

Certificate in Health and Nutrition Informatics

Course Curriculum and Syllabus



A Joint Collaborative Certificate Program Foundation of Healthcare Technologies Society,

India India India

And

St Ann's College for Women, Hyderabad, India



Certificate in Health and Nutrition Informatics

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Defining Nutrition Informatics

Nutrition Informatics is an effective retrieval, organization, storage, and optimum use of information, data, and knowledge for food- and nutrition-related problem solving and decision-making. Nutrition informatics is the management of the information dietetics professionals need to practice successfully while tailoring recommendations to meet each patient's specific needs.

Why the need?

- Nutrition informatics describes the intersection of nutrition, information, and technology, and it underlies all areas of dietetics practice.
- Growing opportunity to facilitate technology-enabled behavioral change interventions to support NI research and practice.
- Management and interpretation of data could help clarify the relationships and interrelationships of diet and disease at international, national, and regional levels.
- Need to prepare a NI workforce that could provide valuable tools to address the double burden of nutrition.
- The program combines theoretical aspects with the presentation of practical solutions in real-world settings.

Skills Student Acquire

- Use data for problem-solving and improving practice outcomes.
- Use of systems for the effective collection, organization, and interpretation of data.
- Use of clinical information systems to find information related to patient care.
- Evaluation of quality of health information over the internet.
- Design and develop innovative solutions to address issues related to nutrition.
- Competency in the analysis, management, and evaluation of technology and applications.
- Examination of the role of data, policy, and technology-enabled behavioral change interventions to support nutritional informatics research and practice.
- Guiding consumers to apply the information available to them through informatics systems.

Program Benefits

• Become a member and participate in the nutrition informatics research team.



- Opportunity to develop technology-based interventions to address problems related to nutrition.
- Opportunity to work in technological settings and communicate data and information effectively.
- Show nutrition informatics knowledge to better qualify for higher education.
- Integrate knowledge of nutrition informatics into nutritional care to enhance the quality of nutrition care.
- Improve the efficiency and quality of work with enhanced digital literacy.

Program Features

- Synchronous and Asynchronous learning
- Weekly interactive lectures
- Weekly discussions
- Problem-solving exercises
- Case studies
- Quizzes
- Research Seminar
- Experiential learning
- Research advisor assigned

16 WEEKS	240 Hours	16 HOURS	32 Hours
Program Duration	Total teaching hours	Online live lectures	Discussion forum / mentoring
40 HOURS	40 HOURS	40 HOURS	8 CREDITS
E-tutorial	E-content	Self-study hours	Total number of credits



Module No.	Торіс	Teaching and Activity	Assessment Type	
Module 1	Introduction to Nutrition Informatics	Lecture, Reading and Class Discussion		
Module 2	Data, Information Knowledge	Lecture, Reading, and Class Discussion		
Module 3	Human-Centered Design Interventions	Lecture, Reading and Class Discussion, Case Study		
Module 4	Design and Develop Nutrition Informatics interventions	Lecture, Reading and Class Discussion, Case Study	Assignment	
Module 5	Internet and Public Health	Lecture, Reading and Class Discussion, Case Study	Assignment	
Module 6	Evaluating nutrition nutrition	Lecture, Reading and Class Discussion, Case Study		
Module 7	Behaviorchangeinterventionstosupportnutritioninformaticsresearch and practice	Assignment		
Module 8	Nutrition informatics databases, programs, and policies	Lecture, Reading, Class Discussion, Case Study	heate	
Module 9	Informatics enabled menu planning			
Module 10	Personalized nutrition plan: A case study	Assignment		
Module 11	Nutritional apps	Lecture, Reading and Class Discussion	Assignment	
	Mid-Evalu	uation		
Module 12	Formulating Research Question	Lecture, Reading, and Class Discussion		
Module 13	Mixed methods	Lecture, Reading, and Class Discussion		
Module 14	Statistical analysis of healthcare data	Lecture, Hand-on-Experience, and Class Discussion,		

Course Structure

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Module 15	Scientific writing	Lecture, Readin Discussion	ng and	Class	Assignment		
Module 16	Research seminar	Presentation					
Final-Evaluation							

Detailed Curriculum

Module 1

Title: Introduction to Nutrition Informatics Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

This module will give an overview of nutrition informatics, how and when it started, and highlight examples from various aspects of nutrition practice. This module will involve an understanding of the competencies required to excel in the field of nutrition informatics. Additionally, it will highlight points on why nutrition informatics is the need of the hour.

Learning Objectives

- Define nutrition informatics
- Describe the history of nutrition informatics
- Describe the potential applications of Informatics in the field of nutrition
- Explore the need for Nutrition Informatics

Learning Outcomes

Upon completion of this module students will be able to:

- Have an overview of nutrition informatics
- Discuss the application of nutrition informatics to address nutritional challenges of the 21st century.
- Identify how nutrition informatics can help in the advancement of their careers

Contents:

- Introduction to Nutrition Informatics
- History of Nutrition Informatics
- Suggested computer literacy skills for dietetics practitioners at all levels of practice
- Education model competencies and performance indicators for nutrition informatics
- Potential applications of nutrition informatics across various areas of practice
- Need for Nutrition Informatics in India



- Rusnak S, Charney P. Position of the Academy of Nutrition and Dietetics: nutrition informatics. Journal of the Academy of Nutrition and Dietetics. 2019 Aug 1;119(8):1375-82.
- Ayres EJ, Hoggle LB. ADA Nutrition Informatics member survey: results and future steps. J Am Diet Assoc. 2008 Nov;108(11):1822, 1824-6. doi: 10.1016/j.jada.2008.09.016. PMID: 18954567; PMCID: PMC3652250.
- Joshi A, Gaba A, Thakur S, Grover A. Need and Importance of Nutrition Informatics in India: A Perspective. Nutrients. 2021 May 27;13(6):1836. doi: 10.3390/nu13061836. PMID: 34072133; PMCID: PMC8230128.
- Yadrick MM. Informatics: a word we need to know. J Am Diet Assoc. 2008 Dec;108(12):1976. doi: 10.1016/j.jada.2008.10.036. PMID: 19027391.
- Papoutsakis C, Moloney L, Sinley RC, Acosta A, Handu D, Steiber AL. Academy of Nutrition and Dietetics Methodology for Developing Evidence-Based Nutrition Practice Guidelines. J Acad Nutr Diet. 2017 May;117(5):794-804. doi: 10.1016/j.jand.2016.07.011. Epub 2016 Sep 7. PMID: 27614690.
- Hoggle LB, Michael MA, Houston SM, Ayres EJ. Nutrition informatics. Journal of the American Dietetic Association. 2006 Jan 1;106(1):134-9.
- Ayres EJ, Greer-Carney JL, Fatzinger McShane PE, Miller A, Turner P. Nutrition informatics competencies across all levels of practice: a national Delphi study. J Acad Nutr Diet. 2012 Dec;112(12):2042-53. doi: 10.1016/j.jand.2012.09.025. PMID: 23174690; PMCID: PMC3652246.





Title: Data, Information Knowledge Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

This module will introduce the foundations of health data, information, knowledge, and wisdom. The module will help the students in understanding the difference between data, information, and knowledge. Through this module, students will get an overview of the DIKW pyramid.

Learning Objectives

- Define data, information, knowledge, and wisdom (DIKW) models
- Explain the use of the DIKW models in population health informatics
- Learn how to assess user needs for technology-enabled DIKW models to improve public health decision making

Learning Outcomes

Upon completion of this module students will be able to:

- Describe the differences between data, information, and knowledge;
- Develop an understanding of problem-solving methods
- Developing insights by analyzing data and information for a given context

Contents

- What is an Information System?
- Introduction to Data, Information and Knowledge Principles
- Definitions of data, information, knowledge and Wisdom
- DIKW pyramid
- From Information to Knowledge: Assimilating Public Health Data

- Karanikolas NN. Knowledge and Information in Nutrition Software Design. Procedia-Social and Behavioral Sciences. 2014 Aug 25;147:398-404.
- Van Meter HJ. Revising the DIKW pyramid and the real relationship between data, information, knowledge, and wisdom. Law, Technology and Humans. 2020 Jan;2(2):69-80.
- Yang C, De Baets B, Lachat C. From DIKW pyramid to graph database: a tool for machine processing of nutritional epidemiologic research data. In2019 IEEE International Conference on Big Data (Big Data) 2019 Dec 9 (pp. 5202-5205). IEEE.



- Sharma N. The Origin of the "Data Information Knowledge Wisdom"(DIKW) Hierarchy. February, www. researchgate. net/publication/292335202_The_Origin_of_Data_Information_Knowledge_ Wisdom DIKW Hierarchy. 2008.
- Dalrymple PW. Data, information, knowledge: The emerging field of health informatics. Bulletin of the American Society for Information Science and Technology. 2011 Jun;37(5):41-4.



Title: Human-Centered Design Interventions Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

Through this module, the students will gain a better understanding of how to design intervention through co-creation with community partners. Students will understand better the need to place people at the center of the problem-solving process to develop innovative interventions for the communities we seek to serve.

Learning Objectives

- Discuss what human-centered designs are?
- Discuss the difference between user-centered design and human-centered design
- Describe the human-centered design approach and its features

Learning Outcomes

Upon completion of this module students will be able to:

- Gain a basic understanding of the terminology, concepts, and process of human-centered design
- Have an understanding of how HCD can be used to enhance the development and implementation of behavioral interventions
- Enhance the knowledge of how to develop an HCD to address nutrition-related issues in the country

Content

- Introduction to Human-Centered Design
- Users Centered Design to Human centers Design
- A Three-Step Approach to Human-Centered Design
- Potential Applications of Human-centered Design
- Case study: A human-centered approach to design a diet app for patients with metabolic syndrome

Suggested Reading

• Brest P, Roumani N, Bade J. Problem solving, human-centered design, and strategic processes. InConference Paper. Retrieved from http://pacscenter. stanford.



edu/sites/all/files/Brest% 20Roumani% 20Bade% 20Solving% 20and% 20Strategic% 20Processes% 20v% 2015a. docx 2015 (Vol. 205, p. 15).

- Leung, C.L., Naert, M., Andama, B. et al. Human-centered design as a guide to intervention planning for non-communicable diseases: the BIGPIC study from Western Kenya. BMC Health Serv Res 20, 415 (2020). https://doi.org/10.1186/s12913-020-05199-1
- UNICEF
- Adam M, McMahon SA, Prober C, Bärnighausen T. Human-Centered Design of Video-Based Health Education: An Iterative, Collaborative, Community-Based Approach. J Med Internet Res. 2019;21(1):e12128.
- Das A, Svanæs D. Human-centred methods in the design of an e-health solution for patients undergoing weight loss treatment. Int J Med Inform. 2013 Nov;82(11):1075-91. doi: 10.1016/j.ijmedinf.2013.06.008. Epub 2013 Jul 23. PMID: 23886482.
- Bazzano AN, Martin J, Hicks E, Faughnan M, Murphy L. Human-centred design in global health: A scoping review of applications and contexts. PloS one. 2017 Nov 1;12(11):e0186744.
- Joshi A, Amadi C, Schumer H, Galitzdorfer L, Gaba A. A human centered approach to design a diet app for patients with metabolic syndrome. mHealth 2019;5:43





Title: Design and Develop Nutrition Informatics interventions Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

Nutrition informatics (NI) is the effective retrieval, organization, storage, and optimum use of information, data, and knowledge for food-and-nutrition-related problem-solving and decision-making. There is a growing opportunity to facilitate technology-enabled behavioral change interventions to support NI research and practice. This module aims to equip graduate students with a holistic understanding of the behavior change intervention related to nutrition. The course will introduce the students to elements of behavior change intervention including managing of nutrition informatics arena.

Learning Objectives

- To know the key elements of Nutrition Informatics
- To recognize the structure of Nutrition Informatics
- To learn about design and develop an intervention in context to nutrition informatics

Learning Objectives

Upon completion of this module students will be able to:

- Identify opportunities for nutrition informatics interventions.
- Apply a structured framework for articulating the components of interventions.
- Outline a nutrition informatics intervention for effective health outcomes.

Content

- Nutrition Informatics Intervention
- Design of informatics intervention
- Conceptual Framework
- Sketching of interface
- Diet Apps: Role of informatics
- Human-Centered Design (HCD)
- HCD Approach
- User preferences



- Joshi A, Amadi C, Schumer H, Galitzdorfer L, Gaba A. A human centered approach to design a diet app for patients with metabolic syndrome. mHealth 2019;5:43
- North, J. C., Jordan, K. C., Metos, J., & Hurdle, J. F. (2015). Nutrition Informatics Applications in Clinical Practice: a Systematic Review. *AMIA* ... *Annual Symposium proceedings*. *AMIA Symposium*, 2015, 963–972.



Title: Internet and Public Health Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

This module will help students learn how the internet is used to deliver healthcare information to the public. The students will gain an understanding of how to evaluate the quality and readability of the information delivered on the Internet. Upon evaluating the quality, the students will identify the gaps in the online health information and recommend strategies for ensuring information quality.

Learning Objectives

- Learn the importance of internet to disseminate public health information
- Discuss the various modes of delivery of public health information on the internet
- Describe the existing challenges of using Internet for Public Health education.
- Discuss methods to assess the quality of health information on the internet
- Discuss methods to assess the readability of health information on the internet

Learning Outcomes

Upon completion of this module students will be able to:

- Evaluate the quality online health information
- Build capacity to obtain and distinguish health-related facts from opinions.
- Evaluate the reliability of the online health information
- Demonstrate the ability to access valid and reliable health information

Content

- Use of the Internet for health information
- Health Information
- Challenges of health information on the Internet
- Advantages of health information on the internet
- Health Literacy Evaluation of OHI
- Criteria for Evaluating Internet Health Information
- Quality of Health Information Tools
- Readability Assessment Tool
- Case Study



- Dash NR, Pipal K, Kaza SK, Panigrahi P, Joshi A. Assessment of the malnutrition related information on the internet. Technol Health Care. 2012;20(2):117-25. doi: 10.3233/THC-2011-0658. PMID: 22508023.
- Perra, A., Preti, A., De Lorenzo, V. et al. Quality of information of websites dedicated to obesity: a systematic search to promote high level of information for Internet users and professionals. Eat Weight Disord (2021). https://doi.org/10.1007/s40519-020-01089-x
- Hirasawa, R., Saito, K., Yachi, Y., Ibe, Y., Kodama, S., Asumi, M., . . . Sone, H. (2012). Quality of Internet information related to the Mediterranean diet. Public Health Nutrition, 15(5), 885-893. doi:10.1017/S1368980011002345
- Fallis D, Frické M. Indicators of accuracy of consumer health information on the Internet: a study of indicators relating to information for managing fever in children in the home. J Am Med Inform Assoc. 2002 Jan-Feb;9(1):73-9. doi: 10.1136/jamia.2002.0090073. PMID: 11751805; PMCID: PMC349389.
- Tahir M, Usman M, Muhammad F, Khan I, Idrees M, Irfan M, Glowacz A. Evaluation of Quality and Readability of Online Health Information on High Blood Pressure Using DISCERN and Flesch-Kincaid Tools. Applied Sciences. 2020 Jan;10(9):3214.
- Sun Y, Zhang Y, Gwizdka J, Trace CB Consumer Evaluation of the Quality of Online Health Information: Systematic Literature Review of Relevant Criteria and Indicators J Med Internet Res 2019;21(5):e12522 doi: 10.2196/12522 PMID: 31045507 PMCID: 6521213
- El Sherif R, Pluye P, Thoër C, Rodriguez C Reducing Negative Outcomes of Online Consumer Health Information: Qualitative Interpretive Study with Clinicians, Librarians, and Consumers J Med Internet Res 2018;20(5):e169 doi: 10.2196/jmir.9326 PMID: 29728350 PMCID: 5960043
- Beaunoyer E, Arsenault M, Lomanowska AM, Guitton MJ. Understanding online health information: Evaluation, tools, and strategies. Patient education and counseling. 2017 Feb 1;100(2):183-9.



Title: Evaluating nutrition informatics interventions Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

This module will broaden their horizon to assess the issues and the nutrition informatics intervention with a problem-solving approach.

Learning Objectives

- Describe what the key components to assess the intervention are.
- Methods to evaluate the nutrition informatics interventions.
- Develop strategic components of interventions to address the issues.

Learning Outcomes

Upon completion of this module students will be able to:

- Criteria to assess the nutrition informatics interventions.
- Evaluation of interventions.
- Strategies to design effective nutrition informatics intervention.

Content

- Components for evaluation of nutrition informatics intervention.
- Evaluating the nutrition informatics intervention.
- How to comprehend the existing apps and mapping with the evaluation criteria.

- Jefferson, K., Semnani-Azad, Z., Wong, C., L'Abbé, M. R., & Arcand, J. (2019). Changing Sodium Knowledge, Attitudes and Intended Behaviours Using Web-Based Dietary Assessment Tools: A Proof-Of-Concept Study. *Nutrients*, *11*(9), 2186. <u>https://doi.org/10.3390/nu11092186</u>
- Cade, J. (2017). Measuring diet in the 21st century: Use of new technologies. *Proceedings of the Nutrition Society*, *76*(3), 276-282. doi:10.1017/S0029665116002883
- Chau, M. M., Burgermaster, M., & Mamykina, L. (2018). The use of social media in nutrition interventions for adolescents and young adults-A systematic review. *International journal of medical informatics*, 120, 77–91. <u>https://doi.org/10.1016/j.ijmedinf.2018.10.001</u>



• Coumans, J., Bolman, C., Friederichs, S., Oenema, A., & Lechner, L. (2020). Development and Testing of a Personalized Web-Based Diet and Physical Activity Intervention Based on Motivational Interviewing and the Self-Determination Theory: Protocol for the MyLifestyleCoach Randomized Controlled Trial. *JMIR research protocols*, *9*(2), e14491. https://doi.org/10.2196/14491





Title: Behavior change interventions to support nutrition informatics research and practice. Instructor : Credits: 0.5 Duration: 60 minutes

Module Description: This module will broaden their understanding of the concept & application of health behavior science in the field of nutrition informatics.

Learning Objectives:

- To understand the concept of health behavior science & nutrition informatics.
- To develop an understanding of fundamental features of the major theories related to health behavior change.
- To understand the application of health-related behavioral theory in developing community-based nutrition interventions.
- To understand various theories & their strengths and limitations.

Learning Outcomes:

Upon completion of this module students will be able to:

- Describe the fundamental features of the major theories related to health behavior change.
- Apply health-related behavioral theory in developing community-based nutrition interventions
- Describe each theories strengths and limitations

Content

- Health Behaviour Science & Nutrition Informatics.
- Theories Used in Health Behavior Research & Health Promotion Practice.
- Darnton's Nine Principles
- Behaviour Change Models and Strategies

Suggested Reading

 Macready AL, Fallaize R, Butler LT, Ellis JA, Kuznesof S, Frewer LJ, Celis-Morales C, Livingstone KM, Araújo-Soares V, Fischer AR, Stewart-Knox BJ, Mathers JC, Lovegrove JA. Application of Behavior Change Techniques in a Personalized Nutrition Electronic Health Intervention Study: Protocol for the Web-Based Food4Me Randomized Controlled Trial. JMIR Res Protoc. 2018 Apr 9;7(4):e87. doi: 10.2196/resprot.8703. PMID: 29631993; PMCID: PMC5913568.



- Brug, J., Oenema, A. and Ferreira, I., 2005. Theory, evidence and Intervention Mapping to improve behavior nutrition and physical activity interventions. International Journal of Behavioral Nutrition and Physical Activity, 2(1), pp.1-7.
- Sung, K., Cooper, T., and Kettley, S. (2016) An alternative approach to influencing behaviour: Adapting Darnton's Nine Principles framework for scaling up individual upcycling, in Lloyd, P. and Bohemia, E. (eds.), *Future Focused Thinking - DRS International Conference 2016*, 27 - 30 June, Brighton, United Kingdom. <u>https://doi.org/10.21606/drs.2016.391</u>





Title: Nutrition informatics databases, programs, and policies Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

Through this module, students will comprehend the existing nutrition databases, programs, and policies.

Learning Objectives:

- Interpret the nutrition informatics dashboard.
- Compare and contrast various nutrition programs and policies.

Learning Outcomes:

Upon completion of this module students will be able to :

- Develop need-based programs and policies.
- Understand the nutrition informatic datasets.

Content

- History and Brief of Nutrition Informatics
- Need of Nutrition Informatics
- Data Visualisation tools
- Nutrition Informatics Platforms

- Kim, S. A., Blanck, H. M., Cradock, A., & Gortmaker, S. (2015). Networking to Improve Nutrition Policy Research. Preventing chronic disease, 12, E148. https://doi.org/10.5888/pcd12.150329
- Busse H, Covic N, Aakesson A, Jogo W. What Is the Role of Civil Society in Multisectoral Nutrition Governance Systems? A Multicountry Review. Food Nutr Bull. 2020 Jun;41(2):244-260. doi: 10.1177/0379572119877348. Epub 2020 Mar 27. PMID: 32216553.
- Aceves-Martins M, Aleman-Diaz AY, Giralt M, Solà R. Involving young people in health promotion, research and policy-making: practical recommendations. Int J Qual Health Care. 2019 Mar 1;31(2):147-153. doi: 10.1093/intqhc/mzy113. PMID: 29788085.
- Shamah-Levy T, Romero-Martínez M, Cuevas-Nasu L, Méndez Gómez-Humaran I, Antonio Avila-Arcos M, Rivera-Dommarco JA. The Mexican National Health and Nutrition Survey as



a Basis for Public Policy Planning: Overweight and Obesity. Nutrients. 2019 Jul 26;11(8):1727. doi: 10.3390/nu11081727. PMID: 31357441; PMCID: PMC6723052.

- Gao C, Xu J, Liu Y, Yang Y. Nutrition Policy and Healthy China 2030 Building. Eur J Clin Nutr. 2021 Feb;75(2):238-246. doi: 10.1038/s41430-020-00765-6. Epub 2020 Nov 20. PMID: 33219269.
- Aceves-Martins M, Aleman-Diaz AY, Giralt M, Solà R. Involving young people in health promotion, research and policy-making: practical recommendations. Int J Qual Health Care. 2019 Mar 1;31(2):147-153. doi: 10.1093/intqhc/mzy113. PMID: 29788085.
- Bou-Karroum L, El-Jardali F, Hemadi N, Faraj Y, Ojha U, Shahrour M, Darzi A, Ali M, Doumit C, Langlois EV, Melki J, AbouHaidar GH, Akl EA. Using media to impact health policy-making: an integrative systematic review. Implement Sci. 2017 Apr 18;12(1):52. doi: 10.1186/s13012-017-0581-0. PMID: 28420401; PMCID: PMC5395744.
- Kim SA, Blanck HM, Cradock A, Gortmaker S. Networking to Improve Nutrition Policy Research. Prev Chronic Dis. 2015 Sep 10;12:E148. doi: 10.5888/pcd12.150329. PMID: 26355829; PMCID: PMC4576425.
- Bero LA, Norris SL, Lawrence MA. Making nutrition guidelines fit for purpose. BMJ. 2019 Apr 16;365:11579. doi: 10.1136/bmj.11579. PMID: 30992263.
- Cullerton K, Donnet T, Lee A, Gallegos D. Exploring power and influence in nutrition policy in Australia. Obes Rev. 2016 Dec;17(12):1218-1225. doi: 10.1111/obr.12459. Epub 2016 Oct 5. PMID: 27706891.
- Cullerton K, Donnet T, Lee A, Gallegos D. Playing the policy game: a review of the barriers to and enablers of nutrition policy change. Public Health Nutr. 2016 Oct;19(14):2643-53. doi: 10.1017/S1368980016000677. Epub 2016 Apr 1. PMID: 27034196.





Title: Informatics enabled menu planning Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

This module will help students learn how informatics is used to create nutritional menu plans. The students will gain an understanding of how to evaluate the quality and quantity of the nutrition.

Learning Objectives

- To describe the important attributes needed to plan a meal.
- To explore the use of informatics for planning meals cost-effectively and efficiently.
- To discuss how informatics can be used to can create tailored meal plans.
- To illustrate the optimization function to develop an individualistic and tailored meal plan.

Learning Outcomes

Upon completion of this module students will be able to:

- Create an ideal nutritional meal plan tailored to the nutritional needs.
- Identify the attributes critique in the nutritional meal planning.
- Operationalize the meal planning using an informatics platform

Content

- Introduction
- Need of Nutritional Personalization
- Standardization & Integration of Nutrition Data
- Technologies used for meal planning

- Jaiswal, V., 2019. A new approach for recommending healthy diet using predictive data mining algorithm. Int. J. Res. Anal. Rev., 6(2), pp.58-65.
- North JC, Jordan KC, Metos J, Hurdle JF. Nutrition Informatics Applications in Clinical Practice: a Systematic Review. AMIA Annu Symp Proc. 2015 Nov 5;2015:963-72. PMID: 26958233; PMCID: PMC4765562.
- Wong, K. et al. "Exploring the Use of Information Technology in Dietetics Practice among Clinical Dietitians." Journal of community nutrition 7 (2005): 149-155.
- Bell, Arlanda, "Nutrition Informatics: Information Technology Transition for Registered Dieticians" (2016). Applied Research Projects. 7



- Lewis KD, Burton-Freeman BM. The role of innovation and technology in meeting individual nutritional needs. J Nutr. 2010 Feb;140(2):426S-36S.
- Kuziel, Alexa Lauren, "THE UTILIZATION OF TECHNOLOGY AS AN APPROACH TO IMPROVE MEAL PLANNING AND DIETARY INTAKE" (2019). Theses and Dissertations--Dietetics and Human Nutrition. 75.
- Kwon, D.Y. Personalized diet oriented by artificial intelligence and ethnic foods. J. Ethn. Food 7, 10 (2020). https://doi.org/10.1186/s42779-019-0040-4
- Choon NH, Cheah YN, Goh OS, Choo YH, Basiron H, Kumar YJ. A Review on Automated Menu Planning Approaches. J. Comput. Sci.. 2016;12(12):582-96.
- Arrate Lasa, Idoia Larretxi, Edurne Simón, Itziar Churruca, Virginia Navarro *, Olalla Martínez, María Ángeles Bustamante and Jonatan Miranda 2019
- Steele, R., 2013. An overview of the role of informatics-based systems in furthering an integrated paddock to plate food supply system. Progress in Industrial Ecology, an International Journal, 8(1-2), pp.30-44.
- Seljak, B.K., 2009. Computer-based dietary menu planning. Journal of food composition and analysis, 22(5), pp.414-420.
- Grady A, Wolfenden L, Wiggers J, Rissel C, Finch M, Flood V, Salajan D, O'Rourke R, Stacey F, Wyse R, Lecathelinais C, Barnes C, Green S, Herrmann V, Yoong SL Effectiveness of a Web-Based Menu-Planning Intervention to Improve Childcare Service Compliance With Dietary Guidelines: Randomized Controlled Trial J Med Internet Res 2020;22(2):e13401 doi: 10.2196/13401 PMID: 32014843 PMCID: 7055768
- Noah SA, Abdullah SN, Shahar S, Abdul-Hamid H, Khairudin N, Yusoff M, Ghazali R, Mohd-Yusoff N, Shafii NS, Abdul-Manaf Z DietPal: A Web-Based Dietary Menu-Generating and Management System J Med Internet Res 2004;6(1):e4 doi: 10.2196/jmir.6.1.e4 PMID: 15111270 PMCID: PMC1550583
- Skouroliakou, M., Kakavelaki, C., Diamantopoulos, K., Stathopoulou, M., Vourvouhaki, E. and Souliotis, K., 2009. The development and implementation of a software tool and its effect on the quality of provided clinical nutritional therapy in hospitalized patients. *Journal of the American Medical Informatics Association*, *16*(6), pp.802-805.
- Bader A, Gougeon R, Joseph L, Da Costa D, Dasgupta K Nutritional Education Through Internet-Delivered Menu Plans Among Adults With Type 2 Diabetes Mellitus: Pilot Study JMIR Res Protoc 2013;2(2):e41 doi: 10.2196/resprot.2525 PMID: 24185033 PMCID: PMC3806354
- Hsu, C.Y., Huang, L.C., Chen, T.M., Chen, L.F. and Chao, J.C.J., 2011. A web-based decision support system for dietary analysis and recommendations. Telemedicine and e-Health, 17(2), pp.68-75.
- Gurinović M, Milešević J, Kadvan A, Nikolić M, Zeković M, Djekić-Ivanković M, Dupouy E, Finglas P, Glibetić M. Development, features and application of DIET ASSESS & PLAN (DAP) software in supporting public health nutrition research in Central Eastern European Countries (CEEC). Food chemistry. 2018 Jan 1;238:186-94.
- Paschidi M, Skouroliakou M, Archontovassilis F, Papassarantopoulos P, Markantonis SL. Development of a software tool for computation of parenteral nutrition in adults, and its potential role in improving nutritional care. Pharm World Sci. 2006 Oct;28(5):265-73. doi: 10.1007/s11096-006-9053-3. Epub 2006 Nov 17. PMID: 17111240.



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- Skouroliakou M, Kakavelaki C, Diamantopoulos K, Stathopoulou M, Vourvouhaki E, Souliotis K. The development and implementation of a software tool and its effect on the quality of provided clinical nutritional therapy in hospitalized patients. J Am Med Inform Assoc. 2009 Nov-Dec;16(6):802-5. doi: 10.1197/jamia.M2894. Epub 2009 Aug 28. PMID: 19717805; PMCID: PMC3002126.
- Meyfroidt G, Wouters P, De Becker W, Cottem D, Van den Berghe G. Impact of a computer-generated alert system on the quality of tight glycemic control. Intensive Care Med. 2011 Jul;37(7):1151-7. doi: 10.1007/s00134-011-2159-7. Epub 2011 Mar 3. PMID: 21369814.
- Limketkai, B.N., Mauldin, K., Manitius, N. et al. The Age of Artificial Intelligence: Use of Digital Technology in Clinical Nutrition. Curr Surg Rep 9, 20 (2021). https://doi.org/10.1007/s40137-021-00297-3





Title: Personalized Nutrition Plan: A case study Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

This module will broaden their horizon about personalized nutrition & its importance with a scientific & practical approach.

Learning Objectives

- To develop an understanding of personalized Nutrition.
- To design the personalized nutrition plan.
- To develop an understanding of customization of nutrition plans.

Learning Outcomes

Upon completion of this module students will be able to:

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- Students will understand the concept of personalized Nutrition.
- Students will be learning how to design & customise the personalized nutrition plan.

Content

- Introduction
- Aspects of Personalized Nutrition
- Benefits of Personalized Nutrition
- Case Study

- Adams, S.H., Anthony, J.C., Carvajal, R., Chae, L., Khoo, C.S.H., Latulippe, M.E., Matusheski, N.V., McClung, H.L., Rozga, M., Schmid, C.H. and Wopereis, S., 2020. Perspective: guiding principles for the implementation of personalized nutrition approaches that benefit health and function. Advances in nutrition, 11(1), pp.25-34.
- Verma M, Hontecillas R, Tubau-Juni N, Abedi V, Bassaganya-Riera J. Challenges in Personalized Nutrition and Health. Front Nutr. 2018;5:117. Published 2018 Nov 29. doi:10.3389/fnut.2018.00117
- Bush, C.L., Blumberg, J.B., El-Sohemy, A., Minich, D.M., Ordovás, J.M., Reed, D.G. and Behm, V.A.Y., 2020. Toward the definition of personalized nutrition: a proposal by the



American Nutrition Association. Journal of the American College of Nutrition, 39(1), pp.5-15.

Module 11

Title: mHealth and Nutritional Apps Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

Our nation's healthcare system is changing at a rapid pace. Transformative health care delivery programs depend heavily on health information technology to improve the health of the country. Through this module, the students will understand the importance of mHealth to enhance the nutritional status of the country. The module will focus on the features and behavior change techniques needed to develop an effective nutritional app. The students will learn about the various nutritional app evaluation tool. Upon evaluating the quality of the apps the students will identify the gaps in the nutrition apps available and recommend strategies for improving their quality.

Learning Objectives

- Introduce the students to the concept of mhealth in the field of nutrition
- Describe how to use nutrition apps to improve the quality of patient care
- Explain potential benefits and weaknesses of the nutrition apps
- Explore the various nutrition app evaluation tool
- Understand the features and BCT's used in developing a nutrition app

Learning Outcomes

Upon completion of this module students will be able to:

- Use skills to use mobile apps to provide lifestyle counseling
- Evaluate mobile apps that reflect evidence-based information using an app evaluation tool
- Identify relevant nutrition-based apps to recommend the clients
- Aid in the development of evidence-based nutrition and lifestyle apps from a multidisciplinary and user-centered design (UCD) perspective
- Educate patients on how to download and use mHealth for different conditions
- Educate patients on how to relay mHealth app information to a healthcare provider
- Educate the patients on how to evaluate a reliable app

Content



- Introduction
- Need for Nutrition apps
- Prevalence of health-related mobile applications (apps)
- Features of Nutrition Based Apps
- Behaviour Change Technique's in nutrition-based apps
- The current weakness of the nutrition-based apps
- How to evaluate nutrition-based apps

- DiFilippo KN, Huang W, Chapman-Novakofski KM A New Tool for Nutrition App Quality Evaluation (AQEL): Development, Validation, and Reliability Testing JMIR Mhealth Uhealth 2017;5(10):e163 doi: 10.2196/mhealth.7441 PMID: 29079554 PMCID: 5681720
- Gabrielli S, Dianti M, Maimone R, et al. Design of a Mobile App for Nutrition Education (TreC-LifeStyle) and Formative Evaluation With Families of Overweight Children. JMIR Mhealth Uhealth. 2017;5(4):e48. Published 2017 Apr 13. doi:10.2196/mhealth.7080
- Ahmad M, Khan MA, Bibi M, Ullah Z, Shah ST. Mobile apps for human nutrition: a review. Mobile Devices and Smart Gadgets in Medical Sciences. 2020:121-47.
- Franco RZ, Fallaize R, Lovegrove JA, Hwang F. Popular nutrition-related mobile apps: a feature assessment. JMIR mHealth and uHealth. 2016 Aug 1;4(3):e5846.
- Ferrara G, Kim J, Lin S, Hua J, Seto E. A Focused Review of Smartphone Diet-Tracking Apps: Usability, Functionality, Coherence With Behavior Change Theory, and Comparative Validity of Nutrient Intake and Energy Estimates. JMIR Mhealth Uhealth. 2019 May 17;7(5):e9232. doi: 10.2196/mhealth.9232. PMID: 31102369; PMCID: PMC6543803.
- Holzmann SL, Pröll K, Hauner H, Holzapfel C. Nutrition apps: Quality and limitations. An explorative investigation on the basis of selected apps. Ernaehrungs Umsch. 2017;64:80-9.
- König LM, Attig C, Franke T, Renner B Barriers to and Facilitators for Using Nutrition Apps: Systematic Review and Conceptual Framework JMIR Mhealth Uhealth 2021;9(6):e20037 doi: 10.2196/20037 PMID: 34254938
- Ji Y, Plourde H, Bouzo V, Kilgour RD, Cohen TR. Validity and usability of a smartphone image-based dietary assessment app compared to 3-day food diaries in assessing dietary intake among canadian adults: Randomized controlled trial. JMIR mHealth and uHealth. 2020;8(9):e16953.
- Emma Tonkin, Julie Brimblecombe, Thomas Philip Wycherley, Characteristics of Smartphone Applications for Nutrition Improvement in Community Settings: A Scoping Review, Advances in Nutrition, Volume 8, Issue 2, March 2017, Pages 308–322, <u>https://doi.org/10.3945/an.116.013748</u>
- Schumer H, Amadi C, Joshi A. Evaluating the Dietary and Nutritional Apps in the Google Play Store. Healthc Inform Res. 2018 Jan;24(1):38-45. doi: 10.4258/hir.2018.24.1.38. Epub 2018 Jan 31. PMID: 29503751; PMCID: PMC5820085.
- Heather A Eicher-Miller, Lukkamol Prapkree, Cristina Palacios, Expanding the Capabilities of Nutrition Research and Health Promotion Through Mobile-Based Applications, Advances



in Nutrition, Volume 12, Issue 3, May 2021, Pages 1032–1041, https://doi.org/10.1093/advances/nmab022

• Tassone C, Keshavjee K, Paglialonga A, Moreira N, Pinto J, Quintana Y. Evaluation of mobile apps for treatment of patients at risk of developing gestational diabetes. Health informatics journal. 2020 Sep;26(3):1983-94.

Module 12

Title: Formulating Research Question Instructor: Credits: 0.5 Duration: 60 minutes

Module Description

The course is aimed to provide graduate students with the essential skills and knowledge that is required to formulate a tangible research question. It will include a methodological approach on how to formulate a research question, identify characteristics and components of a good research question. The students will also learn the constituents of literature search and sources of literature. The course will help the students to formulate a research hypothesis and an appropriate research question that can help with the scientific investigation.

Learning Objectives

- To understand the process of formulating a research question.
- To know the FINER criteria to develop a research question.
- To identify the characteristics of a good research question.
- To learn literature search for identifying a good research question.
- To identify components of the research question.

Learning Outcomes

Upon completion of this module students will be able to:

- To identify and select a suitable research topic.
- To develop and write research questions, research hypotheses, and research objectives.
- To recognize the significance of a good research question in scientific research.
- To evaluate the research question as per a set of criteria.

Content

- FINER criteria for research question
- Characteristics of a good research question
- Literature search constituents and description
- Sources of literature published literature, grey literature
- Components of research question using PICOT
- Examples of the research question

Reading Material



- Dhir, S.K., Gupta, P. Formulation of Research Question and Composing Study Outcomes and Objectives. Indian Pediatr 58, 584–588 (2021). https://doi.org/10.1007/s13312-021-2246-y
- Ratan, S. K., Anand, T., & Ratan, J. (2019). Formulation of Research Question Stepwise Approach. Journal of Indian Association of Pediatric Surgeons, 24(1), 15–20. https://doi.org/10.4103/jiaps.JIAPS_76_18
- Fandino W. (2019). Formulating a good research question: Pearls and pitfalls. Indian journal of anaesthesia, 63(8), 611–616. <u>https://doi.org/10.4103/ija.IJA_198_19</u>



Title: Mixed methods research Instructor: Credits : 0.5 credits Duration: 60 Minutes

Module Description

The course is aimed to familiarize researchers, practitioners, and graduate students with the basic understanding of mixed-method research methodologies. It will introduce the students to types of research paradigms including their advantages and drawbacks. The students will also learn to integrate qualitative and quantitative research methods. The course will also help students to identify and apply the appropriate research methods as per the research question in population health science.

Learning Objectives

- To know the types of research paradigms.
- To understand qualitative research methods, their advantages, and drawbacks.
- To understand quantitative research methods, their advantages, and drawbacks.
- To recognize the features and strengths of mixed methods research.
- To learn how and where mixed methods can be used.

Learning Outcomes

Upon completion of this module students will be able to:

- Identify the mixed-method approaches used in population health research.
- Describe the appropriate methods to be used as per the research question.
- Understand the significance of the mixed methods approach in population health.
- Design, implement and critically analyze a mixed-methods study.

Contents

- Different research paradigms.
- Qualitative and quantitative research methods and their key features.
- What is mixed-method research?
- Key features of mixed-method research.
- Need for mixed-method approach.
- Example: how to formulate a research question using a mixed-methods approach.

- Creswell JW. A Concise Introduction to Mixed Methods Research Creswell JW, Clark V. 2018. Designing and conducting mixed methods research (3rd ed.). Thousand Oaks: Sage.
- Kaur, M. (2016). Application of mixed-method approach in public health research. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine, 41*(2), 93.



- Halcomb, E., & Hickman, L. (2015). Mixed methods research. Nursing standard (Royal College of Nursing (Great Britain): 1987), 29(32), 41–47. https://doi.org/10.7748/ns.29.32.41.e8858
- Katz, J., Vandermause, R., McPherson, S., & Barbosa-Leiker, C. (2016). A demonstration of mixed-methods research in the health sciences. *Nurse researcher*, 24(2), 24–29. https://doi.org/10.7748/nr.2016.e1433





Title: Statistical analysis of Healthcare data (Theory + Workshop) **Instructor:** Credits: 0.5 **Duration:** 3 Hours

Module Description: The course, "Statistical analysis of Healthcare data" prepares students to describe, understand, analyze and implement data intelligence to make decisions on real-life problems. It will also provide hands-on experience on various methods for analysis, presentation, and interpretation of healthcare data. Also, will further introduce students to the use of statistical analysis in health sciences.

Learning objectives: This course aims to develop the understanding of various statistical methods used for decisions making and how each applies to and can be used in the community environment. At the end of this course students will be able to:

- To understand the significance of the data intelligence
- To train students in the presentation and interpretation of data
- To impart examples of utilization of data in decision making
- Training in usage of appropriated statistical software and handling of large datasets

Learning Outcome

On completion of the course students will be able to:

- Develop skills in Data understating
- Demonstrate skills in data management
- To interpret and summarize the given set of data
- Proficiency with statistical analysis of data
- Gaining insights about the data and applying data science concepts and methods to solve problems in community-based settings.

Contents

- IU OUISSOSSE • What is the dimension of Big data, the Goal behind Big data analytics, Need for data analytics
- Characteristics of Quantitative and Qualitative data Types of Variables according to value, scale, and relationship, Dependent, and Independent variables

Types of data analysis: Univariate, Bivariate, and Multivariate Data Collection, Editing, Missing data, Coding, and data entry, Data transformation/conversion

Rates of Events, Measures of morbidity, Crude death rate, Specific death rate, Vital Index, • Gross reproduction rate, Net reproduction rate Simple, Compound, Percentage, Bar chart, Histogram, Frequency polygon, Frequency curve, Skewed diagram Integration and collection of multi score data, Data cleaning, Non-Uniformity, Data duplicacy



- Introduction to Public Health. Mary-Jane Schneider, 6th edition
- De Smith MJ. Statistical Analysis Handbook A Comprehensive Handbook of Statistical Concepts, Techniques and Software Tools/Dr Michael J de Smith, 2018, The Winchelsea Press. The Winchelsea Press; 2018.
- Bartkowiak BA, Finnegan BJ. Health statistics. Clin Med Res. 2004 Aug;2(3):189-90. doi: 10.3121/cmr.2.3.189. PMID: 15931356; PMCID: PMC1069092.
- Dash, S., Shakyawar, S.K., Sharma, M. et al. Big data in healthcare: management, analysis and future prospects. J Big Data 6, 54 (2019). https://doi.org/10.1186/s40537-019-0217-0
- [BRE1] Breslow N E, Day N E (1980) Statistical Methods in Cancer Research: Volume 1 The Analysis of Case-Control studies. IARC Scientific Publications No.32, World Health Organization, IARC Lyon
- [BRE2] Breslow N E, Day N E (1987) Statistical Methods in Cancer Research: Volume 2 The Design and Analysis of Cohort Studies. IARC Scientific Publications No.82, World Health Organization, IARC Lyon
- Reiser SJ. The clinical record in medicine part 1: Learning from cases. Annals of internal medicine. 1991 May 15;114(10):902-7.





Title: Scientific Writing (Theory) Instructor: Credits: 0.5 credits Duration: 60 minutes

Module Description

This module aims to equip graduate students with an in-depth understanding of the process of scientific writing. The course will introduce the students to desirable features and essential elements of a scientific paper including managing references in software. The students will also learn the aspects of research and publication ethics. The course will help students to organize and manage their research papers effectively and would also train them to communicate their results effectively.

Learning Objectives

- To know the key elements of a research paper.
- To recognize the structure of key elements.
- To learn about reporting guidelines for study types.
- To know tools for citing and managing references.
- To identify the criteria for authorship in a scientific paper.
- To learn about predatory journals.

Learning Outcomes

Upon completion of this module students will be able to:

- To plan and prepare well-written scientific research papers and reports.
- To describe the structure of a scientific paper.
- To practice ethics and scientific integrity while reporting and writing a scientific research article.
- To communicate the result using appropriate scientific terminology and formatting.

Contents

- Introduction to scientific writing
- Features of scientific writing
- Elements of a scientific paper (Introduction, methods, result, discussion, conclusion, abstract)
- Ethics in research (plagiarism, authorship)
- Citations and references as per the journal format
- Citation manager tools (Endnote, Zotero)

Suggested Reading

 Bahadoran, Z., Mirmiran, P., Kashfi, K., & Ghasemi, A. (2019). The Principles of Biomedical Scientific Writing: Title. International journal of endocrinology and metabolism, 17(4), e98326. <u>https://doi.org/10.5812/ijem.98326</u>



- Forero, D. A., Lopez-Leon, S., & Perry, G. (2020). A brief guide to the science and art of writing manuscripts in biomedicine. Journal of translational medicine, 18(1), 425. https://doi.org/10.1186/s12967-020-02596-2
- Mestres, C. A., & Sampathkumar, A. (2019). The art and science of scientific writing. Asian cardiovascular & thoracic annals, 27(5), 335–337. <u>https://doi.org/10.1177/0218492319856972</u>



Title: Research Seminar Instructor: Credits: 0.5 credits Duration: 2 hours

Module Description

The module will focus on the nuances of scientific writing, develop skills in critiquing, collating, and presenting scientific information. Students will read papers on the selected topic and critique them. Based on that the student will prepare a report and a seminar presentation.

Learning Objectives

- To learn the rationale behind critiquing a research paper
- To list the elements of critiquing the research
- To describe the step-by-step process of conducting a research critique

Learning Outcomes

On completing the research seminar students will be able to:

- State the purpose for completing a research critique
- Enlist the necessary elements/questions in a research critique

Content

- Defining Research Critique
- Rationale behind Research Critique
- Need and Importance of Research Critique
- Process of Research Critique
- Guidelines to Research Critique
- Research Seminar Presentation by Students

- Vance DE, Talley M, Azuero A, Pearce PF, Christian BJ. Conducting an article critique for a quantitative research study: Perspectives for doctoral students and other novice readers. Nursing: Research and Reviews. 2013 Apr 22;3:67-75.
- Ownby R. Applying Evidence-Based Methods in Psychiatry Journal Club: How to Read & Critique Articles.
- Coughlan M, Cronin P, Ryan F. Step-by-step guide to critiquing research. Part 1: quantitative research. British journal of nursing. 2007 Jun 14;16(11):658-63.
- Lipp A, Fothergill A. A guide to critiquing a research paper. Methodological appraisal of a paper on nurses in abortion care. Nurse education today. 2015 Mar 1;35(3):e14-7.



- Knowles JM, Gray MA. The experience of critiquing published research: Learning from the student and researcher perspective. Nurse Education in Practice. 2011 Nov 1;11(6):390-4.
- Alley, M. (2018) The Craft of Scientific Writing. New York: Springer.



Coursework Evaluation

Discussion Board Assignments (10%): Students are expected to participate actively in the course discussion board on Canvas. Throughout the semester, students will be assigned discussion board questions that will be addressed in the student's original post. Students are also expected to reply to at least two peers' postings per discussion board. Peer replies should be thoughtful, reflective, and respectful while prompting further discussion using content knowledge, critical thinking skills, questioning, and relevant information on the topic. Original posts are due no later than 11:59 pm on Wednesday and peer replies are due no later than Sunday at 11:59 pm of the week assigned.

Course Assignments: All assignments will be submitted via email unless stated otherwise.

Homework Assignments (30%): There will be one equally weighted homework assignment for this module. Students are required to submit the completed assignments on or before the due date. A 10% deduction will be applied for every 24 hour late submission. Homework Assignments submitted after four days of the due date will not be graded.

Grading:

Please refer to the rubric for grading details. Additional information about the grading criteria for each component will be distributed with the assignment. The weight of each course component is as follows:

atic	Innovation is	Struggle
30%	Homework Assignments	er oo
15%	Midterm Examination	
20%	Research Seminar	
25%	Final Examination	
10%	Discussion Board Assignments	Se S
100%	Sulles Pood	aruatuo.

Grading Scale: The grading scale for the course is shown below and is consistent with UNIVERSITY policies.

Grade Point:	4.0	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0
Final Percentage:	100- 98	97- 93	92-9 0	89-8 8	87- 83	82-8 0	79-7 8	77- 73	72-7 0	69-6 8	67- 63	62-6 0	<60
Letter Grade:	A+	А	A-	B+	В	B-	C+	С	C-	D+	D	D-	F

Academic integrity and professional conduct: The University established policy on academic integrity and professional conduct will be followed. This policy may be found in the Student Handbook. All graduate students are expected to adhere scrupulously to this policy. Cheating, academic misconduct, fabrication, and plagiarism are viewed as serious matters and will lead to



disciplinary action as described in the Student Handbook under Procedural Rules Relating to Student Discipline. Additional materials related to Responsible Conduct in Research can be found in the Student Handbook.

A violation of the standards of academic integrity is viewed as a very serious matter at university. Any violation of the academic integrity and professional conduct policy will result in a zero grade for the assignment or exam in question. A second offense will result in an F for the course. Violations will be reported to student's Department Chair and the Associate Dean for Academic and Student Affairs and may be entered into the student's academic record. This record may affect future job opportunities.

Cheating: A general definition of cheating is the use or attempted use of unauthorized materials or information for an academic exercise. Examples of cheating include but are not limited to:

- 1. Using unauthorized materials such as books, notes, calculators or other aids during an examination or other academic exercises;
- 2. receiving unauthorized assistance from another person during an exam or exercise such as copying answers, receiving answer signals, conversation or having another person take an examination for you;
- 3. Assisting another person during an exam or exercise, such as allowing your answers to be copied, signaling answers or taking an exam for someone else;
- 4. obtaining answers and/or other information without authorization from someone who has previously taken an examination;
- 5. including all or a portion of previous work for another assignment without authorization

Academic Misconduct: Academic misconduct is defined as the falsification of official documents and/or obtaining records, examinations or documents without authorization. Several examples of academic misconduct are:

- 1. the unauthorized acquisition of all or part of an unadministered test;
- 2. selling or otherwise distributing all of part of an unadministered test;
- 3. changing an answer or grade on an examination without authorization;
- 4. falsification of information on an official university document such as a grade report, transcript, an instructor's grade book or evaluation file or being an accessory to an act of such falsification;
- 5. forging the signature of an authorizing official on documents such as letters of permission, petitions, drop/add, transcripts, and/or other official documents;
- 6. unauthorized entry into a building, office, file or computer database to view, alter or acquire documents.

Plagiarism: Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, i.e. an appropriate attribution or citation. Some examples are:

1. In the methods section of a thesis, a graduate student describes a procedure used in research for the thesis. The procedure was developed by a fellow graduate student in the laboratory of their major professor; however, neither the student who developed this procedure nor the major professor was given credit in the thesis. This implies that the author of these had



himself developed the procedure.

2. In the background section of a thesis, a graduate student quotes verbatim the results of a previous investigator's work but fails to credit the individual through citation. The work is recent and thus cannot be considered common knowledge.

