc.
Montgomery, D.C. 2012. Design and Analysis of Experiments. 8th Edition. Hoboken, NJ: John Wiley & Sons, Inc.

NT30703 FOOD SAFETY AND QUALITY CONTROL

This course emphasizes the importance of food safety and quality assurance in the food industry. Foodborne diseases and threats to food safety constitute a growing public health problem worldwide. Thus, food professional should be provided with up-to-date information and skills as part of the strategy to reduce contamination of food, ensuring foods sold in the market are safe. Food safety and quality education form the backbone of the food science and technology programs. It is also true that more standards and certification on food safety programs will be established to facilitate national and international food controls and risk management.

References

Alli, I. 2013. *Food quality assurance: principles and practices.* 2nd ed. Boca Raton: CRC Press.
Clute, M., Mountain, T. and Eugene, LLC. 2008. *Food industry quality control systems*. Boca Raton, CRC Press. Knechtges, P.L. 2012. *Food safety: theory and practice*. Jones & Bartlett Learning: Burlington.
Newslow, D.L. 2001. *The ISO 9000 Quality system. Applications in food and technology*. New York: Wiley Interscience. Ortega-Rivas, E. 2009. *Processing effects on safety and quality of foods*. Boca Raton, CRC Press.
Shaw, I.C. 2013. *Food safety: The science of keeping food safe*. Wiley-Blackwell: Oxford.
Vasconcellos, J.A. 2004. *Quality assurance for food industry: a practical approach.* Boca Raton: CRC Press

NT40103 FOOD LEGISLATION & STANDARDS

The course is focused on food legislation and standards that are commonly practiced by the food industry to ensure their products are safe and fulfilling the standard specifications. Students are taught about food regulations in Malaysia (Food Act 1983, Food Regulations 1985 and Food Hygiene Regulations 2009) and several international standards or guidelines pioneered by the expert committees or international organizations such as Codex Alimentarius Commission (CAC), World Health Organization (WHO), Food & Drug Administration (FDA) and Food Agriculture Organization (FAO). The course will emphasize on the importance of safety and quality issues related to all types of foods in the international business. Other aspects to be discussed include quality management systems which are used by the food industry such as ISO 9000, halal certification and Total Quality Management (TQM).

References

Food Act 1983 (Act 281) & Regulations (As at 20 April 2012). Kuala Lumpur: International Law Book Services. Trade Description Act 2011. Kuala Lumpur: International Law Book Services
Malaysian Standard: MS1500: 2009. Standards Malaysia, Selangor
Anderson, J. L. 2003. *International seafood trade*. Cambridge: Woodhead Publishing Ltd.
Bennet, G.S. 2010. *Food identity preservation and traceability - Safer grains*. Boca Raton: CRC Press Clute, M. 2009. *Food industry quality control systems*. Boca Raton: CRC Press.
Dillon, M. & Griffith, C. 2001. *Auditing in the food industry*. Boca Raton: CRC Press. Goodburn, K. 2001. *EU food law: a practical guide.* Cambridge: Woodhead Publishing Ltd.
Hasler, C. 2004. *Regulation of functional foods and nutraceuticals*. New York: Blackwell Publishing. Rees, N. & Watson, D. 2000. *International standard for food safety.* Texas: C.H.I.P.S

NT11403 FUNDAMENTALS OF MARKETING

This course aims to provide exposure on the basic concepts of marketing as an important function in business to students. This course introduces the marketing concepts and elements of marketing mix in one practical framework in order to achieve understanding on the importance of marketing strategy in fulfilling customer needs so that a business organization is capable to maintain its position in a competitive environment. This course focussing on introduction of marketing, consumer behaviour and the marketing mix, especially on menu, the food retailing, wholesaling, promotion and marketing ethnics.

Reference

Kotler, Philip, & Armstrong, Gary. (2016). Principles Of Marketing. Global Edition.16th Edition.UK: Pearson Education.
Stanley, John, & Stanley, Linda (2015). Food Tourism: 'A Practical Marketing Guide'. UK: CABI.
Kotler, Philip & Armstrong, Gary. (2010) Principles Of Marketing. NJ: Pearson.
Scanlon, L. Nancy (1999) Marketing By Menu. US: John Wiley.
Schaffner, J. David, Schroder, R. William & Early, D. Mary (1998) Food Marketing: An International Perspective. Boston: Mc Graw-Hill.

NT11503 PRINCIPLES AND PRACTICES OF MANAGEMENT

This course is about management and managers in organization.It is about managing people towards mutual needs and organizational goals.Furthermore, with globalization and the changing world that faced by managers understanding theright management process and strategic management is important to ensure organizational goals achieved effectivelycourse covers the core management function of planning,organizing,leading,and controlling in an organization.

Reference

Principles of Management: Borges, Lee, Nagiah, Shishi, Nazari, Koon, Shahrol, Ang, Nerina, Sreenivasan and Risidaxshinni (2015)
Robbin, P.R, Coulter.M. 2014. Management, 13th Edition (Global Edition). Pearson
Batemen & Snell. 2015. Management: Leading and collaborating in a Competitive World, 11th Edition.Mc-Graw Hill.
Jones, G.& George J., 2016. Contemporary Management. 8th Edition, Global Edition
Daft, R.L., 2014. Management. 11th Edition, South Western Cengage Learning

NT11603 BASIC FINANCIAL MANAGEMENT

This course is an introduction course in the field of finance. It covers the main idea in finance that starts with a general background, conceptual framework and techniques to assist in managing financial decision. The main focuses are towards fundamental principal, exercises and modern financial management procedures.

Reference

Block S.B. & Hirt, G.A. (2009). Foundations of Financial Management. NY: McGraw-Hill. 13th Ed.
Ross, S.A. et al. (2007). Financial Management Fundamentals in Malaysia. Malaysia: McGraw-Hill. 2nd Ed.
Brigham, E.F. & Houstan, J.F. (2010). Essentials of Financial Management. FL: Thomson.

FOOD TECHNOLOGY AND BIOPROCESSING PROGRAMME (HY07)

NB20003 UNIT OPERATIONS IN FOOD PROCESSING

This course introduces basic units in food industry, which involves various food processing operations. Students will be exposed to important unit operations in food processing such as material and energy balances, fluid flow, heat transfer, drying, evaporation, mechanical separations, size reduction processes, and mixing. This course will be a basis for food engineering process where selection of reasonable raw material can be carried out, plant can be conducted efficiently, safely and cost effectively as well as able to meet requirements by consumers.

References

Earle, R.L. 1983, *Unit Operations in Food Processing,* Second Edition, Sydney: Pergamon Press,

Earle, R.L. 1983, *Unit Operations in Food Processing.* (Terjemahan Muhamad Hakimi Ibrahim, Hanafi Ismail (1993) *Unit Operasi dalam Pemprosesan Makanan***,** Kuala Lumpur: Dewan Bahasa dan Pustaka, ISBN 983-861-032-1

Singh, R. P & Heldman, D. R. 2009. Introduction to Food Engineering. 4th Edition. Academic Press is an imprint of Elsevier. ISBN 978-0-12-370900-4.

Toledo, R.T. 1991. *Fundamentals of Food Process Engineering.* London: Chapman and Hall.

Toledo, R.T. 1991. *Fundamentals of Food Process Engineering.(*Terjemahan: Che Man, Wan Jamilah Wan Abdullah, Russly Abdul Rahman, 1995, *Asas Kejuruteraan Pemprosesan Makanan*, Kuala Lumpur: Dewan Bahasa dan Pustaka) ISBN 983-62-4198-1

NB20403 BIOPROCESSING TECHNOLOGY

Bioprocess Technology, a sub-discipline within biotechnology that combines living matter, in the form of organisms and or enzymes, with nutrients under specific optimal conditions to make a desired product. The topics herein deal with fermentation technology, bioreactors and downstream process technology. The important feedstocks used in bioprocesses and the functional food ingredients derived from the feedstocks will also be address.

References

Bagchi, D., Lau, F.C. & Ghosh, D.K. 2010. Biotechnology in Functional Foods and Nutraceuticals. Baco Raton: CRC Press. Chen, J., Zhu, Yang. 2014. Solid state fermentation for food and beverages. Boca Raton: CRC Press.

Dunford, N. T. 2012. Food and Industrial Bioproducts and Bioprocessing. Oxford: Wiley-Blackwell.

German, B. and Neeser, J.-R. 2004. Bioprocesses and Biotechnology for Functional Foods and Nutraceuticals. Baco Raton: CRC Press.

Moser, A. 1988. Bioprocess Technology: Kinetics and Reactors. New York: Springer-Verlag.

Panesar, P. S., Marwaha, S. S. 2014. Biotechnology in agriculture and food processing: opportunities and challenges. Boca Raton: CRC Press.

Soccol, C. R., Pandey, A., Larroche, C. 2013. Fermentation processes engineering in the food industry. Boca Raton: CRC Press.

Teixeira, Jose, A., Vicenta, A. A. 2014. Engineering aspects of food biotechnology. Boca Raton: CRC Press.

NB20502 FOOD ENZYMOLOGY

The historical uses of enzymes to make beer, wine, cheese and bread are fine examples of the industrial exploitation on its catalytic function and selectivity. This course covers the basic and applied aspects of the enzymology important to food systems. The basic aspects of the course include the basic enzyme properties, factors that affect enzyme activity and methods of measuring enzymatic activities. In the other hand, the applied aspects focusing on the enzymes used by the food industry and methods or controlling endogenous enzyme activities.

References

Aehle, W. 2004. *Enzymes in industry: production and applications.* Weinheim : Wiley-VCH

Nitisewojo, P. 1990. *Enzimologi makanan.* Kota Kinabalu: UMS

Palmer, T. 1995. Understanding enzymes. 4th edition. Hertfordshire: Prentice Hall

Tucker, G. A. L. F. & Woods, J. 1995. *Enzymes in food processing*. London : Blackie Academic and Professional

Whitaker, J. R., Voragen, A. G. J., Wong, W. S. 2003. *Handbook of food enzymology.* New York : Marcel Dekker

Robert, R. 2007. *Novel enzyme technology for food applications*. England : Boca Raton

Whitaker, J. R. 1994. *Principles of enzymology for the food science*. New York : Marcel Dekke Whitehurst, R.

J. & Law, B. A. 2002. *Enzymes in food technology*. Sheffield : Sheffield Academic Press

Whitehurst, R. J. & van Oort, M. 2010. *Enzymes in food technology*. 2nd edition. Singapore: Wiley-Blackwell.

NB20603 FOOD PACKAGING

Packaging is a very important aspect in preservation and marketing of food products. Knowledge acquire from this course will increase the students' capability in evaluating the suitable type of packaging for a particular type of food product, particularly the extension of shelf life and marketing aspect. Students could keep abreast with the development of innovative and creative concepts, the latest science and technology in food packaging to add value to their level of competency. Ethic values and responsibility towards environment and society are embedded through discussion on safety of food packaging, food packaging disposal problems, recycling of food packaging and so on.

References

Ahvenainen, R. 2003. *Novel Food Packaging Techniques.* Cambridge: Woodhead Publishing Limited.
Brody, A.L., Strupinsky, E.R. & Kline, L.R. 2001. *Active Packaging for Food Applications*. Boca Raton: CRC Press.
Han, J.H. 2014. *Innovations in Food Packaging*. Amsterdam: Elservier Academic Press. Klimchuk, M.R. & Krasovec, S.A.2006. Packaging Design. *Successful Product Branding from Concept to Shelf*. New Jersey: John wiley & Sons Inc. Lee, D.S. & Yam, K.L. 2008. *Food Packaging Science and Technology*. Baco Raton: CRC Press.
Mattsson, B. & Sonesson, Ulf. 2003. *Environmentally-friendly Food Processing*. Cambridge: Woodhead Publishing Limited. Mattsson, B. & Sonesson, Ulf. 2003. *Environmentally-friendly Food Processing*. Cambridge: Woodhead Publishing Limited.

NB40012 INDUSTRIAL TRAINING AND SEMINAR

Students are required to undergo industrial training at food industry or selected research institution to gain experiences relevant to students' education programme. Students will be able to gain work experience in real work environment during the training. Duration of training is twenty four weeks, which is one semester. Students are required to prepare a written training report and present in seminar after completion of training. Students' performance will be evaluated by industrial supervisor, and also by academic supervisor via discussion with industrial supervisor and visitation during students training. Students' assessment marks for this course will consist of evaluation mark from industrial supervisor, academic supervisor who pay a visit to place of training, industrial training report, daily activity log book and also marks from presentation of training in seminar.

NB31003 NOVEL FOOD PROCESSING

This course will discuss an overview on several thermal and non-thermal novel processes such as Pulsed Electric Field (PEF), High Hydrostatic Pressure (HPP), ionizing irradiation, UV light and etc. Their respective principles, potential applications, advantages and disadvantages of each technique will be discussed.

References

Barbosa-Cánovas, G. V., Tapia, M. S. & Pilar Cano, M. 2005. *Novel Food Processing Technologies*. CRC Press, Boca Raton. Doona, C. J., Kenneth Kustin, K. & Feeherry, F. E. 2010. *Case Studies In Novel Food Processing Technologies*. Woodhead Publishing, Oxford.
Barbosa-Cánovas, G. V., Zhang, H. Q. & Tabilo-Munizaga, G. 2001. *Pulsed Electric Fields in Food Processing*. Technomic Publishing, Lancaster.
Fan, X. & Sommers, C. H. 2012. *Food Irradiation Research and Technology*. Wiley-Blackwell, USA.

NB30804 FOOD PRODUCT DEVELOPMENT

The importance of development of industrial food products from the aspect of consumer and manufacturer needs to be learnt. This course encompasses the study of basic strategies in food products development, starting from idea generation, experiment, product tests in experiment, prototype production, product specification, manufacturing and marketing.

References

Earle, M., Earle, R. and Anderson, A. 2001. *Food Product Development.* Cambridge: Woodhead Publishing Limited.
Fuller, G.W. 2011. *New Food Product development from Concept to marketplace*. Third edition. Ohio: CRC Press.
Jones, T. 1996. *New Product development: A Multi-functional Process.* London: Butterworth Heineman.
Moss, M.A. 1995. *Applying TQM to Product Design and Development*. New York: Marcel Dekker Publications.

NB30703 FOOD FERMENTATION

The course covers a wide range of food fermentation processes applied worldwide either for product development or as a preservation method. Topics to be discussed i n the course include importance and characteristics of microorganisms used in various fermented foods, their health benefits and microbial or enzymatic processing of food and food ingredients to achieve desirable shelf life and favour. In addition, the microbiological consideration in the production of fermented foods, their natural antimicrobial by-products, application of genetic and recombinant DNA for starter improvement as well as their impact on functional properties of foods will be discussed. Equally important is the safety issues related to fermented foods and food ingredients. Students will have the opportunity to run fermentation process in laboratory to produce fermented food products and study the basic requirements for food fermentation.

References

Chen, J. and Zhu, Y. 2013. Solid State Fermentation for Foods and Beverages. Boca Raton: CRC Press.
Holzapfel, W. 2014. Advances in Fermented Foods and Beverages: Improving Quality, Technologies and Health Benefits. Cambridge: Woodhead Publishing Limited.
Hui, Y.H and Evranuz, E.Ö. 2012. Handbook of Plant-Based Fermented Food and Beverage Technology. Second edition. Boca Raton: CRC Press.
Joshi, V.K. 2016. Indigenous fermented foods of South Asia. Boca Raton: CRC Press.
Owens, J.D. 2014. Indigenous Fermented Foods of Southeast Asia. Boca Raton: CRC Press.
Ray, R.C. And Montet, D. 2014. Microorganisms and Fermentation of Traditional Foods. Boca Raton: CRC Press.
Tamang, J.P 2015. Health Benefits of Fermented Foods and Beverages. Boca Raton: CRC Press

NB00202 RESEARCH PROJECT I

This course is specifically designed to allow final year students to gain experience in conducting research. Each student is required to take a total of eight credit hours for one research project (throughout two semesters) under the supervision of an academic; two credit hours will be evaluated in this course. Students are advised to contact their supervisors for detailed information regarding the research that they will be doing, and then determine the agreed work targets. Students are required to present their research proposals before starting laboratory work. This will give students opportunities to get feedback or alternative views about their proposed research, especially regarding study designs and analytical techniques

References

Garis Panduan Gaya Penulisan Pascasiswazah 2014, Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah. [http://www.ums.edu.my/pasca/images/PenulisanGayaBahasa2014] Panduan Penulisan Laporan Projek

NB30903 FOOD ENGINEERING

The course introduces basic food engineering principles which include of fundamental physics to several applications in food processing such as the concepts of mass and energy balance, thermodynamics, fluid flow and heat transfer. Based on the basic food engineering principles, student will be exposed to various applications in food processing such as refrigeration, food freezing and dehydration, evaporation and membrane separation processes.

References

Singh, R. P & Heldman, D. R. 2009. Introduction to Food Engineering. 4th Edition. Academic Press is an imprint of Elsevier. ISBN 978-0-12-370900-4.
Toledo, R.T. 1991. *Fundamentals of Food Process Engineering.* London: Chapman and Hall.
Toledo, R.T. 1991. *Fundamentals of Food Process Engineering.(*Terjemahan: Che Man, Wan Jamilah Wan Abdullah, Russly Abdul Rahman, 1995, *Asas Kejuruteraan Pemprosesan Makanan*, Kuala Lumpur: Dewan Bahasa dan Pustaka) ISBN 983-62-4198-1
Fellows, P. J. 2000. *Food Processing Technology: Principles and Practice*. 2nd Edition. Woodhead Publishing Limited and CRC Press LLC.

NB00306 RESEARCH PROJECT II

This course is the continuation to NB00202 Research Project I, where students are required to complete their ongoing research project. In this course, students will focus on laboratory analyses and field work. At the end of the project, students will report their findings in the form of a final research project report which will be submitted for examination by two examiners (not including the supervisor) who will be appointed by the course coordinator. All submitted final research project reports for examination must adhere to the scientific writing style and standards approved by UMS. Each student will be called to defend his/her final research project report in an oral examination which will be conducted after submission of the final research project report.

References

Garis Panduan Gaya Penulisan Pascasiswazah 2014, Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah. [http://www.ums.edu.my/pasca/images/PenulisanGayaBahasa2014]
Panduan Penulisan Laporan Projek Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

NB40703 BIOSEPARATION

This course covers the essential and importance of downstream processing as part of bioprocess in food technology industry. A variety of bioseparation approaches, from conventional to sophisticated high resolution techniques will be described and discussed. The topics herein deal with isolation and extraction of desired products from a complex mixture of starting material, reaction products and by-products, and how to concentrate, recover and purify the desired products.

References

Sivasankar, B. 2005. *Bioseparations Principles and Techniques*. Prentice-Hall of India Private Limited, New Delhi.
Grandison,A.S and Lewis, M.J. 1996. *Separation Process in the Food and Biotechnology Industries.* Woodhead Publishing Ltd, Abington Hall, Abington, Cambridge England.
Satinder, A. 2000. *Handbook of Bioseparations.* Academic Press, San Diego, California USA.
Sadana, A. 1998. *Biospearation of Proteins Unfolding/Folding and Validation.* Academic Press, San Diego, California USA.

NB20703 HUMAN NUTRITION

This course will cover nutrition standards and guidelines; nutrient importance, function and requirements in humans; digestion and absorption of each nutrient in relation to the intake of a well-balanced diet as well as health risks of over consumption and deficiency of various nutrients.

References

Geissler C, Powers H (eds.) 2005. *Human nutrition*. 11th ed. Elsevier Churchill Livingstone.
Gibney MJ, Lanham-New SA, Cassidy A, Vorster HH, 2009. 2nd ed. *Introduction to Human Nutrition*. The Nutrition Society text book series. Wiley-Blackwell.
Grosvenor, MB & Smolin LA. 2002. *Nutrition, from science to life*. US: Harcourt College Pub.
NCCFN. 2010. *Malaysian Dietary Guidelines 2010*. Putrajaya: Ministry of Health.
NCCFN. 2013. *Malaysian Dietary Guidelines for Children and Adolescents*. Putrajaya: Ministry of
Health. Suriah, A.R, 1993. *Memahami Pemakanan*. Kuala Lumpur: DBP.
Wardlaw, G.M. 2000. *Contemporary Nutrition: Issues & Insights*. 4th ed. Boston Massachusetts: Mc-Graw Hill.
Whitney, E.N, Cataldo, C.B & Rolfes, S.R. 2002. *Understanding Normal and Clinical Nutrition*. 6th ed. Belmont, CA: Wadsworth.

FOOD SCIENCE AND NUTRITION PROGRAMME (HS04)

NP20303 HUMAN NUTRITION

This course will cover nutrition standards and guidelines; nutrient importance, function and requirements in humans; digestion and absorption of each nutrient in relation to the intake of a well-balanced diet as well as health risks of over consumption and deficiency of various nutrients.

References

Geissler C, Powers H (eds.) 2005. *Human nutrition*. 11th ed. Elsevier Churchill Livingstone.
Gibney MJ, Lanham-New SA, Cassidy A, Vorster HH, 2009. 2nd ed. *Introduction to Human Nutrition*. The Nutrition Society text book series. Wiley-Blackwell.
Grosvenor, MB & Smolin LA. 2002. *Nutrition, from science to life*. US: Harcourt College Pub.
NCCFN. 2010. *Malaysian Dietary Guidelines 2010*. Putrajaya: Ministry of Health.
NCCFN. 2013. *Malaysian Dietary Guidelines for Children and Adolescents*. Putrajaya: Ministry of
Health. Suriah, A.R, 1993. *Memahami Pemakanan*. Kuala Lumpur: DBP.
Wardlaw, G.M. 2000. *Contemporary Nutrition: Issues & Insights*. 4th ed. Boston Massachusetts: Mc-Graw Hill.
Whitney, E.N, Cataldo, C.B & Rolfes, S.R. 2002. *Understanding Normal and Clinical Nutrition*. 6th ed. Belmont, CA: Wadsworth.

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NP20003 NUTRITION IN THE LIFE CYCLE

This course discusses the changing physiology and nutritional requirements as well as related health and nutritional concerns occurring in the different stages of the life cycle such as in pregnancy and lactation, infancy, childhood, adolescence, adulthood and during the late years of life.

References

Brown, J.E., Isaacs, J.S, Krinke, U.B, Murtaugh, M.A, Stang, J & Wooldridge, N.H. 2002. *Nutrition Through the Life Cycle*.USA: Wadsworth/ Thomson Learning.

Grosvenor MB, Smolin LA. 2002. *Nutrition: from science to life.* Fort Worh: Harcourt College Publishers.

Ward EM. 2009. *Expect the best: your guide to healthy eating before, during, and after pregnancy.* ChichesteR: John Wiley. Worthington-Roberts BS, Williams SR. 1997. *Nutrition in pregnancy and lactation.* Massachussetts: McGraw-Hill.

Coates MM, Riordan J. 2011. *Study guide to accompany breastfeeding and human lactation*. Massachussetts: Jones & Bartlett Pub.

More J. 2013. *Infant, child and adolescent nutrition: a practical handbook.* Boca Raton: CRC.

NCCFN. 2010. *Malaysian Dietary Guidelines 2010*. Putrajaya: Ministry of Health.

NCCFN. 2013. *Malaysian Dietary Guidelines for Children and Adolescents*. Putrajaya: Ministry of Health.

Raats M, de Groot L, van Staveren W (eds). 2009. *Food for the ageing population.* Cambridge: Woodhead Publishing. Boca Raton: CRC Press.

Suriah Abdul Rahman, Tengku Aizan Hamid. 2001. *Pemakanan warga tua*. Kuala Lumpur: DBP.

Lee JE (ed). 2011. *Undernutrition: effects, causes, and management.* New York: Nova Science Publishers.

Cameron N, Norgan NG, Ellison GTH (eds). 2005. *Childhood obesity: contemporary issues*. Boca Raton: CRC Press / Taylor & Francis.

Parizkova J, Hills AP. 2005. *Childhood obesity: prevention and treatment.* Boca Raton: CRC Press.

NP20603 FUNCTIONAL FOODS

Functional foods are foods that deliver specific non-nutritive physiological benefits that may enhance health. The growing consumer interest in functional foods is transforming the food industry, and redefining the relationship between food, nutrition, and health. Nutritionists and other health professionals need to be better educated in this area in order to counsel and provide guidance to the public on the efficacy and/or risks associated with these functional food products. The course will cover the impact of functional foods on health and disease prevention.

References

Aluko, R.E. 2012. *Functional Foods and Nutraceuticals*. New York: Springer Science+Business Media, LLC. Guo, M. 2009. *Functional Foods: Principles and Technology.* Cambridge: Woodhead Publishing Limited. Johnston, I. and Williamson, G. 2003. *Phytochemical Functional Foods.* Boca Raton, FL: CRC Press.

Saarela, M. 2011. *Functional Foods: Concept to Product,* Second Edition. Cambridge: Woodhead Publishing Limited.

Shahidi, F. 2010. *Functional Food Product Development.* West Sussex: Wiley-Blackwell.

Wildman, Robert. E.C. 2007. *Handbook of Nutraceuticals and Functional Foods,* Second Edition. Boca Raton, FL: CRC Press.

NP30203 NUTRITIONAL ASSESSMENT

This course is about assessment of the nutritional status of individuals, households, and at the national level using various methods of nutritional assessment, i.e., anthropometry, biochemistry, clinical and dietary intake. Students will learn these methods in theory and practical (laboratory/field work).

References

Charney P, Malone AM. 2004. *ADA pocket guide to nutrition assessment.* 2nd ed. Amer Dietetic Assn. ISBN-10: 0880914211, ISBN-13: 978-0880914215

Gibson RS. 2005. *Principles of nutritional assessment.* 2nd ed. Oxford University Press.

Lee RD & Nieman DC. *Nutritional Assessment*. 5th ed. McGraw-Hill International Edition.

Pagana KD, Pagana TJ, Pagana TN. 2014. *Mosby's diagnostic and laboratory test reference.* 12th ed. Mosby. ISBN-10: 0323225764, ISBN-13: 978-0323225762.

Sauberlich HE. *Laboratory tests for the assessment of nutritional status.* 2nd ed. CRC Press LLC.

Tee, E.S, Ismail, M.N, Nasir, M.A & Khatijah, I, 1997. *Nutritional Composition of Malaysian Foods*. Kuala Lumpur, Asean Food Habits Project.

NP40012 INDUSTRIAL TRAINING AND SEMINAR

This course is to provide exposure to students to work experience and knowledge in areas related to the student's undergraduate programme. Besides, this course also provides opportunities for students to put to practice in a real work environment what had been learned during lectures, and to strengthen their communication skills as well as ability to work in a team. The students are given a platform to be independent, hold responsibilities and understand work ethics.

References

Panduan LI FSMP
Industrial Training Report format Daily Activity Log Book format

NP30803 FOOD INNOVATION

This course emphasizes the importance of creativity and innovation in the food industry in respond to the needs of the consumers. It gives students industry relevant practical experience whilst exploring the local and global trends in food processing and food innovations. It also addresses the key drivers of food industry innovation - affordability, sustainability, and tightening government regulations. Innovation in developing new food products, processes and business models is recognized as a key requirement for achieving the future vision of food graduates for the fast growing R&D demands within the food and beverage industry. The course involves real problem solving projects, with strong practical links with industry. This provides a good grounding in the creative and practical aspects of food product development, gained through teamwork using local resources.

References

Ghosh, D., Das, S., Bagchi, D and Smarta, R.B. 2013. Innovation in Healthy and Functional Foods. Boca Raton: CRC Press. Fuller, G.W. 2011. New food product development: from concept to marketplace. Third edition. Boca Raton: CRC Press Jaeger, S.R. and MacFie, H. 2010. Consumer driven innovation in food and personal care products. Cambridge: Woodhead Publishing.
Lundahl, D. 2011. Breakthrough Food Product Innovation Through Emotions Research. London: Elsevier Press. Martinez, M.G. 2013. Open innovation in the food and beverage industry. Cambridge: Woodhead Publishing.
Moskowitz, H.R., Beckley, J.H and Resurreccion, A.V.A. 2012. Sensory and Consumer Research in Food Product Design and Development. Second edition. New York: Blackwell Pub.
Traitler, H., Coleman, B. and Hofmann, K. 2014. Food industry design, technology and innovation. Iowa: John Wiley and Sons Ltd.

NP31003 FOOD TOXICOLOGY

This course aims to give students an overview of principles in food toxicology including the application of these principles to qualitative and quantitative toxicological testing of food products. The occurrence of various natural toxicants in food either from plants or animal origin will be discussed. Other topics includes pesticides residues, food additives and contaminants, by products originating from food processing as well as implication of industrial waste on human health and environment. Today food toxicology relies heavily on the knowledge in chemical and biological field and assumes that the students have an understanding of the basic concepts of human physiology and biochemistry. Therefore it is important for the student of food science and nutrition that they should be aware of the properties and mode of action and methods of analysis for the various toxic compounds.

References

Curtis D. Klaassen. 200 1. *Casarett And Doull's Toxicology: The Basic Science of Poisons.* Edition. McGraw-Hill Companies, Inc., USA.
Deshpande S. S. 2002. *Handbook of Food Toxicology*. Marcel Dekker, Inc. New York, USA DeVries, J. 1997. *Food safety and toxicity*. CRC Press LLC, New York, USA.
FAO, 2001. *Genetically modified organisms, consumers, food safety and the environment*. Food and Agriculture Organization, Rome. Ethics Series No. 2
Helferich & Winter. 1998 *Food toxicology*. New York: Kluwer Academic Press.
Moffat, C & Whittle, K.J. 1999. *Environmental Contaminants in Food*. New York: CRC Press Shibamoto, T & Bjeldanes, L.F 1993. *Introduction to food toxicology.* New York: Academic Press
Stanley Manahan. 2003. *Toxicological Chemistry and Biochemistry,* Third Edition. Lewis Publishers. CRC Press LLC. New York, USA.
Stanley T. Omaye. 2004. *Food and Nutritional Toxicology.* CRC Press LLC. New York, USA.

NP00202 RESEARCH PROJECT I

This course is specifically designed to allow final year students to gain experience in conducting research. Each student is required to take a total of eight credit hours for one research project (throughout two semesters) under the supervision of an academic; two credit hours will be evaluated in this course. Students will pick their research topic from a list of project titles which is given by all academics on the first week of semester. Students are advised to contact their supervisors for detailed information regarding the research that they will be doing, and then determine the agreed work targets. Students are required to present their research proposals before starting laboratory work. This will give students opportunities to get feedback or alternative views about their proposed research, especially regarding study designs and analytial techniques

References
Garis Panduan Gaya Penulisan Pascasiswazah 2014, Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah.[http://www.ums.edu.my/pasca/images/PenulisanGayaBahasa2014]
Panduan Penulisan Laporan Projek Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

NP00306 RESEARCH PROJECT II

This course is the continuation to NP00202 Research Project I, where students are required to complete their ongoing research project. In this course, students will focus on laboratory analyses and field work. At the end of the project, students will report their findings in the form of a final research project report which will be submitted for examination by two examiners (not including the supervisor) who will be appointed by the course coordinator. All submitted final research project reports for examination must adhere to the scientific writing style and standards approved by UMS. Each student will be called to defend his/her final research project report in an oral examination which will be conducted after submission of the final research project report.

Reference
Garis Panduan Gaya Penulisan Pascasiswazah 2014, Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah. [http://www.ums.edu.my/pasca/images/PenulisanGayaBahasa2014] Panduan Penulisan Laporan Projek Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

FOOD SERVICE PROGRAMME (HG09)

NF10002 FOOD SERVICE ENTREPNEURSHIP

This course gives student the exposure of basic principal of entrepreneurship as well as emphasis on foodservice entrepreneurship. Students will learn on ways to prepare business plan.

Reference
UiTM Entrepreneurship Study Group (2005). Fundamentals of Entrepreneurship, revised edition. Pearson, Prentise Hall. MEDEC (1997). Keusahawanan, Medec.
Wade D. (2006). Successful restaurant management. Thomson Delmar Learning.
Entrepreneurship. Robert Hisrich, Michael Peters, and Dean Shepherd. McGraw-Hill/Irwin; 7 edition (October 6, 2006)
Innovation and Entrepreneurship. Peter F. DruckerHarper Paperbacks (May 9, 2006)

NF10102 FUNDAMENTALS OF FOOD SERVICE

This Course teaches student the basic principle of food service management. Student would need to equipped with knowledge regarding the history of food service and how it may shape the future of food service, current trends, and other related aspects in managing a food service operation such as procurement, menu planning and food safety

Reference
Payne-Palacio, J. & Theis, M. (2009). Introduction to Foodservice. London: Prentice Hall.
Spears, M. C. (2013). Foodservice Organizations: A Managerial and Systems Approach. New Jersey: Prentice Hall.

NF10003 EASTERN AND WESTERN COOKERY

This course provides an opportunity for students to recognize and learn cooking recipies from different countries, including eastern and western cuisine. Students will also have the exposure in terms of theory and practice in the kitchen laboratory such as production area, basic cutting and cookery, baking and cleaning/hygiene

Reference
Donovan, Mary D.1997. Cooking Essential for the New Professional Chef. NY: John Wiley & Sons.
Kittler, P.G. & Sucher, K.P. 2000.Cultural Foods. Wadsworth. U.S
Labensky, Sarah R & Hause, Alan M. 1999. On Cooking : A Textbook of Culinary Fundamentals. New Jersey: Prentice Hall.
Minzer D.A. 2000. Food Preparation for the Professional. New York: John Wiley & Sons, Inc. Nam, I. and Schimidt, A. 1993. Art of Garnishing. New York: John Wiley & Sons, Inc.
Mc Williams, M. 1997. Foods Experimental Perspective, 6th Edition. New Jersey: Pearson, Prentice Hill. Multimedia /CD
Conklin, Alfred Russel, 1941. World food: production and use. Hoboken, N.J. : Wiley-Interscience, c2007

NF20303 HUMAN NUTRITION

This course provides students with a background in the basics of nutrition knowledge. The link between nutrition practices, health, disease and lifestyle were highlighted. Topics include nutrient requirement and function in human, digestion and absorption of each nutrient in relation to the intake of a well-balanced diet, the effect of nutrients excess and deficiencies towards body performance and health. Students also gain knowledge about nutrition standards and guidelines in Malaysia.

Reference

Geissler, C., Power, H. (Eds,) 2005. Human Nutrition, 11th ed. Elsevier Churchill Livingstone
Gibney, M.J., Lanham-New, S.A., Cassidy, A., Vorster, H.H. 2009. 2nd ed. Introduction to Human Nutrition. The Nutrition Society text book series. Wiley-Blackwell.
Grosvenor, M.B. and Smolin, L.A. 2002. Nutrition, from science to life. US: Harcourt College Pub.
NCCFN. 2010. Malaysian Dietary Guidelines 2010. Putrajaya. Ministry of Health.
NCCFN. 2013. Malaysian Dietary Guidelines for children and adolescents. . Putrajaya. Ministry of Health.

NF20502 FOOD AND CULTURE

This course is a theoretical and empirical exploration of human food choices from an ecological, political and sociological perspective. The course is designed to discuss the socio-cultural dimensions of food production, preparation and consumption to include dimensions of individual, family, community and societal structures, as well as ideological, religious and cultural identities embodied in gender, race, ethnicity and socioeconomic status.

Reference

Jackson, Peter, (2015). Anxious Appetites: Food and Consumer Culture. New York: Bloomsbury Pub.
Counihan, Carole, & Esterik, Van, Penny (2008) Food and Culture: A Reader. New York: Routledge.
Kittler, Goyan, Pamela & Sucher, P. Kathryn (2008) Food and Culture. Australia: Thomson/Wadsworth.
Cheung, C. H. Sidney, & Chee-Beng, Tan, (2007). Food and Foodways in Asia: Resource, Tradition and Cooking. New York: Routledge.
Montanari, Massimo, (1994). The Culture of Food. Oxford: Blackwell.

NF20003 MOLECULAR GASTRONOMY

This course explains the basic structural properties of food with the effects of methods and manipulation and types of ingredients. It explains phenomena that occur during food preparation in which the effects of physical and chemical influence on food can be identified. Students will be able to understand the science and principles behind food preparation, including the preparation of raw materials, cooking methods and the type of food commodities.

Reference

Margaret McWilliams. 2007. Foods: Experimental Perspectives.
Amy Brown. 2010. Understanding Food Principles and Preparation.
Harold McGee. 1997. On Food and Cooking.
Peter Barham. 2001. The Science of Cooking.
Ted Lister & Heston Blumenthal. 2005. Kitchen Chemistry.

NF20202 INTERNATIONAL BUSINESS

International business introduces students to the concept and diversification component in international business. The topic of globalization, its impact and how it related to the local economy. Students will also be disclosed in the interests of international organizations and international financial policies. Students will be exposed to factors outside of control that affect the international environment and examine the changes that have occurred against the international business aren a. This course also helps students to learn social and cultural factors that affect the business carried on around the world.

Reference

Ball and McCulloch. 2002. *International Business: The Challenge of Global Competition*, 8th Edition. New York: Irwin McGraw-Hill.
Charles W. Hill. 2008. *International Business*. 7th Edition.USA: McGraw Hill Higher Education. John J. Wild, Kenneth L. Wild,.2007.
International Business: The Challenges of Globalization, 4th Edition. USA: Prentice Hall.
John Daniels, Lee Radebaugh dan Daniel Sullivan. 2006. *International Business: Environments and Operations*, 11th Edition.
USA: Prentice Hall.
Richard Schaffer, Filiberto Agusti dan Beverley Earle.2008. *International Business Law and Its Environment*, 7th Edition.
USA: South-Western College / West
Hill, C.W.L., Wee, C. & Udayasankar, K. (2016). *International Business*, 2nd edition. NY, USA: McGraw Hill Education.
Cavusgil, S.T., Knight, G. & Riesenberger, J.R. (2012). I*nternational Business: the new realities*, 2nd edition Pearson Education.

NF30103 MENU DEVELOPMENT

This course covers on planning, preparing and developing a menu to suit the organization. Students will be exposed to the menu which are available, standard recipes, its uses and cost culculation. This course will also introduces students to the menu designing.

Reference

McVety, P. J., Ware, B. J., and Ware, C. L. 2009. *Fundamentals of Menu Planning*, 3rd Edition. New Jersey: Wiley.
Drysdale, J. A. and Galipeau, J. A. 2009. *Profitable Menu Planning,* 4th Edition. New Jersey: Prentice Hall.
Kotschevar, L. H. and Withrow, D. 2007. *Management by Menu*, 4th Edition. Wiley.

NF00202 RESEARCH PROJECT I

This course is specifically designed to allow final year students to gain experience in conducting research. Each student is required to take a total of nine credit hours for one research project (throughout two semesters) under the supervision of an academic; three credit hours will be evaluated in this course. Students will pick their research topic from a list of project titles which is given by all academics on the first week of semester. Student are advised to contact their supervisors for detailed information regarding the research that they will be doing, and then determine the agreed work targets. Students are required to present their research proposals before starting laboratory work. This will give students opportunities to get feedback or alternative views about their proposed research, especially regarding study designs and analytical techniques.

Reference

Garis Panduan Gaya Penulisan Pascasiswazah 2014, Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah. [http://www.ums.edu.my/pasca/images/PenulisanGayaBahasa2014]
Panduan Penulisan Laporan Projek Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

NF30203 COMMERCIAL FOOD PREPARATION

This course is one of important areas in operation of foodserivce establishment. It is to give exposure to the student in a dining service in commercial food preparation inclusive of technical skill and knowledge of service and kitchen operation. Students are given hands on experince on organizing foodservice event function from planning until event execution

Reference

The Food and Beverage Service, John Cousins, Dennis Lillicrap and Suzanne Weekes. Hodder Education; 9 edition (2014)
Culinary Artistry by Adrew Dornenburg and Karen Page. International Thomson Publishing Company. 1996.
Kitchen Operation: Second Edition by Graham Dark, Deirdre McLean and Sarah Weatherhead. Pearson Australia, 2011.
The Waiter & Waitress and Waitstaff Training Handbook: A Complete Guide to the Proper Steps in Service for Food & Beverage Employees by Lora Arduser and Douglas R. Brown. Atlantic Publishing Group Inc. (September 1, 2004)
At Your Service: A Hands-On Guide to the Professional Dining Room by Culinary Institute of America and John W. Fischer. Wiley; 1 edition (September 9, 2005)
A Perfect Waiter by Alain Claude Sulzer and John Brownjohn (Paperback - Jan. 19, 2009) Bloomsbury USA (April 1, 2008)
The Restaurant: From Concept to Operation by John R. Walker. Wiley; 5 edition (September 21, 2007)
The Restaurant Manager's Handbook: How to Set Up, Operate, and Manage a Financially Successful Food Service Operation 4th Edition - Atlantic Publishing Company (FL); 4th edition (September 25, 2007)

NF30603 FOOD SERVICE SYSTEM AND OPERATION

This course provides an introduction about the system and operation of food service organizations. Students will be able to differentiate the type of food service operations, the model/design and its components. In addition, students will gain insight on the management function of food service operations such as marketing and leadership aspects. Theory is applied through group assignment whereby students identify and look into the system of a particular foodservice organization.

Reference

Spears, M. C. (2013). Foodservice Organizations: A Managerial and Systems Approach. New Jersey: Prentice Hall.
Payne-Palacio, J. & Theis, M. (2009). Introduction to Foodservice. London: Prentice Hall.

NF30403 ARRANGEMENT, DESIGN AND EQUIPMENT FOR FOOD SERVICE

These courses design to accommodate student with introduction of kitchen premises and its functionality. The student will be trained in planning and developed kitchen that is suitable for certain food service institution such as hospital, restaurant and others. Food preparation Safety and Sanitation will be infuse in the courses. Student will able to understand the important of building safety, equipment, energy conservation, the air and water ventilation been used, safety code and HACCP compliance layout.

Reference

John C. Birchfield, Raymond T. Sparrowe. 2002. *Design and Layout of Foodservice Facilities*, 2nd edition. USA: John Wiley & Sons.

Lendal H. Kotschevar, Margaret E. Terrell. 1999. *Foodservice Planning: Layout and Equipment,* 4th edition. USA: Prentice Hall.

Costas Katsigris, Chris Thomas., 2005. *Design and Equipment for Restaurants and Foodservice: A Management View*, 2nd edition. USA: Wiley.

Alamanza, B. Kotschevar, L. and Terrell, M. 2000. *Foodservice Planning*. Texas: CHIPS Books.

Stevens, J. and Scriven, C. 2001. *Manual of Equipment and Design for the Foodservice Industry*. Texas: CHIPS Books.

NF00306 RESEARCH PROJECT II

This course is the continuation to NP 4043 Research Project I, where students are required to comp lete their ongoing research project. In this course, students will focus on laboratory analyses and field work. At the end of the project, students will report their findings in the form of a dissertation which will be submitted for examination by two examiners (not including the supervisor) who will be appointed by the course coordinator. All dissertati ons submitted for examination must adhere to the scientific writing style and standards approved by UMS. Each student will be called to defend his / her dissertation in an oral examination which will be conducted after submission of the dissertation

Reference

Garis Panduan Gaya Penulisan Pascasiswazah 2014, Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah. [http://www.ums.edu.my/pasca/images/PenulisanGayaBahasa2014]

Panduan Penulisan Laporan Projek Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

NF40302 QUANTITY FOOD PURCHASING

The courses introduce student on quantity purchasing aspects. Its emphasize principle and theory in purchasing on large quantity. Whereby, aspect such as specification is important when buyer or purchaser made selection on meat, fish, vegetables, fruits and others. Besides the purchasing method, the student will acquire method of receiving, method of selection and operational cost.

Reference

Andrew, H. Feinstein, John M. Stefanel. 2001 Purchasing: Selection and Procurement for the Hospitality Industry, 5th Edition. USA:Wiley

Lendal, H. Kotschevar, Richard Donnelly.1998. Quantity Food Purchasing 5th Edition. USA:Prentice Hall.

Lynne, Nannen. Robertson. 1994. Purchasing for Food Service. Blackwell Publishing Professional; 2nd edition. M.C. Warfel, Marion Cremer . 2005. Purchasing for Food Service Managers, 5th edition. USA: McCutchan Publishing Corporation.

Sharon, L. Fullen. 2002The Food Service Professionals Guide To: Controlling Restaurant & Food Service Labor costs (The Food Service Professionals Guide, 7). Florida: Atlantic Publishing Company (FL).

NF40703 SPECIAL TOPICS

This course is offered because it describes and explains the importance of various issues faced by the world in the area of foodservice. This course will discuss current issues/scenario facing the food industry, new technologies research, and recent changes trend in the foodservice industry.

NF40503 QUANTITY FOOD PREPARATION

This course exposes the student to prepare the food in large scale food production This is the combination all food courses student learnt before. This course is to teach the student standard for planning production, carry out culinary technique, and justification of procedures and techniques involved in large-scale food preparation. It also gives the student the taste of real practices in enhancing their culinary skills and knowledge.

Reference

Food Production Competency Guide, National Restaurant Association Education. Prent1ce Hall; 1 edition (January 1, 2006)

Food for Fifty. Mary K. Molt. Prentice Hall; 13 edition (February 4, 2010)

Quantity Food Production, Planning, and Management,.John B. Knight (Author), Lendal H. Kotschevar Wiley; 3 edition (February 18, 2000)

On Cooking: A Textbook of Culinary Fundamentals Sarah R. Labensky , Alan M. Hause , Steven R. Labensky , Pricilla Martel . Prentice Hall; 5 edition (January 14, 2010)

NF40502 DIET THERAPY

This course emphasize on the etiology of nutrition related diseases and provides information on the role of nutrition in the prevention of different disease states. This course includes examples of the application of medical nutrition therapy and specific nutrition intervention techniques which can help students to understand the rationale behind the modification of dietary intake and how these modifications can be applied in the prevention, investigation and treatment of diseases.

Reference
Lee, R.D. & Nieman, D.C. 2003. Nutrition Assesment. 3rd ed. Boston, MA: McGraw-Hill
Nems, M.N. and Anderson, S.L. 2004. Medical Nutrition Therapy. 2nd ed. USA: Thomson/ Wardsworth
Garrow, J.S., James, W.P.T. and Ralph, A. 2000. Human Nutrition and Dietetics. 10th ed. Uk: Churcill Livingstone
Townsend, C.E. and Roth, R.A. 200.Nutrition and Diet Therapy. 7th ed. Boston: Delmar Publisher.

NF40012 INDUSTRIAL TRAINING & SEMINAR

Students are required to undergo industrial training at food industry or selected research institution to gain experiences relevant to students' education programme. Students will be able to gain work experience in real work environment during the training. Duration of training is twenty four weeks, which is one semester. Students are required to prepare a written training report and present in seminar after completion of training. Students' performance will be evaluated by industrial supervisor, and also by academic supervisor via discussion with industrial supervisor and visitation during students training. Students' assessment marks for this course will consist of evaluation mark from industrial supervisor, academic supervisor who pay a visit to place of training, industrial training report, daily activity log book and also marks from presentation of training in seminar.

NF30503 FOOD SERVICE ACCOUNTING

This course is an introduction to the basic concepts and standards underlying financial accounting systems. Several important concepts will be studied in detail, including: revenue recognition, inventory, long-lived assets, present value, and long term liabilities. The course emphasizes the construction of the basic financial accounting statements - the income statement, balance sheet, and cash flow statement - as well as their interpretation. Topics include the complete accounting cycle with end-of-period statements, bank reconciliation, payrolls, and petty cash

Reference
Shaari Isa. 2006. Accounting Principles(2d edition). Prenrice Hall.
Chee, A.L.F and Van, W.S. Business accounting (2nd edition). Prentice Hall.
Mclaney, E. and Atrill, P. 2004. Accounting : An Introduction (3rd Edition). FT Prentice Hall.
Dyson, J.R. 2004. Accountuing for Non-accounting Students (6th edition). Prentice Hall.

ELECTIVE COURSES

NUTRITION MODULE

NE40002 NUTRITION EDUCATION

This course is designed to support the learning and practice of nutrition. Nutrition education, the pedagogy, technique and equipment used in communicating nutrition information to the public is important for public health nutrition.

References
Bauer, K.D. and Sokolik, C.A. 2001. *Basic Nutrition Counselling Skill Development.* Brooks Cole.
Contento, I.R. 2007. *Nutrition Education: Linking Research, Theory and Practice.* Boston: Jones and Bartlett Publishers Fleury, J. and Keller, C. 2000. *Health Promotion for the Elderly.* Thousand Oaks: Sage Publications, Inc.
Mildred, K. 1990. *Nutrition in Public Health: A Handbook for Developing Programs and Services*. Gaithersburg: Aspen Publishers, Inc.
Rao, S.B. 2007. *Principles of Community Medicine*. 4th Ed. Delhi: A.I.T.B.S. Publishers & Distributors.
Tan L.H. 1990. *Malnutrisi, Sumber Kesihatan dan Pendidikan* di Semenanjung Malaysia. Terj. Mohamad Nordin Abdul Karim.
Kuala Lumpur: Dewan Bahasa dan Pustaka.
Venkataiah, S. (pnyt.). 2000. *Health and Nutrition Education*. New Delhi: Anmol Publications Pvt.
Ltd. Wadlaw, G.M. 2003. *Contemporary Nutrition: Issues and Insight*. 5th Ed. USA: McGraw-Hill Publication.

NE40102 DIET THERAPY

This course discusses the modification and formulation of normal diet to the therapeutic diet. Also discuss the variance types of diets on require in healing process. The students will also be taught the calorie calculation or estimation of each therapeutic diet.

References

Nelms, M, N,. & Anderson, S, L. 2004. Medical Nutrition Therapy. 2nd Edition. Thomson/Wardsworth, USA.
Garrow, J.S. James WPT, Ralph A. 2000. Human Nutrition and Dietetics (10 th ed). UK: Churchill Livingstone.
Townsend, C. E, & Roth, R. A. 2000. Nutrition & Diet Therapy. 7th Edition. Boston, Delmar Publisher.
Mahan, L. K., et al. (2012). Krause's food & the nutrition care process. St. Louis, Mo. :, Elsevier/Saunders.
Stanfield, P. S., et al. (2009). Nutrition and Diet Therapy: Self-Instructional Approaches, Jones & Bartlett Learning.
Worthington, P. H. (2004). Practical Aspects of Nutritional Support: An Advanced Practice Guide, Saunders.
Brunner, L. S., et al. (2010). Brunner & Suddarth's Textbook of Medical-surgical Nursing, Wolters Kluwer Health/Lippincott Williams & Wilkins.
Gomella, L. and S. Haist (2006). Clinician's Pocket Reference, 11th Edition, Mcgraw-hill.
Skipper, A. (2009). Advanced Medical Nutrition Therapy Practice, Jones & Bartlett Learning.

NE40202 FOOD HYDROCOLLOIDS

This course provides an overview of the types, properties, functions and practices of the major food hydrocolloids in food industry. It is structured to allow the students to develop their in depth understanding of the food components, their interactions and the processes which are employed in their transformation into food products. This course emphasizes on the application aspects of food hydrocolloids. Students are expected to acquire the general practical concepts in the use of hydrocolloids in a few categories of food products. Despite the technological functionality, the health benefits of food hydrocolloid are also highlighted in the course. Several current issues and research trends on food hydrocolloids will be discussed.

References

Hoefler, A.C. 2004. Hydrocolloids – Practical Guides for the Food Industry. Minnesota, Eagan press.
Hollingworth, C.S. 2010. Food Hydrocolloids: Characteristics, Properties and Structures. New York, Nova Science Publishers, Inc.
Imeson, A. 2010. Food Stabilisers, Thickeners and Gelling Agents. Oxford: Blackwell PublishingLtd.
Laaman, T.R. 2011. Hydrocolloids in Food Processing. Singapore, Blackwell Publishing, Ltd and IFT Press. Phillips, G.O. & Williams, P.A. 2010. Handbook of Hydrocolloids. Boca Raton, CRC Press.
Williams, P. & Philips, G. 2014. Gums and Stabilisers for the Food Industry 17: The Changing Face of Food Manufacture: The Role of Hydrocolloids (Special Publications). Royal Society of Chemistry.

NE40302 FOOD SECURITY

This course will review the effects of social, economic, political policies and climate change on the availability, accessibility, affordability, appropriateness, and sustainability of food production to allow for attainment of optimum nutritional status. An ability to critically read various literatures and a basic understanding of Malthusian theory is expected of students. Students are also expected to write very analytical assignments based on those readings.

References

Asia Pacific Journal of Clinical Nutrition. 2009 Vol. 18(4).
Geissler C & Powers H. *Human nutrition* (11th ed.). Elsevier Churchill Livingstone.
Leathers HD, Foster P. *The world food problem: toward ending undernutrition in the third world*. 4th ed. Lynne Rienner Publishers Inc.

NE40402 NUTRITIONAL CONTENT OF FOOD

This course will look at nutritional properties as basis for food choices in achieving nutritious diets for healthy life, and as basis for food product development. Students will be tasked to criticise food choices and food products based on its nutritional content, ingredients, production and marketing strategies.

References

Geissler C & Powers H. *Human nutrition* (11th ed.). Elsevier Churchill Livingstone

NE40502 MOLECULAR NUTRITION

This is an introductory course to nutrition at the molecular level, an emerging field in nutrition research. Students will be exposed to gene-nutrient relationships (nutrigenetics, nutrigenomics). In each topic of discussion, emphasis will be given to the latest scientific research findings.

References

Emery P, Sanders T. 2002. *Molecular basis of human nutrition*. London: Taylor & Francis.
Lucock M, 2007. *Molecular nutrition and genomics: nutrition and the secret of humankind*. New Jersey: Wiley.
Berdanier CD & Moustaid-Moussa N (eds). 2004. *Genomics and proteomics in nutrition*. New York: Marcel Dekker.
Akoh CC & Min DB (eds). 2008. *Food lipids: chemistry, nutrition, and biochemistry.* Boca Raton: CRC Press/ Taylor & Francis.
Zempleni J, Daniel H. 2003. *Molecular nutrition*. Oxford: Cabi Publishing.
Zempleni J, Dakshinamurti K (eds). 2005. *Nutrients and cell signalling*. Boca Raton: Taylor & Francis.
Berdanier CD, Zempleni J. 2009. *Advanced nutrition: macronutrients, micronutrients, and metabolism*. Boca Raton: CRC Press.
*selected scientific journal articles

NE40602 FOOD SERVICE

FOOD TECHNOLOGY AND BIOPROCESSING MODULE

NE40702 DAIRY SCIENCE & TECHNOLOGY

The course specializes in milk production from the farm through the distribution, storage, manufacturing and application of dairy products. Milk and dairy products play a key role in meeting the demand for natural, affordable, nutritional and well-tasting food for a growing global population. Students will be exposed to various milk production chains and the processes affect the product quality. Besides providing knowledge of the properties of milk itself, it forms the basis for understanding what happens during processing, handling and storage. The nutritional aspects of milk components covered in this course. Some common dairy products and their processing parameters will be discussed. Due to the increasing interest on the dairy derived biological active compounds, the physiological functions of these components to human body, as well as the developments of functional dairy ingredients will also be discussed. The technologies employed for dairy production and its environmental impacts are covered in the course. A series of exercises are designed to provide student with the opportunity to develop analytical skills that are associated with the quality and safety of dairy and dairy products.

References

Britz, T. J and Robinson, R.K. 2008. Advanced Dairy Science and Technology. Oxford: Blackwell Publishing.
Griffiths, M. 2010. Improving the Safety and Quality of Milk. Oxford: Woodhead Publishing Ltd.
Nollet, L.M.L and Toldra, F. 2009. Handbook of Dairy Food Analysis. Boca Raton: CRC Press.
Tamine, A.Y. 2009. Milk Processing and Quality Management. Oxford: Blackwell Publishing.
Walstra, P., Wouters, J.T.M and Geurts, T.J. 2006. Dairy Science and Technology. New York: Taylor and Francis

NE40802 MEAT SCIENCE & TECHNOLOGY

This course stresses the importance of both the theoretical and practical aspects of meat products processing. Students will be acquainted with the composition and structure of meat, post-harvest chemical changes in meat, determination of quality of the meat and factors affecting it, equipment, technology and ingredients used in meat products. Factors which affect the carcass quality during processing will also be discussed. Issues like animal handling from an international perspective, slaughter, and management of processing wastes will also be scrutinized.

References

Feiner, G. 2006. Meat Products Handbook: Practical Science and Technology. Woodhead Publishing Limited. Cambridge, England.
Hui, Y.H. 2012. Handbook of Meat and Meat Processing. CRC Press. Taylor & Francis Group. Kerry, J.P. & Kerry, J.F. 2011. Processed Meats. Woodhead Publishing.
Toldra, F. 2010. Handbook of Meat Processing. Blackwell Publishing.
Nollet, L.M.L & Toldrá, F. 2009. Handbook of Processed Meats and Poultry Analysis. CRC Press. Taylor & Francis Group.
Nollet, L.M.L & Toldra, F. 2006. Advanced Technologies for Meat Processing. CRC Press, Taylor and Francis Group, USA
Tarté, R. 2009. Ingredients in Meat Products: Properties, Functionality and Applications. Springer.

NE40902 BAKERY & CONFECTIONARY TECHNOLOGY

This course aims to introduce students to the bakery and confectionary technology been used in the food industry today. This involves knowledge of science and technology in bakery / confectionary process, the ingredients, popular produce product, manufacturing methods, the use of machinery and equipment, quality control, packaging, hygiene and sanitation and nutritional aspects. Students are given the opportunity to produce bakery and confectionary products during laboratory practice.

References

Figoni, P. 2011. How baking works: exploring the fundamentals of baking science. John Wiley & Sons, Inc. New Jersey, USA. Bernard W.Minifie.1999. *Chocolate, Cocoa and Confectionery: Science and Technology.* Maryland: An Aspen Pub.
DiMuzio, D. T. 2009. *Bread baking: an artisan's perspective.* John Wiley & Sons, Inc. New Jersey, USA. Edwards, W. P. 2007. *The Science of Bakery Products*. Royal Society of Chemistry, Cambridge.
Hui, Y.H. 2006. *Bakery Products: Science and Technology*. USA: Blackwell.

NE41002 HALAL FOOD PRODUCTION

This course will explain concepts and standard requirements used in halal food production in all food industries. The subjects will expose students on halal food industry development, halal food ingredients, halal food processing, halal meat, halal fats and oil and use of alcohol in halal food production.Students should be able to lead and maintain the Halal Assurance System in any production with technical knowledge in identifying haram raw ingredients besides implementing basics in sanitation procedure and hygienic practices in a factory.

References

Ali, A.B. 2004. The Holy Qur'an – Text and Translation. Islamic Book Trust, Kuala Lumpur.
Chaand. M.N. 1995. Halal and Haram – The Prohibited and the Permitted Foods and Drinks. Percetakan Zakaria Sdn.Bhd., Kuala Lumpur. (BP188 . C32)
Malaysian Standard MS 1500:2009. 2009. Halal Food Food – Production, Preparation, Handling and Storage – General Guidelines (Second Revision). Department of Standard Malaysia.
Mian Riaz, M.M. Chaudry, 2004. Halal Food Production. CRC Press. (TP370 . R47 2004)
Ministry of Domestic Trade, Consumerism and Cooperatives. 2011. Trade Description Act 2011.
Isabel Guerrero Legarreta, 2010. Handbook of Poultry Science and Technology, Volume 1: Primary Processing. Wiley Publication. (TS1968 . H36 2010)
Sakr, A. H. 1996. A Muslim Guide to Food Ingredients. Foundation for Islamic Knowledge. 6th Edition, Lombard, Illinois.

NE41102 FATS & OIL TECHNOLOGY

This course consists general aspect of edible fats and oils composition and properties, extraction and fats analysis, trans fatty acid analysis method, fats and oils processing technologies, fats and oils modification such as interesterification and hydrogenation. Besides, lipid oxidation, fats deterioration mechanism, antioxidant and lipid biotechnology are discussed. Attention is given towards local fats and oils industry such as palm oil and cocoa butter processing. Current issues related on nutrition value of fats and oils and its implications towards health especially trans fatty acid will be highlighted.

Reference

Ismail, Noryati dan Cheah Poh Bee. 1998. *Lepas Tuai: Satu Pengenalan fisiologi dan Pengendalian Buah-buahan dan Sayur-sayuran.* Penerbit: USM. Terjemahan: Will, R.B.H., McGlasson, W.B., Graham, D., Lee, T.H. and Hall, E.G. Australia: New South Wales University Pres.
Thompson, A.K. 1996. *Postharvest Technology of Fruits and Vegetable*. Westport, Connecticut: AVI Publishing Co., Ltd.
Pantatico, E.B.1975. *Post harvest physiology, handling and utilisation of tropical And sub-tropical fruits and vegetables. Westport, Connecticut: AVI Publishing Co., Ltd*
Dellino, C.V.J. 1990. *Cold and Chilled* Storage *Technology London* Blackie Academic & Professional.

NE41202 FUNCTIONAL FOOD

NE41302 FOOD TOXICOLOGY

NE41402 MARINE & AQUACULTURE PRODUCT

This course applied food science and technology to the processing, storage and handling of marine and aquaculture products. Knowledge acquired from this course will increase the students' capability to determine suitable types of ingredients and processing technologies involved in the production of various types of marine and aquaculture products.

References

Kim, S.K. 2015. Seafood Science: Advances in Chemistry, Technology and Applications. CRC Press. Taylor & Francis Group. Granata, L.A., Flick, G.J. & Martin, R.E. 2012. The Seafood Industry: Species, Products, Processing and Safety.Wiley-Blackwell.

Martin, R.E., Carte, E.P., Flick, G.J. & Davis, L.M. 2000. Marine and Freshwater Products Handbook. Technomic Publishing Co., Inc.

Park J.W. 2005. Surimi & Surimi Seafood. Taylor & Francis Group.

Venugopal, V. 2006. Seafood processing.Taylor & Francis Group, LLC, Boca Raton, FL.

Shahidi, F. 2007. Maximising the value of marine by-products. CRC Press LLC. Boca Raton, FL.

Bremner, A. H. 2002. Safety and quality issues in fish processing. CRC Press LLC.Boca Raton, FL. Torger Bùrresen. 2008. Improving seafood products for the consumer. CRC Press LLC.Boca Raton, FL.