

COURSE SYNOPSIS

BACHELOR OF FOOD SCIENCE WITH HONOURS

BPKP KOD	PROGRAMMES OFFERED
HS04	Food Science & Nutrition
HY07	Food Technology & Bioprocessing
HG09	Food Service
HS05	Nutrition

FACULTY CORE COURSES

NT10102 FUNDAMENTALS OF FOOD SCIENCE AND NUTRITION

The course will provide students with some fundamental knowledge on various aspects of food science and nutrition. The key topics to be discussed include major components of food (macro and micronutrients), functionality of food components, processing and preservation, sensory evaluation, food safety and quality as well as balanced diets and energy metabolism.

References

- Brown, J. E. 2014. Nutrition Now. 7th Edition. Australia: Wadsworth CENGAGE Learning.
- Campbell-Platt, G. 2017. Food Science and Technology. Second edition. New Jersey: Wiley-Blackwell.
- Roday, S. 2012. Food Science and Nutrition. Second Edition. New Delhi: Oxford University Press.
- Thompson, J. & Manore, M. 2013. Nutrition for Life. Boston: Pearson.
- Vaclavik, V. A. & Christian, E. W. 2014. Essential of Food Science. New York: Springer.

NT10502 GENERAL MICROBIOLOGY

This course provides an introduction to a diversity of microbial cells, their structures and functions. Students will also learn on the microbial growth and control, microorganisms that cause diseases, the natural ecology of microorganisms and the beneficial application of microorganisms. A series of laboratory exercises are designed to enable student to develop basic microbiological skills in culture media preparation, aseptic techniques, microbial staining and microscope handling.

References

- Brown, A., Smith, H. 2015. Benson's Microbiological Applications: Laboratory Manual in General Microbiology. 13th Edition. New York: McGraw Hill.
- Hardin, J., Bertoni, G., Kleinsmith, L. J. 2017. Becker's World of the Cell. Boston: Pearson.
- Madigan, M. T., Martinko, J. M. Stahl, D. A. & Clark, D. P. 2012. Brock's Biology of Microorganisms. 13th Edition. Boston: Benjamin Cummings.
- Sherwood, L. M., Willey, J. M., Woolverton, C. J. 2013. Prescott's Microbiology. 9th Edition. Boston: McGraw-Hill.
- Tortora, G. J., Funke, B. R., Case, C. L. 2019. Microbiology: An introduction. 13th Edition. San Francisco: Pearson.

NT10902 ORGANIC CHEMISTRY

This course will discuss the principles of organic chemistry and the chemical reactions found in many applications including in 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. 2017. Organic Chemistry. 8th Edition. New Jersey: Pearson Prentice Hall.
- Carey, F. A. & Giuliano, R. M. 2016. Organic Chemistry. 10th Edition. New York: McGraw-Hill.
- Wade, L. G. (Jr) & Simek, J. W. 2017. Organic Chemistry. 9th Edition. Boston: Pearson.

Solomons, T. W. G., Fryhle, C. B. & Snyder, S. A. 2017. Organic Chemistry. 12th Edition. United States of America: John Wiley & Sons.

McMurry, J. 2016. Organic Chemistry. 9th Edition. United States of America: Cengage Learning Inc.

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.

References

Block S. B. & Hirt, G. A. 2009. Foundations of Financial Management. NY: McGraw-Hill. 13th Edition.

Ross, S. A. et al. 2007. Financial Management Fundamentals in Malaysia. Malaysia: McGraw-Hill. Second Edition.

Brigham, E. F. & Houston, J. F. 2010. Essentials of Financial Management. FL: Thomson.

NT11202 CALCULUS

This course contains basic concepts of calculus as introduction to the mathematics in order to solve problem by specific techniques. This course also covers topics such as: limits, continuity, differentiation, integration and the applications of differentiation and integration and techniques of integration.

References

Stewart, J. 2016. Calculus. 8th Edition. Brooks/Cole, Cengage Learning.

Larson, R. & Edwards, B. H. 2012. Calculus. 9th Edition. Singapore: 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. 9th Edition. Pearson. United State of America.

Smith R. T, Minton R. B. 2007. Calculus. McGraw-Hill: New York.

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 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. Lipid and amino acid metabolism will also be discussed.

References

Campbell, M. K. & Farrell, S. O. 2012. Biochemistry. 7th Edition. United States of America: Brooks/Cole.

Voet, D. & Voet, J. G. 2011. Biochemistry. 4th Edition. United States of America: John Wiley & Sons, Inc.

Garrett, R. H. & Grisham, C. M. 2013. Biochemistry. 5th Edition. United States of America: Brooks/Cole.

Pratt, C. W. & Cornely, K. 2011. Essential Biochemistry. Second Edition. United States of America: John Wiley & Sons, Inc.

Appling, D. R., Anthony-Cahill, S. J. & Mathews, C. K. 2016. Biochemistry–Concepts and Connections. Global Edition. Essex, United Kingdom: Pearson.

NT10402 ANALYTICAL CHEMISTRY

This course will introduce the students with theoretical and basic techniques on the procedures and practices associated with chemical analyses and relevant analytical instrumentation. Basic concepts and solving problems in analytical chemistry with regard to solution equilibria and electrochemistry, as well as the introduction to instrumental methods of analysis will also be discussed.

References

- Skoog, D. A., West, D. M., Holler, F. J. & Crouch, S. R. 2014. Fundamentals of Analytical Chemistry. 9th Edition. USA: Brooks/Cole, Cengage Learning.
- Christian, G. D., Dasgupta, P. K. & Schug, K. A. 2014. Analytical Chemistry. 7th Edition. USA: John Wiley and Sons, Inc.
- Beran, J. A. 2014. Laboratory Manual for Principles of General Chemistry. 10th Edition. Hoboken, New Jersey: John Wiley & Sons. Inc.
- Harris, D. C. 2016. Quantitative Chemical Analysis. 8th Edition. USA: W. H. Freeman.
- Harvey, D. 2000. Modern Analytical Chemistry. First Edition. Boston, USA: McGraw-Hill Companies.

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

- Shankar, R. 2014. Fundamentals of Physics: Mechanics, Relativity, and Thermodynamics. Yale University Press.
- Giancoli, D. C. 2016. Physics: Principles with Applications. 7th Edition. Pearson Education.
- Mazur, E. 2015. Principles & Practice of Physics. Pearson Education.
- Amato, J. C. & Galvez, E. J. 2015. Physics from Planet Earth - An Introduction to Mechanics. CRC Press.
- Merches, I. & Radu, D. 2014. Analytical Mechanics: Solutions to Problems in Classical Physics. CRC Press.
- Chow, T. L. 2013. Classical Mechanics. Second Edition. CRC Press.
- Vuille, C., Serway, R. A. & Faughn, J. S. 2009. College Physics. Brooks/Cole Cengage Learning, Canada.
- Giordano, N. J. 2010. College Physics: Reasoning and relationships. International Student Edition. Brooks/Cole Cengage Learning, Canada.
- Halliday, D., Resnick, R. & Walker, J. 2008. Fundamentals of Physics. 8th Edition. Wiley.
- Bueche, F. J. & Jerde, D. A. 2008. Principles of Physics. 9th Edition. McGraw Hill, US.

NT11403 FUNDAMENTALS OF MARKETING

This course aims to provide exposure to the core concepts of marketing as an important function in business to students. This course introduces the marketing concepts and elements of the marketing mix in one practical framework to achieve

understanding on the importance of marketing strategy in fulfilling customer needs so that a business organization is capable of maintaining its position in a competitive environment. This course focuses on the introduction of marketing, consumer behaviour and the marketing mix, the food retailing, wholesaling, promotion and marketing ethics.

References

- Kotler, Philip, & Armstrong, Gary. 2018. Principles of Marketing. Global Edition. 16th Edition. UK: Pearson Education.
- Kotler, Philip, & Armstrong, Gary. 2016. Principles of Marketing. Global Edition. 16th Edition. UK: Pearson Education.
- Kotler, Philip & Armstrong, Gary. 2010. Principles of Marketing. NJ: Pearson.
- Armstrong, Gary, Kotler, Philip, & da Silva, Geoffrey. 2006. Marketing: An Introduction, An Asian Perspective. UK: Pearson Education.
- Armstrong, G. & Kotler, P. 2008. Principles of Marketing. International Edition. 12th Edition. New Prentice-Hall: NJ.

NT11503 PRINCIPLES AND PRACTICES OF MANAGEMENT

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

Textbook

- Robbins. S. P., Coulter. Mary. 2017. Management , New York: Pearson Education, Inc. New Jersey. 14th Edition.

References

- Kinicki. A. & Williams. B. K. 2016. Management: A practical Introduction. McGraw-Hill Irwin, New York. 7th Edition.
- Bateman. T. S. & Snell. S. A. 2011. Management: Leading & Collaborating in a Competitive World. McGraw-Hill Irwin, New York. 9th Edition.
- Kamaluddin. Z., Hassan. Z., Wahab. R. A., Hussein. R. M. 2018. Principles of Management. Oxford University Press. Third Edition.
- Borges. W. G., Lee. S. L, Nagiah.R, Shishi. K. P, Ismail., M. N, Koon. V. Y., Ahmad. A. S., Ang. E. , Yusof. R. N, Sreenivasan. J. & Risidaxshinni. K. 2015. Principles of Management. SJ Learning.

NT20703 FOOD ANALYSIS AND 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 and acceptability of the food products. Students will be taught on preparation of chemicals and instruments to conduct the analyses. Analytical errors including those arising from impurity of chemicals, instruments and methods used will also be discussed. Students will learn how to report their laboratory results, findings and calculations. Proximate analyses, as well as the theory and 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.
- Nielsen, S. S. 2010. Food Analysis. 4th Edition. New York: Springer.
- Nielsen, S. S. 2010. Food Analysis Laboratory Manual. Second Edition. New York: Springer.
- Nollet, L. M. L. & Toldra, F. 2015. Handbook of Food Analysis. Third Edition. Boca Raton: CRC Press.
- Pomeranz, Y. & Meloan, C. E. 2000. Food Analysis: Theory and Practice. Third Edition. Gaithersburg: Aspen Publishers.
- Ötles, S. 2008. Handbook of Food Analysis Instruments. Boca Raton: CRC Press.

NT20903 FOOD CHEMISTRY AND BIOCHEMISTRY

This course covers introduction and fundamental knowledge of major food components such as water, carbohydrate, lipid, protein and other minor components, namely vitamins and mineral. Fundamental knowledge of enzyme, food pigments and flavour will also be covered. Students will be exposed to the chemistry aspect, classification, physico-chemical characteristics and functional properties of each of the component and relate with its application in food.

References

- Akoh, C. C. & Min, D. B. (ed.) 2008. *Food Lipids Chemistry, Nutrition, and Biotechnology*. Third Edition. Boca Raton: CRC Press Taylor & Francis Group.
- Belitz, H.-D., Grosch, W. & Schieberle, P. 2009. *Food Chemistry*. 4th revised and extended Edition. Garching: Springer.
- Damodaran, S., Parkin, K. L. & Fennema, O. R. (ed.). 2008. *Fennema's Food Chemistry*. 4th Edition. Boca Raton: CRC Press Taylor & Francis Group.
- McWilliams, M. 2005. *Foods Experimental Perspectives*. 5th Edition. Pearson Prentice Hall, New Jersey.
- Simpson, B. K., Nollet, L. M. L, Toldra, F., Benjakul, S., Paliyath, G. & Hui, Y. H (ed.) 2012. *Food Biochemistry and Food Processing*. Second Edition. Wiley-Blackwell, USA.
- Vaclavik, V. A. & Christian, E. W. 2003. *Essentials of Food Science*. Second Edition. Kluwer Academic/Plenum Publishers, New York.

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 20, 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

- Blitzstein, J. K. & Hwang, J. 2019. Introduction to Probability. Second Edition. CRC Press.
- Brian Williams. 2017. Biostatistics: Concepts and Applications for Biologists. CRC Press.
- Manly, B. F. J. & Navarro Alberto, J. A. 2016. Multivariate Statistical Methods: A Primer. 4th Edition. CRC Press.
- Nigam, A. K. 2015. Statistical Aspects of Community Health and Nutrition. CRC Press.
- Ekstrom, C. T. & Sørensen, H. 2014. Introduction to Statistical Data Analysis for the Life Sciences. Second Edition. CRC Press.
- Welham, S. J., Gezan, S. A., Clark, S. J. & Mead, A. 2014. Statistical Methods in Biology: Design and Analysis of Experiments and Regression. CRC Press.

- Coakes, S. J. 2012. SPSS version 20.0 for Windows. Analysis without anguish. Australia: John Wiley & Sons.
- 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.
- Paulson, D. S. 2008. Biostatistics and microbiology: A survival manual. Springer Science + Business Media, New York, USA.
- Campbell, M. J. & Swinscow, T. D. V. 2009. Statistics at square one. 11th Edition. BMJ Books & Wiley-Blackwell.
- Zar, J. H. 1999. Biostatistical analysis. 4th Edition. Prentice Hall International, Inc.

NT21303 PHYSICAL PROPERTIES OF FOOD

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 advanced courses, such as Unit Operation in Food Processing and Food Engineering.

References

- Rao, M. A. 2014. Engineering Properties of Foods. CRC Press.
- 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*. Second 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*. Second 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.

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

- Florkowski, W. J., Prussia, S. E., Shewfelt, R. L. & Brueckner, B. 2009. Postharvest Handling: A Systems Approach (Food Science and Technology). Second Edition. Elsevier's Science & Technology.
- Feiner, G. 2006. Meat Products Handbook : Practical science and technology. Woodhead Publishing Limited. Cambridge, England.

Rahman, M. S. 2007. Handbook of Food Preservation. Second Edition. Taylor and Francis Group. CRC Press.

Elhadi, M. Y. 2011. Postharvest biology and technology of tropical and subtropical fruits. Volume 3: Cocona to mango. Woodhead Publishing Limited, UK.

Pareek, S. 2018. Novel Postharvest Treatment of Fresh Produce. CRC Press. Taylor & Francis Group.

Damodaran, S. & Parkin, K. L. 2017. Fennema's Food Chemistry. 5th Edition. CRC Press. Taylor & Francis Group.

Golding, J. B. & Wills, R. B. H. 2015. Advances in Postharvest Fruit and Vegetable Technology. CRC Press. Taylor & Francis Group.

NT20203 FOOD MICROBIOLOGY

The course discusses the basic principles of food microbiology, which include scope of study, classification of microorganisms, existing of microflora in various foods and their source of contamination. Characteristic and 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 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 foodborne 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 the isolation, identification and enumeration of the major groups of microorganisms associated with food 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.

Montville, J. T., Matthews, K. R. & Kniel, K. E. 2017 Food microbiology: an introduction. 4th Edition. Washington: ASM Press.

Ray, B. & Bhunia, A. 2014. Fundamental food microbiology. 5th Edition. Boca Raton: CRC Press.

Roller, S. 2012. Essential microbiology and hygiene for food professionals. Boca Raton: CRC Press.

NT30903 FOOD PRESERVATION AND PROCESSING

This course is designed and conducted with the assumption that participants have possessed the fundamentals about the principles and techniques of food processing and preservation such as freezing, drying, blanching, pasteurizing, sterilizing, etc. In addition to topics stipulated in the course outline, the course also covers relevant and current issues. Students are required to understand the advantages and disadvantages for each of the processing and 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 (Third 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. Second 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. Second Edition. New York: Kluwer Academic/Plenum Publisher.
Sperber W. H & Doyle M. P. 1995. Compendium of the Microbiological Spoilage 135 of Foods and Beverages, Food Microbiology and Food Safety. Springer Science Business Media.

NT30503 INDUSTRY REVOLUTION AND RESEARCH METHODOLOGY

This course will introduce and expose the student to the concept and fundamental pillars of Industry Revolution 4.0 (IR4.0), in particular, the knowledge digitization and machine learning. The student will also be introduced to the systematic and structural outline in conducting research, such as data acquisition, research problem formulation, conducting an experiment, data analysis and writing scientific and academic manuscript effectively.

References

Day R. A. 1998. How to Write & Publish a Scientific Paper. Oryx Pres, Phoenix. Arizona.
Dharmapalan, B. 2012. *Scientific Research Methodology*. Alpha Science International.
Matthews, J. R. & Matthews, R. W. 2007. *Successful Scientific Writing: A Step-by-Step Guide for the Biological and Medical Sciences*. Third Edition. Cambridge University Press, Cambridge.
Panduan Penulisan Disertasi. 2008. Edisi ke-4, Sekolah Sains dan Teknologi, Universiti Malaysia Sabah. Kota Kinabalu.
Peat, J., Elliot, E., Baur, L. & Keena, V. 2002. *Scientific Writing: Easy When You Know How*. BMJ Book, London.
Schwab, K. 2016. *The Fourth Industrial Revolution*. World Economic Forum. Geneva.
UMS: Kerangka Revolusi Industri 4.0.
Bower, J. A. 2013. *Statistical Methods for Food Science: Introductory procedures for the food practitioner*. Second Edition. Blackwell Publishing Ltd.
Kumar, R. 2010. *Research Methodology: A Step-by-Step Guide for Beginners*. Third Edition. Sage Publications Ltd.
Leedy, P. D. & Ormrod, J. E. 2010. *Practical research – Planning and design*. New Jersey: Perason Education, Inc.
Sahu, P. K. 2013. *Research Methodology: A guide for researchers in agricultural science, social science and other related fields*. Springer India.

NT30703 FOOD SAFETY AND QUALITY CONTROL

This course emphasizes on the importance of food safety and quality assurance for the food industry. Among the food safety programs discussed include Hazard Analysis Critical Control Point (HACCP), Good Manufacturing Practice (GMP), ISO 22000 and Food Hygiene. In addition, students will be introduced with various aspects of quality assurance and its roles in food industry particularly on certain high-risk foods such as poultry and meat products, dairy products and vegetables/fruits. The basic tools of statistical quality control on sampling, inspection, and data organization are made palatable by using examples from the food industry to provide students with case study and promote critical thinking on quality issues. A variety of quality attributes and analytical techniques on objective evaluation based on instrumental measurement are also discussed.

References

Alli, I. 2013. *Food quality assurance: principles and practices*. Second Edition. Boca Raton: CRC Press.

Cramer, M. M. 2013. Food plant sanitation: design, maintenance, and good manufacturing practices. Second Edition. Boca Raton: CRC Press.

Ghonkrokta, S. S. 2017. Science and strategies for safe food. Boca Raton: CRC Press.

Mortimore, S. & Wallace, C. 2013. HACCP: a practical approach. Third Edition. New York: Springer.

Motarjemi, Y. & Lelieveld, H. 2014. Food safety management: A practical guide for the food industry. New York: Academic Press.

Vardeman, S. B. & Jobe, J. M. 2016. Statistical Methods for Quality Assurance. Second Edition. New York: Springer-Verlag.

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 and valid test results.

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. Second Edition. New York: Springer.

Meilgaard, M., Civille, G. V. & Carr, B. T. 2007. Sensory Evaluation Techniques. 4th Edition. Boca Raton, Florida: CRC Press.

Stone, H., Bleibaum, R. N. & Thomas. H. A. 2012. Sensory Evaluation Practices. 4th Edition. London: Elsevier.

NT40103 FOOD LEGISLATION AND 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 Trade Organization (WTO), Food & Drug Administration (FDA), the European Food Safety Authority 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 ISO 22000.

References

Food Act 1983 (Act 281) & Regulations (As at 1 February 2017). Petaling Jaya: International Law Book Services.

Clute, M. 2009. *Food industry quality control systems*. Boca Raton: CRC Press.

Understanding Codex. 2018. Food and Agriculture Organization of the United Nations and World Health Organization, Rome.

The Science of Food Standards. 2017. Food and Agriculture Organization of the United Nations and World Health Organization, Rome.

Alemanno, A. & Gabbi, S. 2014. Foundations of EU Food Law and Policy. Ashgate.

Trade Description Act 2011. Kuala Lumpur: International Law Book Services.

Malaysian Standard: MS1500: 2019. Standards Malaysia, Selangor.

PROGRAMME CORE COURSES

FOOD SCIENCE AND NUTRITION (HS04)

NP20303 HUMAN NUTRITION

This course provides an overview of fundamental knowledge in nutrition. Students will learn about nutrition standards and guidelines in Malaysia, nutrient requirements and function in humans, digestion and absorption of each nutrient in relation to the intake of a well-balanced and healthy diet, health risks of over consumption and deficiency of various nutrients.

References

- Geissler C, Powers H (eds.) 2005. *Human nutrition*. 11th Edition. Elsevier Churchill Livingstone.
- Gibney MJ, Lanham-New SA, Cassidy A, Vorster HH, 2009. Second Edition. *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 Edition. Boston Massachusetts: Mc-Graw Hill.
- Whitney, E.N, Cataldo, C.B & Rolfes, S.R. 2002. *Understanding Normal and Clinical Nutrition*. 6th Edition. Belmont, CA: Wadsworth.

NP20002 FOOD HABITS

Students will be exposed to food habits vis a vis culture, religion, traditional health beliefs, the environment and socio-economic situations. The course will also encourage students to try for themselves various types of foods within the allowance of their personal beliefs and practices.

References

- FAO, Human Nutrition in the Developing World <http://www.fao.org/DOCREP/W0073e/w0073e03.htm>.
- Laderman C. 1983. *Wives and midwives: childbirth and nutrition in rural Malaysia*. University of California Press.
- Jackson, P. 2015. *Anxious appetites: food and consumer culture*. Bloomsbury Pub.
- Poulain JP (Dorr A, transl.) 2017. *The Sociology of Food. Eating and the Place of Food in Society*. Bloomsbury Publishing.
- Sebastia B. 2017. *Eating traditional food: politics, identity and practices*. Routledge, Taylor & Francis.

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 the elderly.

References

- Brown, JE. 2014. *Nutrition through the life cycle*. Engage Learning.

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

Edelstein, S. 2015. *Life cycle nutrition: an evidence-based approach*. Jones & Bartlett Learning.

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.

NP20603 FUNCTIONAL FOOD

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.

Guo, M. 2009. *Functional Foods: Principles and Technology*. Cambridge: Woodhead Publishing Limited.

Johnston, I. & 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.

NP20403 FOOD PRODUCTION ECOSYSTEM

This course will provide technical knowledge on the interlinked and intensifying problems of climate change, ecosystem services degradation, and the need to double food production to sustain a growing global population. It describes the dominant influence of food production on ecosystems and the associated risk of ecosystems reaching tipping points beyond which they lose the ability to provide people with food and other vital services. It then offers two approaches to help conserve ecosystem services in a changing climate - a tool for integrating climate change and ecosystem service risks into decision making and a framework for reconciling food production and conservation goals. The course focus on how to meet food security and conservation goals for us to move from managing ecosystems for food at the expense of other ecosystem services to managing ecosystems for food plus other nature-based services.

References

Mahendra Shah et al. 2003. Chapter 6: Food and Ecosystem. *Ecosystems and Human Well-being: Policy Responses*. 175-209. World Resources Institute.

A. R. Holt et al. 2016. Food Production, Ecosystem Services and Biodiversity. *Journal of Science of the Total Environment*, Elsevier.

- A. G. Power. 2010. Ecosystem Services and Agriculture: tradeoffs and synergies. *Phil. Trans. R. Soc. B* (2010) 365, 2959–2971.
- J. Ranganathan & C.Hanson. 2010. *Tomorrow's Approach: Food Production and Ecosystem Conservation in a Changing Climate*. World Resources Institute.
- Hans R. Herren. 2009. *International Assessment of AKST for development (IAASTD)*.
- Elena M. Bennett. 2013. *Feeding the World: Ecosystem Services, Food Production and Sustainability*. McGill University.
- FAO. 2014. *Building a common vision for sustainable food and agriculture*. <http://www.fao.org/3/a-i3940e.pdf>
- FAO. 2014. *Ecosystem Services Sustain Agricultural Productivity and Resilience*. <http://www.fao.org/sustainability/en/>
- Miguel Altieri, *Agroecology. The Science of Sustainable Agriculture*. Westview Press, Second Edition.
- Michael Pollan. *In Defense of Food, An Eater's Manifesto*. The Penguin Press.
- David Pimentel. *Environmental and Economic Benefits of Sustainable Agriculture*, in *Socio-economic and Policy Issues for Sustainable Farming Systems*, 5–20 (Padova, Italy: Cooperativa Amicizia, 1993).
- D. Pimentel et al. *Environmental and Economic Costs of Reducing Pesticides Use*. *BioScience* 41, no. 6 (June 1991): 402–409.
- Environmental and Economic Costs of Pesticide Use*. *BioScience* 42, no. 10 (November 1992): 750–760.

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

- Gibson, R. S. 2005. *Principles of nutritional assessment*. Oxford university press, USA.
- Kandiah, M. & Z. M. Shariff. 2006. *A Handbook on Nutritional Assessment Methods*, August Publishing.
- Lee, R. & Nieman, D. C. 2013. *Nutritional assessment*. 6th Edition. McGraw-Hill.
- Mahan, L. K. 2008. *Krause's food, nutrition, & diet therapy*. S. Escott-Stump (12th Ed.). Philadelphia: Saunders.
- Tee, E. S., Ismail, M. N., Nasir, M. A. & Khatijah, I. 1997. *Nutritional Composition of Malaysian Foods*. Kuala Lumpur, Asean Food Habits Project.

NP30302 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

- Ashley, J. M. *Food Security in the Developing World*. 2016. Elsevier Academic Press.
- Geissler C & Powers H. 2011. *Human nutrition* (12th Edition.). Elsevier Churchill Livingstone.
- Leathers HD, Foster P. *The world food problem: toward ending undernutrition in the third world*. 4th Edition. Lynne Rienner Publishers Inc.
- Christoplos, I. & Pain, A. 2015. *New Challenges to Food Security*. Routledge.

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

- DeVries, J. 1997. Food safety and toxicity. CRC Press. New York.
- Pusa, T. 2014. Principles of Food Toxicology. CRC Press. New York.
- Shibamoto, T & Bjeldanes, L. F. 2009. Introduction to food toxicology. Academic Press. New York. Second Edition.
- Watson, D. 1998. Natural toxicants in food: manual for experimental foods. CRC Press. New York.
- Moffat, C & Whiffle, K. J. 1999. Environmental contaminants in food. CRC Press, New York.
- Tu, T. 1993. Food poisoning. Handbook of natural toxins. Vol. 7. Marcel Dekker Inc. New York.

NP30803 FOOD INNOVATION

This course emphasizes the importance of creativity and innovation in the food industry in order to meet the ever changing consumer needs. It gives students relevant practical experience problem solving whilst exploring the current trends of R & D in the food industry through 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 includes real problem solving project, with strong practical links to the need of industry and consumers. It provides a good grounding in the creative and practical aspects of innovation starting from an idea to the establishment of prototype through effective team collaboration.

References

- Ghosh, D., Das, S., Bagchi, D. & 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
- Martinez, M. G. 2013. Open innovation in the food and beverage industry. Cambridge: Woodhead Publishing.
- Moskowitz, H. R., Beckley, J. H. & 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. & Hofmann, K. 2014. Food industry design, technology and innovation. Iowa: John Wiley and Sons Ltd.

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 8 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 analytical techniques

References

- Garis Panduan Gaya Penulisan Pascasiswazah. 2014. Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah.
Panduan Penulisan Laporan Projek Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

NP30403 ENZYMES IN FOOD PROCESSING

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 to food systems. The basic aspects of the course include the basic chemical and kinetic properties of enzyme properties, factors that affect enzyme activity, and methods in measuring enzymatic activities. In addition, this course also exposes students in the determination of enzyme kinetic activities. In the other hand, the applied aspects focusing on the enzymes utilized by food industry, specifically in different major food industries such as milk and cheese, fish and meat, starch and sugar industry.

References

- Ackeah-Gyasi, N. A., Patel, P., Ducharme, J., Fan, H. Y., & Simpson, B. K. 2015. Enzymes and Inhibitors in Food and Health. In Cirillo, G., Gianfranco Spizzirri, U. & Lemma, F. (Eds.), In *Functional Polymers in Food Science: From Technology to Biology* (Volume 2): Food Processing, pp. 289-328. Scrivener Publishing LLC.
- Adhikari, S. 2019. Application of Immobilized Enzymes in the Food Industry. In *Enzymes in Food Biotechnology* (pp. 711-721). Academic Press.
- Aehle, W. 2004. *Enzymes in Industry: Production and Applications*. Weinheim: Wiley-VCH.
- 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 Dekker.
- 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*. Second Edition. Singapore: Wiley-Blackwell.
- Yada, R. Y. (Ed.). 2015. *Improving and Tailoring Enzymes for Food Quality and Functionality*. Elsevier.

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 asked 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 Penyerahan dan Penulisan Tesis/Disertasi Gaya UMS. Pusat Pengajian Pascasiswazah, Universiti Malaysia Sabah.

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

NP40012 INDUSTRIAL TRAINING

Students are required to undergo industrial training for twenty four weeks at food-related industry either in government or private sector that is relevant to the course study to gain the work experiences. This course also provides opportunities for students to demonstrate and strengthen their communication skill, to be able to work independently and as a team, take responsibilities and understand work ethics. Student's performance will be assessed by industrial supervisor and also by academic supervisor.

References

Panduan Latihan Industri. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.

FOOD TECHNOLOGY AND BIOPROCESSING PROGRAMME (HY07)

NB20003 UNIT OPERATIONS IN FOOD PROCESSING

This course introduces basic operational units in the 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,
- 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.
- Russly Abdul Rahman, 1995, *Asas Kejuruteraan Pemprosesan Makanan*, Kuala Lumpur: Dewan Bahasa dan Pustaka) ISBN 983-62-4198-1
- Fellows, P. J. 2003. Food Processing Technology. Principles and Practise. Cambridge: Woodhead Publishing Limited.
- Heldman, D.R. and Lund, D.B. 2007. Handbook of Food Engineering. Boca Raton: Taylor and Francis Group, LLC.
- Singh, R. P. and Heldman, D. R. 1993. Introduction to Food Processing. Second Edition. Academic Press Limited, London.
- Vieira, M. and Ho, P. 2008. Experiments in unit operations and processing of foods. New York: Springer Science Business Media, LLC

NB20403 BIOPROCESSING TECHNOLOGY

Bioprocess Technology, a sub-discipline within biotechnology that combines living matter, in the form of organisms 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 feedstock used in bioprocesses and the functional food ingredients derived from the feedstock will also be addressed.

References

- 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.
- Panesar, P. S., Marwaha, S. S. 2014. Biotechnology in agriculture and food processing: opportunities and challenges. Boca Raton: CRC Press.
- Ravindra, P. 2015. Advances in bioprocess technology. Springer.
- 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 of 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 chemical and kinetic properties of enzyme, factors that affect enzyme activity and methods of measuring enzymatic activities. On the other hand, the applied aspects focusing on the enzymes used by the food industry and methods in measuring the enzyme activities.

References

- Ackaah-Gyasi, N. A., Patel, P., Ducharme, J., Fan, H. Y., & Simpson, B. K. 2015. Enzymes and Inhibitors in Food and Health. In Cirillo, G., Gianfranco Spizzirri, U. & Lemma, F. (Eds.), In Functional Polymers in Food Science: From Technology to Biology (Volume 2): Food Processing, pp. 289-328. Scrivener Publishing LLC.
- Adhikari, S. 2019. Application of Immobilized Enzymes in the Food Industry. In Enzymes in Food Biotechnology (pp.711-721). Academic Press.
- Aehle, W. 2004. Enzymes in Industry: Production and Applications. Weinheim : Wiley-VCH.
- 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 Dekker.
- 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.
- Yada, R. Y. (Ed.). (2015). Improving and Tailoring Enzymes for Food Quality and Functionality. Elsevier.

NB20603 FOOD PACKAGING

Fundamental principles in food packaging will be discussed in this course. Among the topics discussed are the functions and levels of packaging, types and properties of common packaging material, as well as safety and environmental issues of packaging. Students will also be exposed to the evolution and innovations in the food packaging system to suit the market demand. The most up-to-date developments, trends and current issues in food packaging will be highlighted.

References

- Arvanitoyannis, I.S. 2012. Modified Atmosphere and Active Packaging Technologies. Boca Raton: CRC Press.
- David, J.R.D., Graves, R.H. & Szemplenski, T. 2013. Handbook of Aseptic Processing and Packaging. Boca Raton: CRC Press.
- Han, J.H. 2014. Innovations in Food Packaging. Amsterdam: Elsevier Academic Press.
- Kerry, J.P. 2012. Advances in Meat, Poultry and Seafood Packaging. Cambridge: Woodhead Publishing Limited.
- Robertson, G.L. 2013. Food Packaging: Principles and Practice. Boca Raton: CRC Press.

NB40012 INDUSTRIAL TRAINING AND SEMINAR

Students are required to undergo industrial training for twenty four weeks at food-related industry either in government or private sector that is relevant to the course study to gain work experiences. This course also provides opportunities for students to demonstrate and strengthen their communication skill, to be able to work independently and as a team, take

responsibilities and understand work ethics. Student's performance will be assessed by the industrial supervisor and also by the academic supervisor.

Reference

Panduan Latihan Industri (FSMP)

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.

Barbosa-Cánovas, G. V., Zhang, H. Q. & Tabilo-Munizaga, G. 2001. *Pulsed Electric Fields in Food Processing*. Technomic Publishing, Lancaster.

Doona, C. J., Kenneth Kustin, K. & Feeherry, F. E. 2010. *Case Studies In Novel Food Processing Technologies*. Woodhead Publishing, Oxford.

Fan, X. & Sommers, C. H. 2012. *Food Irradiation Research and Technology*. Wiley-Blackwell, USA.

O'Donnell, C., Tiwari, B.K., Cullen, P.J., & Rice, R.G. 2012. *Ozone in Food Processing*. Blackwell Publishing Ltd., UK

Sun, D-W., 2005. *Emerging Technologies for Food Processing*. UK: Elsevier

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 in the course include the 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 flavour. 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 the fermentation process in the 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 decided 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 Penyelidikan. 2015. Fakulti Sains Makanan dan Pemakanan, Universiti Malaysia Sabah.
- Scientific writing : thinking in words 2011, David Lindsay

NB30903 FOOD ENGINEERING

The synopsis of the course ranges from basic engineering principles to several applications in food processing. Within the first four chapters, the concepts of mass and energy balance, thermodynamics, fluid flow and heat transfer are introduced. The next four chapters include applications of thermodynamics and heat transfer such as dehydration, evaporation (concentration of liquid foods), refrigeration, freezing processes. Finally, several topics related to separation processes whether liquid-liquid or liquid-solid are introduced such as membrane separation, centrifugation and sedimentation.

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.
- Fryer, P.J. 1996. Chemical Engineering for the Food Industry. London: Chapman and Hall.
- Lydersen, B., DiElia, N.A. & Nelson, K.L. 1994. Bioprocess Engineering: Systems, Equipment And Facilities. Singapore: John Wiley & Sons (Asia).
- Spieß, W.E.L., & Schubert, H. 1990. Engineering and Food: Advanced Processes. London: Blackie Academic & Professional.

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.
- Scientific writing : thinking in words 2011, David Lindsay

NB40703 BIOSEPARATION

This course covers the essential and important downstream processing as part of bioprocess in the food 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. *Bioseparation of Proteins Unfolding/Folding and Validation*. Academic Press, San Diego, California. USA.

Wheelwright, S.M. 1991. *Protein Purification: Design and Scale Up of Downstream Processing*. A Wiley Interscience Publication. John Wiley & Son, Inc. New York.

Ahmed, H. (2005). Principles and reactions of protein extraction, purification and characterization. pp 43-45. Boca Raton, Florida: CRC Press.

NB20703 HUMAN NUTRITION

This course provides an overview of fundamental knowledge in nutrition. Students will learn about nutrition standards and guidelines in Malaysia, nutrient requirements and function in humans, digestion and absorption of each nutrient in relation to the intake of a well-balanced and healthy diet, 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 SERVICE PROGRAMME (HG09)

NF10203 FOOD SERVICE ENTREPRENEURSHIP

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 relevant to foodservice.

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)
Keusahawanan: Inovasi dan Perniagaan.(2012). Shuhairimi Abdullah, Ku Halim Ku Ariffin, Julinawati Suanda, Ahmad Zulhusny Rozali, Mohd. Mizan Mohammad Aslam Azizi Halipah, Abdul Jalil Ramli and Azlini Hassan. Universiti Malaysia Perlis.

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.
Payne-Palacio, J. & Theis, M. (2014). Foodservice Management: Principles and Practice. Prentice Hall.
Reynolds, D & McClusky, K. W. (2013). Foodservice Management Fundamentals. Wiley.
Sanders, E. E., Hill, T. H., & Faria, D. J. (2008). Understanding Foodservice Cost Control: An Operational Text for Food, Beverage, and Labor Costs. Prentice Hall.

NF10003 EASTERN AND WESTERN COOKERY

This course provides an opportunity for students to recognize and learn cooking recipes 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
Schmidt, 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 /CDConklin, Alfred Russel, 1941. *World food: production and use*. Hoboken, N.J. : Wiley-Interscience, c2007

NF20303 HUMAN NUTRITION

This course provides an overview of fundamental knowledge in nutrition. Students will learn about nutrition standards and guidelines in Malaysia, nutrient requirements and function in humans, digestion and absorption of each nutrient in relation to the intake of a well-balanced and healthy diet, 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.

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 that included 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. Kittler, Goyan, Pamela & Sucher, P. Kathryn (2012) *Food and Culture*. Australia: Thomson/Wadsworth
- Edelstein, Sari (2011) *Food, Cuisine and Cultural Competency for Culinary, Hospitality and Nutrition Professionals*. USA: Jones and Bartlett Publishers, LLC.
- 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.

NF20203 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

- McWilliams, M. (2008). *Foods: Experimental Perspectives*.
- Brown, A. (2015). *Understanding Food Principles and Preparation*. Cengage Learning.
- McGee, H. (2014). *On Food and Cooking*. Scribner.
- Barham, P. (2001). *The Science of Cooking*. Springer.
- Sibel, O. Z. (2015). *Cooking as a Chemical Reaction: Culinary Science with Experiments*. CRC Press.
- Wolke, R. L. (2002). *What Einstein Told His Cook: Kitchen Science Explained*. W. W. Norton & Co.
- Lister, T. & Blumenthal, H. (2005). *Kitchen Chemistry*. Royal Society of Chemistry.

NF20202 INTERNATIONAL BUSINESS

Globalization has led to an intense growth in cross-border transactions as individuals, firms and governments engage in international business. Therefore, a study of international business is needed by students to understand the complexities of cross-border transactions and how firms face the challenges of globalization. This course will provide an overview of the international business environment, the opportunities and the risks that firms encounter when they do business internationally. Such knowledge will enable students to advise or manage businesses that plan to compete in the international market.

Reference

- Hill, Charles W. L. (2018). *International Business: Competing in the Global Marketplace (11th Edition)*. New York, NY: McGraw-Hill/Irwin
- 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. 2013. *International Business: The New Realities*. New Jersey: Pearson Education, Inc.
- Cavusgil, S.T., Knight, G. & Riesenberger, J.R. (2012). *International Business: the new realities*, 2nd edition Pearson Education.
- Daniels, J. D., Radebaugh, L.H. & Sullivan, D.P. 2013. *International Business: Environments and Operations*. Essex, England: Pearson Education Limited.
- Czinkota, M.R., Ronkainen, I.A. & Moffett, M.H. 2011. *International Business*. Hoboken, NJ: John Wiley & Sons.
- Fariza Hashim, Abdul Rahim Abu Bakar & Asmat Nizam Abdul Talib. 2010. *International Business*. Kuala Lumpur: Oxford Fajar Sdn Bhd.

NF30103 MENU DEVELOPMENT

This course covers on planning, preparing and developing a menu that suits to a foodservice organization. Students will be exposed to the menu which are available, the recent trends, standard recipes and its uses, and cost calculation. This course also introduces students to the principles of menu designing.

Reference

- McVety, P. J., Ware, B. J., and Ware, C. L. 2009. *Fundamentals of Menu Planning*, 3rd Edition. New Jersey: Wiley & Sons.

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 & Sons.

Dopson, L.R. and Hayes, D.K. 2016. *Food & Beverage: Cost control*, 6th edition. New Jersey: Wiley & Sons.

Traster, D. 2018. *Foundations of Menu Planning*, 2nd edition. Pearson Education.

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 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 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 foodservice 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 experience in organizing foodservice event/function from its planning until event's 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.
- Payne-Palacio, J. & Theis, M. (2014). Foodservice Management: Principles and Practice. Prentice Hall.
- Reynolds, D & McClusky, K. W. (2013). Foodservice Management Fundamentals. Wiley.
- Reynolds, D. E. (2003). On-Site Foodservice Management: A Best Practices Approach. John Wiley and Sons.

NF30403 ARRANGEMENT, DESIGN AND EQUIPMENT FOR FOOD SERVICE

This course is designed to provide students with the introduction of the kitchen and dining area design and its functions. They will be trained to plan and develop kitchen layout including its equipment that suitable for food service institutions. This course is designed for students understand the importance of building safety, equipment, systems of energy use, the students also learn about safety practices and HACCP compliance layout

Reference

- John C. Birchfield, Raymond T. Sparrowe. 2008. Design and Layout of Foodservice Facilities, 3rd edition. USA: John Wiley & Sons.
- 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, 2 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 NF 00202 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 dissertation which will be submitted for examination by two examiners (not including the supervisor) who will be appointed by the course coordinator. All dissertations 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

This course provides exposure on principles and theory of quantity purchasing, whereby aspects such as specifications required in the selection of meat, fish, vegetables, fruits and others. In addition on making a purchase, the students will be exposed to the method of acceptance, receiving, selection and operational costing.

Reference

[Andrew, H. Feinstein](#), John M. Stefanel. 2012 Purchasing: Selection and Procurement for the Hospitality Industry, 8th 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. Prentice 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 emphasizes 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 Assessment. 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: Churchill Livingstone

Townsend, C.E. and Roth, R.A. 200. Nutrition and Diet Therapy. 7th ed. Boston: Delmar Publisher.

NF40012 INDUSTRIAL TRAINING

Students are required to undergo industrial training for twenty four weeks at food-related industry either in government or private sector that is relevant to the course study to gain the work experiences. This course also provides opportunities for students to demonstrate and strengthen their communication skill, to be able to work independently and as a team, take responsibilities and understand work ethics. Student's performance will be assessed by industrial supervisor and also by academic supervisor.

Reference

Panduan Latihan Industri (FSMP)

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). Prentice 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. Accounting for Non-accounting Students (6th edition). Prentice Hall.

NUTRITION PROGRAMME (HS05)

NN10003 PATHOPHYSIOLOGY

This course is a continuation of the physiology component of NN10103 (Anatomy and Physiology) taken in the first semester. This semester, emphasis is on human pathophysiology, including aetiology, prognosis, medical treatment, signs and symptoms of common diseases of all body systems.

References

- Berkowitz A. 2007. *Clinical pathophysiology made ridiculously simple*. ISBN-13: 978-0940780804.
- Hammer GD, McPhee SJ. 2011. *Pathophysiology of disease. An introduction to clinical medicine*. 7th ed. Lange Medical Books. ISBN-13: 978-0071806008.
- Nelms M, Sucher KP, Lacey K, Roth SL. 2010. *Nutrition therapy and pathophysiology*. 2nd ed. Thomson Wadsworth. ISBN-13: 978-1439049624.
- Preston RA. 2010. *Acid-base, fluids, and electrolytes made ridiculously simple*. 2nd ed. ISBN-13: 978-0940780989.

NN10202 INTRODUCTION TO PSYCHOLOGY

This course is designed for nutrition students to be comfortable with psychology in preparation for nutrition counseling. Nutritional psychology is an emerging field of work that is a specialization in the field of health psychology. The aims of this course is to provide basic knowledge to the field of psychology such as the history of psychology, the main goals in psychology, psychological theories, neuroscience and biological foundations of behavior and research method in psychology for nutrition students. This basic knowledge can enhance students' understanding to the field of psychology as the scientific study of behavior and mental processes.

References

- Ciccarelli S. K., & White J. N.(2016).Psychology (5th Ed.). USA: Pearson
- Friedman HS, Silver RC. 2002. *Foundations of health psychology*. 1st ed. Oxford University Press. ISBN-13: 9780195139594.
- Kosslyn SM, Rosenber RS. 2010. *Introducing psychology: brain, person, group*. 4th ed. Pearson Education. ISBN9780558882846.
- Plotnik, R. & Kouyoumdjian, H. (2011). Introduction to psychology.9th ed. Cengage Wadsworth. ISBN 978-0-495-908661.
- Stangor C. 2010. *Introduction to psychology*. Available for free online under Creative Commons licensing, courtesy of Charles Stangor and the Saylor Foundation.
- Weiten W. 2014. *Psychology: themes and variations, briefer versions*. 9th ed. Cengage Wadsworth.

NN10303 PRINCIPLES OF HUMAN NUTRITION

This course provides an overview of fundamental knowledge in nutrition. Students will learn about nutrition standards and guidelines in Malaysia, nutrient requirements and function in humans and health risks of over consumption and deficiency of various nutrients. In tandem with the NN10104 (Anatomy and physiology) course, students will be exposed to the digestion and absorption of each nutrient in relation to the intake of a well-balanced diet.

References

- Geissler C & Powers H. *Human nutrition (12th ed.)*. 2010. Elsevier Churchill Livingstone. eBook ISBN: 9780702060885; eBook ISBN: 9780702044373
- 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*. 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.

NN10403 BASIC PHARMACOLOGY

This course provides basic concepts, principles, drug administration and calculations in pharmacology for nutrition students. Food/nutrient – drug interaction will be discussed. When over 85% of chronic diseases and disabilities that older adults develop could have been prevented by nutrition interventions, the ability to understand pharmacology is important for nutritionists to be able to work in an increasingly interdisciplinary approach to health. Legal and ethical issues pertaining to drugs will also be discussed.

References

- Brown M, Mulholland JL. 2011. *Drug calculations: ratio and proportion problems for clinical practice (drug calculations companion)*. 9th ed. Mosby. ISBN-10: 0323077501, ISBN-13: 978-0323077507.
- Boullata J, Armenti VT. 2009. *Handbook of drug – nutrient interactions (nutrition and health)*. 2nd ed. Humana Press. ISBN-10: 1603273638, ISBN13-978-1603273633.
- Cupp MJ, Tracy TS. 2002. *Dietary supplements: toxicology and clinical pharmacology (forensic science and medicine)*. Humana Press. ISBN-10: 158829014X, ISBN-13: 978-1588290144.
- Giangrasso A, Shrimpton D. 2013. *Ratio and proportion dosage calculations*. 2nd ed. Prentice Hall. ISBN-10: 0133107205, ISBN-13: 978-0133107203.
- Holland N, Adams M, Brice J. 2014. *Core concepts in pharmacology*. 4th ed. Prentice Hall. ISBN-10: 0133449815, ISBN-13: 978-0133449815.
- Hollands N, Adams M. 2014. *Student workbook and resource guide to core concepts in pharmacology*. 4th ed. Prentice Hall. ISBN-10: 0133804496, ISBN-13: 978-01338-4492.
- Hua TC, Liu BL. 2010. *Freeze-drying of pharmaceutical and food products. Woodhead publishing series in food science, technology and nutrition*. 1st ed. Woodhead Publishing. ISBN-10: 1845697464, ISBN-13: 978-1845697464.
- IUBMB (au), Fraga CG (ed). 2009. *Plant phenolics and human health. Biochemistry, nutrition, and pharmacology*. 1st ed. Wiley. ISBN-10: 0470287217, ISBN-13: 978-0470287217.
- Kohlstadt I (ed.) 2012. *Advancing medicine with food and nutrients*. 2nd ed. CRC Press. ISBN-10: 1439887721, ISBN-13: 978-1439887721.
- McCabe-Sellers B, Frankel EH, Wolfe JJ. (eds.) 2003. *Handbook of food – drug interactions (nutrition assessment)*. CRC Press. ISBN-10: 084931531X, ISBN-13: 978-0489315312.
- Otles S. 2013. *Probiotics and prebiotics in food, nutrition and health*. CRC Press. ISBN-10: 1466586230, ISBN-13: 978-1466586239.

- Pronsky ZM, Elbe D, Ayoob K, Crowe JP, Epstein S, Roberts WH. 2015. *Food medication interactions*. 18th ed. Food Medication Interactions. ISBN-10: 0971089663, ISBN-13: 978-0971089662.
- Richard C, Kudsk KA. 2002. *From nutrition support to pharmacologic nutrition in the ICU (update in intensive care medicine)*. Springer. ISBN-10: 3540426043, ISBN-13: 978-3540426042.
- Shlafer M. 2010. *Pharmacology: pretest self-assessment and review*. 13th ed. McGraw-Hill Medical. ISBN-10: 0071623426, ISBN-13: 978-0071623421.
- Stargrove MB, Treasure J, McKee DL. 2007. *Herb, nutrient and drug interactions: clinical implications and therapeutic strategies*. 1st ed. Mosby. ISBN-10: 0323029647, ISBN-13: 978-0323029643.
- Talbott SM. 2003. *A guide to understanding dietary supplements (nutrition, exercise, sports and health)*. 1st ed. Routledge. ISBN-10: 0789014556, ISBN-13: 978-0789014559.
- Talbott SM, Hughes K. 2006. *The health professional's guide to dietary supplements*. 1st ed. LWW. ISBN-10: 0781746728, ISBN-13: 978-0781746724.

NN10503 FOUNDATIONS OF COMMUNICATION

This course provides an overview of the basic concepts of communication and the skills necessary to communicate in a variety of contexts. Emphasis is placed on communication theories and techniques used in interpersonal, group, public, intercultural and mass communication situations.

References

- Baran SJ, Davis DK. 2010. *Mass communication theory: foundations, ferment and future*. 7th ed. Wadsworth.
- Miller K. 2005. *Communication theories: perspectives, process and context (2nd ed)*. McGraw Hill.
- Real MR. 1996. *Exploring media culture: a guide*. SAGE Publications.
- Rogers EM. 1994. *A history of communication study: a biographical approach*. 3rd ed. New York: The Free Press.
- Samsudin A. Rahim 2003. *Komunikasi asas*: Dewan Bahasa & Pustaka.
- Other books and journal articles related to this course, as given during teaching and learning activities.*

NN10603 BIostatistics

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, 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

- Campbell MJ, Swinscow TDV. 2009. *Statistics at square one*. 11th ed. BMJ Books.
- Campbell MJ. 2006. *Statistics at square two: understanding modern statistical applications in medicine*. 2nd ed. BMJ Books. ISBN-10: 1405134909, ISBN-13: 978-1405134903.
- Dupont WD. *Statistical modeling for biomedical researchers. A simple introduction to the analysis of complex data*. 1st ed. ISBN-10: 0521655781, ISBN-13: 978-05216655781.
- Einspruch, E.L. 2005. *An Introductory Guide to SPSS® for Windows®, Second Edition*. SAGE publications Inc., California, USA.

- Ellis PD. 2010. *The essential guide to effect sizes. Statistical power, meta-analysis, and the interpretation of research results*. 1st ed. Cambridge University Press. ISBN-10: 0521142466, ISBN-13: 978-0521142465.
- Friss RH. 2010. *Epidemiology 101*. Jones & Bartlett Learning. ISBN 978-0-7637-5443-3.
- McKillup, S. 2005. *Statistics Explained: An Introductory Guide for Life Scientists*. Cambridge University Press, Cambridge, UK.
- Paulson, D.S. 2008. *Biostatistics and Microbiology: A Survival Manual*. Springer Science + Business Media, New York, USA.
- Samuels ML, Witmer JA. 2003. *Statistics for the life sciences*. 3rd ed. New Jersey: Perason Education Inc (UMS Library QH 323.5.S23)
- Vittinghoff E, Glidden DV, Shiboski SC, McCulloch CE. 2012. *Regression methods in biostatistics: linear, logistic, survival and repeated measures models. (Statistics for biology and health)*. 2nd ed. Springer. ISBN-10: 1461413524, ISBN-13: 978-1461413523.
- Note: The following are guidebooks on usage of statistical softwares. The SPSS software is available in UMS. Students may also wish to consider other statistical softwares in their own time. The softwares listed here are often used for health research.
- Coakes SJ. 2012. *SPSS version 20.0 for Windows. Analysis without anguish*. Wiley. ISBN: 978-1-118-337776-9.
- Cody R. 2007. *Learning SAS by example: a programmer's guide*. SAS Institute. ISBN-10: 1599941651, ISBN-13: 978-1599941653.
- Cody R. 2011. *SAS statistics by example*. 1st ed. SAS Publishing. ISBN-10: 1607648008, ISBN-13: 978-160764800.
- Delwiche L, Slaughter S. *The little SAS book: a primer*. 5th ed. SAS Institute. ISBN-10: 1612903436, ISBN-13: 978-1612903439.
- Juul S, Frydenberg M. 2014. *An introduction to Stata for health researchers*. 4th ed. Stata Press. ISBN-10: 1597181358, ISBN-13: 978-1597181358.
- Long JS. 2008. *The workflow of data analysis using Stata*. Stata Press. ISBN-10: 1597180475, ISBN-13: 978-1597180474.

NN20004 NUTRITIONAL STATUS ASSESSMENT

This course is about assessment of the nutritional status of individuals, households and at the country level using the A, B, C, D of nutritional assessment; anthropometry, biochemistry, clinical and dietary intake. Assessment of food security will also be discussed.

References

- Charney P, Malone AM. 2004. *ADA pocket guide to nutrition assessment*. 2nd ed. Amer Dietetic Assn. ISBN-10: 0880914211, ISBN-13: 978-0880914215
- Driskell, J.A, Wolinsky, I. 2002. *Nutritional Assessment of Athletes*. Boca Raton, Fla. : CRC Press.
- Gibson RS. 2005. *Principles of nutritional assessment*. 2nd ed. Oxford University Press.
- Kandiah, M. 2007. *Handbook on Nutritional Assessment Methods*. Subang Jaya: Selangor.
- Lee RD & Nieman DC. 2012. *Nutritional Assessment*. 6th ed. McGraw-Hill International Edition.
- Moore, M.C. 2005. [Pocket guide to nutritional assessment and care](#). Elsevier Mosby.
- 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. 1999. *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.

NN20103 BEHAVIOUR AND HEALTH

This course discusses behaviour and health in context of nutrition. This includes evidence that nutritional status and/or the intake of specific nutrients can influence behaviour and health and that conversely, behavior, with emphasis on eating behaviour, can affect nutritional status and health.

References

- Costin, C. (2007). *The eating disorder sourcebook: A comprehensive guide to the causes, treatments, and prevention of eating disorders* (3rd ed.). New York: McGraw-Hill.
- Dovey, T. (2010). *Eating behaviour*. Maidenhead, Berkshire, England: McGraw Hill/Open University Press.
- Jones, K., & Creedy, D. (2012). *Health and human behaviour* (3rd ed.). South Melbourne, Vic.: Oxford University Press.
- Preedy, V. (2011). *Handbook of behavior, food and nutrition*. New York: Springer.
- Worobey, J., & Tepper, B. (2006). *Nutrition and behavior a multidisciplinary approach*. Wallingford, UK: CABI Pub.

NN20203 NUTRITIONAL ANTHROPOLOGY

This course provides a basic introduction to anthropological theory for nutrition students. Students are introduced to anthropology's four-field modes of inquiry, cross-cutting theoretical approaches and thematic interest groups, their respective institutions and intellectual concerns. Then students will be required to think about applications of these concepts and methods to food and nutrition issues. There will be one assignment which requires students to do an anthropological literature review on a food and nutrition matter that interests them. For example, the political economy of food and nutritional requirements in Malaysia. This course encourages critical thinking and scientific assessment of anthropology's evidence base, analytical tools, logic, and meaning-making, in the context of understanding multi-disciplinary research if they wish to pursue it in the future.

References

- Anderson EN. 2005. *Everyone eats*. New York University Press.
- Byrant CA, DeWalt KM, Courtney A. 2003. *The cultural feast: an introduction to food and society*. 2nd ed. ISBN-13: 978-0534525828.
- Candlish, J. et al. 2003. *Nice or Nasty: Food Choice, Food Law and Health in South East Asia*. Thomson, Singapore.
- Cheung, S.C. et al. 2007. *Food and Food Ways in Asia: resource, tradition and cooking*. Routledge Taylors & Francis Group.
- Counihan, C. et al. 2008. *Food and Culture: a reader*. Routledge Taylors & Francis Group.
- DuFour DL, Goodman AH, Pelto GH. 2012. *Nutritional anthropology: biocultural perspectives on food and nutrition*. 2nd ed. Oxford University Press. ISBN-13: 978-0199738144.
- Hartog, A.P. et al. 2006. *Food Habits and Consumption in Developing Countries*. Wageningen Academic Publishers, The Netherlands.
- Jing J. (ed.). 2000. *Feeding China's little emperors: food, children and social change*. ISBN-13: 978-0804731348.
- Pelto GH, Pelto PJ, Messer E. (eds.) 1989. *Research methods in nutritional anthropology*. Hong Kong: United Nations University Press. (this book is available for free download at <http://www.unu.edu/unupress/unupbooks/80632e/80632E00.htm#Contents>)
- Pollan M. 2008. *In defense of food*. Penguin Books.
- Wadlaw, G.M. 2003. *Contemporary Nutrition: Issues and Insight*. 5th Ed. USA: McGraw-Hill Publication.
- Watson, J. et al. 2005. *The Cultural Politics of Food and Eating*. Blackwell Publishing.

NN20303 NUTRITION THROUGH 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. Methods of nutritional assessment specific for each age group will also be covered.

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.
- Garrow, JS., James WPT, Ralph A. 2000. *Human Nutrition and Dietetics (10th ed)*. UK: Churchill Livingstone.
- Grosvenor, MB & Smolin LA. 2002. *Nutrition, From Science to Life*. US: Harcourt College Pub.
- Lee, R.D & Nieman, D.C. 2003. *Nutritional Assessment*. 3rd ed. Boston, MA: McGraw-Hill.
- Suriah Abdul Rahman & Tengku Aizan Hamid. 2001. *Pemakanan Warga Tua*. KL: DBP.
- Wardlaw, G.M. 2000. *Contemporary Nutrition: Issues & Insights*. 4th ed. Boston Massachusetts: Mc-Graw Hill.

NN20403 IMMUNOLOGY

This course covers principles and issues related to nutrition and immunology, the impact of nutrients and nutritional status on immune responses as well as the impact of disease states on nutritional status.

References

- Bender, D.A. 2014. *Introduction to Nutrition and Metabolism, 5th ed*. Boca Raton, FL: CRC Press.
- Gropper, S.S, Smith, J.L, Groff, J.L. 2008. *Advanced Nutrition and Human Metabolism*. Belmont: Wadsworth.
- Lehninger, AL., Nelson DL, Cox MMs. 2013. *Lehninger Principles of Biochemistry*. New York: W.H. Freeman.
- Murphy, K, Travers, P, Walport, M. 2008. [JaneWAY's Immunobiology](#), 7th ed. New York: Garland Science, Taylor and Francis Group.
- Roitt, I.M, Martin, S.J, Delves, P.J. 2006. [Roitt's Essential Immunology](#), 11th ed. Grand Rapids: Blackwell Publishing Limited.
- [Sompayrac](#), L.M. 2012. *How the Immune System Works, 4th ed*. Grand Rapids: Wiley-Blackwell.

NN20503 PRINCIPLES OF FOOD PREPARATION

This course is designed to help students understand the scientific, cultural and technical principles behind meal preparation. Students would then be tasked to modify and adapt commonly consumed foods to make them more nutrient dense.

References

- Payne-Palacio J & Theis M. 2009. *Introduction to Foodservice*. London: Prentice Hall
- NCCFN. 2010. *Malaysian dietary guidelines*. Putrajaya: Ministry of Health.
- NCCFN. 2013. *Malaysian dietary guidelines for children and adolescents*. Putrajaya: Ministry of Health.

NN20604 ADVANCED NUTRITION

Nutrient metabolism and biochemical pathways; normal and disease states, nutritional disorders including non-communicable diseases. This course will enable students to understand the objective, scope and principles of biochemistry in relation to human nutrition and the biological processes and systems as applicable to nutrition.

References

- Bender, D.A. 2014. *Introduction to Nutrition and Metabolism, 5th ed.* Boca Raton, FL: CRC Press.
- Garrow JS, James WPT, Ralph. 2000. *Human Nutrition and Dietetics, 10th ed.* London: Churchill Livingstone.
- Gibney MJ, Lanham-New SA, Cassidy A, Vorster HH, 2009. *Introduction to Human Nutrition, 2nd ed.* The Nutrition Society Text Book Series. Wiley-Blackwell.
- Gropper, S.S, Smith, J.L, Groff, J.L. 2008. *Advanced Nutrition and Human Metabolism.* Belmont: Wadsworth.
- Lehninger, Albert L., David L. Nelson, and Michael M. Cox. 2013. *Lehninger Principles of Biochemistry.* New York: W.H. Freeman.
- Zubaidah Haji Abdul Rahim. 1992. *Pemakanan-Pendekatan Dari Segi Biokimia.* Kuala Lumpur: DBP.

NN30104 MEDICAL NUTRITION THERAPY

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

References

- Garrow, J.S. James WPT, Ralph A. 2000. *Human Nutrition and Dietetics.* 10th ed.). UK: Churchill Livingstone.
- Lee, R.D & Nieman, D.C. 2003. *Nutritional Assessment.* 3rd ed. Boston, MA: McGraw-Hill.
- Nelms, M, N., & Anderson, S, L. 2004. *Medical Nutrition Therapy.* 2nd ed.. Thomson/Wardsworth, USA.
- Townsend, C. E, & Roth, R. A. 2000. *Nutrition & Diet Therapy.* 7th ed. Boston, Delmar Publisher.

NN30204 COMMUNITY NUTRITION

This course uses Project Based Learning alongside lectures and topical assignments. Within PBL, field work in the community (NICE) for this semester requires students to plan a small, suitable nutrition intervention project to improve dietary intake in the community. Every student will get to do at least one oral presentation. Every student is encouraged to observe and reflect on a nutrition project in the community with one other student. Alternatively, students could choose to do a writing assignment, which addresses a nutrition issue of public health concern.

References

- Boyle MA & Holben DH. (2010). *Community Nutrition in Action: an entrepreneurial approach.* USA: Wadsworth.
- Gibney MJ, Margetts BM, Kearney JM, Arab L. (eds) (2004). *The Nutrition Society Textbook Series. Public Health Nutrition.* Blackwell Science.
- Owen LA, Splett PL. (1999). *Nutrition in The Community: The Art and Science of Delivering Services.* 4th ed. New York:Mcgraw-Hill.
- Rao, S.B. 2007. *Principles of Community Medicine.* 4th Ed. Delhi: A.I.T.B.S. Publishers & Distributors.

NN30303 NUTRITION FOR SPORTS AND PHYSICAL ACTIVITY

This course is designed to address sport nutritional issues which include nutrient requirements, metabolism of nutrients in relation to athletic performance, ergogenic aids (nutritional supplements for exercise performance), physiological aspects of individuals involved in sports activities as well as assessment of their nutritional status. Students will be familiarized with nutritional practices that optimize athletic performance in addition to body composition changes desirable to achieve optimal sports/exercise efforts.

References

- Bender, D.A. 2014. *Introduction to Nutrition and Metabolism, 5th ed.* Boca Raton, FL: CRC Press.
- Garrow JS, James WPT, Ralph. 2000. *Human Nutrition and Dietetics, 10th ed.* London: Churchill Livingstone.
- Gibney MJ, Lanham-New SA, Cassidy A, Vorster HH, 2009. *Introduction to Human Nutrition, 2nd ed.* The Nutrition Society Text Book Series. Wiley-Blackwell.
- Gropper, S.S, Smith, J.L, Groff, J.L. 2008. *Advanced Nutrition and Human Metabolism.* Belmont: Wadsworth.
- Lee, R.D & Nieman, D.C. 2003. *Nutritional Assessment, 3rd ed.* Boston, MA: McGraw-Hill.
- Lehninger, Albert L., David L. Nelson, and Michael M. Cox. 2013. *Lehninger Principles of Biochemistry.* New York: W.H. Freeman.
- Williams, M.H., Anderson, D, Rawson, E. 2012 . *Nutrition for Health, Fitness, & Sport.* Boston, MA: WCB/ McGraw-Hill.
- [Wolinsky, I & Driskell, J.A. 2007. *Sports Nutrition Energy Metabolism and Exercise.* New York: C R C Press LLC.](#)

NN30403 NUTRITION EDUCATION AND PROMOTION

This course requires students to conduct nutrition education to a small group of individuals in the community, using the theory and research discussed in class.

References

- Bauer, K.D. and Sokolik, C.A. 2001. *Basic Nutrition Counselling Skill Development.* Brooks Cole.
- Contento IR. *Nutrition education.* 2011. *Linking research, theory and practice.* 2nd ed. Jones and Bartlett Publishers.
- Fleury, J. and Keller, C. 2000. *Health Promotion for the Elderly.* Thousand Oaks: Sage Publications, Inc.
- Gibney MJ, Margetts BM, Kearney JM, Arab L. (eds) (2004). *The Nutrition Society Textbook series. Public health nutrition.* Blackwell Science.
- Tan L.H. 1990. *Malnutrisi, Sumber Kesehatan dan Pendidikan di Semenanjung Malaysia. Terj.* Mohamad Nordin Abdul Karim. Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Venkataiah, S. (ed.). 2000. *Health and Nutrition Education.* New Delhi: Anmol Publications Pvt. Ltd.
- Internet resources from authoritative websites, such as:
- FAO, Human Nutrition in the Developing World <http://www.fao.org/DOCREP/W0073e/w0073e03.htm>
- Kellogg's Nutrition <http://www.kelloggnutrition.com/education-materials/index.html>
- USDA Food and Nutrition Services <http://www.fns.usda.gov/fns/nutrition.htm>
- MOH My Health <http://www.myhealth.gov.my/myhealth/bm/>
- MOH Info Sihat <http://www.infosihat.gov.my/> Bahagian Pendidikan Kesihatan

NN30503 NUTRITION POLICIES AND FOOD SECURITY

For this course, special emphasis will be on challenges to global food security, constraints on the modern “conventional” farming system, and sustainable strategies to increase global food production. Topics also include the genesis of food production, economics as a shaper of food production systems, population growth, food production in developing countries and novel strategies to address food security. Issues regarding policy making that will be discussed include, e.g., financing any implementation, possibility of support for or against a policy, expected impact on the target group and stakeholders.

References

- Joint FAO/WHO Progress report on the implementation of ICN World Declaration and Plan for Action for Nutrition. <http://www.fao.org/docrep/W2313E/W2313E00.htm>
- Lawrence G, Lyons K, Wallington T. 2013. *Food Security, Nutrition and Sustainability*. Earthscan, US.
- Malaysian Journal of Nutrition. *National dietary guidelines of South east Asian nations*. (in press).
- McDonald BL. 2013. *Food Security*. John Wiley & Sons.
- MOH. 2015. *Third National Plan of Action for Nutrition Malaysia 2016 – 2025 (NPANM III)*. Putrajaya.
- MOH. 2005. *Second National Plan of Action for Nutrition Malaysia (NPANM II)*.
- MOH. 2008. *Mid-term review of NPANM II*.
- MOH. *National Plan of Action for Nutrition Malaysia (NPANM)*.
- MOH. 2010. *Malaysian dietary guidelines*.
- MOH. 2013. *Malaysian dietary guidelines for children and adolescents*.
- MOH. 2016. *Malaysian dietary guidelines for the elderly*.
- MOH. 2016. *Malaysian dietary guidelines for vegetarians*.
- Naylo RL. 2014. *The Evolving Sphere of Food Security*. Oxford University Press.
- Rayfuse RG, Weisfelt N. 2012. *The Challenge of Food Security: International Policy and Regulatory Frameworks*. Edward Elgar Publishing.

NN30603 HEALTH CARE MANAGEMENT

This course is about the administration, organisation and delivery of health care in Malaysia. It covers the organisational structures, types of governance, and management issues of the Malaysian health care system.

References

- Buchbinder, S.B., Shanks, N.H. 2017. *Introduction to health care management*, 3rd ed. Burlington, Massachusetts : Jones & Bartlett Learning.
- Burns, L.R., Bradley, E.H., Weiner, B.J. 2012. *Shortell and Kaluzny's health care management : organization, design, and behavior*. Clifton Park, NY : Delmar Cengage Learning.
- Goldsmith, S.B. 2014. *Understanding health care management : a case study approach*. Burlington, Mass. : Jones & Bartlett Learning.
- Hammaker, D.K., Tomlinson, S.J. 2011. *Health care management and the law : principles and applications*. Clifton Park, NY : Delmar/Cengage Learning.
- Healey, B.J., Marchese, M.C. 2012. *Foundations of health care management : principles and methods*. San Francisco, CA: Jossey-Bass.
- Stahl, M.J..2004. *Encyclopedia of health care management*. Thousand Oaks, California : Sage.

NN30703 NUTRITION PROGRAMME PLANNING

This course introduces the DESIGN concept in systematically planning a nutrition programme to address problems relating to food and lifestyle habits. DESIGN is a stepwise procedure for planning theory-based nutrition education programmes. This course utilises case studies from university settings. Students will plan a small, suitable nutrition programme to address any nutrition and lifestyle related problems given in the case studies.

References

- Contento IR. 2008. Nutrition education: linking research, theory, and practice. *Asia Pac J Clin Nutr* 17(1):176-9.
- Contento IR. *Nutrition education*. 2011. *Linking research, theory and practice*. 2nd ed. Jones and Bartlett Publishers.
- Boyle MA & Holben DH. (2010). *Community Nutrition in Action: an entrepreneurial approach*. USA: Wadsworth.
- Gibney MJ, Margetts BM, Kearney JM, Arab L. (eds) (2004). *The Nutrition Society Textbook Series. Public Health Nutrition*. Blackwell Science.
- Owen LA, Splett PL. (1999). *Nutrition in The Community: The Art and Science of Delivering Services*. 4th ed. New York:Mcgraw-Hill.
- Rao, S.B. 2007. *Principles of Community Medicine*. 4th Ed. Delhi: A.I.T.B.S. Publishers & Distributors.

NN30904 RESEARCH METHODS AND SCIENTIFIC COMMUNICATION

This course discusses various research methodologies that are commonly used in scientific investigation related to nutrition. Students will be exposed to the importance of scientific communication skills. Other subject areas to be discussed include experimental design, sampling methods, ethics, research models for consumer and nutritional studies, data exploration and how to make scientific poster and Microsoft Powerpoint slides (for oral presentation).

References

- Chua YP. 2006. Kaedah dan Statistik Penyelidikan: Kaedah Penyelidikan. Kuala Lumpur: Mc Graw Hill (Malaysia)Sdn Bhd.
- Dean A, Voss D. 1999. *Design and analysis of experiments*. New York: Springer. (UMS Library QA 279.D43)
- Del Vecchio RJ. 1997. *Understanding design of experiments: a primer for technologists*. New York: Hanser/Gardner Publications Inc.
- Kuehl RO. 2000. *Design of experiments: statistical principles of research design and analysis*. 2nd ed. Singapore: Duxbury Press.
- O'Connor M. 1999. *Writing successfully in science*. London: E & FN Spon.
- Samuels ML, Witmer JA. 2003. *Statistics for the life sciences*. 3rd ed. New Jersey: Perason Education Inc (UMS Library QH 323.5.S23)

NN40014 INDUSTRIAL TRAINING

Students are required to undergo industrial training at a healthcare institution, relevant industry / company, or a relevant government agency to gain experience 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. Students' performance will be assessed by an industrial supervisor and also by an academic supervisor.

References

Panduan Latihan Industri, FSMP
Industrial Training Report format
Daily Activity Log Book format

NN40303 SPECIAL TOPICS IN NUTRITION

Students will be exposed to knowledge of nutrition-related current issues. Students are expected to do further reading on an assigned topic and contribute to critical dialogue after lecture on a particular nutrition topic.

References

American journal of clinical nutrition. [RC583. A5].
British journal of nutrition. [TX501. B75].
Critical reviews in food science & nutrition. [TP368. C7].
Malaysian journal of nutrition. [QU145. M365].
Nutrition research reviews. [QP141. A1N883].
Nutrition Society of Malaysia (www.nutriweb.org.my)
Zanders, E. & MacLeod L. (2010). Presentation skills for scientists: a practical guide. New York: Cambridge University Press. [Q223 . Z36 2010].

NN40503 CATERING AND FOOD SERVICE MANAGEMENT

This course will expose students to foodservice segmentations such as foodservice in commercial areas, noncommercial, and institutional foodservice. Students will also gain knowledge in operational and administration of foodservice operation. This include procurement, production and service, menu planning as well as other related aspects of foodservice management.

References

Payne-Palacio J & Theis M. 2009. *Introduction to Foodservice*. London: Prentice Hall
Gregoire MB. 2013. *Foodservice Organizations. A Managerial and System Approach, 7th Edition*. New Jersey: Pearson Prentice Hall

NN40703 SEMINAR

Students will engage in searching and reading of current scientific literature. Students will be responsible in finding appropriate, reliable and scientifically-research based articles based on their assigned or chosen seminar-based topics. Students are responsible for developing new knowledge by engaging in critical dialogue during the presentation and discussion. A summary research report of the seminar topic will be submitted after the presentation.

References

American journal of clinical nutrition. [RC583. A5].
British journal of nutrition. [TX501. B75].

Critical reviews in food science & nutrition. [TP368. C7].

Malaysian journal of nutrition. [QU145. M365].

Nutrition research reviews. [QP141. A1N883].

Nutrition Society of Malaysia (www.nutriweb.org.my)

Zanders, E. & MacLeod L. (2010). Presentation skills for scientists : a practical guide. New York: Cambridge University Press. [Q223 . Z36 2010].

NN00006 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 12 credit hours for one research project (spread throughout two semesters) under the supervision of an academic; 6 credit hours will be evaluated in this course. Students will choose their research title from a list of project titles which will be offered by academics. Students are advised to contact their supervisors for detailed information regarding the project that they will be doing, and then determine the agreed work targets. It is the students' responsibility to consult their supervisor regarding the research project. Students are required to present their project proposals before starting laboratory work/field work; this is usually arranged before the mid-semester break. This will give students opportunities to get feedback or alternative views about their proposed project, especially regarding study designs and analytical techniques. At the end of the semester, students must present the initial findings from their projects, and submit a report which includes the introduction, literature review, methods, initial findings and future work.

References

Panduan Penulisan Laporan Projek Penyelidikan Akhir Fakulti Sains Makanan dan Pemakanan, UMS.

UMS. 2018. Garis Panduan Penyerahan dan Penulisan Tesis/Disertasi Gaya UMS. Pusat Pengajian Pascasiswazah. Universiti Malaysia Sabah.

NN00106 RESEARCH PROJECT II

This course is the continuation to NN00006 Final Year Project I, where students are required to complete their ongoing research project. Students are not permitted to change the title of their project registered under NN00006 (Final Year Project I). In this course, students will focus on laboratory analyses and/or field work. It is the students' responsibility to consult their supervisor regarding their final year project (FYP). At the end of the project, students will report their findings in the form of an FYP report which will be submitted for examination by two examiners and their supervisor. The examiners shall be appointed by the course coordinator. All FYP reports submitted for examination must adhere to the scientific writing style and standards of FSMP and UMS. Each student will be required to defend his/her FYP report in an oral examination (viva-voce) which will be conducted after submission of the report. After that, students are required make amendments/corrections as recommended by the supervisor and examiners.

References

Panduan Penulisan Laporan Projek Penyelidikan Akhir Fakulti Sains Makanan dan Pemakanan, UMS

UMS. 2018. Garis Panduan Penyerahan dan Penulisan Tesis/Disertasi Gaya UMS. Pusat Pengajian Pascasiswazah. Universiti Malaysia Sabah.

ELECTIVES

NE40402 NUTRITIONAL CONTENT OF FOODS

This course will cover 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

- Coultrate TP. 2002. *Food The Chemistry of Its' Components*. 4th Edition. Royal Society of Chemistry, UK.
- Geissler C & Powers H. *Human nutrition (11th ed.)*. Elsevier Churchill Livingstone
- Parker R. 2003. *Introduction to Food Science*. Delmar Thomson, USA.
- Potter NN, Hotchkiss JH. 1995. *Food Science*, Fifth Edition, Chapman & Hall. New York.
- Vierra RE. 1996. *Elementary Food Science*. 4th Edition. Chapman & Hall. New York.

NE41202 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, as we know it, 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

- Gibson, G.R and Williams, C.M. 2001. *Functional foods: Concept to Product*. CRC Press, Boca Raton, FL.
- Johnston, I and Williamson, G. 2003. *Phytochemical Functional Foods*. CRC Press, Boca Raton, FL.
- Meskin, M.S, Bidlack, W.R, Davies, A.J and Omaye, S.T. 2002. *Phytochemicals in Nutrition and Health*. CRC Press, Boca Raton, FL.
- Rotimi E. Aluko. 2012. *Functional Foods and Nutraceuticals*. Springer
- Schmidl, M.K and Labuza, T.P. 2000. *Essentials of Functional Foods*. Aspen Publishers, Inc., Gaithersburg, MD.
- Watson, D. 2003. *Performance Functional Foods*. CRC Press, Boca Raton, FL.
- Wildman, REC. 2001. *Handbook of Nutraceutical and Functional Foods*. CRC Press, Boca Raton, FL.

NE41302 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 the plants or animal origin will be discussed. Other topics covered in the course include pesticide residues, food additives and contaminants, by product originating from food processing (or packaging materials) as well as implication of industrial waste on human health and environment. In its modern context, food toxicology draws heavily on knowledge in chemical and biological field and seeks detailed understanding of toxic effects. Therefore, it is important that students from food science and nutrition are familiar with the basic chemical and biological aspects of the deleterious substances present in foods especially dealing with their properties, mode of action and methods of analysis.

References

- DeVries, J. 1997. Food safety and toxicity. CRC Press. New York.
- Pusa, T. 2014. Principles of Food Toxicology. CRC Press. New York.
- Shibamoto, T & Bjeldanes, L. F. 2009. Introduction to food toxicology. Academic Press. New York. 2nd ed.
- Tu, T. 1993. Food poisoning. Handbook of natural toxins. Vol. 7. Marcel Dekker Inc. New York.
- Watson, D. 1998. Natural toxicants in food: manual for experimental foods. CRC Press. New York.
- Moffat, C & Whiffle, K. J. 1999. Environmental contaminants in food. CRC Press, New York.
- Various Journals related to Toxicology, e.g. Food and Chemical Toxicology

NE41402 MARINE AND AQUACULTURE PRODUCTS

This course applies food science and technology to the processing, storage and handling of marine and aquaculture products. This course covers sources of raw material, raw material handling, storage and preparation of products from various marine and aquaculture sources as well as their physical, microbiological and chemical properties.

References

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

ELECTIVE COURSES

NE40002 NUTRITION EDUCATION

This course emphasizes on nutrition education models, theories, techniques and strategies used in nutrition education including instructional media and nutrition education aids for various target groups.

References

- Bauer, K. D. & 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. & 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 Edition. Delhi: A.I.T.B.S. Publishers & Distributors.
- Tan L. H. 1990. *Malnutrisi, Sumber Kesehatan 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.
- Wardlaw, G. M. 2003. *Contemporary Nutrition: Issues and Insight*. 5th Edition. USA: McGraw-Hill Publication.

NE40102 DIET THERAPY

This course discusses the role of nutrition in health and disease. The course emphasize on the role of diet in the prevention and treatment of disease. Students will begin by learning about the basic or core elements of diet therapy. Students then learn to distinguish between normal and therapeutic diets as well as explain type of diet prescribed for selected diseases, nutritional disorders or clinical conditions.

References

- Ferraro, K., & Winter, C. 2013. *Diet Therapy in Advanced Practice Nursing: Prescriptions for Improving Patient Outcomes Through Nutrition*. McGraw Hill Professional.
- Lutz, C. A., Mazur, E. & Litch, N. 2014. *Nutrition and diet therapy*. FA Davis.
- Mahan, L. K. 2008. *Krause's food, nutrition, & diet therapy*. S. Escott-Stump (12th Edition.). Philadelphia: Saunders.
- Maher, A. K. (11th Edition.). 2012. *Simplified diet manual*. John Wiley & Sons.
- Rolfes, S. R., Pinna, K. & Whitney, E. 2014. *Understanding normal and clinical nutrition*. Cengage Learning.
- Schlenker, E. & Gilbert, J. A. 2018. *Williams' Essentials of Nutrition and Diet Therapy*. Elsevier Health Sciences.

NE40202 FOOD HYDROCOLLOIDS

This course provides an overview of the types, properties, functions and applications of the major food hydrocolloids in food industry. The application knowledge of food hydrocolloids is emphasized. Students are required to demonstrate the optimal conditions for the applications of food hydrocolloids in their group assignment. In addition to the technological functionality, the health benefits of food hydrocolloid are highlighted in the course. Several current issues and research trends related to food hydrocolloids will be also discussed.

References

- 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 Publishing Ltd.
- 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. A. & Phillips, G. O. 2014. Gums and Stabilisers for the Food Industry 17: The Changing Face of Food Manufacture: The Role of Hydrocolloids (Special Publications). Cambridge: Royal Society of Chemistry.

NE40402 NUTRITIONAL CONTENT OF FOOD

This course is offered as an elective for this programme to support the body of knowledge for nutritionists. This course aims to expose students to consider food from its nutritional aspects and to consider the beneficial nutritional properties of food and food products. Current issues related to food safety and quality also will be highlighted.

References

- Coultate, T. P. 2015. Food: The Chemistry of Its' Components. 6th Edition. Royal Society of Chemistry, UK.
- Geissler, C. & Powers, H. 2011. Human nutrition (12th Edition.) Elsevier Churchill Livingstone.
- Parker, R. 2019. Introduction to Food Science. Delmar Thomson, USA.
- Potter, N. N. & Hotchkiss, J. H. 1995. Food Science. 5th Edition. Chapman & Hall. New York.
- Vierra, R. E. 2013. Elementary Food Science. 4th Edition. Chapman & Hall. New York.

NE40502 MOLECULAR NUTRITION

Molecular nutrition is an interesting aspect of nutritional science. This course can help students understand how nutrients interact with the genome, to alter gene expression, which in turn can affect normal growth, health and causing diseases. In this introductory course, students will start by reviewing the core concepts in molecular biology, the process of gene expression, discerning important research tools used to investigate molecular aspects of nutrition, to study how the genome influences the response to nutrients and discussing various examples of how nutrients regulate gene expression. 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.
- Roche & Mensink. 2003. Molecular aspects of nutrition. In Nutrition & Metabolism. Blackwell 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.

NE40602 FOOD SERVICE

This course would give an overview of foodservice industry especially the different types of systems. Students would gain knowledge on the fundamental principles of facilities design, foodservice equipment and also include the menu planning as well as other related aspects of foodservice management.

References

- Gregoire, M. 2017. Foodservice Organizations: A Managerial and Systems Approach. New Jersey: Prentice Hall.
- Payne-Palacio, J. & Theis, M. 2011. Introduction to Foodservice. London: Prentice Hall.
- Labensky, S. R. 2015. On Cooking: a Textbook of Culinary Fundamentals. Boston: Prentice Hall.
- Reynolds D. & Wachter M. K. 2013. Foodservice management fundamentals. USA: Wiley.
- Birchfield J. C., Sparrowe R. T. 2008. Design and Layout of Foodservice Facilities. Third Edition. USA: John Wiley & Sons.

NE40702 DAIRY SCIENCE AND TECHNOLOGY

This course applies food science and technology to the handling, processing, storage of dairy products. Dairy products provides the tools for students to learn how to transform milk into high-quality products. Knowledge acquired from this course will increase the students understanding of milk composition, milk chemistry, milk microbiology, milk processing, unit operations, and technologies for whey processing.

References

- Walstra, P., Wouters, J. T. M & Geurts, T. J. 2006. Dairy Science and Technology. Second Edition. Boca Raton, New York: CRC/Taylor and Francis.
- Coimbra, J. S. d. R. & Teixeira, J. A. 2010. Engineering Aspects of Milk and Dairy Products. First Edition. Hoboken: Taylor and Francis.
- Kanekanian, A. 2014. Milk and Dairy Products as Functional Foods. Society of Dairy Technology series. First Edition. Hoboken: Wiley-Blackwell.
- Datta, N. & Tamasula, P. M. 2015. Emerging Dairy Processing Technologies. First Edition. Publisher: Wiley-Blackwell.
- Marth, E. H. & Steele, J. L. 2001. Applied Dairy Microbiology. Second Edition. New York: Marcel Dekker, Inc.

NE40802 MEAT SCIENCE AND 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

- Hui, Y. 2012. Handbook of Meat and Meat Processing. Boca Raton, FL: CRC Press.
- Toldra, F. 2010. Handbook of Meat Processing. Blackwell Publishing.
- Kerry, J. P. & Kerry, J. F. 2011. Processed Meats. Woodhead Publishing.

- Kerry, J. P., Kerry, J. F. & Ledward, D. 2002. Meat Processing: Improving Quality. CRC Press & Woodhead Publishing Limited.
- Nollet, L. M. L. & Toldra, F. 2006. Advanced Technologies for Meat Processing. CRC Press, Taylor and Francis Group, USA.
- Heinz and Hautzinger. 2007. Meat Processing Technology for Small-To-Medium Scale Producers. FAO UN Bangkok.
- Lawrie, R. A. 2006. Lawrie's meat science. Boca Raton: CRC Press; Cambridge, England: Woodhead Pub.

NE40902 BAKERY AND 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 provides an understanding on halal and haram concepts, principles of halal food and the importance of halal products and services. Students are exposed to the standards and requirements for halal food production and halal certification. The course covers halal food industry development, halal food ingredients, halal food processing, halal assurance system and contemporary issues in halal food production. The course equips students with the knowledge to implement identification of halal risk and best practices for halal food manufacturing.

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.
- Malaysian Standard MS 1500:2009. 2009. Halal 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.
- 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.
- Sakr, A. H. 1996. A Muslim Guide to Food Ingredients. Foundation for Islamic Knowledge. 6th Edition, Lombard, Illinois.

NE41102 FATS AND 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.

References

- Wolf Hamm, Richard J. Hamilton, Gijs Calliauw. 2013. Edible oil processing John Wiley & Sons Inc.
- Alejandro Marangoni, Leendert H. Wesdorp. 2013. Structure and properties of fat crystals networks. CRC Press.
- AOAC. 2000. American Official Analytical Chemists. 16th Edition. Washington D.C.: Association of Analytical Chemists.
- Akoh, C. C. & Min, D. B. 2002. Food Lipids: Chemistry, Nutrition and Biotechnology. Boca Raton: CRC Press.
- Gunstone, F. D. 2006. Modifying Lipids for Use in Food. Boca Raton: CRC Press.
- Hamm, W. & Hamilton, J. 2000. Edible Oil Processing. Boca Raton: CRC Press.
- O'Brien, R. D. 2009. Fats and Oils: Formulating and Processing for Applications. Boca Raton: CRC Press.

NE41202 FUNCTIONAL FOOD

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.
- Guo, M. 2009. *Functional Foods: Principles and Technology*. Cambridge: Woodhead Publishing Limited.
- Johnston, I. & 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.

NE41402 MARINE AND AQUACULTURE PRODUCT

This course applies food science and technology to the handling, processing, storage of marine and aquaculture products. This course covers the sources and characteristics of raw material, quality changing during handling, preservation and processing and their quality characteristics (physical, microbiological and chemical). Knowledge acquired from this course will increase the students' capability to determine suitable methods of 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.