MAKERERE UNIVERSITY

COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

SCHOOL OF FOOD TECHNOLOGY NUTRITION AND BIOENGINEERING

DEPARTMENT OF FOOD TECHNOLOGY AND NUTRITION

REVISED CURRICULUM FOR THE BACHELORS OF SCIENCE IN HUMAN NUTRITION AND DIETETICS (BHND)

DURATION: FOUR YEARS

SEPTEMBER 2023

CONTENTS

ACRONYMS AND ABBREVIATIONS

1	BAGR	Bachelor of Science in Agriculture
2	BBPE	Bachelor of Science in Bioprocess Engineering
3	BFST	Bachelor of Science in Food Science and Technology
4	BHUN	Bachelor of Science in Human Nutrition
5	BWIE	Bachelor of Science in Water and Irrigation Engineering
6	CAES	College of Agricultural and Environmental Science
7	CH	Contact hours
8	CU	Credit unit
9	DABE	Department of Agricultural and Biosystems Engineering
10	DFTN	Department of Food Technology and Nutrition
11	FAO	Food and Agricultural Organization
12	MAAIF	Ministry of Agriculture Animal Industry and Fisheries
13	MoH	Ministry of Health
14	MIA	Ministry of Internal Affairs
15	MTIC	Ministry of Trade, Industry and Cooperatives
16	NaCORI	National Coffee Research Institute
17	NARO	National Agricultural Research Organization
18	NCDs	Non-Communicable Diseases
19	SFTNB	School of Food Technology, Nutrition and Bio-engineering
20	UIRI	Uganda Industrial Research Institute
21	UNBS	Uganda National Bureau of Standards
22	UNHCR	United Nations High Commission for Refugees
23	USAID	United States Agency for International Development
24	WHO	World Health Organization
25	URA	Uganda Revenue Authority

1. INTRODUCTION

1.1 Title of the Programme

The title of the programme is BSc Human Nutrition and Dietetics (BHND)

1.2 Description of the Programme

The BHND programme is designed to equip students with practical skills and knowledge in the science of nutrition with the ability of offering evidence-based advice on the use of foods to promote health, manage malnutrition and diet-related illnesses like diabetes, heart disease, and obesity, which are significant public health concerns. Graduates from the program are employed in: (i) hospitals as nutritionists and dieticians (ii) government ministries, departments and institutions, (iii) international and national NGOs involved in policy development, advocacy and program delivery related to nutrition, (iv) academia as lecturers or researchers, (v) Self-owned companies involved in nutrition & dietetics, processing & marketing of food supplements, functional foods and nutrient dense food, and (vi) consultancy on different aspects of human nutrition, dietetics and wellness.

1.3 Justification of the BHND Programme

The Bachelor of Science in Human Nutrition and Dietetics (BHND) program plays a crucial role in addressing the pressing nutritional challenges outlined in Uganda's National Development Plan III (NDP III) and aligns with the Sustainable Development Goals (SDGs). Nutrition is inherently intertwined with human development, and this program is pivotal in producing skilled professionals who can contribute to the realization of these goals.

Nutrition is the study of nutrients in food, how the body absorbs and uses them, and the relationship between diet, health, and disease. Dietetics refers to the practical application of nutrition science to assist individuals or groups of people and communities in reaching optimal health through dietary choices. It involves using nutrition expertise to produce personalised nutrition plans, provide people advice on creating healthy eating habits, and treating medical conditions through dietary modifications. Nutrition and dietetics are foundational to the holistic well-being of individuals and communities, impacting their health, productivity, and economic potential. NDP III emphasizes the importance of human capital development, aiming to increase per capita income, life expectancy, and reduce poverty rates. The BHND program directly contributes to these targets by equipping students with the knowledge and skills to address several nutritional challenges including undernutrition and over nutrition. Furthermore, the program aligns with SDG2, which seeks to end hunger and malnutrition by 2030. In Uganda, where there's a shortage of skilled nutrition professionals, this program fulfils a critical role in developing the human resource base needed to drive change. By producing graduates who can design personalized nutrition plans, promote healthy eating habits, and address medical conditions through dietary interventions, the BHND program empowers individuals and communities to achieve optimal health. This is vital not only for improving the quality of life but also for sustaining economic growth and development, in line with NDP III's objectives.

Additionally, the BHND program supports Makerere University's strategic goal of becoming a research-led institution. By educating students in the latest nutrition science and research methodologies, the program contributes to the university's research endeavours in nutrition and health. The research conducted by faculty and students can generate evidence-based solutions to Uganda's nutritional challenges and inform policies and programs aimed at achieving the ambitious targets set in NDP III and the SDGs. Through a strong emphasis on research and innovation, Makerere University can actively engage in multidisciplinary collaborations and knowledge dissemination, positioning itself as a leader in addressing nutrition-related issues both nationally and globally. This program thus bridges the gap between academic excellence and practical solutions, reinforcing Makerere University's commitment to becoming a research-led institution while also advancing the development goals set forth in NDP III and the SDGs.

1.4 Programme Objectives

To provide education, discovery and experiential training opportunities to prepare graduates as both human nutritionists and dieticians.

Specific Objectives:
This programme is aimed at imparting the following knowledge and skills aspects to the students:

1. The basics of public health, clinical and community nutrition
2. Application food and health sciences in solving nutrition-related problems
3. Managerial and policy aspects related to nutrition and dietetics
4. Critical thinking and research
5. Communication and information-handling
6. Professional values, attitudes and behaviour

1.5 Programme Outcomes

By the end of the program, students will be in position to:

1. Develop and deliver relevant nutrition information, products, and services to individuals, groups, and populations
2. Use strategic application of principles of management and systems in providing nutrition-related services to individuals and organizations
3. Integrate scientific information and translate research into evidence-based professional nutrition practice
4. Demonstrate critical thinking and problem-solving skills for applying nutrition and dietetics knowledge to improve health and wellness
5. Participate in the change process of health care systems across different sectors
6. Use basic concepts of leadership, including knowledge of internal and external organisational influences on practice in order to provide continuity of health care delivery

1.6 Justification for Reviewing the Programme

1. The University Senate and National Council for Higher Education (NCHE) require that curricula be reviewed every five years. The curriculum for the BSc Human Nutrition programme was approved in 2008 and has been in place for 13 years to date. The programme was, therefore, overdue for review.

2. The curriculum review process derives the basis from developments in knowledge and technologies in the field, changes in the business environment because of progress in research, changes in population and the attendant impact on the economy that impacts on the training needs in various disciplines. Revising the curriculum therefore, ensures that the programme will produce graduates who can meet the current human resource requirements in the job market.

3. Some of the current content in the curriculum is not in line with current national policies/strategies/guidelines and hence not aligned to meet national nutrition needs. Under the National Development Plan III and Uganda Nutrition Action plan II (2020-2025), for example, key nutrition strategies/policies and guidelines recommend the need for a for a multi-sectoral approach to further enhance national strategies to address nutrition.

4. At the population level, despite the current investment, the nutritional status of the population, especially women and children remain sub-optimal. Nearly every three out of every ten children below the age of five years of age are stunted and one out of every seven children underweight. Anemia is high among both children and women in the reproductive age group (49% and 23%, respectively). This picture, coupled with new developments of the increasing numbers of people affected with non-communicable diseases, makes

nutrition a public health problem in Uganda and a priority area for targeted interventions that are addressed in the current revision of this curriculum.

5. Coupled with a shift to competency-based assessments, the revision of this curriculum takes into account the need to have a multidisciplinary direction in both the content and teaching of the respective modules offered and taking into account the existence of both under and over nutrition; also otherwise known as the double burden of malnutrition. By default, the revision of the curricular also takes into account the changing needs of the various stakeholders in the area of nutrition that require skilled graduates to address their needs.

6. The Department of Food Technology and Nutrition already offers an MSc programme in Applied Human Nutrition, which strongly warrants a BSc degree programme in Applied Human Nutrition and Dietetics. Applied Human Nutrition and Dietetics has a wide spectrum of application in addressing nutritional issues that cover both the community and clinical aspects. The current curricular is lacking in aspects of dietetics.

7. The duration of the running program of 3 years is not adequate to cover aspects of both nutrition and dietetics hence the revision to 4 years. The following are the justifications for increasing the program to 4 years:

    i. A 4-year program is the current practice/standard for most BSc Human Nutrition and Dietetics programs. Similar programmes in Uganda (Kyambogo University, Victoria University and Uganda Christian University), in the East African region (University of Nairobi, Jomo Kenyatta University of Science and Technology) in the rest of Africa and internationally (University of Western Cape, South Africa, Stellenbosch University, University of Surrey, London Metropolitan University, etc) have curricula running for 4 years.
    ii. Alumni of the program who participate in the curriculum review process indicated that the program was so packed with little time often leading to some aspects being skipped or not being covered adequately.
    iii. Feedback from the stakeholders during the curriculum review process indicated some gaps in the training program. Addition of new courses to cover these gaps inevitably required an increase in the duration of the program.

Therefore, this revision in program duration takes into account conventional practice globally and helps provide sufficient time for training in human nutrition and dietetics.

From the stakeholders' point of view:

1. The current curriculum for Bsc Human Nutrition has a narrow scope to address the multidimensional and multisector skillset required to address malnutrition. Moreover, this also falls short of addressing the needed competencies that are in line with current global and national priorities for nutrition.

2. Some course units have outdated content-not in line with the current national nutrition needs amidst new scientific evidence and strategies have become available. Moreover, the course Human Nutrition and Dietetics spans the needed broad-ranging areas, overlapping with many other disciplines including biochemistry, physiology, cell biology, dietetics, medicine, communications and public health that provide students with a holistic skillset to needed to address the nutrition needs of the population using a life cycle approach.

3. Teaching and assessments methods - with a focus on practical based and competency based will produce graduates with the skills to creatively solve multiple nutrition problems in the country.

1.7 Employment Prospects

The program will produce nutrition and dietetics graduates who will be employed in:

1. Government and private hospitals as nutritionists and dieticians
2. Government ministries, departments and institutions e.g Ministry of Agriculture Animal Industry and Fisheries (MAAIF), Ministry of Health (MoH) etc as nutrition and dietetics officers
3. Research institutions e.g the Uganda Industrial Research Institute, National Agricultural Research Organisation (NARO) as research officers
4. International and national NGOs involved in policy development, advocacy and program delivery related to nutrition like: World Health Organization (WHO), Food and Agriculture Organization (FAO), World Food Programme (WFP), and United Nations Children's Fund (UNICEF) among others.
5. Academia as lecturers, researchers or graduate students in different universities
6. Food processing companies as clinical nutrition product sales and marketing personnel
7. Self-owned companies involved in nutrition & dietetics, processing & marketing of food supplements, functional foods and nutrient dense food products thus creating jobs for themselves and others
8. Consultancy on different aspects of human nutrition and dietetics

1.8 The Review Process

The revised curriculum of the BSc Human Nutrition programme was produced out of a wide range of activities and consultations at different levels as summarized below:

1. A **curriculum review committee** was constituted at department level and given the task of coordinating the process. The committee conducted a desk review of key documents including copies of the old curriculum, other curricula of programmes in the School of Food Technology, Nutrition and Bio-engineering as well as the revised curriculum for the BSc Agriculture program from the School of Agricultural Sciences, Makerere University. The BSc Human Nutrition programme borrows some courses from the BAGR programme. Therefore, changes in the latter, which was being reviewed concurrently, were taken into consideration during this review. The committee also reviewed relevant university policies and guidelines for reviewing programmes.

2. **Survey of stakeholders** including employers and alumni in the field (a total of six stakeholders). Open-ended questionnaires were shared electronically with stakeholders in different organizations (National Council for Science and Technology, Ministry of Health, HMH Rainbow Ltd, SR Afro Chicks and Breeders Ltd and Recast Agrisystems). The committee, working with staff of the DFTN developed open ended questionnaires that were shared electronically via Google Forms alongside the running curriculum. The questionnaires covered; general evaluation of the DFTN graduates, clarity of program description, admission requirements, program content, program resources, program instruction, future growth areas that would impact or change (for employers); graduate satisfaction with the program, any other matters to raise about the curriculum, experiences in studying the course, the best and worst courses in the curriculum they studied, their comment and opinion about the mode of teaching of the curriculum, areas of training they think will shape their discipline in the coming years, and; what they would change about the curriculum if they had an opportunity to do so (for graduates). This survey was carried out between August to September 2021. The list of stakeholders who gave feedback and a summary of their feedback are in appendix 1

3. **Engagement of DFTN alumni using social media (WhatsApp)**. The committee engaged DFTN alumni in a discussion on several topics related to: (i) their experience on the BHUN programme, (ii) the curriculum (satisfaction with the courses, gaps in the program and mode of teaching), and (iii) trending issues likely to shape the profession in the coming years. This discussion was on the DFTN alumni WhatsApp platform which comprises a total of 255 alumni of the DFTN from inception of the programme to 2020. Members of the curriculum review committee moderated the discussion and transcribed the key issues raised with regards to

reviewing the curriculum. This discussion was held in August 2021. A list of participants and a summary of the key issues raised are in appendix 2.

4. **Internal review meetings** involving staff members from the department of Food Technology and Nutrition (DFTN), Makerere University. Consultative meetings were held with the staff/instructors at the DFTN and the curriculum review team to map out and agree on key review issues, review progress and agree on key areas of the review process taking into consideration competitiveness of programmes, uniqueness of the programme and relevance to the current job market among others.

5. **Stakeholder validation workshop**. A revised curriculum was presented to stakeholders for review during an online workshop via Zoom on 29th and 30th March 2022. A total of 25 participants including members from: the DFTN, Kyambogo University, Bugema University, Ministry of Health, United Nations High Commission for Refugees (UNHCR), United Nations International Children's Emergency Fund (UNICEF), the food industry and alumni participated. A summary of issues raised during that meeting together with the list of stakeholders present is attached (Appendix 3).

1.9 Key Changes and Justification

The key changes in the revised BHUN curriculum are summarised in table 1. These revisions were mainly informed by feedback from the review process which involved DFTN staff, DFTN alumni and stakeholders who employ our graduates.

Table 1: Key changes in the revised BSc Human Nutrition programme and the justification for the change

No.	Revision	Justification
1	The name of the programme was changed from BSc Human Nutrition to BSc Human Nutrition and Dietetics	1. Stakeholders had noted that the program was weak on dietetics. A strong component of dietetics (HMN1109 Food Hygiene and Safety, HMN1110 Nutrition Ethics and Professionalism, HMN2205 Community Nutrition Assessment , HMN2206 Pathophysiology of Nutrition Disorders, HMN2302 Clinical Nutrition Practice, HMN3109 Meal and Diet Planning, HMN3110 Community Nutrition Interventions, HMN3208 Culinary skills, FST3206 Food Product Development, FST3217 Food Laws & Legislation, HMN3301 Dietetics Practice, HMN4102 Planning, Monitoring and Evaluation of Nutrition Programs, HMN4103 Nutrition and Dietetics Seminars and SPS 3106 Nutrition for Sports and Health), was thus added to the programme warranting a change of name to reflect this. 2. The renaming of the course was also guided by the National regulatory Authority (Allied Health Professionals' Council), which recommends that graduates with dietetics and nutrition competencies are allowed to practice clinical dietetics in a health setting while graduates of Human Nutrition shall only practice in the community. 3. Therefore, the revised curriculum offers double competencies-both of a nutritionist and a dietician not only by its name, but also from the revised training content.
2	The duration of the programme increased from 3 years to 4 years	The running, 3-year, programme was weak on aspects of dietetics and dietetics practice as observed during the review

No.	Revision	Justification
		process. Other skills and competencies required to produce graduates that can meet the vast but also changing nutritional needs of society were identified during the review. This necessitated addition of more courses in the curriculum thus increasing the duration of the programme. Additionally, a review of other related curricula in Uganda, Africa and globally indicated that nutrition and dietetics programmes are generally 4-year programmes.
3	Total number of credit units increased from 129 to 153	This is because a number of new courses were added to the curriculum to cater for strengthening aspects of dietetics and dietetics among others
4	In total, 31 courses out of 52 were revised as shown in table 2 of the curriculum. Some of the courses were merged to create new ones while others had some name changes or were moved from one semester to another. Some entirely new (14) courses previously not on the curriculum were introduced. The details on justification of these and other changes are in Table 2 of the curriculum.	Due to recommendations from stakeholders and alumni, new course units were introduced to cater for some skills and competence gaps in the old programme (Section 1.3). Some courses were also moved from one semester to another and thus changed codes, other had changes in their CUs or modifications in the names modified. The details are shown in Section 1.9.
5	HMN1301 Environmental Health and Sanitation formerly done in recess term of year 1 was replaced by a new course HMN1109 Food Hygiene and Safety and transferred to year 1 semester	This is an important course which always received little coverage during the recess term. The content was revised and the course transferred from recess to allow for more time to be dedicated to it
6	Some courses on economics, entrepreneurship were introduced i.e 1. AEC1120 Principles of Economics, 2. FST2104 Entrepreneurship and Financial Management	These courses will impart skills and competencies required for setting up and managing nutrition and dietetics related businesses.
7	Courses on, healthy polices, leadership and management were introduced e.g 1. HMN4101 Nutrition Leadership and Management 2. HMN4102 Planning, Monitoring and Evaluation of Nutrition Programs 3. EEE4220 Organizational Management & Leadership.	The review process indicated that BHUN graduates were weak on leadership and program planning and monitoring skills. These courses, some of which are electives, are meant to fill these gaps.

1.10 Comparison of the Old and New Curriculum

Table 2: BHUN running curriculum and revised BHND outlines showing the new courses, those that have been dropped, replaced and revised

#		Old (Running Program) - BHUN		Revised (Proposed Program) - BHND			Remarks
	Year & Sem	Code and Course Title	CU	Code and Course Title	CU	Status	
1	1-1	HMN1101 Biomolecules	4	HMN1106 Biochemistry of Macromolecules	3	Old (Revised)	Content of FST1101 Biochemistry I in the BFST curriculum merged with HMN1101 Biomolecules in BHUN curriculum to avoid duplication
2	1-1	HMN1102 Physiology I	4	HMN1107 Human Anatomy & Physiology I	3	Old (Revised)	Added content of anatomy to HMN1102 for better comprehension
3	1-1	HMN1103 Microbiology	3	HMN1108 Communication Skills and counselling	2	Old (Revised)	HMN1103 replaced by FST1207 Basics of Food Microbiology in the BFST curriculum and moved to second semester HMN1108 previously in year 2 sem 1 (as HMN2101). No change in content, moved from year II semester 1
4	1-1	HMN1104 Behavioural Science	3	HMN1109 Food Hygiene and Safety	3	New	HMN1104 moved to year 4 (HMN4105) HMN1109 is a new course replacing HMN1301 Environmental Health and Sanitation that was offered in recess term.
5	1-1	HMN1105 Intro to Foods, Nutrition and Health	3	HMN1105 Intro to Foods, Nutrition and Health	3	Old	No change
6	1-1	CRS2103 Introduction to Genetics	2	HMN1110 Nutrition Ethics and Professionalism	2	New	CRS2103 dropped since its material is covered in HMN3104 in the old curriculum. HMN3104 moved from year 3 sem 1 to year 1 sem 2 (HMN1206). HMN1110 will introduce students to ethics of the profession
7	1-1			AEC 1120 Principles of Economics	3	New	AEC1120 (from the new BAGR curriculum) added BHND to introduce students to skills of economics
		Total Credit Units	**19**	**Total Credit Units**	**19**		
8	1-2	HMN1201 Metabolism	4	HMN1205 Biochemistry of Micromolecules	3	Old (Revised)	Content of FST1201 merged with HMN1201 Metabolism in the BHUN curriculum to avoid duplication and have one shared course
9	1-2	HMN1202 Physiology II	4	HMN1208 Human Anatomy & Physiology II	3	Old (Revised)	HMN1208 formed by adding aspects of anatomy to HMN1202 for better comprehension of aspects of physiology
10	1-2	HMN1203 Micronutrients and Their Deficiencies	4	FST1207 Basics of Food Microbiology	3	Old (Revised)	HMN1203 moved to year 2 sem 1 (HMN2109) HMN1103 Microbiology (sem 1) replaced by FST1207 Basics of Food Microbiology I in the BFST curriculum and moved to second semester

#		Old (Running Program) - BHUN		Revised (Proposed Program) - BHND			Remarks
	Year & Sem	Code and Course Title	CU	Code and Course Title	CU	Status	
11	1-2	HMN1204 Introduction to Biostatistics and Epidemiology	3	HMN1204 Introduction to Biostatistics and Epidemiology	3	Old	No change
12	1-2	FST1202 Food Chemistry I	3	FST1206 Basics of Food Chemistry	3	Old	Name changed to reflect content
13	1-2	AEN1202 Introduction to Computer Applications	2				AEN1202 dropped and relevant material merged with that of
14	1-2			HMN1206 Cell and Molecular Biology	3	Old (Revised)	HMN3104 moved from year 3 sem 1 to year 1 sem 2 (HMN1206).
		Total Credit Units	**20**	**Total Credit Units**	**18**		
15	1-3	HMN1301 Environmental Health and Sanitation	**3**	-			HMN1301 replaced by HMN1109 Food Hygiene and Safety (moved to year 1 sem 1)
16	1-3	HMN1302 Nutrition Practice I	**5**				HMN1302 content revised to focus on Clinical Nutrition Practice, course renamed and moved to Field attachment 2
		Total Credit Units	**8**	**Total Credit Units**	**-**		
17	2-1	HMN2101 Communication Skills and Counselling	3	HMN2108 Nutrition through the Lifecycle	4	Old (Revised)	HMN2101 moved to year 1 sem 1 (HMN1108 Communication Skills and counselling) Content of HMN2201 Maternal and Child Nutrition was merged with HMN2204 which was moved from year 2 sem 2 to become HMN2108
18	2-1	HMN2102 Assessment of Nutritional Status	4	HMN2102 Assessment of Nutritional Status	3	Old (Revised)	
19	2-1	HMN2103 Computer Applications in Nutrition	3	HMN2105 Nutrition and Immunity	3	Old	HMN2103 Computer Applications in Nutrition which was moved to year 2 sem 2 (HMN2207)
20	2-1	HMN2104 Food Composition and Analysis	3	HMN2109 Micronutrients and their Deficiencies	3	Old (Revised)	HMN2104 replaced by FST3102 Food Analysis in the BFST curriculum to avoid duplication. Moved to year 3 sem 1HMN1203 moved from year 1 sem 2 to year 2 sem 1 & became HMN2109
21	2-1	HMN2105 Nutrition and Immunity	2	FST2104 Entrepreneurship and Financial Management	3	New	FST2104 from BFST curriculum covers aspects of food enterprises financial management
22	2-1	HMN2106 Clinical Nutrition I	3				HMN2106 Moved to year 2 sem 2 (HMN2208)
		Total Credit Units	**18**	**Total Credit Units**	**16**		
23	2-2	HMN2201 Maternal and Early Childhood Nutrition	4	HMN2205 Community Nutrition Assessment	3	New	New course. Content of HMN2201 and HMN2108 merged, revised and updated. FST3206 Community Nutrition offered in year 3 sem 2 was revised, expanded and split into HMN2205 Community Nutrition Assessment and HMN3110 Community Nutrition Interventions
24	2-2	HMN2202 Principles of Diet Therapy	3	HMN2206 Pathophysiology of Nutrition Disorders	3	New	New course. HMN2202 and HMN2203 merged, revised and updated. Split into HMN2206 and HMN3109.

#		Old (Running Program) - BHUN		Revised (Proposed Program) - BHND			Remarks
	Year & Sem	Code and Course Title	CU	Code and Course Title	CU	Status	
25	2-2	HMN2203 Food Preparation	3	HMN2207 Software for Food and Nutrition Applications	3	Old (Revised)	HMN2203 content merged with HMN2202 to form HMN2206 AEN1202 dropped and relevant material merged with HMN2103 Computer Applications in Nutrition which was moved to year 2 sem 2 (HMN2207)
26	2-2	HMN2204 Nutrition through the Life Cycle	3	HMN2208 Clinical Management of Acute Malnutrition	3	Old (Revised)	HMN2204 merged with HMN2201 and moved to year 2 sem HMN2106 Clinical Nutrition I moved from year 2 sem 1.
27	2-2	FST2202 Food Processing and Preservation	3	FST2202 Food Processing and Preservation	3	Old	No change
28	2-2	EEE3201 Social Research Methods I	3	EEE2220 Research Methods and Scientific Writing	3	Old (Revised)	EEE3201 removed from revised BAGR curriculum. Replaced by EEE2220
		Total Credit Units	**19**	**Total Credit Units**	**18**		
29	2-3	HMN2301 Nutrition Practice II	5	HMN2302 Clinical Nutrition Practice	5	New	Content of HMN1302 revised and updated to focus on Clinical Nutrition Practice, course renamed and moved to Field Attachment 1. HMN2301 – Content revised with a focus on dietetics practice. Moved to Field Attachment 2 HMN3301
		Total Credit Units	**5**	**Total Credit Units**	**5**		
30	3-1	HMN3101 Nutrient-Drug Interactions	2	HMN3111 Food-Drug Interactions	4	Old (Revised)	HMN3101 CU increased to 4 to allow for better coverage of content and Nutrient replaced by Food to cater for interactions beyond specific nutrients. New code given
31	3-1	HMN3102 Special Project	5	FST3102 Food Analysis	3	Old (Revised)	HMN3102 moved to year 3 sem 2 (HMN3209). HMN2104 Food Composition & Analysis replaced by FST3102 Food Analysis in BFST curriculum to avoid duplication. Moved to year 3 sem 1
32	3-1	HMN3103 Nutrition Biochemistry	3	HMN3109 Meal and Diet Planning	3	New	HMN3103 dropped. Material distributed in HMN HMN1106 and HMN1205 to avoid duplication. HMN2202 and HMN2203 merged, revised and updated. Split into HMN2206 and HMN3109.
33	3-1	HMN3104 Cell and Molecular Biology	3	HMN3110 Community Nutrition Interventions	3	New	HMN3104 moved from year 3 sem 1 to year 1 sem 2 (HMN1206) Cell and Molecular Biology HMN2205 Community Nutrition Assessment and HMN3110 Community Nutrition Interventions replaced FST3206 Community Nutrition in the BFST curriculum.
34	3-1	HMN3105 Clinical Nutrition II	4	HMN3112 Clinical Management of Nutrition Disorders	4	Old (Revised)	Some new content added and course renamed
		Electives (To select one)					
35	3-1	EEE3102 Introduction to Communication and Extension Methods	3				EEE3102 moved to year 4 sem 1 as elective

#		Old (Running Program) - BHUN		Revised (Proposed Program) - BHND			
	Year & Sem	Code and Course Title	CU	Code and Course Title	CU	Status	Remarks
36	3-1	FST3203 Food Plant Economics and Marketing	3				FST3203 revised to FST2104 Entrepreneurship and Financial Management and moved to year 2 sem 1 as a core
37	3-1	HMN3107 Food Service Systems Management	3				HMN3107 moved to year 4 sem 2 and turned into a core (HMN4202)
38	3-1	HMN3108 Nutrition Anthropology	3				HMN3108 moved to yeat 4 sem 2 and turned into a core (HMN4204)
		Total Credit Units	**20**	**Total Credit Units**	**17**		
39	3-2	HMN3201 Food, Nutrition and HIV/AIDS	2	HMN3208 Culinary skills	3	New	HMN3201 content covered in new course HMN2206 Pathophysiology of Nutrition Disorders as well as HMN2105 Nutrition and Immunity. HMN2202 content merged with HMN2203 (Food Preparation) and split to form HMN2206 Pathophysiology of Nutrition Disorders and HMN3109 Meal and Diet Planning Content from HMN2203 Food Preparation revised to form HMN3208 to provide practical aspects of food preparation for optimal diets
40	3-2	HMN3202 Nutrition in Emergencies	3	HMN3202 Nutrition in Emergencies	3	Old	No change
41	3-2	HMN3203 Nutraceuticals and Nutrigenomics	3	HMN3209 Research Project	5	Old (Revised)	HMN3203 moved to year 4 sem 1 renamed HMN4104 HMN3102 moved to year 3 sem 2 (HMN3209)
42	3-2	HMN3204 Management in Nutrition	3	FST3206 Food Product Development	3	New	HMN3204 revised and moved to year 4 sem 1 as HMN4101 Nutrition Leadership and Management FST3206 provided in the BFST curriculum. Introduced in the BHND curriculum to provide skills in development of nutritious food products
43	3-2	FST3206 Community Nutrition	3	FST3215 Post-harvest Technology	3	Old	FST3206 replaced by HMN2205 Community Nutrition Assessment & HMN3110 Community Nutrition Interventions. FST3215 was an elective, now it is a core
44	3-2	FST4203 Food and Nutrition Security	3	FST3217 Food Laws & Legislation	3	New	FST4203 replaced by FST4207 Food & Nutrition Security from BFST curriculum & moved to year 4 sem 2. Now includes food systems FST 3217 added to introduce aspects of food legislation and control
		Electives (To select one)					
45	3-2	HMN3205 Nutrition Education	3				HMN3205 turned into a core and moved to year 4 sem 2 HMN4201
46	3-2	HMN3206 Nutrition and Sports	2				HMN3206 moved to year 4 sem 2 as an elective (HMN4205)
47	3-2	HMN3207 Geriatric Nutrition	2				HMN3207 content moved to HMN2018 Nutr. Through the Life Cycle
48	3-2	FST3201 Post-harvest Technology	2				FST3201 is now a core with a BFST code (FST3215)
		Total Credit Units	**20**	**Total Credit Units**	**20**		
49	3-3			HMN3301 Dietetics Practice	5	New	Replaces HMN2301 Nutrition Practice (formerly recess year 2). Its content was revised and updated with a strong focus on dietetics practice.
				Total Credit Units	**5**		

#		Old (Running Program) - BHUN		Revised (Proposed Program) - BHND			Remarks
	Year & Sem	Code and Course Title	CU	Code and Course Title	CU	Status	
50	4-1			HMN4101 Nutrition Leadership and Management	3	Old (Revised)	HMN3204 Management in Nutrition revised and moved to year 4 sem 1 as HMN4101 Nutrition Leadership and Management
51	4-1			HMN4102 Planning, Monitoring and Evaluation of Nutrition Programs	3	New	For skills in planning, monitoring & evaluation of nutrition related projects
52	4-1			HMN4103 Nutrition and Dietetics Seminars	2	New	To impart and enhance communication skills for dietetic practice
53	4-1			HMN4104 Functional Foods, Nutraceuticals and Nutrigenomics	4	Old (Revised)	Moved from year 3, sem 2 (HMN3203). CU increased to 4 to allow for better coverage of content on aspects of functional foods added
54	4-1			SPS 3106 Nutrition for Sports and Health	3	New	HMN3206 Nutrition & Sports was an elective in year 3 but replaced by SPS3106 which now a core. SPS is offered by BSc Sports Science
				Electives (To select one)			
55	4-1			EEE3120 Extension Methods & Approaches	3	Old	Moved from year 3 sem 1 to year 4 sem 1.
56				FST4114 Fruits & Vegetable Processing Technology	3	New	To impart skills for processing nutritious fruit and vegetable products. Offered in the BSFT curriculum
				Total Credit Units	**18**		
57	4-2			HMN4201 Nutrition Education	3	Old (Revised)	Was an elective in year 3 sem 2 (HMN3205). Now a core in year 4
58	4-2			HMN4202 Food Service Systems and Management	3	Revised	Was an elective in year 3 sem 1 (HMN3107). Now a core in year 4
59	4-2			HMN4203 Anthropology of Food and Nutrition	3	Old (Revised)	Was an elective in year 3 sem 1 (HMN3108). Now a core in year 4
60	4-2			HMN4204 Behavioral Science	3	Old (Revised)	Moved from year 1, sem 1 (HMN1104). No change in content
61	4-2			FST4207 Food & Nutrition Security	3	Old (Revised)	FST4203 Food & Nutrition Security replaced by FST4207 Food & Nutrition Security from the BFST curriculum and moved to year 4 sem 2. Revised to include aspects of food systems.
				Electives (To select one)			
62	4-2			EEE4220 Organizational Management & Leadership	3	New	To impart leadership and management skills. Course is offered in the Department of Extension and Innovation studies
63				EEE4221 Gender & Agricultural Development	3	New	To introduce aspects of gender in development. Course is offered in the Department of Extension and Innovation studies
64	4-2			FST4206 Cereals, Legumes & Root Crop Technology	3	New	To impart skills for processing nutritious cereal, legumes and root-based product. Offered in the BSFT curriculum
				Total Credit Units	**18**		
		Overall Total Credit units	**129**	**Overall Total Credit Units**	**153**		

Old: course previously existing in the old curriculum. Its name, code and scheduling where not changed. Where necessary minor changes such revising the description, learning outcomes, reading materials etc were done.
New: course previously not in the old curriculum and has just been introduced. Also includes courses that have been merged or split and content updated.
Revised: course previously existing in the old curriculum but its content revised or code was changed as a result of it being shifted from one semester or year to another.

1.11 Key Knowledge Areas

There are eight key knowledge areas in the revised **BHND** programme namely:

KA1= Nutrition Assessment
KA2= Clinical Nutrition/Management of Malnutrition
KA3= Nutrition Leadership, Management and Ethics
KA4= Nutrition Policy and Programming
KA5= Research, Extension and Communication Skills
KA6= Dietetics
KA7= Community Nutrition
KA8= Food Science (Biochemistry, Chemistry, Microbiology, Safety)

Table 3: Content distribution of the BHND by knowledge areas

Year-Sem	Knowledge Area (KA)															
	KA1		KA2		KA3		KA4		KA5		KA6		KA7		KA8	
	Course Code	CU	Course Code	CU	Course Code	CU	Course Code	CU	Course Code	CU	Course Code	CU	Course Code	CU	Course Code	CU
1-1			HMN1107	3	HMN1110	2			HMN1108	2					HMN1106	3
1-1					AEC1120	3									HMN1105	2
1-1															HMN1109	2
1-2			HMN1206	3					HMN1204	3					HMN1205	3
1-2			HMN1208	3											FST1206	3
1-2															FST1207	3
2-1	HMN2102	3	HMN2105	3	FST2104	3							HMN2108	4		
2-1			HMN2109	3												
2-2			HMN2208	3					HMN2207	3	HMN2206	3	HMN2205	3	FST2202	3
2-2									EEE2220	3						
2-3			HMN2308	5												
3-1			HMN3109	3							HMN3109	3	HMN3110	3	FST3102	3
3-1			HMN3112	4												
3-2									HMN3209	5	HMN3208	3	HMN3202	3	FST3206	3
3-2															FST3215	3
3-2															FST3217	3
3-3											HMN3301	5				
4-1			HMN4104	4	HMN4101	3	HMN4102	2	HMN4105	3	HMN4103	2	SPS3106	3	FST4114	3

4-1									EEE3120	3						
4-2					EEE4220	3			HMN4201	3	HMN4202	3	HMN4203	3	FAT4206	3
4-2											EEE4221	3	FST4207	3		
Total CU		**3**		**34**		**14**		**2**		**25**		**22**		**22**		**37**

2. CONDUCT OF THE PROGRAM

2.1 Nature and Duration of the Programme

The BHND is a full-time day programme. The mode of delivery involves a blended approach of on-line and physical lectures, laboratory practicals and student presentations.

2.2 Target Group

The BHND programme targets:

- Holders of the Uganda Advanced Certificate of Education (U.A.C.E), or its equivalent, having taken the subject combination of Biology, Chemistry or Foods & Nutrition with any other subjects including: Physics, Agriculture, Mathematics or Economics.
- Holders of a Diploma in Human Nutrition, Home Economics, Food Science, Food Processing Technology, Food Technology, Catering, Veterinary Science, Health/Medical disciplines (Fisheries, Aquaculture, Forestry, Agriculture or their equivalent, obtained from a recognized institution.

2.3 Duration of the Programme

This is a four-year programme with 8 semesters & 2 field attachment terms of 10 weeks each at the end of the 2nd and 3rd years. During field attachment students will be attached to different institutions for supervised clinical nutrition and dietetics internships.

2.4 Designation of the Award

All successful candidates will be awarded a Degree of Bachelor of Science in Human Nutrition and Dietetics of Makerere University.

2.5 Tuition

The tuition fees for the BHND program per annum will be:

(i) 3,650,100 UGX for East Africans
(ii) 6,758,768 UGX for Internationals

In addition to tuition, students will be required to pay:

(i) 900,000 UGX for each of the recess terms in Year 1 and 2.
(ii) 100,000 UGX per semester in Year 2 and 3 for Internship/Field Attachment administrative costs.

3. REGULATIONS

3.1 Admission Requirements

Admission to the programme will be gained through the following avenues.

3.1.1 Direct Entry

Candidates seeking admission through this avenue must have obtained the following:

(i) At least a pass in Mathematics at Uganda Certificate of Education (U.C.E) examination or its equivalent
(ii) At least 2 principal passes at the Uganda Advanced Certificate of Education (U.A.C.E) examination or its equivalent in any 2 of Biology, Chemistry and Foods & Nutrition obtained at the same sitting
(iii) The minimum weighted points set by the Makerere University Admissions Board

(iv) The requirements are the same for international students except that applicants from different education systems will be required to have their qualifications verified by UNEB and NCHE as the case may be.

Table 4 shows weights of the groups of subjects required for admission to the BHND program through the direct entry

Table 4: Weights of groups of subjects at U.A.C.E or its equivalent required for admission to the BHND program through the direct entry

Group	Weight	Subjects
Essential	3	Any two of Biology, Chemistry or Foods & Nutrition
Relevant	2	Physics, Agriculture, Economics or Mathematics
Desirable	1	Sub-Mathematics and General paper
Others	0.5	All others

3.1.2 Diploma Entry Scheme

Holders of at least a Second Class/Credit Diploma in any of the disciplines below, obtained from a recognized institution, may be admitted to the programme:

a) Human Nutrition, Home Economics, Food Science, Food Processing Technology, Science Technology (Biology/Chemistry), Catering, Agriculture, Chemistry or Biology
b) Health/Medical disciplines such as: Medical Laboratory Technology, Physiotherapy, Anaesthesia, Orthopaedics, Clinical Medicine, Clinical Ophthalmology, Environmental Health, Public Health, Dental Public Health, Midwifery, Comprehensive Nursing and Community Health
c) Education having studied any of the following: Biology, Chemistry, Agriculture, Home Economics

3.1.3 Mature Age Scheme

Admission under the Mature Age Entry Scheme may be granted after the candidate has passed the Makerere University Mature Age Entry Exams.

3.1.4 Degree Holders

Under this scheme, applicants should at least have a second-class lower degree in a biological science discipline obtained from any recognised institution of higher learning.

3.1.5 Credit Transfer

For applicants wishing to transfer credits from a recognised institution of higher learning, the Makerere University guidelines on transfer of credits shall apply.

3.2 Course Categorization

Courses are categorized as Core, Elective, Pre-requisite or Audited.

3.2.1 Core Course

This is a course which is essential to an academic programme and gives the programme its unique features. A core course is compulsory for all students who have registered for a particular programme and must be passed. Core courses are offered in all the semesters.

3.2.2 Elective Course

A course done to broaden an academic programme or for specialization. It is chosen from a group of courses by the student. All electives must be passed. If passed, it may be substituted for another failed elective.

3.2.3 Pre-requisite Course

A course that should be taken, and passed, in preparation for a higher-level course in the same area of study. A student who fails a pre-requisite course shall not proceed to the corresponding higher-level course.

3.2.4 Audited Course

This is a course taken by a student for which a credit/credit unit is not awarded. This course enables the student to follow or understand another course.

3.3 Progression

3.3.1 Normal Progress

When a student has passed the assessments in all the courses he/she registered for in that semester.

3.3.2 Probationary Progress

A situation in which a student whose performance is below average for any course taken is cautioned and allowed to proceed to the next semester. A student will be placed on probationary progress if the GP for any course is <2.0 or the CGPA is <2.0. A student on probationary progress must retake the course(s) he/she has failed and obtain at least the Pass Mark (50%) before they can be removed from probation.

3.3.3 Discontinuation

A student shall be discontinued from the programme when he/she:

(i) Accumulates three consecutive probations based on CGPA,
(ii) Fails to obtain at least the Pass Mark (50%) during the 3rd assessment in the same course unit(s) he/she had retaken
(iii) Has overstayed in an academic programme by more than two (2) years

3.3.4 Retaking a Course

A student may retake any course(s) when next offered in order to:

(i) Pass it if he/she had failed it before (scored below the pass mark of 50%)
(ii) Improve the grade if the first pass grade was low

When a course is, or courses are, retaken:

(i) A student shall attend all the prescribed lectures/tutorials/practicals/fieldwork in the course
(ii) A student shall satisfy all the requirements for the coursework component in the course or courses and sit for the university examinations in the affected course or courses
(iii) A student shall not be allowed to accumulate more than five (5) retakes at a time
(iv) A final year student whose final examination results have been classified by the School/College Board, and has qualified for the award of a degree, shall not be permitted to retake any course(s)
(v) The better of the two grades a student has obtained in the course(s) shall be used to compute his/her Cumulative Grade Average (CGPA)

(vi) The academic transcript shall indicate that a course was retaken

3.4 Certificate of Due Performance

A student who does not have coursework marks shall be denied a certificate of due performance and will not be allowed to sit the University Examinations.

3.5 Approval of Examination Results

Examination results are discussed and approved at different levels: Department, School and College academic boards and finally by Senate. Results shall not be regarded as final until they are confirmed by Senate.

3.6 Appeals

The University Senate approved guidelines for handling cases of students who are dissatisfied with the marks they have been awarded as follows:

(i) A candidate wishing to appeal against his/her exam results shall do so within 30 days from the date of publication of the final results.
(ii) All appeals for re-marking shall be addressed to the Chairperson of the School's Academic Board/Committee and a copy given to the Lecturer/Instructor concerned.
(iii) Candidates shall make their requests in writing and should clearly specify the grounds upon which the appeal is being made including, but not limited to:
- Miscomputation of marks
- Bias on the part of the Lecturer/Instructor
- Marks generally out of step with one's over-all performance

(iv) The School Examinations Committee shall communicate its decisions to the affected student within 14 days of its deliberations.
(v) That from the time the decision to remark is made by the School Examinations Committee remarking should be completed within two weeks and the Dean, on behalf of the College /Schools Board of Studies should approve the new mark awarded.
(vi) That if a candidate decides to withdraw his/her appeal before the Committee considers it, such withdrawal should be done in writing.

3.7 Course Assessment

The general regulations and statutes of Makerere University shall govern examinations for the BHND programme. Each course shall be assessed in two parts as follows:

(i) The Coursework (Practicals, Progressive/Continuous Assessment), which shall contribute 60% of the total marks. Continuous assessment shall consist of tests/quizzes, practicals, assignments, seminars, presentations, fieldwork reports etc.
(ii) End of semester examinations which shall contribute 40% of the total marks.

Additionally, students will be required to undertake: (i) a supervised internship in the food industry during the 3rd year and, (ii) a research project during the 4th year. Each student will be required to submit an internship training report and a research project report. Each of these reports will be assessed out of 100%.

3.8 Grading of Courses

A course unit shall be graded out of 100%, assigned letter grades & grade points (GP) as shown in Table 5:

Table 5: Grading System

Marks (%)	Letter Grade	Grade Point	Interpretation
90-100	A+	5	Exceptional
80-89	A	5	Excellent
75-79	B+	4.5	Very good
70-74	B	4	Good
65-69	C+	3.5	Fairly good
60-64	C	3	Fair
55-59	D+	2.5	Pass
50-54	D	2	Marginal pass
45-49	E	1.5	Marginal Fail
40-45	E-	1	Clear Fail
Below 40	F	0	Bad Fail

A student with a grade point ≥2 (letter grade D) in a course unit is considered to have passed it.

3.9 Calculation of Cumulative Grade Point Average (CGPA)

The CGPA is calculated using the equation below:

$$\text{CGPA} = \frac{\sum(\text{Course GP score} \times \text{Course Credit Units (CU)}}{\sum \text{Credit Units for Courses Attempted}}$$

3.10 Classification of the Award

A BHND graduate can get any of the four classes of a degree shown in Table 6. This academic recognition becomes part of the official record and is noted on the degree certificate of the recipient.

Table 6: Classification of degree award based on CGPA

Degree class	Cumulative Grade Point Average (CGPA)
First Class	4.4 – 5.0
Second Class (Upper)	3.6 – 4.39
Second Class (Lower)	2.8 – 3.59
Pass	2.0 – 2.79

3.11 Semester Load

The programme shall normally be four years. Each academic year consists of 2 semesters of 17 weeks each and two field attachment terms of 10 weeks. The 4th year has no field attachment. The normal semester load shall range from 15 - 21 Credit Units. A full-time student shall not carry < 15 Credit Units and not > 25 Credit Units per semester. The maximum semester load shall be 28 Credit Units to cater for students who have retakes.

3.12 Academic Programme Load

The programme will offer 52 courses, 47 of which are cores and 5 are electives. Students will have to take at least one elective in each semester of 4th year. Table 7 shows the core & elective courses per semester.

Table 7. Number of core and elective courses per semester for the BHND programme

Duration		No. of Cores	No. of Electives	Total Credit Units
Year	**Semester**			
Year 1	Semester 1	7	0	19
Year 1	Semester 2	6	0	18
Year 2	Semester 1	5	0	16
Year 2	Semester 2	6	0	17
Year 2	Field attachment I	1	0	5
Year 3	Semester 1	5	0	17
Year 3	Semester 2	6	0	20
Year 3	Field attachment II	1	0	5
Year 4	Semester 1	5	At least 1 (Out of 2 available)	18
Year 4	Semester 2	5	At least 1 (Out of 3 available)	18
Total		**47**	**2**	**153**

3.13 Minimum Graduation Load

To qualify for the award of Bachelor of Science in Human Nutrition & Dietetics, a full-time candidate must get a Cumulative Grade Point Average (CGPA) of at least 2.0 & at least 153 credit units. S/he must fulfil all requirements of the degree within a minimum of 4 years & maximum of 6 years from the date of first enrolment.

3.14 Course Weighting System

The weighting unit for each course is a Credit Unit (CU). One CU is equivalent to 1 contact hour per week per semester (or a series of 15 contact hours per semester). A contact hour is defined as follows:

- 1 Contact Hour (CH) is equivalent to 1 Lecture Hour (LH)
- 1 Contact Hour (CH) is equivalent to 2 Tutorial Hours (TH)
- 1 Contact Hour (CH) is equivalent to 2 Practical Hours (PH)
- 1 Contact Hour (CH) is equivalent to 4 hours of field work/internship

With regards to size of a course:

(i) The smallest course shall be two (2) Credit Units
(ii) A course that has a practical component within it shall have a maximum of five (5) Credit Units
(iii) A course that has no practical component within it shall have a maximum of four (4) Credit Units

4. PROGRAM STRUCTURE

4.1 Course Units

The details of the course structure are shown in Table 8, where CU, LH, TH, PH, CH stand for credit units, lecture hours, tutorial hours, practical hours and contact hours respectively.

Table 8: Course structure for the BSc. Human Nutrition and Dietetics Programme

COURSE UNITS	CU	LH	TH	PH	CH	Remark
YEAR 1 SEMESTER 1						
Core						
HMN1105 Introduction to Foods, Nutrition and Health	3	30	30	-	45	Old
HMN1106 Biochemistry of Macromolecules	3	30	-	30	45	Old (Revised)
HMN1107 Human Anatomy & Physiology I	3	30	-	30	45	Old (Revised)

COURSE UNITS	CU	LH	TH	PH	CH	Remark
HMN1108 Communication Skills and Counselling	2	25	-	10	30	Old (Revised)
HMN1109 Food Hygiene and Safety	3	30	-	30	45	New
HMN1110 Nutrition Ethics and Professionalism	2	25	-	10	30	New
AEC 1120 Principles of Economics	3	30	-	30	45	New
Total Credit Units	**19**					
YEAR 1 SEMESTER 2						
Core						
HMN1204 Introduction to Biostatistics and Epidemiology	3	30	-	30	45	Old
HMN1205 Biochemistry of Micromolecules	3	30	-	30	45	Old (Revised)
HMN1206 Cell and Molecular Biology	3	30	-	30	45	Old (Revised)
HMN1208 Human Anatomy & Physiology II	3	30	-	30	45	Old (Revised)
FST1207 Basics of Food Microbiology	3	30	-	30	45	Old (Revised)
FST1206 Basics of Food Chemistry	3	30	-	30	45	Old
Total Credit Units	**18**					
YEAR 2 SEMESTER 1						
Core						
HMN2105 Nutrition and Immunity	3	30	30	-	45	Old
HMN2108 Nutrition through the Lifecycle	4	45	-	30	60	Old (Revised)
HMN2109 Micronutrients and Their Deficiencies	3	30	-	30	45	Old (Revised)
HMN2110 Nutrition Status Assessment	3	30	-	30	45	Old (Revised)
FST2104 Entrepreneurship and Financial Management	3	30	30	-	45	New
Total Credit Units	**16**					
YEAR 2 SEMESTER 2						
Core						
HMN2205 Community Nutrition Assessment	3	30	-	30	45	New
HMN2206 Pathophysiology of Nutrition Disorders	3	30	-	30	45	New
HMN2207 Software for Food and Nutrition Applications	3	30	-	30	45	Old (Revised)
HMN2208 Clinical Management of Acute Malnutrition	3	15	-	60	45	Old (Revised)
FST2202 Food Processing and Preservation	3	30	-	30	45	Old
EEE2220 Research Methods and Scientific Writing	3	30	-	30	45	Old (Revised)
Total Credit Units	**17**					
YEAR 2 FIELD ATTACHMENT 1						
HMN2302 Clinical Nutrition Practice	5	-	-	150	75	New
Total Credit Units	**5**					
YEAR 3 SEMESTER 1						
Core						
HMN3109 Meal and Diet Planning	3	30	-	30	60	New
HMN3110 Community Nutrition Interventions	3	30	-	30	45	New
HMN3111 Food-Drug Interactions	4	45	-	30	60	Old (Revised)
HMN3112 Clinical Management of Nutrition Disorders	4	45	-	30	60	Old (Revised)
FST3102 Food Analysis	3	30	-	30	45	Old (Revised)
Total Credit Units	**17**					
YEAR 3 SEMESTER 2						
Core						
HMN3202 Nutrition in Emergencies	3	30	-	30	45	Old (Revised)
HMN3208 Culinary skills	3	30	-	30	45	New
HMN3209 Research Project	5	-	-	150	75	Old (Revised)
FST3206 Food Product Development	3	30	-	30	45	New

COURSE UNITS	CU	LH	TH	PH	CH	Remark
FST3215 Post-harvest Technology	3	30	-	30	45	Old
FST3217 Food Laws & Legislation	3	30	30	-	45	New
Total Credit Units	**20**					
YEAR 3 FIELD ATTACHMENT II						
HMN3301 Dietetics Practice	5	-	-	150	75	New
Total Credit Units	**5**					
YEAR 4 SEMESTER 1						
Core						
HMN4101 Nutrition Leadership and Management	3	30	30	-	45	Old (Revised)
HMN4102 Planning, Monitoring & Evaluation of Nutrition Programs	3	45	-	30	60	New
HMN4103 Nutrition and Dietetics Seminars	2	20	-	20	30	New
HMN4104 Functional Foods, Nutraceuticals and Nutrigenomics	4	45	15	15	60	Old (Revised)
SPS3106 Nutrition for Sports and Health	3	30	-	30	45	New
Electives (At least one relevant course)						
FST4114 Fruits & Vegetable Processing Technology	3	30	-	30	45	New
EEE3120 Extension Methods & Approaches	3	30	-	30	45	Old (Revised)
Total Credit Units	**18**					
YEAR 4 SEMESTER 2						
Core						
HMN4201 Nutrition Education	3	30	-	30	45	Old (Revised)
HMN4202 Food Service Systems and Management	3	30	-	30	45	Old (Revised)
HMN4203 Anthropology of Food and Nutrition	3	30	30	-	45	Old (Revised)
HMN4204 Behavioural Science	3	30	30	-	45	Old (Revised)
FST4207 Food & Nutrition Security	3	30	-	30	45	Old (Revised)
Electives (At least one relevant course)						
EEE4220 Organizational Management & Leadership	3	30	30	-	45	New
EEE4221 Gender & Agricultural Development	3	30	30	-	45	New
FST4206 Cereals, Legumes & Root Crop Technology	3	30	-	30	45	New
Total Credit Units	**18**					
Total Minimum Gradution Credit Units	**153**					

It is mandatory for the student to take at least one elective in each semester of year 4 with the guidance of the Head of Department, in order to fulfil the minimum programme load.

5. DETAILED COURSE CONTENT

5.1 Year 1 Semester 1 Course Units

CORE COURSES

5.1.1 HMN1105 Introduction to Foods, Nutrition and Health

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

This gives an overview of the physiological requirements and functions of protein, energy, and the major micronutrients that are determinants of health and disease. Nutrients, their food sources, metabolism, importance in health, dietary guidelines. It will include relationships among food, nutrition and health.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Principles of nutrition; roles, requirements, sources of nutrients, their digestion, absorption & metabolism
2. Current health promotion strategies and dietary guidelines
3. Simple nutrition assessments to determine risk for under nutrition and over nutrition

d) Learning outcomes

At the end of this course the student should be able to:

1. Explain principles of nutrition; roles, requirements, sources of nutrients, their digestion, absorption & metabolism
2. Describe current health promotion strategies and dietary guidelines
3. Conduct simple nutrition assessments to determine risk for under nutrition and over nutrition

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals & student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Food groups, nutrients and health benefits • Balanced diet; and importance, overview of RDAs	2	2
2. Introduction	• Food labelling, Food Guide Pyramid , food choices	2	2
3. Digestion & absorption	• Anatomy, digestion, absorption, common digestive disorders	2	2
4. Carbohydrates	• Classification, importance, sources and RDAs • Digestion, absorption and metabolism • Problems in carbohydrate metabolism (Diabetes)	2	2
5. Lipids	• Functions, sources, RDA, digestion, absorption, metabolism, overweight and obesity; deficiency	2	2
6. Protein	• Digestion, absorption, metabolism, bioavailability, indicators of deficiency and toxicity, PEM & improving nutriture	2	2
7. Energy balance	• Metabolism both macro and micronutrients, energy balance, components and estimation of energy expenditure	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
8. Water-soluble vitamins	• Characteristics of each vitamin, functions, sources, Bioavailability, deficiency, toxicity, RDA	2	2
9. Fat-soluble vitamins	• Functions, sources, deficiency (esp. folic acid and B-12), bioavailability, toxicity, RDA, improving nutriture	2	2
10. Water and electrolytes	• Functions water, dehydration and water toxicity • Water and electrolytes on the market	2	2
11. Minerals in nutrition	• Functions, sources, bioavailability, deficiency, toxicity, RDA, interventions to improve nutriture	2	2
12. Nutrient needs in lifecycle	• Address the special nutrient needs of pregnant, and lactating women, infants and children	2	2
13. Nutrient needs in lifecycle	• Address the special nutrient needs of school-age child, adolescents and adults (≥65 yrs)	2	2
14. Food, nutrition and health	• Relationships between nutrition and disease • Rapid assessment of health risk	2	2
15. World food & nutrition issues	• Hunger and malnutrition, factors influencing food production	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practicals	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Whitney, E., & Rolfes, S. R. (2018). *Understanding nutrition* (15 ed.) Cengage Learning.
2. Geissler, C., & Powers, H. J. (Eds.). (2017). *Human nutrition*. Oxford University Press
3. Nelms, M., & Sucher, K. P. (2015). Nutrition therapy and pathophysiology.

5.1.2 HMN1106 Biochemistry of Macromolecules

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

This course emphasizes the metabolism and biochemistry of the energy-containing macronutrients: carbohydrates, lipids, proteins and other related compounds. Their chemical structures, digestion, absorption, distribution, and cellular metabolism are covered. Central themes will include the utilization of macronutrients in energy metabolism and the integration and regulation of metabolic pathways. Focus is on application of biochemistry to nutrition to provide an appreciation for the chemical basis of applied food and nutrition science.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. The chemical structures and biochemical functions of the macronutrients and their sources in the human diet.

2. Biochemical and physiological influences of ingestion, digestion, absorption, transport and utilization of the macronutrients on overall metabolism.
3. Transformation of energy in food to chemical energy available to cells and stored in cells.
4. Integration of the pathways of macronutrient utilization for cellular nourishment
5. Cellular effects of food energy and macronutrients on regulated metabolism, tissue homeostasis, inter-organ relationships, and overall body function.
6. Important aspects of nutrition in human performance, health, and selected diseases.

d) Learning outcomes

At the end of this course the student should be able to:

1. Explain the mechanisms by which macromolecules are metabolized in the body
2. Describe the processes involved in digestion and absorption of macro- and micronutrients.
3. Describe the major pathways for metabolism of nutrients and key mechanisms regulating these pathways.
4. Describe various macronutrient-related metabolic disorders in nutrition and health and provide evidence-based nutritional advice
5. Discuss the important aspects of nutrition in human performance, health, and selected diseases

e) Mode of delivery. A blended approach of on-line and physical lectures, laboratory practicals and student presentations.

f) Course Content

Topic by week	Content	Time allocated (h)	
		LH	PH/TH
1. Introduction	• Key concepts and definitions, metabolism, anabolism and catabolism	2	2
2. Introduction	• Bioenergetics, thermodynamics, free energy & chemical reactions	2	2
3. Carbohydrates	• Structure, classification, properties and functions, digestion, assimilation and transportation	2	2
4. Carbohydrates	• Metabolism (glycolysis, gluconeogenesis, glycogenolysis, hexose monophosphate shunt TCA cycle, electron transport system)	2	2
5. Carbohydrates	• Alcohol metabolism, Glycemic index and glycaemic load	2	2
6. Carbohydrates	• Disorders of carbohydrate metabolism, Recommended dietary intakes	2	2
7. Dietary fiber	• Definitions and classification, Structures, properties and functions, Prebiotics, Recommended dietary intakes	2	2
8. Lipids	• General overview and introduction to lipids	2	2
9. Lipids	• The build-up (anabolism) and breakdown (catabolism) of fats	2	2
10. Lipids	• Metabolic pathways of other forms of lipids	2	2
11. Steroids	• Metabolic pathways involved in the metabolism of steroids	2	2
12. Proteins	• Structure, classification, properties and functions, digestion, assimilation and transportation	2	2
13. Proteins	• Metabolism (deamination, decarboxylation, ornithine cycle), amino acid synthesis	2	2
14. Proteins	• Essential and limiting amino acids, Disorders associated with protein metabolism, Recommended dietary allowance	2	2
15. Enzymes, regulation	• Definition of terms, Examples of enzymes and their roles in metabolism and food processing. Mechanisms and modes of enzyme activity	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH/TH
	• Factors affecting enzyme activity (temperature, pH, ion, inhibitors etc), types & mechanisms of inhibitors (Reversible and irreversible), Mitchealis and Menten equation (derivation) • Application of enzyme kinetics, Measuring the rates of enzyme catalyzed reactions/enzyme assays, Regulation of enzyme activity		
16-17	• Revision and University Exam		

g) Summary of Time Needed

Lectures	30 h
Practicals	30 h

h) Course Assessment

Continuous assessment	60%
University examination	40%

i) Recommended Reading List

1. Ferrier, D.R. 2013. Lippincott's Illustrated Reviews: Biochemistry, 6th Ed, Lippincott Williams & Wilkins, Baltimore, MD.
2. Gropper, S. S., & Smith, J. L. 2012. Advanced Nutrition and Human Metabolism. Cengage Learning.
3. Moran, L. A., Horton, H. R., Scrimgeour, K. G., Perry, M. D., & Rawn, D. 2012. Principles of Biochemistry (pp. 433-435). Pearson, London.

5.1.3 HMN1107 Human Anatomy and Physiology I

a) **Course Type**: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Covers functional anatomy and physiology of cells, tissues, organs & systems. Role of nutrients in the body.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Cells, tissues and organs, cell growth, and Relationship of body systems to each other
2. Role of nutrients in the functioning of tissues, organs & systems

d) Learning outcomes

At the end of this course, students should be able to:

1. Explain of cells, tissues and organs, cell growth, and relate the body systems to each other
2. Explain the role of nutrients in the functioning of tissues, organs and systems

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals & student presentations

f) Course Content and Method of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	Levels of organization; composition	2	2
2. Introduction	Arrangement; cells tissue, organs	2	2

3. Nerves & muscles	Structure & functions of excitable tissues	2	2
4. Blood	Composition and functions	2	2
5. Peripheral nervous system	Structure and functioning	2	2
6. Peripheral nervous system	Structure and functioning	2	2
7. Integumentary system	Structure and functioning	2	2
8. Integumentary system	Structure and functioning	2	2
9. Digestive system	Structure and functioning	2	2
10. Digestive system	Structure and functioning	2	2
11. Cardiovascular system	Structure and functioning	2	2
12. Cardiovascular system	Structure and functioning	2	2
13. Respiratory system	Structure and functioning	2	2
14. Respiratory system	Structure and functioning	2	2
15. Immune system	Description and basics of immunity	2	2
	Weeks 16-17; Revision and University Examination		

Summary of time needed

Lectures	30 h
Practicals	30 h

Course assessment

Continuous assessment	60%
University examination	40%

Recommended reading list

1. Murray, R.K., Granner. D.K., Rodwell, V.W., 2006. Harper's illustrated Biochemistry. Lange Medical Books, USA.
2. Ganong, W.F., 2003. Review of Medical Physiology. McGraw-Hill Medical Publishing Division, USA

5.1.4 HMN1108 Communication Skills and Counselling

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30TH), **Duration:** 15 weeks

b) Course description

Guidance, counselling, communication, behavioural change, meetings, teams, presentations & problem-solving

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Principles of communication, counselling, guidance and models of communication
2. Effective meetings, presentations, interviews, and report writing
3. Problem solving, teamwork, decision making and behavioural change communication

d) Learning outcomes

At the end the course, the students should be able to:

1. Describe the principles of communication, guidance counselling and modes of communication.
2. Describe steps in conducting effective meetings, making presentations, interviews, and report writing
3. Describe solving, teamwork, decision making and behavioural change communication

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	TH
1. Introduction	• Communication skills; how and why, types, elements,	2	2
2. Introduction	• Barriers, solutions, behavioral changes	2	2
3. Counselling & guidance	• Process, interviews, ethics, behavioral change,	2	2
4. Counselling & guidance	• Theories of counselling and guidance, individual differences	2	2
5. Teamwork	• Teams, team building,	2	2
6. Teamwork	• Team diversity, experiential learning	2	2
7. Effective meetings	• Purpose, successful meetings, writing minutes,	2	2
8. Effective meetings	• Managing meetings	2	2
9. Presentations	• Planning, preparation, practice, performance & questions	2	2
10. Presentations	• Practice, performance & questions	2	2
11. Presentations	• Practice, performance & questions	2	2
12. Written documents	• Writing Memos, letters, Reports	2	2
13. Written documents	• E-mail and E-mail etiquette	2	2
14. Problem solving	• Why? skills, outline framework,	2	2
15. Problem solving	• Problem solving model	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Assessment method

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. A field guide to designing a health communication strategy, 2003. Johns Hopkins Bloomberg Sch. Pub. Health
2. Effective Helping: Interviewing and Counselling Techniques. 1997. Okun, B.F. 5th ed. Brooks/Cole Publish. Co.

5.1.5 HMN1109 Food Hygiene and Safety

a) Course Type: Core, Credit Units: 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Food hygiene and legislation, food hazards, Temperature Danger Zone, pest control, personal hygiene, GMPs

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Food safety food hygiene requirements and personal hygiene in the workplace
2. Microbiological, chemical, physical and allergen contamination, control & associated risks

d) Learning outcomes

At the end of this course, students should be able to:

1. Describe the food safety, food hygiene requirements and of personal hygiene in the workplace
2. Explain microbiological, chemical, physical and allergen contamination it control & associated risks

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals & student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Food safety, food hygiene law & their importance	2	2
2. Food hygiene & legislation	• Legislations, health issues caused by poor hygiene & safety	2	2
3. Food hazards	• Biological food hazards, sources & control	2	2
4. Food hazards	• Chemical food hazards, sources & control	2	2
5. Food hazards	• Physical food hazards, sources & control	2	2
6. Food hazards	• Food allergens	2	2
7. Food hazards	• HACCP	2	2
8. Cleaning & disinfection	• Importance, methods, cleaning agents and disinfectants	2	2
9. Waste management	• Types of waste, importance, methods of management	2	2
10. Pest control	• Importance, nature, signs & prevention of pest infestation	2	2
11. Pest control	• Importance, nature, signs & prevention of pest infestation	2	2
12. Personal hygiene and health	• What is personal hygiene?, importance, hand hygiene,	2	2
13. Personal hygiene and health	• Personal behavior, protective clothing, illness and first aid.	2	2
14. Safe food handling & storage	• 5 keys to food safety, temperature control, food deliveries	2	2
15. Safe food handling & storage	• Use by dates and best before dates, tock rotation (FIFO)	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Sprenger R. A, 2015. The highfield Food Safety Handbook (Level 2) 30th Ed. Highfield house Heavens walk, UK
2. Kirchsteiger-Meier, E & Baumgartner, T. 2014. Global Food Legislation: An Overview Wiley-VCH

5.1.6 HMN1110 Nutrition Ethics and Professionalism

a) **Course Type: Core, Credit Units:** 2 CU, **Contact Hours:** 30 Hours (25 LH, 10 PH),

b) Course description

Guidance on behaviour and practice as professionals. Ethical theories, ethical principles, bioethics and human rights. It introduces the process of certification of nutritionist and dieticians.

c) Course objectives

The objectives for this course are to equip students with basic/foundational knowledge on:

1. Ethics, integrity and codes of conduct, ethical theories and application in of nutrition and dietetics
2. Meaning of ethical principles and their application in human nutrition and dietetics
3. Role of ethics and professional code of conduct in the practice of human nutrition and dietetics

d) Learning outcomes

At the end of this course unit, students should be able to:

1. Explain ethics, integrity and codes of conduct, ethical theories and application in nutrition & dietetics
2. Explain & apply the meaning of ethical principles and their application in human nutrition and dietetics
3. Describe the role of ethics and professional code of conduct in the practice of nutrition and dietetics

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations.

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	TH
1. Ethical principles	• Human rights & ethics	1	-
2. Ethical principles	• Human rights & ethics & application in nutrition & dietetics	2	-
3. Ethical principles	• Human rights & ethics & application in nutrition & dietetics	2	-
4. Ethical theories & application	• Utilitarianism, deontology, morality	2	-
5. Ethical theories & application	• Utilitarianism, deontology, morality	2	-
6. Ethical theories & application	• Utilitarianism, deontology, morality	1	-
7. Ethical theories & application	• Liberalism, proportionism, communitarianism	2	-
8. Ethical theories & application	• Liberalism, proportionism, communitarianism	1	-
9. Bioethics	• Life ethics	2	-
10. Bioethics	• Conception, abortion, acts & omissions, quality of life	2	-
11. Bioethics	• Killing & letting die, ends & means, principle of double effect	2	2
12. Integrity and professionalism	• Nutritionists & dietetics code of conduct, challenges	2	2
13. Integrity and professionalism	• Nutritionists & dietetics code of conduct, challenges	1	2
14. Integrity and professionalism	• Certification and/or registration of nutritionists & dietitians	2	2
15. Integrity and professionalism	• Certification and/or registration of nutritionists & dietitians	1	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	25 h
Tutorial	10 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. British Dietetic Association, 2008. Code of Professional Conduct. Birmingham
2. European Federation of the Associations of Dieticians. 2005. European Academic & Practitioner Standards for Dietetics. Gloucester.

5.1.7 AEC1120 Principles of Economics

a) **Course Type: Core, Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30TH), **Duration:** 15 weeks

b) **Course description**
The course will cover Production Possibilities Frontier Framework. Key topics: economics; Scientific thinking; Theory of Supply; Supply; The market; Microeconomic fundamentals; Elasticity; Theory of the firm and costs; Microeconomic theories; Monopoly; Monopolistic Competition & Oligopoly; Microeconomic theories

c) Course objectives
The objectives for this course are to equip students with basic/foundational knowledge on:
1. Economic analysis tools to solve contemporary issues in agriculture & related disciplines
2. Fundamental laws of demand, supply & market equilibrium & measuring national income and output
3. Circular flow, business cycles, unemployment, inflation, their implications on economic & agricultural output.
4. Macroeconomic policy tools of fiscal & monetary policy to general economic & agricultural problems

d) Learning outcomes
At the end of this course, students will to be able to:
1. Apply basic economic analysis tools to solve contemporary issues in agriculture & related disciplines
2. Explain laws of demand, supply & market equilibrium, & measure National income & output
3. Explain circular flow, business cycles, unemployment, inflation & implications on economic & agricultural output
4. Apply macroeconomic policy tools of fiscal & monetary policy to general economic & agricultural problems

e) Mode of delivery
A blended & interactive approach including lectures, case studies, and student presentations.

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	TH
1. What is Economics?	• Scarcity, choice and opportunity cost, the nature and role of theory, Microeconomics & Macroeconomics	2	2
2. Theory of supply	• Demand, law of demand, demand schedule, demand curve, market demand, demand shifters, change in quantity demanded versus a change in demand, Law of supply, Market supply	2	2
3. The market	• Supply & demand, equilibrium, surplus; shortage, Max & min prices, changes in equilibrium prices and quantity, absolute and relative price	2	2
4. Microeconomic fundamentals	• Microecon players, Trilogy of objective-constraint-choice, markets, logic of consumer choice, Utility theory, consumer equilib & demand	2	2
5. Elasticity	• Price elasticity of demand, point & arc, Price elasticity of supply, price elasticity of supply & time, who pays tax, elasticity & tax revenue	2	2
6. The theory of the firm & costs	• Why firms exist, types, balance sheets, financing corporations (stocks, bonds), production & costs in the short run/long run.	2	2
7. Microeconomic theories (Product Markets)	• Perfect Competition, Theory of perfect competition, and perfect competition in the short run & long-run.	2	2
8. Monopoly, monopolistic competition & oligopoly	• Monopoly, monopoly pricing & output decisions, Monopolistic competition, oligopoly: assumptions & real-world behaviour	2	2

9. Microeconomic theories (factor markets)	• Factor markets with emphasis on labour markets, Labour markets and information, Introduction to game theory	2	2
10. The circular flow of national income and income distribution	• Household sector, business sector, government sector, foreign sector & financial intermediaries, consumption theory • GDP & GNP, Measuring national income, importance & problems, income inequality & Lorenz curve, income inequality in Uganda	2	2
11. Aggregate demand & aggregate supply	• Price Level, National Output, Shifts in aggregate demand and aggregate supply curves	2	2
12. Inflation & Taxation	• Price indices, types, causes & effects of inflation & Phillips curve • Taxation; uses, classification, impact, fiscal policies & problems	2	2
13. Money and banking	• Money & money supply, the central bank & commercial banks, credit creation & financial intermediation	2	2
14. Unemployment	• Voluntary & involuntary unemployment, frictional, structural & cyclical unemployment, Underemployment, causes & solutions	2	2
15.Introduction to international trade	• Pros & cons, absolute & comparative advantage, Foreign exchange, Currency depreciation, appreciation & devaluation	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Tutorials	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Roger A. Arnold. Microeconomics, 2nd Edition, West Publishing Company.
2. Hal R. Varian: Intermediate Microeconomics, Third Ed. Chapter 27.
3. Macroeconomics by R. Dornbush and S. Fischer.

5.2 Year 1 Semester 2 Course Units

CORE COURSES

5.2.1 HMN1204 Introduction to Biostatistics and Epidemiology

a) **Course Type:** Core**, Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Data management & interpretation. Epidemiological concepts. Descriptive & inferential statistics. Mean separation and tests of association. Statistical theory, parametric & non-parametric statistics, software.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Ethical principles for research & study designs used in research, descriptive and inferential statistics
2. Hypothesis testing, confidence interval estimation, data collection, organization and presentation
3. Sampling methods, determining sample size. & designing a research proposal

d) Learning outcomes

At the end of this course, the student should be able to:

1. Apply ethics in research, explain study designs, and apply descriptive and inferential statistics
2. Apply hypothesis testing and confidence interval estimation, data collection, organization and presentation
3. Explain and apply sampling methods, determine sample size & design a research proposal

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Basics of epidemiology	2	2
2. Introduction	• Study designs	2	2
3. Data collection	• Data collection methods & analysis	2	2
4. Data collection	• Data collection methods & analysis	2	2
5. Hypotheses,	• Types of error, power of a study, sample size,	2	2
6. Confidence intervals	• Confidence intervals, test of significance, interpretation,	2	2
7. Confidence intervals	• Test of significance, interpretation	2	2
8. Sampling	• Sample size determination & sampling methods	2	2
9. Sample attributes	• Sample attributes, power, expected effect size, event rate	2	2
10. Correlation &	• Correlation of data	2	2
11. Regression	• Regression of data	2	2
12. Proposal design	• Parts of a research proposal	2	2
13. Proposal design	• Parts of a research proposal	2	2
14. Proposal design	• Parts of a research proposal	2	2
15. Proposal design	• Parts of a research proposal	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Lovegrove J, Hodson L, Sharma S, Lanham-New SA. (2015). Nutrition Research Methodologies.
2. Sullivan LM, Dukes KA, Losina E. Sullivan. (1999). Statistics in medicine tutorial in biostatistics

5.2.2HMN1205 Biochemistry of Micromolecules

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Course builds on Biochemistry of Macromolecules. Covers are vitamins and minerals in metabolism (micronutrients and their roles in metabolism) tissue-specific metabolism & integration of metabolism. How the body adjusts to variations in demand for energy, mechanisms of hormone action & extensions of signal transduction pathways.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Chemical structures and biochemical functions of lipids and their sources in the human diet
2. Pathways involved in the breakdown and build-up of fats in humans
3. Importance of different phytonutrients in nutrition
4. Different metabolic pathways regarding the flow of molecules in human bodies

d) Learning outcomes

At the end of the course, students should be able to:

1. To identify the chemical structures and biochemical functions of lipids and their sources in the human diet
2. Discuss the pathways involved in the breakdown and build-up of fats in humans
3. Explain the importance of different phytonutrients in nutrition
4. Interpret the interplay between different metabolic pathways regarding the flow of molecules in the body

e) Mode of delivery. A blended approach of on-line and physical lectures, laboratory practicals and student presentations

f) Course Content

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Overview of general information in biochemistry II and some definitions: metabolism, catabolism, anabolism	2	2
2. Water Soluble Vitamins	• Structures, properties and uptake of water-soluble vitamins • Roles in metabolism of vitamins: C, B complex: thiamin (vitamin B1)	2	2
3. Water Soluble Vitamins	• Roles in metabolism of vitamins: B complex: riboflavin (vitamin B2), niacin (vitamin B3)	2	2
4. Water Soluble Vitamins	• Roles in metabolism of vitamin B6 (pyridoxine) and folate	2	2
5. Water Soluble Vitamins	• Vitamin B12, biotin and pantothenic acid - Roles in Metabolism	2	2
6. Fat Soluble Vitamins (A, D, E, K)	• Structures, properties and uptake of fat-soluble vitamins	2	2
7. Fat Soluble Vitamins (A, D, E, K)	• Structures, properties and uptake of fat-soluble vitamins - Roles in Metabolism	2	2
8. Fat Soluble Vitamins (A, D, E, K)	• Roles in metabolism and associated disorders and illnesses • Recommended dietary intakes	2	2
9. Minerals	• Diversity of minerals important in nutrition e.g calcium, magnesium, sodium, phosphorous etc	2	2
10. Minerals	• Absorption and roles of minerals in metabolism, Recommended dietary intakes	2	2
11. Nucleotides	• Structure, classification, properties and functions	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
12. Specific metabolism of some organs and tissues	• An overview of specific aspects of metabolism in different organs and tissues: brain, kidney, liver	2	2
13. Specific metabolism of some organs and tissues	• Heart, skeletal muscles, adipose tissue, blood	2	2
14. Integration of metabolism	• Interconnection between metabolic pathways	2	2
15. Integration of metabolism	• Interconnection between metabolic pathways	2	2
16-17	• Revision and University Exam		

g) Summary of Time Needed

Lectures	30 h
Practicals	30 h

h) Course Assessment

Continuous Assessment	60%
University examination	40%

i) Recommended Reading List

1. Geissler, C., & Powers, H. J. (Eds.). (2017). Human Nutrition. Oxford University Press.
2. Ferrier, D.R. 2013. Lippincott's Illustrated Reviews: Biochemistry, 6th Ed., Lippincott Williams & Wilkins, Baltimore, MD.
3. Gropper, S. S., & Smith, J. L. 2012. Advanced Nutrition and Human Metabolism. Cengage Learning.

5.2.3 HMN1206 Cell and Molecular Biology

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Cell physiology & genetic makeup in nutrition and disease. Structure and organization of cell and nuclear organelles, the cytoskeleton and cell motility, the cell cycle, nucleic acids and regulation of gene expression.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Basic cellular organization of cells, DNA replication, transcription, protein synthesis and enzymology
2. Molecular genetics including DNA recombination, gene structure, function and regulation

d) Learning outcomes

At the end of the course, student should be able to:

1. Describe the cellular organization, DNA replication, transcription, protein synthesis and enzymology
2. Explain molecular genetics including DNA recombination, gene structure, function and regulation

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals & student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Cell theory, structure, functionality, etc	2	2

2. Introduction	• Stem cells & Mendelian genetics	2	2
3. Molecular structure & gene functioning	• Nucleic acid structure, genome,	2	2
4. Molecular structure & gene functioning	• Genes & chromosomes	2	2
5. Molecular structure & gene functioning	• DNA replication & transcription,	2	2
6. Molecular structure & gene functioning	• Mutation, repair, transposable elements	2	2
7. Control of transcription	• Promoters, lac operon,	2	2
8. Control of transcription	• Genetic code, mutation	2	2
9. Control of transcription	• Post transcriptional modifications	2	2
10. Control of transcription	• Regulation of gene expression	2	2
11. Recombinant DNA & genetic engineering	• Molecular cloning & cDNA cloning,	2	2
12. Recombinant DNA & genetic engineering	• PCR, DNA sequencing and libraries	2	2
13. Recombinant DNA & genetic engineering	• Ethical considerations	2	2
14. Population genetics	• Hardy-Weinberg principle & deviation	2	2
15. Population genetics	• Sex linkage & applications	2	2
	• Weeks 16-17; Revision and University Exam		

g) Summary of time needed

Lectures	30 h
Practical hours/Tutorials/Self-study and presentations	30 h

h) Course assessment

Course work	60%
University examination	40%

i) Recommended reading list

1. Karp, Gerald. 2013. Cell and Molecular Biology. 7th ed. John Wiley & Sons.
2. Weaver. R.F. 2011. Molecular Biology. 3rd ed. WCB/McGraw-Hill Publishers.

5.2.4 FST1207 Basics of Food Microbiology

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Overview of microbiology: definition of microbiology; the various aspects of microbiology (Basic and applied microbiology); the importance of microbiology. Classification of microorganisms. Microbial metabolism. Aseptic techniques in microbiology: Methods of disinfection and sterilization. Types of microbial culture media and media preparation; growth of cultures. Characterization, identification and classification of microorganisms: Microbial culture characterization (colony type); microscopy, simple and Gram staining techniques.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Basic principles of food microbiology
2. Common aseptic techniques used in the microbiology lab
3. Isolation, growth and characterize the common microorganisms associated with food

d) Learning outcomes

At the end of this course students should be able to:

1. Define the basic concepts of food microbiology
2. Explain the common techniques used to prevent microbial contamination and growth in the microbial laboratory

3. Demonstrate how to grow, enumerate, isolate and store microorganisms associated with food

e) Mode of delivery. A blended approach of on-line and physical lectures, laboratory practicals and student presentations.

f) Course Content

Topic by weeks	Content	Time (h)	
		LH	PH
1. Introduction	• Definition of key terms; Various aspects of microbiology (basic and applied microbiology), importance of microbiology	2	2
2. Classification of micro-organisms	• Hierarchical classification, eukaryotic and prokaryotic cells	2	2
3. Microbial nutrition and nutritional requirements	• Essential nutrients: micronutrients and micronutrients, organic and inorganic nutrients, Growth factors, Roles of nutrients in cell structure & metabolism	2	2
4. Microbial nutrition and nutritional requirements	• Classification according to carbon sources and energy metabolism: chemotrophs, phototrophs, heterotrophs, autotrophs	2	2
5. Microbial nutrition and nutritional requirements	• Environmental influences: temperature, oxygen, pH, water activity	2	2
6. Aseptic techniques	• Sources of microbial contamination, methods of disinfection and sterilization	2	2
7. Growth media	• Types, composition & uses of microbial media	2	2
8. Growth media	• Preparation & storage of microbial culture media	2	2
9. Sampling	• Sampling food and water sampling techniques	2	2
10. Growth & enumeration of microorganisms	• Growing microbial cultures (pour plating, surface plating and broth cultures)	2	2
11. Isolation of microbes	• Isolation and purification of microorganisms	2	2
12. Storage of microbes	• Storage of microbial cultures	2	2
13. Characterization and identification of microbes	• Definitions, Importance, microscopy and staining techniques	2	2
14. Characterization and identification of microbes	• Definitions, Importance, microscopy and staining techniques	2	2
15. Characterization and identification of microbes	• Biochemical techniques	2	2
16-17	• Revision and University Exam		

g) Summary of Time Needed

Lectures	30 h
Practicals	30 h

h) Course Assessment

Continuous assessment	60%
University examination	40%

i) Recommended Reading List

1. Matthews K.R, Kniel K.E, & Montville T.J. 2017. Food Microbiology: An Introduction. ASM Press, Washington, US.

2. Adams M, Moss M.O, McClure P. 2016. Food Microbiology. 4th Ed. The Royal Society of Chemistry. Cambridge, UK
3. Ray B, & Bhunia A. 2013. Fundamental Food Microbiology. 5th Edition. CRC Press, Boca Raton, Florida, USA

5.2.5 FST1206 Basics of Food Chemistry

a) Course Type: Core**, Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Composition, physical and chemical properties of food components: water, proteins, carbohydrates and lipids vitamins, minerals, pigments, flavourants, additives and enzymes. Forms of water of foods. Water absorption phenomena, freezing and ice structures and water activity.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. General concepts and principles in the chemistry of food
2. Different micro- and macro- components of various foods
3. Structure and chemical properties of the different food components
4. Basic food analysis tests

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain the general concepts and principles in the chemistry of food
2. Describe the different micro- and macro- components of various foods
3. Describe the structure and chemical properties of the different food components
4. Demonstrate the basic food analysis tests

e) Mode of delivery. A blended approach of on-line and physical lectures, laboratory practicals and student presentations.

f) Course Content

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• What is food chemistry about?, Elements of food chemistry, Introduction to different food categories and food components	2	2
2. Carbohydrates	• Types properties & reactions of sugars, starch & cellulose • Basic properties & reactions of mono- & oligosaccharide	2	2
3. Carbohydrates	• Starch extraction & properties, Types properties & reactions of gums, pectin & dietary fiber	2	2
4. Proteins	• Amino acids, polypeptides and proteins, Protein structure, types, reactions & functional properties	2	2
5. Proteins	• Enzymes, Emulsification and water holding properties of protein	2	2
6. Lipids	• Types Properties & reactions of lipids	2	2
7. Water	• The water molecules and how they associate, Water solute interactions, Demonstration of pure and colloidal water-based solutions, Water activity, Moisture sorption isotherms	2	2
8. Vitamins	• Types, properties & reactions, Technological applications	2	2
9. Minerals	• Types, properties & reactions, Technological applications	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
10. Pigments and flavourants	• Nature and types of pigments & flavours in food, Reactions of pigments & flavours	2	2
11. Pigments and flavourants	• Technological applications of pigments & flavours • Extraction and properties of natural plant pigments	2	2
12. Additives	• Nature and types of additives in food, Reactions of additives	2	2
13. Additives	• Technological applications & demonstration of food additives	2	2
14. Additives	• Technological applications & demonstration of food additives	2	2
15. Natural food toxicants	• Nature of natural food toxicants, Methods for removal from food	2	2
16-17	• Revision and University Exam		

g) Summary of Time Needed

Lectures	30 h
Practicals	30 h

h) Course Assessment

Continuous assessment		60%
University examination		40%

i) Recommended Reading List

1. Fennema's Food Chemistry 4th edition. S Damodaran, KL Parkin, OR Fennema (ed). CRC Press; 2008.
2. Belitz, H.D., Grosch, W. and Schieberle. 2004. Food Chemistry, 3rd edition, Springer Verlag, Berlin.
3. Coultate, T. P. 2002. Food - The Chemistry of its Components, 4th Ed. Royal Society of Chemistry: London

5.3 Year 2 Semester 1 Course Units

CORE COURSES

5.3.1 HMN210 Nutrition Status Assessment

a) Course Type: Core, **Credit Units: 3 CU, Contact Hours: 45 Hours (30 LH, 30PH), Duration: 15 weeks**

b) Course description

The course covers methods used in the assessment of dietary and nutritional status of communities and individuals, in both health and disease. The methods of nutrition assessment covered include anthropometric, biochemical, clinical and dietary. The course also demonstrated the application of nutritional assessment results to identify nutritionally vulnerable individuals and groups that could be targeted for intervention.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Assess the dietary and nutritional status of individuals and communities using various methods and tools
2. Analyse, interpret and apply dietary and nutritional assessment data in real-life situations

d) Learning outcomes

At the end of the course, the student should be able to:

1. Select and apply the various nutritional assessment methods (anthropometric, biochemical, clinical and dietary) in assessing health status of individuals and communities, including developing the protocols

2. Plan, conduct, analyze, interpret and report comprehensively about the nutritional status of individuals or communities
3. Evaluate the strengths & limitations of the different nutritional assessment methods as well as their appropriateness for use in different clinical situations, individuals and study designs.
4. Monitor growth of young children using growth charts and reference standards

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allowed (h)	
		LH	PH
1. Introduction	• Purpose of nutritional assessment, Nutritional issues by age group, Assessment of under-nutrition	2	2
2. Anthropometry	• Definition & indicators, pros and cons of nutritional anthropometry, How to determine age	2	2
3. Assessing (MUAC) and Edema	• Weight Using Salter-like Hanging Scale, Child Weight Using UNICEF UNISCALE, Measuring, screening, pros & cons of MUAC, Edema assessment & classification	2	2
4. Other anthropometric measurements	• Skinfold thickness, head circumference, waist circumference, Commonly used anthropometric indices or measurements	2	2
5. Biochemical assessment of	• Assessment of Zn, Fe, I, Ca, P, Mg, folate, protein, vitamins A, D, E, B1, C, B2, B6, B12 statuses	2	2
6. Clinical assessment of nutritional status	• Symptoms & signs of nutritional deficiency, pros & cons of clinical assessment, Assessing symptoms & signs of deficiency	2	2
7. Assessment of dietary intake	• Dietary assessment principles, Assessment of individual dietary intakes, Measuring food consumption at national level	2	2
8. Assessment of dietary intake	• National food consumption surveys, Food balance sheets, Total diet studies, Universal product codes, electronic scanning devices	2	2
9. Assessment of dietary intake	• Measuring food consumption at the household level, Food account method & Household food record method, 24 h recall	2	2
10. Advanced methods for assessment of body fat	• Advanced methods for assessing body fat - pros & cons	2	2
11. Advanced methods for assessment of body fat	• Hydro densitometry, Air Displacement Plethysmography, Isotope dilution techniques, Total Body Potassium,	2	2
12. Advanced methods for assessment of body fat	• Dual Energy X-ray Absorptiometry, 3-dimensional photonic scanner, Magnetic Resonance Imaging & Spectroscopy,	2	2
13. Advanced methods for assessment of body fat	• Bioelectric Impedance Analysis and Bioimpedance spectroscopy	2	2
14. Assessment of lipid profile	• Assessing total triglycerides, low density lipoproteins, high density lipoproteins & implications of lipid profile	2	2
15. Physical activity	• Benefits, Methods for assessing physical activity	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. American Dietetic Association. 2010. International Dietetics & Nutrition Terminology (IDNT)
2. Charney, P. and A. Malone. 2009. ADA Pocket Guide to Nutrition Assessment. 2nd ed. American Dietetic Association, Chicago, Illinois.

5.3.2 HMN2105 Nutrition and Immunity

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Contact Hours (30 LH, 30 PH), **Duration:** 15 weeks

b) Course description

The course covers the role of nutrition in combating diseases, parasitic infestation and signs and symptoms of nutrition deficiencies. It covers the relationship between nutritional status and immunity.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Functioning of the immune system & influence of diet on functioning of the immune system
2. Effects of selected infections on immunity and nutritional status
3. The nutrition-infection vicious cycle

d) Learning outcomes

At the end the course, students should be able to:

1. Explain functioning of the immune system the influence of diet on the functioning of the immune system
2. Discuss effects of selected infections on immune responses & nutritional status of affected individuals
3. Interpret the nutrition-infection vicious cycle

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Immune system, infection, nutritional status	2	2
2. Role of nutrients in immunity	• Effect of each nutrient (optimal and deficiencies)	2	2
3. Role of nutrients in immunity	• Effect of each nutrient (optimal and deficiencies)	2	2
4. Role of nutrients in immunity	• Effect of each nutrient (optimal and deficiencies)	2	2
5. Immune modulation of probiotics	• Probiotics, sources, benefits, doses	2	2
6. Immune modulation of probiotics	• Immunomodulation	2	2
7. Immune modulation of probiotics	• Immunomodulation	2	2
8. Infections & immunity	• Influence of infections on immunity	2	2
9. Infections & immunity	• Influence of infections on immunity	2	2
10. Parasitic infestation & immunity	• The influence of intestinal parasites on responses	2	2
11. Parasitic infestation & immunity	• The influence of intestinal parasites on responses	2	2
12. Medication and immunity	• Diseases & drugs on immunity & nutrition	2	2
13. Medication and immunity	• Diseases & drugs on immunity & nutrition	2	2
14. Ageing & immunity	• Nutrition and immunity in the elderly	2	2
15. Ageing & immunity	• Nutrition and immunity in the elderly	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	34 h
Practicals, Tutorials, Discussions, Self-study	26 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading materials

1. Elmadfa I & Meyer A. L., 2019. The role of the status of selected micronutrients in shaping the immune function. *Endocrine, Metabolic & Immune Disorders - Drug Targets 19*, 1100-1115.
2. Lee, G. Y & Han, S. N. 2018. The role of vitamin E in immunity, review. *Nutrients* 2018, 10, 1614

5.3.3 HMN2107 Human Anatomy and Physiology II

a) **Course Type**: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Interactions between body systems during osmoregulation and homeostasis. Functioning of reproductive, endocrine & nervous systems. Functions, mode of action & interactions of hormones in control of body processes.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Interactions between various body systems during osmoregulation and homeostasis
2. Classification, synthesis, mode of action and regulation of different types of hormones.
3. Functions of male & female reproductive hormones at puberty, pregnancy and old age.
4. Components and functions of the nervous system and its control of body processes
5. Functioning of the endocrine and central nervous systems.
6. Nutrients in the functioning of the reproductive, endocrine and central nervous systems.

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain interactions between various body systems during osmoregulation and homeostasis
2. Describe the classification, synthesis, mode of action and regulation of different types of hormones.
3. Describe functions of the male & female reproductive hormones at puberty, pregnancy and old age.
4. Describe the components and functions of the nervous system and its control of body processes
5. Perform tests to assess the functioning of the endocrine and central nervous systems.
6. Describe the nutrients in the functioning of the reproductive, endocrine and central nervous systems

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Endocrine system	• Introduction to the endocrine system	2	2

2. Nervous system	• Introduction to the nervous system	2	2
3. Reproductive system	• Structure & functions	2	2
4. Reproductive system	• Structure & functions	2	2
5. Hormonal changes	• During puberty	2	2
6. Hormonal changes	• During adulthood	2	2
7. Hormonal changes	• During old age	2	2
8. Central system	• Structure and functions of the central system	2	2
9. Central system	• Structure and functions of the central system	2	2
10. Nutrients & functioning	• Endocrine system	2	2
11. Nutrients & functioning	• Endocrine system	2	2
12. Nutrients & functioning	• Reproductive system	2	2
13. Nutrients & functioning	• Reproductive system	2	2
14. Nutrients & functioning	• Nervous system	2	2
15. Nutrients & functioning	• Nervous system	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of Time Needed

Lectures	30 h
Practicals	30 h

h) Course Assessment

Course work	60%
University examination	40%

i) Recommended Reading List

1. McArdle, Katch & Katch, 2010. Exercise physiology: nutrition, energy, & human performance, 7th ed.

5.3.4 HMN2108 Nutrition through the Life Cycle

a) **Course Type**: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Nutritional needs, concerns and health conditions of individuals at different stages of life from preconception to late adulthood. Prevent, identify & manage malnutrition at early stages. The key lifecycle stages: preconception, pregnancy, lactation, infancy, early childhood, preadolescence, adolescence, adulthood, and later adulthood.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Critical stages of human development that require adequate nutrition care in order for individuals to achieve good health through the life course
2. Nutrient requirements at each stage of the life cycle in the context of the physiological & social needs
3. Double burden of malnutrition due to poor maternal nutrition, infant & young child nutrition, & adolescent nutrition
4. Relationship between poor nutrition outcomes in early life and the risk of metabolic syndrome and diet-related non-communicable diseases during later stages of life.
5. Lifecycle approach in reviewing cases of malnutrition in order to refer individuals for appropriate interventions
6. Effective community nutrition programs to prevent and/or manage malnutrition at different life stages

d) Learning outcomes

At the end of the course, students should be able to:

1. Identify critical stages of human development that require adequate nutrition care in order for individuals to achieve good health through the life course
2. Discuss nutrient requirements at each stage of the life cycle in the context of physiological & social needs
3. Discuss the double burden of malnutrition due to poor maternal nutrition, infant & young child nutrition, & adolescent nutrition
4. Describe the relationship between poor nutrition outcomes in early life and the risk of metabolic syndrome and diet-related non-communicable diseases during later stages of life.
5. Apply the lifecycle approach to review malnutrition in order to refer individuals for appropriate interventions
6. Identify community nutrition programs to prevent and/or manage malnutrition at the different life stages

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Major stages of the human life cycle, vicious cycle of malnutrition • Criteria for setting nutrient recommendations (RDI, RNI, AIs, ULs)	2	2
2. Pre-conception nutrition	• National statistics on reproductive health, Nutrition relevant SDGs & national targets on reproductive health, Reproductive physiology of males & females, Nutrition-related disruptions in fertility, Interactions of nutrition and contraceptives, Common nutrition-related disorders that affect fecundity, Effective preconception nutrition interventions	2	2
3. Nutrition during pregnancy	• National statistics on pregnancies and birth outcomes, Normal physiological changes during pregnancy, Critical periods in maternal metabolism, embryonic & fetal growth and development, Prevention & assessment of intrauterine growth retardation & prematurity,	2	2
4. Nutrition during pregnancy	• Assessing dietary intake in pregnancy, Need for dietary supplements during pregnancy, Pregnancy weight gain recommendations, postpartum weight retention, Physical activity and pregnancy outcomes, National targets & programs for reducing poor pregnancy outcomes, Nutrition interventions for risk reduction in pregnancy	2	2
5. Nutrition during lactation	• National goals & status of breastfeeding in Uganda, Lactation physiology, human milk composition, Role of breast milk in infant growth & development, Breast milk supply, demand & substitutes	2	2
6. Nutrition during lactation	• Maternal nutrition & malnutrition among breastfeeding women, Appropriate breastfeeding practices & benefits of breastfeeding, Factors influencing breastfeeding initiation & duration, Breastfeeding promotion, facilitation, support, Harmful effects of alcohol, illicit drugs,	2	2
7. Infant nutrition (0-1 year)	• National goals & statistics on breastfeeding initiation, exclusive breastfeeding, initiation of complementary feeds, mixed feeding, Infant growth and development, nutrient needs, Growth assessment, interventions to reduce risk of malnutrition	2	2
8. Nutrition of toddlers (1-3 years)	• National targets for improving young child nutrition, Normal growth and development milestones, Physiological and cognitive development, Energy & nutrient needs to prevent malnutrition	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
9. Nutrition of toddlers (1-3 years)	• Dietary and physical activity recommendations, Growth assessment, Common nutrition problems – IDA, dental caries, constipation, elevated blood Pb levels, food security, food safety, Prevention of nutrition-related disorders, Nutrition interventions	2	2
10. Nutrition of preschoolers (3-5 years)	• Normal growth & development, Physiological & cognitive development, Normal growth deceleration, appetite, and dietary support, Physical activity, Growth assessment, Prevention of nutrition-related disorders	2	2
11. School-age child nutrition (5-12 years)	• National targets & nutritional status of school-age children, Normal growth & development, Tracking child & preadolescent health, Physiological & cognitive development, Dietary & physical activity needs, Common nutrition problems and prevention	2	2
12. Adolescent nutrition (12-21 years)	• National targets for improving adolescent nutrition, Normal physical growth & psychosocial development, Common dietary practices - snacking, meal skipping, eating away from home, & fad diets, Physical activity, Nutrition assessment, & intervention	2	2
13. Adult nutrition (21 – 65 years)	• Nutrient recommendations, Total diet approach, Alcohol intake and nutrition, Physical activity, Assessing dietary intake & nutrition status	2	2
14. Geriatric Nutrition and older adults (≥65 years)	• Global trends on nutrition of older adults, Theories of aging, physiological changes & nutrient needs, Risk factors of malnutrition, Dietary intake & nutrient recommendations, Physical activity	2	2
15. Aging and NCDs	• The nutrition transition, Healthy diet practices across the lifespan	2	2
	• Weeks 16-17; Revision and University Examination	2	2

g) Summary of time needed

Lectures	30 h
Practicals	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Brown, J.E. (2011). Nutrition through the Life Cycle. 6th ed. Wadsworth / Nelson Thomson Learning, Toronto.
2. Giroux, I. (2008). Lifecycle Nutrition Course Resources. The University of Western Ontario, London, Ontario.
3. Dietary Guidelines for Americans: https://www.dietaryguidelines.gov/

5.3.5 HMN2109 Micronutrients and their Deficiencies

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) **Course description**

The course covers the global, regional and national micronutrient situation. Micronutrients of public health significance. Functions and metabolism of micronutrients & interventions to alleviate micronutrients deficiencies.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Characteristics of various micronutrients and occurrence of different micronutrient deficiencies
2. Clinical signs related to micronutrient deficiencies
3. How micronutrient deficiencies are assessed in communities

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain the different micronutrients and the occurrence of different micronutrient deficiencies
2. Describe various clinical signs related to micronutrient deficiencies
3. Demonstrate how micronutrient deficiencies are assessed in communities

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		2	2
1. Introduction	• Overview of micronutrient situation worldwide	2	2
2. Human nutrition as it relates to vitamins	• Micro nutrients problems, their causes and prevention	2	2
3. Human nutrition as it relates to minerals	• Micro nutrients problems, their causes and prevention	2	2
4. Micronutrient interventions	• Supplementation, fortification, dietary diversity, etc	2	2
5. Micronutrient interventions	• Supplementation, fortification, dietary diversity, etc	2	2
6. Characteristics of major vitamins	• Effect on heat, pH etc, sources, structures, classification, functions, bioavailability, deficiencies	2	2
7. Characteristics of major vitamins	• Effect on heat, pH etc, sources, structures, classification, functions, bioavailability, deficiencies	2	2
8. Characteristics of major minerals	• Effect on heat, pH etc, sources, structures, classification, functions, bioavailability, deficiencies	2	2
9. Characteristics of major minerals	• Effect on heat, pH etc, sources, structures, classification, functions, bioavailability, deficiencies	2	2
10. Metabolism of micronutrients	• Ingestion, digestion, absorption, utilization, metabolism	2	2
11. Metabolism of micronutrients	• Ingestion, digestion, absorption, utilization, metabolism	2	2
12. Functions of vitamins	• For different age groups	2	2
13. Functions of vitamins	• For different age groups	2	2
14. Functions of minerals	• For different age groups	2	2
15. Functions of minerals	• For different age groups	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of Time Needed

Lectures	30 h
Practicals	30 h

h) Course Assessment

Continuous assessment	60%
University examination	40%

i) Recommended Reading List

1. UBOS. 2016. Uganda Bureau of Statistics, Entebbe. *Uganda Demographic and Health Survey*.
2. Muyonga, J.H., Namayengo F.M., Tumuhimbise, G.A. 2010. Food & Nutrition Essentials. Fountain Publishers Kampala

5.3.6 FST2104 Entrepreneurship and Financial Management

a) Course Type: Core, **Credit Units:** 3 CU**, Contact Hours:** 45 Hours (30 LH, 30 TH**), Duration:** 15 weeks

b) Course description

Principles of business management, innovations in business, feasibility studies & project evaluation. Enterprise process, market research, enterprise management, human resource management, financial management & business plan development.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Principles of business management and their application in the food industry
2. Design and implementation feasibility studies & develop business plans to establish food-based enterprises
3. Planning and management of human resources in food related enterprises
4. Development and running of food -related enterprises

d) Learning outcomes

At the end of the course, students should be able to,

1. Outline the principles of business management and their application in the food industry
2. Design and implement feasibility studies and develop business plans for establishment of food-based enterprises
3. Plan and manage human resources in food related enterprises
4. Use the knowledge acquired to develop and run food -related enterprises

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content, Methods of Instruction, Tools and Equipment

Topic by week	Content	Time allocated (h)	
		LH	TH
1. Introduction	• Principles and concepts, Role of entrepreneurship & Finance	2	2
2. Theory of entrepreneurship	• Overview of the economic, resource-based, psychological, sociological/anthropological and opportunity-based theories	2	2
3. Creativity & innovation in business	• Sources of ideas for new ventures, Managing innovations	2	2
4. Feasibility study and project evaluation	• SWOT analysis, Evaluation of feasibility factors: technology, system, legal, operational, economic etc, Needs assessment, planning and implementing an evaluation, handling of data	2	2
5. The enterprise	• Enterprise development process, Needs, scope and characteristics of business organizations	2	2
6. Market research	• Methods and steps for undertaking market research, Benefits & importance of market research, Types of market research	2	2
7. Enterprise management	• Types of businesses, small business ownership,	2	2
8. Enterprise management	• Factors for success, pros & cons of small business ownership	2	2

9. Production management	• Background, definitions and importance, The five 'M's,	2	2
10. Production management	• Planning and control, Models and methods	2	2
11. Investments	• Capital investments, power inputs, expenditure on raw materials and use of computers in business	2	2
12. Financial management	• Principles, financial statements, account opening & management	2	2
13. Business plan	• Steps for development, implementation, costs, prices & balance sheets	2	2
14. Human resource management (HRM)	• Nature, scope & functions of HRM, Matching HR Needs and People	2	2
15. HRM	• Healthy Work Environment and Effective Employee Relations	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practicals	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Lussier R. N, Corman J and D. C Kimball (2014). Entrepreneurial New Venture Skills: Third Edition, Published by Routledge Taylor and Francis, New York and London
2. Aulet B (2013). Disciplined Entrepreneurship: 24 Steps to a Successful Startup. Published by John Wiley and Sons, Inc., Hoboken New Jersey
3. DuBrin A. J (2012). Leadership: Research Findings, Practice, and Skills: Seventh Edition. Published by South Western-Gate Cengage Learning

5.4 Year 2 Semester 2 Course Units

CORE COURSES

5.4.1 HMN2205 Community Nutrition Assessment

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Food and nutrition issues and programs; factors influencing nutritional status of a community; strategies for intervention at community level, program planning, monitoring, & evaluation; & nutrition surveillance methods. Practical assessment of community needs, planning interventions, nutrition & dietary assessment methods.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Examining determinants of nutrition problems in communities to inform development of nutrition programs.
2. Conducting a situational assessment in collaboration with community stakeholders
3. Interpretation and dissemination of nutrition data

d) Learning outcomes

At the end of the course, students should be able to:

1. Examine determinants of nutrition problems in communities to inform development of nutrition programs.
2. Conduct a situational assessment in collaboration with community stakeholders
3. Interpret and disseminate nutrition data

e) Mode of delivery

A blended & interactive approach including lectures, case studies, practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Describe community, Nutrition problems of different communities include worksites, school systems, religious groups, and special groups such as PLWHA and the institutionalized	2	2
2. Introduction	• Determinants of nutritional status, Conceptual frameworks for community food & nutrition security •	2	2
~~3.~~ Identification of Nutritional problems	• Identification of a nutritional problem • Importance of nutritional assessments • Assessing nutritional status (anthropometry, clinical, biochemical, dietary)	2	2
~~4.~~ Anthropometric measurements and indices	• Dietary assessments and intepretation • Anthropometric measurements • Anthropometric Indices and interpretation • Sources of anthropometric information	~~2~~	~~2~~
5. Dietary Assessment	• Food Frequency • 24 hour food recall • Food weighing • Food intake diaries • Estimating nutrient intake	2	2
6. Community food and nutrition security	• Indicators of community food security, Groups vulnerable to malnutrition	2	
7. Assessing food and nutrition programs in community	• Ensuring food security in community including community gardens, food stores, food assistance programmes, congregate/supplementary feeding for special groups, and community therapeutic care	2	2
8. Assessing food and nutrition programs in community	• Case studies of community food and nutrition programs	2	2
9. Nutrition surveillance	• Basic epidemiological concepts & nutritional surveillance methods; anthropometry and dietary assessment methods,	2	2
10. Nutrition surveillance	• Review community nutrition surveillance systems	2	2
11. Community nutrition intervention	• Overview of planning, implementation, and development of community nutrition programs	2	2
12. Community needs assessment	• Methods for collecting data i.e. survey, health risk appraisal, screening, focus groups, key informant interviews, and others,	2	2
13. Community needs assessment	• Issues in data collection: practical, scientific, and cultural	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
14. Community needs assessment	• Anthropometry – major indicators, reference standards, data processing programmes,	2	2
15. Community needs assessment	• Key biochemical & clinical indicators of under nutrition, Limitations of anthropometry, biochemical, & clinical methods	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Interactive lectures covering theory	30 h
Practicals	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Boyle, M.A. (2017) Community Nutrition in Action (7th edition). Boston, MA: Centgage Learning. Available online or at the Barnes & Noble Bookstore (Somerset Street).
2. Lankester, T. (2009). Setting up community health programmes: A practical manual for use in developing countries. Berkeley, Calif: Hesperian Foundation.
3. Food and Nutrition in Uganda. Principles and Community Needs. (2007). Eds. Namutebi, A. Muyonga, J. H. and Tumuhimbise, A. G. Makerere University - Fountain P

5.4.2 HMN2206 Pathophysiology of Nutrition Disorders

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

This course focuses on the pathophysiology, causes, predisposing factors and complications of selected nutrition disorders. It also focuses on nutrition assessment for specific disorders.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Pathophysiology of different diseases to identify & explain associated nutritional problems
2. Nutrition assessment data to evaluate nutritional status and identify specific nutritional problem
3. Nutrition diagnoses and write appropriate problems etiology and symptoms (PES) statements

d) Learning outcomes

At the end of the course, students should be able to:

1. Apply knowledge of the pathophysiology of different diseases to identify & explain associated nutritional problems
2. Analyze nutrition assessment data to evaluate nutritional status and identify specific nutritional problem
3. Determine nutrition diagnoses and write appropriate problems etiology and symptoms (PES) statements

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH/TH
1. Introduction	• Basics of pathophysiology, nutrition disorders, nutritional status assessment	2	2
2. Eating disorders	• E.g. Anorexia nervosa, Bulimia nervosa etc • Causes, signs & symptoms, predisposing factors	2	2
3. Obesity/overweight	• Classification, pathophysiology, predisposing factors, nutrition status assessment	2	2
4. Protein Energy Malnutrition	• Edematous malnutrition, pathophysiology, predisposing factors	2	2
5. Protein Energy Malnutrition	• Non-edematous malnutrition, pathophysiology, predisposing factors and nutrition status assessment	2	2
6. Cardiovascular diseases	• Pathophysiology, signs & symptoms	2	2
7. Cardiovascular diseases	• Classification, pathophysiology, signs & symptoms, predisposing factors • Measurement and classification of hypertension	2	2
8. Diabetes mellitus	• Type 1 & 2, pathophysiology, signs & symptoms, predisposing factors	2	2
9. Diabetes mellitus	• Complications of type 2 diabetes e.g. retinopathy, neuropathy etc	2	2
10. Cancer	• Types, pathophysiology, signs & symptoms, predisposing factors	2	2
11. Cancer	• Effects of cancer on nutrition • Effects of nutrition on cancer • Assessment of nutritional status	2	2
12. Diseases of the gastro-intestinal tract	• Pathophysiology, causes, signs & symptoms, predisposing factors	2	2
13. HIV/AIDS	• Pathophysiology, causes, signs & symptoms, predisposing factors complications • Effects of HIV/AIDS on nutrition • Effects of nutrition on HIV/AIDS • Assessment of nutritional status	2	2
14. Food allergies	• Pathophysiology, causes, signs & symptoms, predisposing factors	2	2
15. Food intolerances	• Pathophysiology, causes, signs & symptoms, predisposing factors	2	2
16-17	• Revision and University Exam		

g) Summary of Time Needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course Assessment

Continuous assessment	60%
University examination	40%

i) Recommended Reading List

1. Nelms, M., Sucher, K. P., Lacey K and Roth S. L. 2015. Nutrition therapy and pathophysiology. Cengage Learning Boston, USA
2. Geissler, C., & Powers, H. J. (2012). Human nutrition. Edinburgh: Churchill Livingstone/Elsevier.
3. Macfie, H. J. H. 2012. Food choice, acceptance and consumption. S.l.: Springer.

5.4.3 HMN2207 Software for Food and Nutrition Applications

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Computer operation and handling and how they can be integrated in the running of nutrition field activities. Basic concepts of information technology, computers and their application in addition to operating systems of both soft & hard wares. Different online data bases and websites relevant to the field of food and nutrition.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Access and critically analyzing the different databases
2. Use of common software including; WHO Anthro, ENA for SMART, NutrtiSurvey, CFc4ed, Linear programming, Access, SPSS, SAS, Power point among others
3. Design and management of web portals resources including free educational websites with emphasis on ethical issues regarding public and private databases
4. Use of modular systems of e-learning

d) Learning outcomes

At the end of this course, students should be able to:

1. Access and critically analyze the different databases
2. Use common software including; WHO Anthro, ENA for SMART, NutrtiSurvey, CFc4ed, Linear programming, Access, SPSS, SAS, Power point among others
3. Design and manage web portals resources including free educational websites with emphasis on ethical issues regarding public and private databases
4. Use modular systems of e-learning

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Organization and characterization of computer, applications	2	2
2. Introduction	• Network applications, Operating systems and working environments, Computer security and protection	2	2
3. Basic computer software	• Word Processing; document typing, editing and formatting	2	2
4. Basic computer software	• Word Processing; document typing, editing and formatting	2	2
5. Basic computer software	• Excel Spreadsheets; hands-on using Spreadsheet software	2	2
6. Basic computer software	• Excel Spreadsheets; hands-on using Spreadsheet software	2	2
7. Basic computer software	• Presentation; hands-on using PowerPoint	2	2
8. Basic computer software	• Presentation; hands-on using PowerPoint	2	2
9. Nutrition software	• New computer technology in nutritional science and dietetics	2	2
10. Nutrition software	• Computer-assisted teaching effectiveness software	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
11. Nutrition software	• Application of computers in Health Management Systems	2	2
12. Nutrition software	• Application of WHO Anthro, ENA for SMART	2	2
13. Nutrition software	• Applications of NutrtiSurvey, Linear programming	2	2
14. Nutrition software	• Applications of CFc4ed, etc, Cronometer, Myplate.gov	2	2
15. Other Applicable packages	• Computer Graphics/Adobe packages, Internet application, Modular systems of e-learning (Moodle), Basics of Web designs and authentication, Internet/computer security	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Beekman, George. Computer Confluence: Exploring Tomorrow's Technology, Concise Edition. Edition 5.5 Upper Saddle River, NJ: Prentice Hall, 2003. Type: Textbook. ISBN: 978-0536-199690
2. O'Leary, T. J., & O'Leary, L. I. (2002). Computing essentials: 2002-2003. Boston, MA: Irwin/McGraw-Hill.
3. Computer Applications in Nutrition and Dietetics. 1998. Orata. Garland Publishing Inc.

5.4.4 HMN2208 Clinical Management of Acute Malnutrition

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (15 LH, 60PH), **Duration:** 15 weeks

b) Course description

Clinical and scientific topics necessary for the students' understanding of the concepts in clinical assessments, screening and management of individuals and their families with acute malnutrition conditions. Commonly encountered clinical nutrition disorders in Uganda and beyond will be used in the examples and clinical rounds.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. General principles of nutrition & its role in the prevention and management of acute malnutrition
2. Attitudes that translate general nutrition principles into plan of care for patients.
3. Appropriate skills in the assessment and screening of individuals for acute malnutrition.
4. Appropriate ethics and professionalism in assessment of individuals for acute malnutrition.

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain general principles of nutrition, & its role in prevention & management of acute malnutrition
2. Demonstrate attitudes that translate general nutrition principles into plan of care for patients.
3. Demonstrate appropriate skills in the assessment of individuals for acute malnutrition
4. Apply appropriate ethics & professionalism in the assessment of individuals for acute malnutrition disorders

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals, ward rounds and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. General principles of nutrition	• Nutritional content of foods, DRIs & RDA, Vegetarian and vegan diets; and rationale for including more whole foods and fewer processed foods in daily diet.	1	4
2. Nutrition and disease	• Principles of normal nutrition to disease states	1	4
3. Nutrition Care Process	• The nutrition care process	1	4
4. Nutrition Assessment in NCP	• Nutrition Assessment in NCP, Clinical assessment in a clinical setting, physical examination; anthropometrics; ordering & evaluating lab tests	1	4
5. Nutrition Assessment in NCP	• Nutrition Assessment in NCP, Clinical assessment in a clinical setting, physical examination; anthropometrics; ordering & evaluating lab tests		
6. Diagnosis, intervention and documentation	• Documentation & Lab Data in Nutrition Care (MAM, SAM, and complications)	1	4
7. Diagnosis, intervention and documentation	• Diagnosis, Intervention, Evaluation in NCP	1	4
8. Managing acute malnutrition	• Severe Acute Malnutrition, Moderate acute malnutrition	1	4
9. Managing acute malnutrition	• Severe Acute Malnutrition, Moderate acute malnutrition	1	4
10. Managing acute malnutrition	• Complications during acute malnutrition	1	4
11. Maternal infant young child and adolescent nutrition	• Maternal, infant and young child & adolescent nutrition	1	4
12. Maternal infant young child and adolescent nutrition	• Maternal, infant and young child & adolescent nutrition	1	4
13. Nutrition & drug interactions	• Food – Drug Interactions, dietary supplement	1	4
14. Health education & counselling	• Health Education & counselling skills in nutrition	1	4
15. Health education & counselling	• Health Education & counselling skills in nutrition	1	4
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	15 h
Practical hours/Tutorials	60 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Principles of Nutritional assessment. Gibson, R.S. Oxford University Press. 2005. 2nd edition.
2. Protocol for the Nutritional Management of Obesity, Diabetes and Hypertension in the Caribbean. AHO/CAR/3.1/01.01. Pan American Health Organization (PAHO) / Caribbean Manual 2004.
3. Uganda Ministry of Health Guidelines for Integrated Management of Acute Malnutrition and Maternal Infant Young Child and Adolescent Nutrition

4. Online resources: caring for infants and young children with acute malnutrition http://www.som.soton.ac.uk/learn/test/nutrition
5. Online resources: Community based management of acute malnutrition http://www.cmamforum.org/

5.4.5 FST2202 Food Processing and Preservation

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30 PH), **Duration:** 15 weeks

b) Course description

Over view of food processing & preservation; Pasteurization and the canning industry; Cold storage; Drying and Evaporation; Acidification; Extrusion; Chemical preservation; irradiation; aseptic processing.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Principles and application of food processing and preservation technologies
2. Manufacture of food products & effects of processing on physical, chemical, microbiological and nutritional quality

d) Learning outcomes

At the end of this course, students should be able to:

1. Explain principles & application of food processing & preservation
2. Manufacture of food products & effects of processing on physical, chemical, microbiological & nutritional quality

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Overview to food processing	• Food preservation and unit operations of food processing	2	2
2. Overview to food processing	• Types of food industries nationally & globally	2	2
3. Preserving food to deter spoilage	• Principle aspects of food microbiology	2	2
4. Preserving food to deter spoilage	• Principle aspects of food chemistry	2	2
5. Food preservation methods	• Water the driver of food spoilage, Temp control (Heat preservation; Pasteurization & Canning)	2	2
6. Food preservation methods	• Calculation of the D & Z value	2	2
7. Food preservation methods	• Temperature control (Cold storage & modifying a_w), Acidity and pH control,	2	2
8. Food preservation methods	• Modifying water activity level/ content (Evaporation),	2	2
9. Food preservation methods	• Use of chemicals, microbes & gases in preserving food	2	2
10. Processing equipment	• Efficiency of equipment, small scale food industries	2	2
11. Processing equipment	• Efficiency of equipment, large scale food industries	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
12. Effect of preservation on food quality	• Nutritional & organoleptic attributes,	2	2
13. Effect of preservation on food quality	• Hurdle technologies	2	2
14. Food processing methods	• Extrusion & irradiation,	2	2
15. Food processing methods	• Microwaves & aseptic technology	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Hand book of Food Processing: Food Preservation, T. Varzakas and C. Tzia, 2015, CRC Press pub.
2. Food Processing, J.S. Carl, 2008, E. Book (ISBN: 978-87-7681-780-0)

5.4.6 EEE2220 Research Methods and Scientific Writing

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Conceptualization and operationalization of research & the utilization of different research methods to conduct original, methodologically sound research as part of academic and professional work. Main components of a research.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Formulating & designing research projects for academic & donor funding purposes
2. Identify, analyze and synthesize various sources of information for literature review and data collection
3. Apply & integrate qualitative and quantitative data collection procedures in real life situations.
4. Different styles for citation and referencing of scholarly reports and articles.

d) Learning outcomes

At the end of the course students will be able to:

1. Formulate and design research projects for academic and donor funding purposes
2. Identify, analyze & synthesize various sources of information for literature review and data collection
3. Apply & integrate qualitative and quantitative data collection procedures in real life situations.
4. Use different styles for citation and referencing of scholarly reports and articles.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Nature of science & scientific inquiry, Research methodology	2	2
2. Types of research	• Basic types, purpose, and criteria for selection of research type	2	2
3. Introduction to research designs	• Meaning of research designs, Considerations in selecting a Research Design, Features of a good Research Design	2	2
4. Quantitative research designs	• Types of non-experimental research designs: Survey research; Correlational research design; Case study research; Longitudinal research design; Ex post facto research design	2	2
5. Quantitative research designs	• Characteristics of experimental research, Purpose of experimental research, Types of experimental research	2	2
6. Quantitative research designs	• Phenomenology qualitative Design, Ethnography qualitative design, Grounded theory qualitative design	2	2
7. Mixed research designs, and their characteristics	• Parallel Mixed methods design, Explanatory Sequential mixed methods design, Exploratory Sequential mixed methods design	2	2
8. Research Process: The research proposal	• Requirements for the research process, The research proposal as a planning tool, Preliminary pages of the research proposal	2	2
9. The Introduction	• Background, problem, objectives, hypotheses/research questions	2	2
10. Literature Review	• Techniques for conducting an effective Literature Search	2	2
11. Methodology	• Research Methodology, Components of research methodology	2	2
12. Designing data collection tools	• Qualitative and quantitative data tools, Integrating qualitative & quantitative data collection tools	2	2
13. Data collection methods	• Observations (Participant and structured), FDGs; Interviews	2	2
14. Reporting results	• Plagiarism; Avoiding Plagiarism, APA style & writing references	2	2
15. Ethics in research & publication	• Ethical considerations for professional practice, researcher-respondent relationship, researcher-researcher relationship	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Tutorials/Discussions/Assignments	30 h

h) Course assessment

Continuous assessment	60%
University Examination	40%

i) Recommended reading list

1. Creswell, J. W. 2018. Research design: Qualitative, quantitative and mixed methods approaches. 5th Ed. Thousand Oaks, CA: Sage. ISBN: 978-1-5063-8670-6
2. Dawson, C. 2009. Introduction to Research Methods: A practical guide for anyone undertaking a research project. 4th Ed. How to Content Publishers, UK.
3. Silverman, D. 2008. Doing Qualitative Research. 2nd Ed. Sage Publications Ltd., Californi

5.5 Year 2 Field Attachment 1

CORE COURSES

5.5.1 HMN2302 Clinical Nutrition Practice

a) **Course Type:** Core, **Credit Units:** 5 CU, **Contact Hours:** 75 Contact Hours (20 LH, 110 PH), **Duration:** 10 weeks

b) Course description

Students will be attached to a health facility, not below Health Center IV but having a Nutrition Unit and a Nutritionist. Students have to clock a minimum of 110 hours on the ward. Prior to placement, students will do an online course (the Malnutrition eLearning course at https://www.med.soton.ac.uk/nutrition/). Interns will be exposed to practice in general Health Management Systems in Uganda and in particular Health information Management Systems. The student will be supervised by academic & field supervisors.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Assessing the nutritional needs of diverse populations.
2. Information management systems & health information management systems in Uganda
3. Communicating effectively in interactions with other professionals and stakeholders.
4. General concepts of Severe Acute Malnutrition (SAM).
5. Carrying out both the clinical and anthropometric assessments in SAM children
6. Managing SAM following the WHO management procedure
7. Importance of managing malnutrition appropriately

d) Learning outcomes

At the end of the course, students should be able to:

1. Describe and assess the nutritional needs of diverse populations.
2. Describe information management systems & health information management systems in Uganda
3. Communicate effectively in interactions with other professionals and stakeholders.
4. Describe the general concepts of Severe Acute Malnutrition (SAM).
5. Carry out both the clinical and anthropometric assessments in SAM children
6. Manage SAM following the WHO management procedure
7. Appreciate the importance of managing malnutrition appropriately and in a timely manner.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic/Activities	Content/Sub activities	Time	
		LH	PH
1. Introduction	• Identification of placement facilities, application process • Concept of malnutrition: (the Malnutrition eLearning Course)	2	-
2. Introduction	• Expectation from students and supervisors	2	-
3. Fundamentals	• Clinical nutrition	4	-
4. Fundamentals	• Nutritional assessment	4	-
5. Fundamentals	• Diagnosis and management of acute malnutrition	4	-
6. Student placement	• The process of placement to attachment facilities: o Sourcing for appropriate facilities for attachment o Application by students attachments	-	-

Topic/Activities	Content/Sub activities	Time	
		LH	PH
	• Compiling placement facilities		
7. Internship Activities	• Clinical nutrition: Nutrition unit (ward)- o Acute severe malnutrition, nutrition status assessment, admission criterion, management of SAM (inpatient and outpatient) and community management of SAM o Health information management systems o Students will record the activities in logbooks including:	-	110
8. Supervision	• Field supervisor will: o Assign daily activities and monitor performance o Sign a logbook & give report at the end of the internship • Academic supervisor will: o Visit student during internship & write an evaluation report	-	-
9. Share experiences, evaluation and reporting	• At the end, the student and supervisors will interact o Share experiences & evaluate performance • Submission of a final report and logbook by the student	4	-

g) Summary of time needed

Lectures	20 h
Practice	100 h

h) Course assessment

Written comprehensive report	70%
Evaluation by field and academic supervisors	10%
Duly filled student logbook	20%

i) Recommended reading materials

1. Holli, B. B., & Beto, J. A. (2014). Nutrition counselling and education skills for dietetics professionals. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.
2. Webster-Gandy, J., Madden, A., & Holdsworth, M. (2012). Oxford handbook of nutrition and dietetics. Oxford University Press.
3. The Malnutrition eLearning Course: https://www.med.soton.ac.uk/nutrition/

5.6 Year 3 Semester 1 Course Units

CORE COURSES

5.6.1 FST3102 Food Analysis

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Sampling and sample preparation. Routine and reference methods for analysis of carbohydrates, fats, proteins, vitamins, minerals, acid and water content, water activity. Application of instrumental analytical methods and procedures: spectroscopy, chromatography, electrophoresis and microscopy in food analysis. Determination of physical properties of foods. Rheological and viscosity measurements. Detection of food adulteration and toxins.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Importance of determining composition as applied to food standards
2. Statistical principles to solve problems related to food sampling and data evaluation
3. Principles behind the different analytical techniques associated with food
4. Different analytical equipment to conduct proximate analyses of different food stuffs

d) Learning outcomes

At the end of the course, students will be able to:

1. Determine food composition as applied to food standards
2. Solve problems related to food sampling and data evaluation using statistical principles
3. Explain the principles behind the different analytical techniques associated with food
4. Conduct proximate analyses of different food stuffs using different analytical equipment

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time (h)	
		LH	PH
1. Introduction	• Rationale for food composition and food analysis, Classification of quantitative methods of analysis, Steps in a quantitative chemical analysis, Choice and validity of analytical method:	2	2
2. Introduction	• Official methods of analysis, Analytical separations/ elimination of interferences: precipitation, extraction, chromatography (ion exchange), electrophoresis; Masking agent; Standard addition protocol, Lab overview: Guidelines, safety, and reporting	2	2
3. Moisture determination	• Forms of water in solids & moisture contents of various foods, Factors to consider when selecting a method for moisture analysis, Over- or under-estimation of the moisture content of a food, Moisture determination	2	2
4. Ash and mineral analysis	• Wet digestion and dry ashing, Sources of error in decomposing & dissolving the sample, Ash soluble or insoluble in acid or water and alkalinity of ash, Mineral determination	2	2
5. Lipid analysis	• Factors for selecting a method for lipid analysis, Lipid determination using Soxhlet, Goldfish, etc, Supercritical fluid extraction and accelerated solvent extraction techniques	2	2
6. Lipid analysis	• Fat characterization: Physical properties, IV, SN, AV, oxidation, hydrolysis, PV	2	2
7. Lipid analysis	• Analysis of lipid fractions: GLC, HPLC, TLC	2	2
8. Protein analysis	• Factors for selecting a method for protein analysis, Protein content from nitrogen content and conversion factors, Protein determination by Kjedahl, combustion, etc,	2	2
9. Protein analysis	• Protein separation and characterization, pH precipitation, size fractionation, salt precipitation, electrophoresis, affinity and ion-exchange chromatography	2	2
10. Protein analysis	• Amino acid & protein quality analysis	2	2

Topic by week	Content	Time (h)	
		LH	PH
11. Carbohydrate analysis	• Determination of carbohydrates, crude fiber, ADF and NDF - AOAC & Englyst-Cummings methods	2	2
12. Acidimetry	• Methods of measuring titratable acidity and pH, Preparation of standard acids and bases, Buffer solutions & Acidity of foods	2	2
13. Vitamin analysis	• Sample preparation - Methods (Principles & food applications)	2	2
14. Application of modern instrumental techniques of analysis	• Pros and cons of using instruments and special techniques in analysis, Theory and practice of molecular and atomic spectrometry & chromatography	2	2
15. Application of modern instrumental techniques of analysis	• Basic principles of chromatography, HPLC, Theory and practice of electrophoresis, Thermal analysis, Rheology of Food, Colour analysis, Detection of food adulteration and presence of toxins	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Interactive lectures covering theory	30 h
Practicals	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Nielsen, S.S. 2003. Analysis Laboratory Manual. Chips Ltd, USA.
2. Nielsen S.S. 1998. Food Analysis. Chapman & Hall, Aspen Publishers Inc., Mary land.
3. A.O.A.C. Official Methods of Analysis, current ed. Association of Official Analytical Chemists, Arlington, VA.
4. Official Methods of Analysis, 17th edn. A.O.A.C. Association of Official Analytical Chemists, Arlington, VA.

5.6.2 HMN3109 Meal and Diet Planning

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

This course focuses on a comprehensive understanding of diet and meal planning principles. It focuses on the role of diet in maintaining health and preventing nutrition disorders such as overweight/obesity, underweight, diabetes mellitus type II, hypertension etc. The course is also designed to impart skills for planning and developing healthy balanced meals for different populations.

c) Course objectives

The objectives for this course are to equip students with knowledge and skills on:

1. The principles of nutrition and its role in health and disease.
2. Planning and developing healthy, balanced meals based on dietary guidelines and recommendations.
3. Applying nutrition assessment tools to evaluate an individual's nutritional needs and developing appropriate meal plans.
4. Developing meal plans for special populations, such as athletes, pregnant women, infants, and elderly individuals.

d) Learning outcomes

At the end of this course, the student should be able to:

1. Analyze and evaluate dietary intake and make appropriate recommendations for nutrient intake.
2. Plan and develop healthy, balanced meals for different populations, taking into consideration their unique nutritional needs.
3. Apply nutrition assessment tools to evaluate an individual's nutritional status and develop appropriate meal plans.
4. Develop meal plans for special populations based on their specific nutritional requirements.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH/TH
1. Introduction to diet and nutrition	• Definitions (Diet, meal, diet planning, food choices etc.…), • Dietary guidelines, food composition tables, computer and online software programs use in meal and diet planning • Principles of diet planning • Overview of roles of different nutrients: carbohydrates, proteins, fats, vitamins, minerals, water	2	2
2. Energy balance and metabolism	• Basal metabolic rate • Thermic effect of food • Physical activity and exercise	2	2
3. Nutrition and dietary aassessment tools	• Overview of anthropometric assessment and biochemical assessment • Dietary assessment and tools used • Meal planning principles and tools used	2	2
4. Meal planning for special populations	• Infancy and childhood • Teenagers • Pregnancy and lactation	2	2
5. Meal planning for special populations	• Aging and elderly • Athletes and sports persons	2	2
6. Food allergies and intolerances	• Nutritional considerations for food allergies and intolerances • Meal planning for food allergies and intolerances	2	2
7. Meal planning for weight management	• Principles and meals for weight loss • Principles and meals for weight gain	2	2
8. Budget-friendly meal planning	• Nutritious meals on a budget • Meal planning for low-income populations • Strategies for grocery shopping on a budget	2	2
9. Culinary skills for meal planning	• Cooking techniques • Recipe modification • Meal preparation and planning strategies	2	2
10. Dieting and types of diets	• Description of various types of diets (vegetarian, lacto-vegetarian, carnivorous, omnivorous, ketogenic diet, DASH, Mediterenean etc) • Risks and benefits of various types of diets • Evidence-based meal planning and special considerations for specific types of diets	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH/TH
11. Dieting, diet types and trends	• Description of various types of diets (vegetarian, lacto-vegetarian, carnivorous, omnivorous, ketogenic diet, DASH, Mediterenean etc) • Risks and benefits of various types of diets • Evidence-based meal planning and special considerations for specific types of diets	2	2
12. Common dieting fads and myths	• Common dieting fads and myths • Evidence-based studies on diet fads and myths	2	2
13. Use of dietary supplements	• Types of dietary supplements • Safety and efficacy of supplements • Appropriate use and dosage of supplements	2	2
14. Nutritional Counseling and Behavior Change	• Principles of nutrition counselling • Strategies for behavior change in nutrition • Motivational interviewing techniques	2	2
15. Practical applications of diet and meal planning	• Case studies • Meal planning projects: real-life applications of diet and meal planning principles • Cultural and social influences on diets	2	2
16-17	• Revision and University Exam		

g) Summary of time needed

Lectures	30 h
Practicals/Seminars	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Cataldo, CB; DeBruyne LK and Whitney EN. Nutrition and Diet Therapy, 6th Ed.), Wadsworth, Belmont CA, USA
2. Various dietary guidelines for different medical or nutritional complications
3. Academy of Nutrition and Dietetics: https://www.eatright.org/
4. Myplate.gov. US Department of Agriculture https://www.myplate.gov/
5. Cronometer https://cronometer.com/

5.6.3 HMN3110 Community Nutrition Interventions

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Overview of food & nutrition issues and programs; factors influencing nutritional status of a community; strategies for intervention at community level, program planning, monitoring, & evaluation; & nutrition surveillance methods.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Principles of developing and evaluating community nutrition programmes

2. Different food and nutrition interventions
3. Activities of key governmental & non-government organizations involved in food, nutrition & dietetics
4. Cultural competence/sensitivity
5. National policies and legislation with regard to food and nutrition & outreach activities

d) Learning outcomes

At the end of the course students will be able to:

1. Demonstrate the principles of developing and evaluating community nutrition programmes
2. Propose different food and nutrition interventions
3. Assess activities of key governmental & non-government organizations involved in food, nutrition & dietetics
4. Demonstrate an understanding of cultural competence/sensitivity
5. Outline and impact of national policies and legislation with regard to food and nutrition & outreach activities

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Identify appreciate cultural barriers to health promotion	2	2
2. Program planning	• Using results of needs assessment, define goals & objectives	2	2
3. Program planning	• Developing program plan, doing monitoring and evaluation	2	2
4. Policy and community programming	• Planning community nutrition programs in line with national policies	2	2
5. Policy and community programming	• Planning community nutrition programs in line with national policies	2	2
6. Policy and community programming	• Overview advocacy as a nutrition intervention	2	2
7. Nutrition education and communication	• Nutrition communication and education strategies	2	2
8. Nutrition education and communication	• Appropriate channels for different groups	2	2
9. Nutrition education and communication	• Appropriate channels for different groups	2	2
10. Health services and community nutrition	• Role of health sector in improving community nutrition • SDGs related to health and nutrition	2	2
11. Health services and community nutrition	• Role of health sector in improving community nutrition • SDGs related to health and nutrition	2	2
12. Linking actors for community intervention	• Building coalitions & networks (includes identifying SWOT)	2	2
13. Linking actors for community intervention	• Building coalitions & networks (includes identifying SWOT)	2	2
14. Linking actors for community intervention	• Legal and ethical issues	2	2
15. Linking actors for community intervention	• Legal and ethical issues	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Interactive lectures covering theory	30 h
Practicals	30 h

h) Course assessment

Continuous assessment	60%
University exam	40%

i) Recommended reading list

1. Boyle, M.A. (2017) Community Nutrition in Action (7th edition). Boston, MA: Centgage Learning.
2. Lankester, T. (2009). Setting up community health programmes: A practical manual for use in developing countries. Berkeley, Calif: Hesperian Foundation.

5.6.4 HMN3111 Food-Drug Interactions

a) **Course Type**: Core, **Credit Units:** 4 CU, **Contact Hours:** 60 Hours (45LH, 30PH), **Duration:** 15 weeks

b) Course description

Principles of General Pharmacology, principles on drugs, nutrients, food, herbals & environmental chemicals; their naming, classification, therapeutic effects, & interactions with various chemicals. Covers drugs, their actions & clinical applications.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. History of pharmacology & drugs, sources, nomenclature, classification uses, administration & dosage
2. Pharmacokinetic properties of drugs (**A**bsorption, **D**istribution, **M**etabolism, **E**xcretion – nutrients, food, herbals and environmental chemicals), their measurements & associated factors
3. Drug transporters, enzyme induction and inhibition, and their clinical implications
4. Pharmacodynamic effects of drugs (drugs, nutrients, food, herbals etc) & their various targets in the body
5. Drug-receptor and nondrug-receptor mechanisms affected by drugs, nutrients, food, herbals and environmental chemicals & theories of drug interactions and their clinical application
6. Dose-Response curves and their application; how they are affected by drugs, nutrients, food, herbals etc
7. Measurement of drug safety (acute, sub-acute and chronic toxicity)
8. Pharmacokinetic and Pharmacodynamics interactions
9. Drugs, nutrients, food, herbals & environmental chemicals that acts as Nutrient depleters
10. Adverse drug reactions –classification and types, their mechanisms and prevention

d) Learning outcomes

At the end of this course, students should be able to:

1. Explain history of pharmacology & drugs, sources, nomenclature, classification, uses, administration, & doses
2. Describe pharmacokinetic properties of drugs (**A**bsorption, **D**istribution, **M**etabolism, **E**xcretion – nutrients, food, herbals and environmental chemicals), their measurements & associated factors
3. Describe drug transporters, enzyme induction and inhibition, and their clinical implications
4. Explain pharmacodynamic effects of drugs (drugs, nutrients, food, herbals etc) & their various targets in the body
5. Explain drug-receptor and nondrug-receptor mechanisms affected by drugs, nutrients, food, herbals and environmental chemicals & theories of drug interactions and their clinical application
6. Explain dose-Response curves and their application; how they are affected by drugs, nutrients, food, herbals etc
7. Explain measurement of drug safety (acute, sub-acute and chronic toxicity)
8. Describe pharmacokinetic and Pharmacodynamics interactions
9. Identify drugs, nutrients, food, herbals & environmental chemicals that act as Nutrient depleters
10. Describe adverse drug reactions –classification and types, their mechanisms and prevention

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	PH
1. Introduction	• Definitions, history of Pharmacology & drugs, sources of drugs, their different classifications, naming or nomenclature and general uses, over-the -counter (OTC) & Prescription drugs. Drug and natural product development process: Preclinical and clinical trials	2	2
2. Pharmacokinetics	• Route of administration, (ADME), Dosage forms and their pros & cons	2	2
3. Pharmacokinetics	• ADME & factors influencing absorption, distribution, metabolism, excretion • Factors affecting absorption, bioavailability and barriers to drug absorption. Plasma protein & tissue binding & volume of distribution, zero and first order kinetics, drugs & body fluid compartment models	4	2
4. Pharmacokinetics	• Metabolism involving Phase I, II and III drug metabolism & major organs and sites of metabolism; major routes of drug excretion, drug half-life and clearance.	2	2
5. Pharmacokinetics	• Enzyme and transporter induction and inhibition by drugs, nutrients, food, herbals and environmental chemicals & how they can lead to variations in individual responses to these substances	2	2
6. Pharmacokinetics	• Plasma drug concentration versus time in single and multiple drug dosing. Pharmacokinetics in special population (liver & kidney disease, pregnancy, elderly, children & neonates, lactating mothers)	4	2
7. Pharmacodynamics	• Drug (drugs, nutrients, food, herbals & environmental chemicals) targets in the body.	4	2
8. Pharmacodynamics	• Modes of drug action-receptor and non-receptor mechanisms & their regulations, theories of drug-receptor interactions.	3	2
9. Pharmacodynamics	• Receptor selectivity, affinity, intrinsic effects, agonist, antagonists, efficacy, potency.	2	2
10. Pharmacodynamics	• Dose-response curves, biological and pharmacogenetic factors influencing drug, nutrients, food, herbals & environmental chemicals responses	4	2
11. Drug Interactions	• Pharmacokinetic & Pharmacodynamics interactions including drug-drug, drug-food, drug-nutrient, drug-herbal and drug-environmental interactions and their clinical significance.	4	2
12. Drug Interactions	• Various drugs, nutrients, food, herbals & environmental chemicals effects in the body with emphasis on desirable and undesirable effects.	2	2
13. Drug Interactions	• Drugs, nutrients, food, herbals & environmental chemicals that acts as Nutrient depleters & their clinical significance	4	2
14. Adverse drug reactions due to the interactions	• Types of adverse effects & hypersensitivity reactions due to drugs, nutrients, food, herbals & environmental chemical exposure • Mechanisms of tolerance, habituation, addiction & dependence.	4	2

15. Adverse drug reactions due to interactions	• Drug safety & toxicity studies and their measurements including potency, efficacy and therapeutic index	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	45 h
Practicals	15 h
Seminars	15 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Katzung BG & Vanderah TW (2021). Textbook of Basic and Clinical Pharmacology. McGraw-Hill Education / Medical; 15 edition. https://accessmedicine.mhmedical.com/book.aspx?bookID=2988
2. Ritter JM, Flower RJ, Henderson G, Loke YK, MacEwan D & Rang HP (2020). Rang & Dale's Pharmacology, 9th Edition. Elsevier Publishers, Edinburgh.
3. Whalen K, Field C & Radhakrishnan R. (2018). Lippincott Illustrated Reviews: Pharmacology (Lippincott Illustrated Reviews Series). 7 editions. Wolters Kluwer Law & Business.

5.6.5 HMN3112 Clinical Management of Nutrition Disorders

a) Course Type: Core, **Credit Units:** 4 CU, **Contact Hours:** 60 Hours (45 LH, 30PH), **Duration:** 15 weeks

b) Course description

This course provides an in-depth understanding of the role of nutrition in managing medical conditions, including nutritional assessment, medical nutrition therapy, and evidence-based guidelines for clinical nutrition practice. Clinical nutrition disorders commonly encountered in Uganda will be used in the examples. Through clinical rounds and other methods, students will gain knowledge and skills to provide nutrition support to manage and prevent common illnesses.

c) Course objectives

The objectives for this course are to equip students with knowledge on:

1. Integrating nutrition knowledge & skills in health promotion, and dietary management of disease
2. Assessment of nutritional status, determining the effectiveness of the intervention, and nutritional counseling
3. Develop and implement personalized medical nutrition therapy plans for patients with diverse health conditions;
4. Latest research and guidelines in clinical nutrition practice.

d) Learning outcomes

At the end of the course, students should be able to:

1. Integrate nutrition knowledge & skills in health promotion and dietary management of disease
2. Assess the nutritional status, determine the effectiveness of the intervention, and give nutritional counseling.
3. Apply principles of medical nutrition therapy in the management of various health conditions;
4. Interpret and analyze research studies and guidelines related to clinical nutrition practice;

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time (h)	
		LH	PH
1. Introduction to Clinical Nutrition	• Definition and scope of clinical nutrition • Principles of evidence-based practice • Overview of nutrition assessment methods	2	2
2. Overview of nutrition assessment and diagnosis	• Anthropometric assessment: measurements and interpretation • Biochemical assessment: lab values and interpretation • Clinical assessment: physical examination and medical history	2	2
3. Medical Nutrition Therapy (MNT) Principles	• Overview of MNT principles • Nutrition care process: assessment, diagnosis, intervention, monitoring, and evaluation • Development of nutrition care plans	2	2
4. Nutrition for Diabetes Mellitus	• Medical nutrition therapy for diabetes • Monitoring and self-management of diabetes	2	2
5. Nutrition for Cardiovascular Disease	• Medical nutrition therapy for cardiovascular disease • Dietary strategies for management of cardiovascular disease	2	2
6. Nutrition for Gastrointestinal Disorders	• Nutritional management of gastrointestinal disorders such as celiac disease, inflammatory bowel disease, and liver disease • Medical nutrition therapy for gastrointestinal disorders	2	2
7. Nutrition for Renal Disease	• Medical nutrition therapy for renal disease • Dialysis and nutritional considerations	2	2
8. Nutrition for Cancer	• Nutritional implications of cancer and cancer treatments • Medical nutrition therapy for cancer patients • Supportive nutrition care for cancer patients	2	2
9. Nutrition for Pulmonary Disorders	• Nutritional management of respiratory conditions such as chronic obstructive pulmonary disease (COPD), asthma, and cystic fibrosis • Medical nutrition therapy for pulmonary disorders	2	2
10. Nutrition for Neurological Disorders	• Nutritional management of neurological conditions such as stroke, multiple sclerosis, and Parkinson's disease • Medical nutrition therapy for neurological disorders	2	2
11. Nutrition for Eating Disorders	• Nutritional management of eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating disorder • Medical nutrition therapy for eating disorders	2	2
12. Hematology: Anemia and Blood Disorders	• Nutritional management of anemia and blood disorders • Medical nutrition therapy for anemia and blood disorders	2	2
13. Nutritional Care of the Critically Ill Patient	• Nutritional needs and challenges in critically ill patients • Medical nutrition therapy for critically ill patients • Enteral and parenteral nutrition in critically ill patients	2	2
14. Nutrition Support for Inborn Errors of Metabolism,	• Nutritional management of inborn errors of metabolism • Medical nutrition therapy for inborn errors of metabolism	2	2
15. Nutrition Support for HIV/AIDS	• Nutritional management of HIV/AIDS patients • Medical nutrition therapy for HIV/AIDS patients	2	2

Topic by week	Content	Time (h)	
		LH	PH
16-17	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	45 h
Practicals/Seminars	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Manual of dietetic practice 2007. Thomas, B. ed. Wadsworth Publishing Company. 5th ed. Iowa State Press.
2. Applications in medical nutrition therapy 1996. 2nd ed. Merrill Prentice Hall. Zeman, F.J. & Ney, D.M.

5.6.6 EEE3120 Extension Methods and Approaches

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Competencies for planning, organizing & conduction effective extension & training programs in agriculture & rural development. Conventional & recent advances in extension approaches, roles & attributes of agricultural extension professionals & various approaches to provision of agricultural extension. Aso tackles strategic partnerships, networks and management of multi-stakeholder platforms; basic concepts, methods and tools for agricultural value chain analysis & service delivery at various value chain nodes; Approaches to addressing gender & youth in extension.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Current goal & expanded roles of agricultural extension and advisory services to respond to the current context
2. Effective extension programmes using different methods to identified training needs of their clientele along the whole agricultural value chain from production to consumption.
3. Youth and gender-related issues in agricultural extension and the importance of mainstreaming gender and youth needs into extension service delivery and technology dissemination.

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain current goal & expanded roles of agricultural extension & advisory services to respond to current context
2. Plan and execute effective extension programmes using different methods to identified training needs of their clientele along the whole agricultural value chain from production to consumption.
3. Apply youth and gender-related issues in agricultural extension and the importance of mainstreaming gender and youth needs into extension service delivery and technology dissemination.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Concepts and philosophy of extension	• Definitions, Service areas of agricultural extension, Distinguishing characteristics of agricultural extension	2	2
2. Philosophical roots of agricultural extension	• What is an extension approach & an extension method? How are they different?	2	2
3. The emerging role of extension	• Roles/responsibilities of an extension worker, The new goal of Extension and Advisory Services	2	2
4. Functions of EAS	• Factors to shape the future of agricultural extension, Capacities required to perform the goal of EAS	2	2
5. Networks & management of multi-stakeholder platforms	• Understanding Agricultural Innovation Systems, The role of extension in AIS, Strengths and weaknesses of AIS	2	2
6. Extension Agents in the Agricultural Value Chain	• Strengthening agric extension systems: options & priorities, Value chain concept, Key actors & roles in a value chain	2	2
7. Agricultural extension service delivery	• Overview of the reforms in Agricultural extension service delivery	2	2
8. Extension Approaches in Uganda	• History and evolution of extension approaches, Description & critique of different extension approaches	2	2
9. Agricultural Extension Methods	• Classification of extension methods, Appropriateness of an agric extension method	2	2
10. Methods of extension	• Classified according to objective & how audience is organised: Individual; Group; & Mass methods,	2	2
11. Methods of extension	• Classified based on function: Awareness methods; Exploration of methods; information provision methods	2	2
12. Appropriate extension methods	• Stages in adoption (awareness, interest, evaluation, trial & decision to use/ reject)	2	2
13. Planning & operating extension training programs	• Identification & qualification of training needs, Types of training needs, job analysis, Develop instructional objectives	2	2
14. Planning & operating an extension programme	• Content selection & sequencing, Identification of training resources, Lesson planning and preparation; Delivery	2	2
15. Strategies responsive to gender inclusion	• Strategies for increasing youth & women participation in agriculture using the extension approaches	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Tutorials/Discussions/Assignments	30 h

h) Course assessment

Continuous assessment	60%
University Examination	40%

i) Recommended reading list

1. Global Forum for Rural Advisory Services, GFRAS. (2011). Guide to extension evaluation. Lindau, Switzerland:.
2. Leeuwis Cees (2004). Communication for Rural Innovation: Rethinking Agricultural Extension. 3rd Edition, Blackwell Publishing

5.7 Year 3 Semester 2 Course Units

5.7.1 HMN3202 Nutrition in Emergencies

a) **Course Type**: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

The aim of the course is to give students an overview of nutrition in humanitarian emergencies, including the types of malnutrition, both direct and underlying causes of malnutrition, how malnutrition is measured, and common nutritional interventions covering the most vulnerable groups.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Different types of malnutrition including micronutrient deficiencies
2. A conceptual framework for the causes of malnutrition
3. How to conduct both individual and population nutrition assessment
4. Interventions and be able to discuss their effectiveness, including infant and young child feeding, community management of acute malnutrition, inter-sectoral interventions, cash transfers and general ration distribution
5. Key interventions for addressing malnutrition across the various population groups
6. Nutrition humanitarian response coordination and the roles of different actors
7. How to apply key policy issues as relate to nutrition in humanitarian response
8. Management for the humanitarian response.

d) Leaning outcomes

At the end of the course, the students should be able to:

1. Identify different types of malnutrition including micronutrient deficiencies
2. Draw on a conceptual framework for the causes of malnutrition
3. Understand how to conduct both individual and population nutrition assessment
4. Identify a range of interventions and discuss their effectiveness, including infant and young child feeding, community management of acute malnutrition, inter-sectoral interventions, cash transfers and ration distribution
5. Apply key interventions for addressing malnutrition across the various population groups
6. Explain nutrition humanitarian response coordination and the roles of different actors
7. Apply key policy issues as relate to nutrition in humanitarian response
8. Apply knowledge management for the humanitarian response.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction to Nutrition in Emergencies	• Humanitarian standards and principles, Role of the UN system • The Transformative Agenda, Roles of stakeholders within the UN system, UNICEF's Core Commitments for Children (CCCs)	2	2
2. Importance of Nutrition in Emergency	• Types of malnutrition & consequences, Global role of UNICEF as Nutrition cluster coordinator, Integrated chain of response, Explain focus area & work approach of Nutrition at UNICEF	2	2
3. Importance of Nutrition in Emergency	• Describing Nutrition-specific interventions UNICEF undertakes, Why work across multiple sectors is so important, Explore real-life, successful multi-sectorial case studies	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
4. Nutrition Coordination in Emergencies Preparedness and Response	• Coordination mechanisms before & during emergencies, Cluster activation and de-activation, Principles of Partnership, Intersectoral coordination, Minimum commitments for participation in coordination, UNICEF as the Global Cluster Lead Agency for Nutrition	2	2
5. Acute Malnutrition in Emergencies Preparedness and Response	• Module 1: Acute Malnutrition - Part 1 o Identification of acute malnutrition, Relevant standards, Community-Based Management of Acute Malnutrition, Preparedness, Planning for programmes, Admission and discharge criteria for CMAM, Early child development	2	2
6. Acute Malnutrition in Emergencies Preparedness and Response	• Module 2: Acute Malnutrition - Part 2 o Community engagement for CMAM, Triage and referral o Management of MAM, Outpatient management of SAM, Inpatient management of SAM, Programme delivery options, Supplies, Monitoring and reporting	2	2
7. Micronutrient malnutrition in emergencies preparedness & response	• Micronutrient deficiencies, Population-based preventive actions, Public health measures and treatment options, Monitoring and evaluating micronutrient interventions	2	2
8. Infant and Young Child Feeding in Emergencies	• Recommended IYCF practices and their importance, Policies, guidelines, and frameworks for IYCF-E, Need for IYCF-E programmes, IYCF-E interventions, Role of early childhood development in IYCF-E interventions	2	2
9. Food assistance minimum standards	• Food assistance and relevant standards, Data for decision-making, Food assistance programme design, Food ration design & commodities distribution	2	2
10. Food assistance minimum standards	• Monitoring and evaluation of food assistance, Food and livelihoods assistance	2	2
11. Maternal nutrition programming in emergencies	• Maternal nutrition needs in emergencies, Opportunities to integrate maternal nutrition into health systems, Explain interventions to prevent and treat maternal malnutrition.	2	2
12. Nutrition of adolescents in emergencies preparedness & response	• Importance of adolescent nutrition, Malnutrition in adolescents • Global trends in adolescent nutrition, Preventing and managing adolescent malnutrition	2	2
13. Multisectoral interventions in emergencies preparedness & response	• Determinants of malnutrition, Nutrition & WASH at the household level, Nutrition and health	2	2
14. Multisectoral interventions in emergencies preparedness & response	• Nutrition and early childhood development, Nutrition in food security, agriculture and livelihood	2	2
15. Knowledge management for handling nutritional information	• What is knowledge management?, Relevant standards, Monitoring, evaluation, and learning, Ethical considerations, Data storage and privacy	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading materials

1. Nutrition in Emergencies (NiE) Learning Channel. https://agora.unicef.org/course/view.php?id=29130
2. Acute Malnutrition in Emergencies Preparedness and Response https://agora.unicef.org/course/info.php?id=28662
3. Infant and Young Child Feeding in Emergencies https://agora.unicef.org/course/info.php?id=28674
4. Maternal Nutrition Programming in Emergencies https://agora.unicef.org/course/info.php?id=28650
5. Nutrition of Adolescents in Emergencies Preparedness and Response https://agora.unicef.org/course/info.php?id=28664

5.7.2 HMN3208 Culinary Skills

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Contact Hours (30 LH, 30 PH), **Duration:** 15 weeks

b) Course description

Introduction to food preparation techniques and culinary theory. Basic concepts of kitchen organization and operation, basic terminology, use of standardized recipes, weights and measures, product evaluation, recipe conversion, food composition & introduction to commercial equipment and work methods.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Use of kitchen equipment and utensils
2. Interpretation of recipes, Preparation techniques, mixing methods and cooking methods
3. Production of quality marketable food products
4. Basic sanitation and safety practices

d) Leaning outcomes

After completing the course, the students should be able to:

1. Use kitchen equipment and utensils
2. Interpret recipes & apply different preparation techniques, mixing methods and cooking methods
3. Produce quality marketable food products
4. Demonstrate basic sanitation and safety practices

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• The Food Service Industry, Kitchen Tour, Food Labels, Knife ID, Cutting Boards, Knife Cuts (Small Dice, Large Dice, Julienne, Brunoise, Fine Julienne, Fine Bruinoise)	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
2. Mise en place & knife skills	• Basic Principles of Cooking and Food Science, Knife cuts (medium dice, 2rondelle, paysanne, chiffonade, supreme, parsley) practice knife cuts & kitchen conversions	2	2
3. Menus and Recipes,	• **Recipes:** Reading a recipe and follow, Writing a recipe, Compiling a list of ingredients (Cup cakes with butter icing); • **Vegetables and salads:** Methods and rules for cooking vegetables and making salads, Characteristics of successful vegetable dishes and salads	2	2
4. Costing	• Costing of given recipes	2	2
5. Flour mixtures:	• Batters and dough, Characteristics of successful scones, muffins, pancakes, crumpets, cakes, biscuits, Ensuring a successful product, The saleability of products: appearance, taste, price, presentation	2	2
6. Stocks and Sauces	• Rue, Bechamel and Veloute Lead Sauces Herbs & Spices, Hollandaise Lead Sauce	2	2
7. Tools and Equipment	• Identification, election, operation, use, safety, care, storage & cleaning of: small equipment and utensils	2	2
8. Tools & Equipment	• Identification, election, operation, use, safety, care, storage & cleaning of: other large equipment such as: stoves, fridges and freezers, deep fryer, electric frying pan, food processor, mixer, blender, kitchen scales, timers, thermometers and thermostats, microwave oven etc	2	2
9. Energy Use	• Energy saving and improved household appliances/ equipment	2	2
10. Culinary sanitation & safety	• Surface cooking equipment, food preparation equipment, baking equipment; food service equipment	2	2
11. Food spoilage	• Bacteria, moulds, and yeasts, Factors influencing growth, Preventing the growth of micro-organisms: commercial and domestic	2	2
12. Food hygiene	• Personal & kitchen hygiene, Safety measures when purchasing food	2	2
13. Food hygiene	• Safe food-handling practices when preparing, serving food and eating	2	2
14. Food storage	• Procedures to prolong quality of perishable and non-perishable foods,	2	2
15. Food storage	• Waste control and disposal. Recycling of household waste	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Cookery practicals, Tutorials, Discussions, Self-study	30 h

h) Course assessment

Continuous assessment	60%
University Examination	40%

i) Recommended reading materials

1. Webster-Gandy, J., Madden, A., & Holdsworth, M. (2012). Oxford handbook of nutrition and dietetics. Oxford: Oxford University Press.
2. Geissler, C., & Powers, H. J. (2012). Human nutrition. Edinburgh: Churchill Livingstone/Elsevier.
3. Macfie, H. J. H. (2012). Food choice, acceptance and consumption. S.l.: Springer.

5.7.3 HMN3209 Research Project

a) Course Type: Core, **Credit Units:** 5 CU, **Contact Hours:** 150 Contact Hours (100 LH, 100 PH/Week), **Duration:** 15 weeks

b) Course description

Each student chooses a special project topic. Research is done in the field attachment terms, the write up in year IV. The proposal & results are presented orally in semester 1 year IV. Report is submitted in semester II of year IV.

c) Course objectives

The objective for this course are to equip students with basic/foundational knowledge on:

1. Evaluating and synthesizing information from a range of relevant sources
2. Collecting, accurately recording, analyzing, interpreting and reporting data.
3. Communicating effectively to an appropriate audience in an appropriate manner.

d) Learning outcomes

At the end of the course, students should be able to:

1. Critically evaluate and synthesize information from a range of relevant sources
2. Collect, accurately record, analyze interpret and report data.
3. Communicate effectively to an appropriate audience in an appropriate manner.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic/activity by week	Content/Sub activities	Time allocation (h)	
		LH	PH
1. Introduction	• Selection of research topics, supervisors	8	4
2. Introduction	• Scientific writing & development of proposal	8	4
3. Introduction	• Scientific writing & development of proposal	8	8
4. Development of research concept	• Literature review	8	8
5. Development of research concept	• Formulating and writing of research concept	8	8
6. Development of full proposal	• Formulating and writing of proposal	8	8
7. Development of full proposal	• Formulating and writing of proposal	8	8
8. Presentation of proposal	• Presenting proposal	8	8

Topic/activity by week	Content/Sub activities	Time allocation (h)	
9. Proposal approval	• Presentation of the proposal	4	4
10. Research & draft report writing	• Data collection, data analysis & report writing	8	8
11. Research & draft report writing	• Data collection, data analysis & report writing	8	8
12. Research & draft report writing	• Data collection, data analysis & report writing	8	8
13. Research & draft report writing	• Data collection, data analysis & report writing	8	8
14. First report draft	• Submission and review of 1st draft	-	-
15. Second report draft	• Review by supervisor & revision by student • Final revisions, printing, binding & submission	-	8

g) Summary of time needed

Lectures	100 h
Practical hours/Self-study and presentations	100 h

h) Course assessment

Evaluation is done using the guide below by internal and external examiners and computed as average mark.

MAKERERE UNIVERSITY, DEPARTMENT OF FOOD TECHNOLOGY AND NUTRITION

CANDIDATE: ……
TITLE OF PROJECT: ……
FIRST EXAMINER: ……
SECOND EXAMINER: ……..
EXTERNAL EXAMINER: ……..

	Maximum marks	First examiner	Second examiner	External examiner
GENRAL ORGANISATION Organization of the report into a logical sequence	5			
INRTODUCTION Ecological, sociological, economic and /or political factors forming background and proper exposition of problem	15			
LITERATURE REVIEW Acquaintance with and appreciation of published literature in general area of project	10			
METHODLOGY Clear explanation of the methods and materials used, indicating suitability or limitation	10			
ADEQUACY OF DATA Adequacy of data on all aspects of the problem irrespective of presentation	10			
PRESENTATION OF RESULTS Relevance of tables, diagrams etc. Proper and discrete sub-division into sections	15			
INTERPRETATION OF RESULTS Correct analysis and interpretation of the data as revealed by discussion of tables, diagrams etc., and conclusion made	25			
EXPRESSION	5			

Correct grammar and usage of words, clear and concise language				
CITATION OF LITERATURE Appropriate citation of literature throughout the text, and in the list of references	5			
TOTAL MARKS	100*			

NOTE: An examiner may award up to 5 bonus marks for exceptional ideas or fore concepts, or for exceptional effort in the collection of data

BACKGROUND

The year IV special projects are an important part of the BSc HN degree in which the students develop and build a positive and professional research culture. The BSc HN is therefore continually looking for ways to improve them. An area that currently requires improvement is the timely completion of the research, timely write up and submission of reports.

To remedy that situation, the following were resolved by the BSc HN academic and technical staff:

Special projects will have a continuous progress evaluation, just like other courses. 40% of the final marks will be awarded towards the continuous progress performance. The following will be evaluated:

a. Pre-processes up-to proposal presentation
b. Monthly progress made, as evaluated by the supervisor and technician
c. Timely submission of the monthly reports
d. Timely submission of final report
e. A table will be provided for the purpose of evaluation monthly reporting and evaluation.

The continuous evaluation will be undertaken once a month. The students will fill in an evaluation form indicating the work done during the course of the month.

The monthly progress reports will be approved by both the project supervisor and the technician who supervised the laboratory/field work, and submitted to the Special projects coordinators.

Special project selection for field or laboratory research. Each student chooses a special project topic and in consultation with a supervisor, develops a proposal. The research is conducted during the field attachment term and part of year IV, and the write up during year IV. The proposal and preliminary results are presented orally during semester 1 year IV. The report is submitted in semester II of the final year.

i) Recommended reading list

1. Food Science and Technology, and Nutrition journals and text books relevant to the students' research topics
2. The Education Regulations, 2019, E0.2, REG 24 The Registrar's Handbook for School Administrators Saskatchewan Education - Special Project Credit Policy – 2018 Policy 12 – Role of the Director

5.7.4 FST3206 Food Product Development

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Concepts of a food 'product', 'new product', product innovation, product development & product life cycles. Technologies in product formulation, quality function deployment & research in product development.

c) Course objectives

The objective for this course are to equip students with basic/foundational knowledge on:

1. Processes and stages required to bring a new food product from conception to commercialization
2. Technical and scientific data in product development and manufacture
3. Production of prototypes that have a high probability for commercialization

d) Learning outcomes

At the end of this course, students should be able to:

1. Explain the processes and stages required to bring a new food product from conception to commercialization
2. Use technical and scientific data in product development and manufacture
3. Produce prototypes that have a high probability for commercialization

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	PH
1. Introduction	• History of food product development, market growth opportunities,	2	2
2. Introduction	• Integrative vs intensive market growth opportunities	2	2
3. The marketing mix	• Price decisions & Promotional tools	2	2
4. Developing, testing and launching new products	• Types of new products, product formulation and specification	2	2
5. Developing, testing and launching new products	• Stages in new product development, adoption of new products	2	2
6. Product life cycle	• Importance, stages, management of products through the life cycle	2	2
7. Marketing research and information systems	• Definition of research problem, data collection instruments	2	2
8. Marketing research and information systems	• Research approaches	2	2
9. Marketing research and information systems	Ssampling procedures	2	2
10. Product quality	• What does quality mean?, communication of product quality	2	2
11. Product quality	• Management of quality through time	2	2
12. Product quality	• Packaging and labelling	2	2
13. Product assessment	• Evaluation of quality, safety assessment & Shelf-life assessment,	2	2
14. Product assessment	• Regulation compliance & determine acceptable variance-control limits	2	2
15. Product assessment	• Regulation compliance & determine acceptable variance-control limits	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Interactive lectures covering theory	30 h
Laboratory -based practicals	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Lawless, HT and Heymann, H. (2010). Sensory Evaluation of foods: Principles and Practice, Springer
2. Fuller, G. W. (2005). New food product development: From concept to market place (2nd Ed.) Florida: CRC Press

5.7.5 FST3215 Postharvest Technology

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Postharvest systems in Uganda. Crops & susceptibility to losses. Post-harvest physiology, ripening & deterioration. Evaluation of maturity & quality. Harvesting & handling technologies. Technologies for management of harvests.

c) Course objectives

The objective for this course are to equip students with basic/foundational knowledge on:

1. Importance of postharvest technology and the status of postharvest systems in Uganda
2. Designing postharvest technologies/procedures for postharvest management of fresh produce

d) Learning outcomes

At the end of the course, students should be able to;

1. Describe importance of postharvest harvest technology & status of postharvest systems in Uganda
2. Apply the knowledge acquired to design technologies/procedures for reducing postharvest losses

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content, Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Importance of Postharvest Technology, Status of postharvest systems in Uganda	2	2
2. Introduction	• Susceptibility of crops to postharvest technology	2	2
3. Value of crops and their losses	• Physiology, ripening & deterioration of produce,	2	2
4. Value of crops and their losses	• Postharvest Food Pipeline: Stages of crop losses	2	2
5. Factors causing PH losses	• Pre-harvest & postharvest factors	2	2
6. Measurement and evaluation of maturity and quality of fresh produce	• Maturation and maturity indices	2	2
7. Measurement and evaluation of maturity and quality of fresh produce	• Technologies for harvesting fresh produce	2	2
8. Measurement and evaluation of maturity and quality of fresh produce	• Parameters used to describe quality of commodities, Standards for fresh produce	2	2
9. Measurement and evaluation of maturity and quality of fresh produce	• Parameters used to describe quality of commodities, Standards for fresh produce	2	2
10. Measurement and evaluation of maturity and quality of fresh produce	• Preparation of produce for market – packaging	2	2
11. Measurement and evaluation of maturity and quality of fresh produce	• Inspection of fresh produce	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
12. Technologies for management of perishables	• On-farm (Primary) technologies	2	2
13. Technologies for management of perishables	• Off –farm (Secondary) technologies	2	2
14. Storage of perishable & non-perishables	• Storage of fresh produce	2	2
15. Storage of perishable & non-perishables	• Storage of primary processed foods	2	2
	• Weeks 16-17; Revision and University Examination		

g) **Summary of time needed**

Lecture hours	30 h
Laboratory hours & field visits/trips	30 h

h) **Course assessment**

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Rees, D., Graham F., J. Orchard. 2012. Crop Post-Harvest: Sci. & Tech., Perishables. John Wiley & Sons
2. Valero, D., M. Serrano. 2010, Postharvest Biology and Technology for Preserving Fruit Quality, CRC Press

5.7.6 FST3217 Food Laws and Legislation

a) Course Type: Core, **Credit Units**: 3 CU, **Contact Hours**: 45 Hours (30 LH, 30PH), **Duration**: 15 weeks

a) Course Description

This course gives an introduction to food law and food legislation; Origins and historical perspective of food legislation; why food legislate; national regional and international food legislation perspectives; food legislation and trade. Food regulation covering all aspects of food production chain, safety, hygiene, labelling, packaging, marketing and also relates to special foodstuffs, including organic products, genetically modified organisms, novel foods, mandatory fortification of foods, food supplements. The course also gives an overview of roles of international agencies in the application of food laws (WHO, FAO, Codex, WTO). This course focuses on issues involved in the regulation of foods and food products on a national and global level. The course will also examine the enforcement of food laws and their application in the food industry.

b) Course Objectives

The objectives of the course are to:

1. To provide a general overview of food laws and legislation
2. To develop students' skills in key principles of food laws necessary to successfully work in the food industry
3. To provide a better understanding of the issues involved in the food legislation and regulation
4. To assist the student, navigate the data base providing information pertaining to food laws and legislation regulations.

c) Learning Outcomes

At the end of the course, students will be able to:

1. Discuss the historical perceptive and current food law and legislation issues
2. Discuss the major food law legislation and its importance to current regulations.
3. Identify and apply national and international food laws and legislation to address food safety issues

4. Explore the sources of international agency information, such as the WHO, FAO, CODEX, and WTO, available through the internet

d) Mode of delivery. A blended approach including on-line and physical lectures will be used to deliver the course. Field and laboratory practicals, case studies and presentations will be employed to enhance learning and analytical skills

e) Course Content

Topic	Content	Time allocated (hrs)	
		LH	**PH/TH**
1. Introduction	What is food law?, Description of food legislation, Key components of food legislation, Why legislate food	2	2
2. Origins of food legislation	Historical perspective of food legislation, Traces of food legislation in Bible, Qoran and other religious literature	2	2
3. Current Issues in Food Regulatory Affairs	Why food legislation, Major food regulatory issues of current concerns	2	2
4. Overview of roles of international agencies in the application of food laws	WHO, FAO, Codex Alimentarius, WTO, OIE, IPPC and the nature of their relationships,	2	2
5. Regional food law-regulatory agencies	Roles of agencies regulating food in the region and their relationships	2	2
6. National food law	The Food and Drug Act 1959 and other related laws, Agencies responsible for food regulation in Uganda	2	2
7. Food legislation and trade	The regulation of food and food products on a national and global level	2	2
8. Food regulation aspects along the production chain	Production and postharvest handling	2	2
9. Food regulation aspects along the production chain	Processing	2	2
10. Food regulation aspects along the production chain	Packaging and labelling	2	2
11. Food regulation aspects along the production chain	Storage, distribution and marketing	2	2
12. Food regulation for special foodstuffs	Organic products, genetically modified organisms, novel foods, mandatory fortification of foods, food supplements	2	2
13. Food regulation and food industry	Enforcement of food laws and their application in the food industry	2	2
14. Understanding the operations of food regulatory agencies	Field visit to Uganda National Bureau of Standards and Kampala Capital City	2	2
15. Course unit Test		2	2
16-17	Revision and University Exam		

f) Summary of Time Needed

Lectures	30 h
Tutorials and field visits	30 h

g) Course Assessment

Continuous assessment	60%
University exam	40%

h) Recommended Reading Material

1. Kirchsteiger-Meier, E & Baumgartner, T. 2014. Global Food Legislation: An Overview Wiley-VCH
2. Marc, S. 2015. Food Law and Regulation for Non-Lawyers: A US Perspective. Food science text series. Springer international Publishing
3. Neale, J.F., & Spivey, A. 2015. Food Safety Law (Litigation Series) Lslf Edition. Law Journal Press
4. Nicole Negowetti, Food Labeling Litigation: Exposing Gaps in the FDA's Resources and Regulatory Authority, Brookings Institution (July 2014).

5.8 Year 3 Field Attachment II

CORE COURSES

5.8.1 HMN3301 Dietetics Practice

a) **Course Type:** Core, **Credit Units:** 5 CU, **Contact Hours:** 75 Contact Hours (20 LH, 110 PH), **Duration:** 10 weeks

b) Course description

This course is designed to help interns gain hands-on skills on integration and application of the theoretical principles of dietetics to achieve and maintain health and manage diseases. The interns will apply knowledge obtained from the three courses on dietetics (HMN2206 Pathophysiology of Nutrition Disorders, and HMN3109 Meal and Diet Planning and HMN3112 Clinical Management of Nutrition Disorders) in designing diets for different populations and conditions. The interns will have to clock a minimum of 110 practical hours during a 10 weeks' period. Interns will be attached to different institutions including hospitals, schools, prisons, police facilities, NGOs. In the hospitals, the interns will be expected to design diets for individuals suffering from different conditions like diabetes, heart diseases, and cancers etc. Interns attached to other institutions like schools, police etc will be expected to gain practical experience in designing diets for health populations of different age groups. In NGOs and government departments, the interns will practically get involved in management of nutrition for emergency situations. Where applicable interns will be required to rotate in different units of these facilities. Students may also develop meal plans, establish nutrition units and give nutrition training in their internship places. The intern will be assessed by academic & field supervisors.

c) Course objectives

The objective for this course are to equip students with knowledge on:

1. Principles of nutrition in developing diets for healthy or sick individuals
2. Effective communication & use various communication tools to deliver nutrition information, products & services
3. Modeling professional skills and behaviors, including social responsibility, ethical practice, a commitment to lifelong learning, and ability to work collaboratively with others.
4. Problem-solving and critical thinking to make meaningful decisions regarding nutrition and diet planning.
5. Principles of management & systems in provision of nutrition services to individuals & organizations.
6. Beliefs, values, attitudes and behaviors for the professional dietitian level of practice

d) Learning outcomes

At the end of the clinical nutrition practice attachment students should be able to:

1. Apply principles of nutrition in developing diets for healthy or sick individuals
2. Communicate effectively & use various communication tools to deliver nutrition information, products & services
3. Model professional skills and behaviors, including social responsibility, ethical practice, a commitment to lifelong learning, and ability to work collaboratively with others.
4. Apply problem-solving and critical thinking skills to make meaningful decisions regarding nutrition & diet planning
5. Apply principles of management & systems in provision of nutrition services to individuals & organizations.
6. Develop beliefs, values, attitudes and behaviors for the professional dietitian level of practice.

e) Phases involved:

Pre-planning phase, Placement of the student interns, Field supervision, Sharing of experiences, evaluation and reporting

f) Course Content and Methods of Instruction

Topic/Activities	Content/Sub activities	Time allocated (h)	
		LH	PH
1. Introduction	• Overview of general information internship • Introduction on the process of attachment: identification of placement facilities and application process	4	-
2. Introduction	• Expectation from & of students	2	
3. Fundamentals	• Fundamentals of clinical, dietetics practice, public health and epidemiology practice taught for 1 week.	4	
4. Fundamentals	• Fundamentals of clinical, dietetics practice, public health and epidemiology practice taught for 1 week. • Students will then attached to health facilities, school, prison, food industry and communities in order to get practical exposure	4	
5. Student placement	• Sourcing for appropriate facilities for attachment • Application by students attachments • Compiling placement facilities	-	-
6. Internship activities	• Orientation • **Hospital attachment** o NCD patients (diabetes, heart diseases, cancers etc.) • **Other institutions** o Schools, NGOs, Government departments, Prisons, etc o Students will record activities during internship in logbooks which will include: o Purpose, lessons and skills learnt o How relevant were the activities to your professional growth	-	110
7. Supervision	• Students will supervised by both field and academic supervisors • Field supervisor will assign activities and monitor performance • Sign logbook to certify weekly performance • Will give report at the end of the internship period • Academic supervisor will visit the student during internship & at the end of it & write reports for both visits	-	-
8. Sharing of Experiences, Evaluation and Reporting	• At the end, the student and supervisors will interact • Share experiences & evaluate the students' performance • End the internship officially • Submission of a final report and logbook by the student	4	-

g) Summary of time needed

Lectures	20 h
Practice	110 h

h) Course assessment

Written comprehensive report	70%

Evaluation by field supervisor	5%
Evaluation by academic supervisor (in the field)	5%
Duly filled student logbook	20%

i) Recommended reading materials

1. Webster-Gandy, J., Madden, A., & Holdsworth, M. (2012). Oxford handbook of nutrition and dietetics. Oxford: Oxford University Press.
2. Holli, B. B., & Beto, J. A. (2014). Nutrition counseling and education skills for dietetics professionals. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.
3. Garrow, J. S., Garrow, J. S., & James, W. P. T. (2007). Human Nutrition and Dietetics. New York.

5.9 Year 4 Semester 1 Course Units

CORE COURSES

5.9.1 HMN4101 Nutrition Leadership and Management

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Contact Hours (30 LH, 30 PH), **Duration:** 15 weeks

b) Course description

Leadership skills, styles and ethics related to leadership and professional practice.

c) Course objectives

The objective for this course are to equip students with knowledge on:

1. Types of leadership styles, functions, competencies and qualities of effective leaders.
2. Situational and behavioural approaches to leadership and management
3. Concepts of ethics and integrity in the delivery of nutrition and dietetics services
4. Constitutional & legal provisions that ground ethics and integrity requirements, institutions and processes
5. Human conduct using indigenous and contemporary ethical framework

d) Leaning outcomes

At the end of this course, the student should be able to:

1. Explain the types of leadership styles, functions & competencies and qualities of effective leaders.
2. Apply the situational and behavioral approaches to leadership and management
3. Integrate the concepts of ethics and integrity in the delivery of nutrition and dietetics services
4. Apply constitutional and legal provisions that ground ethics and integrity requirements, institutions and processes,
5. Evaluate human conduct using indigenous and contemporary ethical framework

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content, Methods of Instruction, Tools and Equipment Required

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• What is leadership, management (definitions), Leadership and management theory and practice), Management and leadership styles	2	2
2. Introduction	• Quality Management and quality improvement	2	2
3. Types of leadership	• Philosophy and ethics related to leadership and professional practice; leadership traits; effective leadership	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
4. Competencies & qualities of effective leaders	• Functions of a leader; behavioral, and situational approaches to leadership	2	2
5. Professional competencies needed for career entry & advancement	• An overview of appropriate means of delivery of Ethics, Integrity and Professional Practice, Professional services for a variety of needs; professional behaviour:	2	2
6. Ethics and Integrity	• Theories and Concepts in ethics, integrity and professionalism, making.	2	2
7. Ethics and Integrity	• Constitutional and legal provisions on ethics and integrity,	2	2
8. Ethics and Integrity	• Values that promote; integrity, Ethics and integrity in Africa and contemporary contexts	2	2
9. Ethics, academic integrity and professional practice	• Successful professionals: qualities and characteristics.	2	2
10. Organizational structure and behaviour	• Principles of industrial relations, theories of planning, (operational & strategic planning),	2	2
11. Principles of human resource and programs management	• General Principles of Management, functions of management (Planning, Organising, Staffing, Directing and Controlling)	2	2
12. Nutrition units in government	• Why nutrition officers need management training, nutrition units in health sectors, existing roles of nutrition units,	2	2
13. Nutrition units in government	• Nutrition officers and their responsibilities, Nutrition units in government sectors in Uganda	2	2
14. Nutrition policy coordination in Uganda	• Nutrition Coordination structures, Roles and Responsibilities of Nutrition, Coordination Committees,	2	2
15. Nutrition policy coordination in Uganda	• Roles of and linkages between nutrition • Coordination, technical planning committees, & councils, nutrition coordination committee monitoring & reporting	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practicals, Tutorials, Discussions, Self-study	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading materials

1. Hough, D. (2013). Corruption, anti-corruption and governance. New york, NY: Palgrave Macmillan.
2. Management Theory and Practice Houston, S. & Bove, L. A. (2010). Project Management for Healthcare Informatics (Health Informatics), New York, Springer.
3. Kathleen M. L., Shirley E.M. (2009). Health Information Management: Concepts, Principles, and Practice, Third Edition. Ahima Publishers. ISBN 10: 1584262176

5.9.2 HMN4102 Planning, Monitoring and Evaluation of Nutrition Programmes

a) **Course Type**: Core, Credit Units: 3 CU, **Contact Hours:** 45 Contact Hours (30 LH, 30 PH), **Duration:** 15 weeks

b) Course description

Concepts in planning, monitoring & evaluation of nutrition projects. Terms used in monitoring and evaluation. Students will have an overview of the whole process of monitoring and evaluation which will enable them (students) design M and E plans

c) Course objectives

The objective for this course are to equip students with knowledge on:

1. Planning phases of projects and designing the planning tools such as log frame, work plan, activity plans, Gantt Charts etc
2. Writing fundable proposals for nutrition programs & implement them
3. Designing monitoring and evaluation systems & report findings

d) Learning outcomes

At the end of this course unit, students should be able to:

1. Describe planning phases of projects & design planning tools such as log frame, work plan, activity plans, Gantt Charts etc
2. Write fundable proposals for nutrition programs & implement them
3. Design M & E systems & report findings

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	PH
1. Introduction	• Planning cycles/phases, purpose		
2. Problem identification	• Use of PRAs, SWOT approach to planning	2	2
3. Designing programme interventions	• Appraisal, discounting & non-discounting,	2	2
4. Designing programme interventions	• Payback period, Cash flow statements,	2	2
5. Designing programme interventions	• NPV, CBR, IRR, budgeting, scaling up & down	2	2
6. Designing programme interventions	• Design nutrition programs: setting goal, objectives, activities, outputs	2	2
7. Designing programme interventions	• Design nutrition programs: setting goal, objectives, activities, outputs	2	2
8. Designing programme interventions	• Review of various planning tools including Log frames, work plans	2	2
9. Resource mobilisation	• Types of resources, writing a fundable proposal	2	2
10. Resource mobilisation	• Types of resources, writing a fundable proposal	2	2
11. Project implementation & management	• Scheduling, use of Work Break Down structures, Critical path techniques	2	2
12. Project implementation & management	• Manage nutrition projects: designing management structures & functions	2	2
13. Monitoring & evaluation	• Planning: sources of information, stakeholders & their roles	2	2
14. Monitoring & evaluation	• Design M & E, tools, indicators	2	2
15. Monitoring & evaluation	• Data collection, analysis, interpretation	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h

Practicals, Tutorials, Discussions, Self-study	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading materials

1. Meredith, Jack R, Samuel J, (2002) Project management, a managerial approach 5th ed., Mantel India.
2. Umar J. Nsereko (2000). Project Planning & Management Quality Information Center, Kampala, Uganda.

5.9.3 HMN4103 Nutrition and Dietetics Seminars

a) **Course Type**: Core, **Credit Units:** 2 CU, **Contact Hours:** 30 Hours (20 LH, 20 PH), **Duration:** 15 weeks

b) **Course description**

This is an interactive course that deals with emerging issues in nutrition and dietetics from a practice point of view. It also focuses on scientific data dissemination and use.

c) Course objectives

The objective for this course are to equip students with knowledge on:

1. Current issues, policies, and guidelines in nutrition and dietetics
2. Best practices for designing, developing, and presenting a quality scientific presentation
3. Critiquing other students' work, writing and publishing a scientific paper

d) **Learning outcomes**

At the end of the course students should be able to:

1. Articulate current issues, policies, and guidelines in nutrition
2. Examine best practices for designing, developing, and presenting a quality scientific presentation
3. Critique other students' work, write a scientific report and publish a scientific paper

e) Mode of delivery

A blended & interactive approach including guest lectures from nutrition and dietetics' experts, lectures, group work, case studies, tutorials, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	TH
1. Presentation of nutrition and dietetics data	• PowerPoint, policy briefs, abstracts, etc	1	1
2. Presentation of nutrition and dietetics data	• Presentation guides & making a good poster	1	1
3. Writing, publishing and reviewing literature	• Guidelines on report and scientific paper writing & publication	1	1
4. Writing, publishing and reviewing literature	• Guidelines for review of scientific literature	1	1
5. Nutrition in transition	• Overview of current issues in nutrition	1	1
6. Nutrition in transition	• Discussion paper on nutrition in transition	2	2
7. Emerging policies, guidelines & standards	• Nutrition-related policies and guidelines in Uganda	2	2
8. Emerging policies, guidelines & standards	• Research & policies on nutrition in Uganda	2	2

Topic by week	Content	Time allocation (h)	
		LH	TH
9. Current procedures and advances in managing different nutrition related conditions	• Obesity and nutritional management	2	2
10. Current procedures and advances in managing different nutrition related conditions	• Nutrition and mental health	1	1
11. Current procedures and advances in managing different nutrition related conditions	• Nutrition and mental health	1	1
12. Current procedures and advances in managing different nutrition related conditions	• Nutrition and hepatic health	1	1
13. Current procedures and advances in managing different nutrition related conditions	• Nutrition and CVDs	1	1
14. Current procedures and advances in managing different nutrition related conditions	• Nutrition regulation of epigenetics	2	2
15. Current procedures and advances in managing different nutrition related conditions	• Nutrition and the Microbiome	1	1
	• Weeks 16-17; Revision and University Exam		

g) Summary of time needed

Lectures	20 h
Practical hours/Self-study and presentations	20 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Helen Sword, 2012. Stylish Academic Writing. 1st Edition. Harvard University Press, USA
2. Tufte E. R, 2001. The visual display of quantitative information. 2nd Ed. Graphic Press, USA.

5.9.4 HMN4104 Functional Foods, Nutraceuticals and Nutrigenomics

a) Course Type: Core, **Credit Units:** 4 CU, **Contact Hours:** 60 Hours (45 LH, 15PH, 15TH), **Duration:** 15 weeks

b) Course description

Concepts of Functional Foods, Nutraceuticals and Nutrigenomics. Classes of functional foods, types of nutraceuticals and their sources, functionality, mechanism of action, pharmacological effects & applications in the food industry. Concept of Nutrigenomics with emphasis on the relationship between food & food constituents or nutrients, diet & gene expression & how genetic variations affect the nutritional environment. Historical perspectives, legislation, production, marketing & recent advances

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Concepts of Nutrigenomics–Nutrition, Genetics & Epigenetics; epigenetic mechanisms and how food and food constituents or nutrients influence them
2. Role of food and food constituents or nutrients and diet on immune system with emphasis on food allergies and food intolerances, prevention and management
3. Technologies for processing functional foods and nutraceuticals

d) Learning Outcomes

At the end of this course, students should be able to:

1. Explain concepts of Nutrigenomics with emphasis on nutrition, genetics, epigenetics & epigenetic mechanisms and how food and food constituents or nutrients influence them
2. Explain role of food and food constituents or nutrients and diet on immune system, individual variation responses with emphasis on food allergies and food intolerances, prevention and management
3. Formulate, process and test the efficacy of functional foods and nutraceuticals

e) Mode of delivery

A blended & interactive approach including lectures, case studies, laboratory practicals and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	PH/TH
1. Introduction	• History of Functional Foods and Nutraceuticals. • Laws and legislation (national, regional and international)	2	2
2. Introduction	• Market trends, consumer demands, rights and advertising. • Assessment of functional foods, clinical trials etc	2	2
3. Bio-active compounds in different classes of functional foods	• Health benefits, target sites, mechanism of action and role in promoting health & disease prevention: emphasis on common chronic diseases	3	2
4. Bio-active compounds in different classes of functional foods	• Health benefits, target sites, mechanism of action and role in promoting health & disease prevention: emphasis on common chronic diseases	4	2
5. Bio-active compounds	• Classes of foods: (i) fruits & vegetables, (ii) nuts, seeds, legumes & cereals	2	2
6. Bio-active compounds	• Classes of foods: (iii) herbs & spices, (iv) animal products,	2	2
7. Bio-active compounds	• Classes of foods: (v) coffee and tea, (vi) fermented foods	2	2
8. Bio-active compounds	• Classes of foods: (vii) probiotics and prebiotics, (viii) performance foods and mood enhancers, (ix) modified functional foods.	4	2
9. Nutrigenomics (nutritional genomics)	• Emphasis on relationship between food & food constituents or nutrients, diet, & gene expression & how genetic variations affect nutritional environment: emphasis on epigenetics & their mechanisms	4	2
10. Nutrigenomics (nutritional genomics)	• Targets of food & its constituents & diet on gene expression & hence prevent/promote disease with emphasis on DNA especially on CpG islands, histone core proteins (Histones H2A, H2B, H3, & H4 -core histones & histones H1 & H5-linker histones), RNA especially microRNAs, transcription factors, metabolites	4	2

Topic by week	Content	Time allocation (h)	
		LH	PH/TH
11. Nutrigenomics (nutritional genomics)	• Role on common diseases: (1) cell cycle, its regulation and cancer (2) Endocrine disrupters,	4	2
12. Nutrigenomics (nutritional genomics)	• Role on common diseases: Obesity & Diabetes Mellitus (3) CVDs, (4) Mental Illnesses	4	2
13. Nutrigenomics (nutritional genomics)	• Role on common diseases: (5) alcohol, substance abuse & addiction (6) Epilepsy & neurodegenerative diseases, neurotoxicity & aging (7)	4	2
14. Food & its constituents or & diet on immunity	• Role leading to, individual variation in responses to certain foods or diet with emphasis on food allergies & intolerances, prevention & treatment	2	2
15. Food & its constituents or & diet on immunity	• Role leading to, individual variation in responses to certain foods or diet with emphasis on food allergies & intolerances, prevention & treatment	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	45 h
Practicals & seminars	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Spagnuolo PA (2020). Nutraceuticals & Human Health: The food-to-supplement Paradigm. Royal Society of Chemistry
2. Carlberg C, Ulven SM & Molnár F (2020). Nutrigenomics: How Science Works. Springer Nature.
3. Egbuna C & Tupas GD (2020). Functional Foods and Nutraceuticals: Bioactive Components, Formulations and Innovations. Springer Nature.

5.9.5 SPS3106 Nutrition for Sports and Health

a) **Course Type**: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (45 LH), **Duration:** 15 weeks

b) Course description

Nutrition for athletes and non-athletes focusing on strategies for improving performance and health. Students will use scientific findings in the designing and recommendation of nutritional interventions to clients.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Principles of nutrition, dietary standards, fluid intake and energy balance in relation to physical activity and health
2. Relationship between diet, rest , sleep and performance
3. Dietary practices, athlete status, nutritional interventions and their effects on performance

d) Learning outcomes

At the end of this course, students should be able to:

1. Apply principles of nutrition, dietary standards, fluid intake & energy balance to physical activity & health
2. Describe the relationship between diet, rest , sleep and performance
3. Analyze dietary practices & athlete status, nutritional interventions and their effects on performance

e) Mode of delivery

A blended & interactive approach including lectures, case studies, practical sessions and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)
1. Introduction	• Concepts, nutrient RDAs, role of nutrition, food as medicine	2
2. Nutrients & dietary standards	• Micro- & macro nutrients, fibre	4
3. Nutrients & dietary standards	• Water, balanced diet etc	2
4. Relationship between nutrition demands & exercise	• Caloric & fluid needs; optimal nutrition for health	4
5. Relationship between nutrition demands & exercise	• Exercise, recreation & sports for various populations and age groups	4
6. Health peoples philosophy	• Health peoples philosophy and its implication on health	2
7. Weight control	• Eating disorders	2
8. Weight control	• Behavioral change in weight management	2
9. Design meal plans for sportsmen	• Review of case studies on nutritional interventions for maximum performance	4
10. Design meal plans for non-sportsmen	• Review of case studies on nutritional interventions for maximum performance	2
11. Diet for effective performance	• Dietary supplements, nutritional quackery ergogenic aids	4
12. Food and high-level performance	• Various foods and their effect on performance	4
13. Food and high-level performance	• Interplay of diet, rest, sleep in energy recovery & performance	4
14. Nutrients and performance	• Nutritional deficiencies and effects on performance	3
15. Nutrients and performance	• Nutritional deficiencies and effects on performance	2
	• Weeks 16-17; Revision and University Examination	

g) Summary of Time Needed

Lectures	45 h

h) Course Assessment

Continuous assessment	60%
University examination	40%

i) Recommended Reading List

1. Slomin, J., 2020. Sports nutrition for young adults: A game-winning guide to maximize performance, MS RDN
2. Williams, M. Rawson, E. & Branch D. (2020) Nutrition for Health, Fitness and Sport. 12th Ed. Amazon Ebook

ELECTIVE COURSES (TO SELECT ONE)

5.9.6 KSW1101 Basic Kiswahili Communication Skills

a) Course Type: Elective**, Credit Units:** 4 CU, **Contact Hours:** 60 Hours (60 Lecture Hours), **Duration:** 15 weeks

b) Course description

Kiswahili alphabet: calendar: time; counting; greetings; asking for/about something/someone; introducing/describing oneself/others; verbs & description of actions; simple conversations & narrations.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Identifying, pronouncing/reading & writing Kiswahili sounds, words, expressions in appropriately
2. Expressing different quantities/numbers, dates, time in different situations as may be applicable.
3. Describing oneself, other people, things, actions, & sustaining simple conversations and narration

d) Learning outcomes

At the end of this course the students should be able to:

1. Identify, pronounce/read and write Kiswahili sounds, words, expressions appropriately
2. Expressing different quantities/numbers, dates, time in different situations as may be applicable.
3. Describe oneself, other people, things, actions, & sustaining simple conversations and narrations.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)
1. Introduction	• The alphabet, dates: day, month, year	4
2. Introduction	• Time, counting etc	4
3. Greetings	• Formal & informal greetings, expressing respect; titles	4
4. Introducing oneself	• Name, age, nationality etc	4
5. Introducing oneself	• Work, descriptions	4
6. Politeness & Hospitality	• Entering a house, office and/or, welcoming a visitor, etc	4
7. Politeness & Hospitality	• Offering/ requesting for s/thing, bidding etc	4
8. The Verb I	• Is /isn't; are/ aren't i.e. *ni/si,*	4
9. The Verb I	• To have/not to have: *Nina/sina*	4
10. The Verb II	• What are you doing? When? Where?	4
11. The Verb II	• What did you do? When? Where?	4
12. General Practice	• Simple conversations	4
13. General Practice	• Simple conversations	4
14. General Practice	• Describing things, situations, etc	4
15. General Practice	• Describing things, situations, etc	4
	• Weeks 16-17; Revision and University Examination	

g) Summary of time needed

Interactive Lectures	58 h
Evaluation	2 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Rwabushaija, M. (1999). *Masomo ya Msingi wa Kiswahili* (Book 1). Fountain Publishers. Kampala.
2. Hinnesbusch, T. (1979). KISWAHILI: *Msingi wa Kusema, Kusoma,na Kuandika*. University Press of America, USA

5.9.7 FST4114 Fruits & Vegetable Processing Technology

a) Course Type: Elective, **Credit Units: 3 CU, Contact Hours: 45 Hours (30 LH, 30PH), Duration:** 15 weeks

b) Course description

This covers the biological, chemical and physical properties of fruits and vegetables and their contribution to diet and nutrition; and the application of preservation principles and technologies in the processing, preservation and value addition to fruits and vegetables in terms of safety, nutritional and dietary quality, wholesomeness and economic value; and value addition to fruit and vegetable wastes.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Biological, chemical & physical properties of fruits & vegetables & their influence on processing & preservation
2. Basic postharvest biological, chemical, physiological and metabolic processes and changes in fruits and vegetables and how these can be controlled to prevent or reduce deterioration n fruits and vegetables
3. Application and operation of selected technologies to process, preserve & add value to fruits & vegetables
4. Processing of fruits and vegetables into various shelf stable products

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain biological, chemical & physical properties of fruits & vegetables & their influence on processing & preservation
2. Describe basic postharvest biological, chemical, physiological and metabolic processes and changes in fruits and vegetables and how they can be controlled to prevent or reduce deterioration in fruits and vegetables
3. Apply selected technologies used to process, preserve & add value to fruits & vegetables
4. Process fruits and vegetables into various shelf stable products

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Fruits and vegetables in human diet and nutrition	• Definition and characterization of fruits and vegetables, structures and composition.	2	2
2. Fruits and vegetables in human diet and nutrition	• Nutritional, dietary & health benefits of fruit & vegetable consumption	2	2
3. Fruits and vegetables in human diet and nutrition	• Current status & challenges of fruit and vegetable production, processing, marketing and consumption in Uganda.	2	2

4. Causes of deterioration in fruits and vegetables	• Biochemistry of fruit ripening, post-harvest physiology and metabolic activity: respiration, ethylene production, senescence and the biochemical and textural changes.	2	2
5. Causes of deterioration in fruits and vegetables	• Definition of Climacteric and Non-Climacteric fruits. Factors causing/promoting post-harvest changes and deterioration in fruits and vegetables	2	2
6. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Objectives of fruit and vegetable processing and preservation, diversity of technologies and processes and fruit and vegetable products and technology and product choices	2	2
7. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Techniques and principles for extension of shelf life of unmodified produce: use of adjuncts, novel packaging, controlled & modified atmosphere storage	2	2
8. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Processing for conversion into products and preservation by chemicals, chilling & freezing	2	2
9. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Processing for conversion into products and preservation by sterilization & canning	2	2
10. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Processing for conversion into products and preservation by concentration & dehydration and other special techniques	2	2
11. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Fruit-based drink products: juices, pulps, concentrates, powders, squashes & cordials, nectars	2	2
12. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Fruit based fermented products: Cider, wine, brandy, vinegar	2	2
13. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Preserves: -Jam, Jelly & Marmalades; candied fruits, dried fruits & fruit products; soup mixes; sauces, ketchups; puree, pastes; chutneys & pickles	2	2
14. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Speciality products: Spices, condiments, spice oils oleoresins, flavours & specialty fruit & vegetable (herbal) extract products	2	2
15. Technology and principles of processing, preservation value addition and extension of shelf life in fruits and vegetables	• Waste based speciality & value-added products: Extraction of pectins & nutritional fibres from fruit rinds, enzymes, colours	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lecture hours	30 h
Pilot Plant based practicals	22 h
Field/Market/Industrial learning visits	8 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Rachna S, Khursheed AK, et al (Editors), 2021. Technological Interventions in the Processing of Fruits and Vegetables. Apple Academic Press, Florida
2. Urszula T, Silvia T, et al (Editors), 2020, Safety, Quality and Processing of Fruits and Vegetables, Multidisciplinary Digital Publishing Institute (Mdpi AG), Basel Switzerland.
3. Khursheed AK, Megh R et al (Editors), 2019. Processing of Fruits and Vegetables: From Farm to Fork. Apple Academic Press, Florida

5.10 Year 4 Semester 2 Course Units

CORE COURSES

5.10.1 HMN4201 Nutrition Education

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30TH), **Duration:** 15 weeks

b) Course description

Nutrition education basics, definition, history, aims and challenges. Nutrition education definition, rationale, impact, role of health educator and nutrition services, and nutritional population problems. Nutrition Education programs in Uganda will be explored. Specific educational needs of patients' population with specific health conditions will be emphasized. Nutrition education methods, approaches in nutrition counselling & nutrition education challenges.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Role of nutrition education in health and nutrition promotion and disease prevention
2. Principles and practices of adult learning
3. Felt and unfelt nutritional needs using participatory methods
4. Designing and presenting a nutrition education campaign to identify and solve nutritional problems.

d) Learning outcomes

After completing the course, the students should be able to:

1. Explain the role of nutrition education in health and nutrition promotion and disease prevention
2. Apply the principles and practices of adult learning
3. Apply felt and unfelt nutritional needs using participatory methods
4. Design and present a nutrition education campaign to identify and solve nutritional problems.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocate (h)	
		LH	TH
1. Introduction	• Basic definitions in nutrition education, Principles of education as applied to the field of nutrition	2	2
2. Introduction	• The need for nutrition education and factors affecting the provision of effective nutrition education and counselling.	2	2
3. Theories and models of human behavioral change and health choices	• Social Behavioral Change Communication, Health Belief Model	2	2
4. Theories and models of human behavioral change and health choices	• Stages of change/transtheoretical model, Social ecological Model	2	2
5. Theories and models of human behavioral change and health choices	• Social learning/cognitive theory, Theory of planned behaviour, The COM-B Model, Tools and methods of achieving behavior change	2	2
6. Teaching methods and skills	• Communication skills & Organization methods, Appropriateness of information for target audience, Use of professional jargon, and effectiveness of audio visual and other teaching aids	2	2
7. Nutrition extension	• Planning & evaluation, adoption, diffusion of innovations for individual, group, mass approaches and, community participation (cultural barriers)	2	2
8. Public health nutrition and fundaments of health promotion	• Definitions and perspectives of health, Variables influencing health beliefs and practices, Functions of public health and clinical nutrition	2	2
9. Public health nutrition & fundaments of health promotion	• Health promotion models and strategies, Health promotion case studies	2	2
10. Training needs assessment	• What is a training needs assessment?, Steps in conducting community training needs assessment	2	2
11. Developing training objectives, teaching materials, & a plan	• Goals and objectives of training, Characteristics of good objectives, Teaching & lesson plans, & components of a teaching plan, Planning training materials	2	2
12. Implementing teaching/learning events	• Principles of adult learning, Stages of a teaching process, Implementation of learning events	2	2
13. Monitoring & evaluation of nutrition education programmes	• Monitoring, evaluation, and learning processes • Steps in monitoring and evaluation of learning	2	2
14. Advocacy and lobbying for nutrition	• Goals and targets for nutrition advocacy, Steps for successful nutrition advocacy	2	2
15. Advocacy and lobbying for nutrition	• Tools for nutrition advocacy	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%

University examination	40%

i) Recommended reading list

1. Contento IR, 2020. Nutrition Education: Linking Research, Theory and Practice. 4th Edition. Jones and Bartlett.
2. Adler RB, Rodman G, Sévigny, 2011. A. Understanding Human Communication Second Canadian Ed. Don Mills, ON: Oxford University Press;
3. Holli BB, Maillet JO, Beto JA, Calabrese RJ. Communication and Education Skills for Dietetics Professionals (5th Ed). Baltimore, MD: Lippincott Williams & Wilkins; 2009.

5.10.2 HMN4202 Food Service Systems Management

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

The course provides core understanding of the different systems approach to foodservice, menu planning, procurement, production, service, delivery, sanitation and food safety in foodservice operation.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Economical menu planning for different consumer groups
2. Occupational safety and food procurement processes
3. Management techniques to monitor, control and evaluate quality in foodservice.
4. Utilization of human resources management techniques to operate a foodservice.
5. How to plan & monitor the safety, sanitation, and maintenance elements for the foodservice system.
6. Techniques to control costs and to make sound financial decisions in foodservice systems.

d) Learning outcomes

At the end of the course, students should be able to:

1. Economically do menu planning for different consumer groups
2. Apply occupational safety and food procurement processes
3. Apply management techniques to monitor, control and evaluate quality in foodservice.
4. Utilize human resources management techniques to operate a foodservice.
5. Plan & monitor the safety, sanitation, and maintenance elements for the foodservice system.
6. Control costs and to make sound financial decisions in foodservice systems

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Overview of the food industry, Understanding foodservice systems, Types of food service operations	2	2
2. Meal planning and Menu analysis	• Meal planning and its components • Menu development ○ Types, menu planning, menu analysis, layout & designs	2	2
3. Food service management	• Management process (skills and roles in food service) • Components of foodservice management • Organizational structure	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
4. Food service management	• Staffing and scheduling • Internal controls (security, theft, cash control, key and lock control, guest control)	2	2
5. Financial systems in food service	• Budgets - Pros and cons, preparation & break even computations • Description of financial statements	2	2
6. Financial systems in food service	• Analyzing financial statements - sales and expenses	2	2
7. Food Purchasing/ Procurement	• Ordering, purchasing, receiving, storage, inventory control	2	2
8. Food Purchasing/ Procurement	• Food cost accounting; Food cost account function, Cost of food and food cost percentage	2	2
9. Food Purchasing/ Procurement	• Standard food cost and application	2	2
10. Food marketing and service	• Customer considerations, Environmental and social factors, Economic and political factors	2	2
11. Food marketing and service	• Marketing plan, Service and customer relations, Service encounter, Food service view point vs. customer view point	2	2
12. Human resource	• Job analysis and description, Civil rights and laws, Recruiting, interviewing and selection	2	2
13. Human resource	• Employee training and development (orientation and ethics in foodservice), Performance indicators	2	2
14. Human resource	• Work motivation, Occupational hazards and employee safety	2	2
15. Sanitation in foodservice	• Food safety and risks, sanitation practices, quality assurance	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. King, H. 2020. Food Safety Management Systems. Springer Nature Switzerland AG.
2. Payne-Palacio, J., & Theis, M. 2015. Foodservice management. Pearson Education UK.
3. Gregoire, Mary B., & C. Spears. 2013. Foodservice organizations: A managerial and systems approach. Boston, MA: Pearson.

5.10.3 HMN4203 Anthropology of Food and Nutrition

a) **Course Type:** Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Contact Hours (30 LH, 30 PH), **Duration:** 15 weeks

b) Course description

This course will focus on the evolution of the hominin diet, and the ecological and cultural factors shaping modern diets.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Role of food & nutrition in human adaptation, diets & cultural perspectives of food from a biological and nutritional perspective
2. Relationships between cultural pressures, cultural environments, natural environments, health nutrition, disease, and hunger.
3. Nutritional anthropologic research by analysing our own diets, food perceptions, and environmental biases.

d) Learning outcomes

At the end of the course, the students should be able to:

1. Explain role of food & nutrition in human adaptation & diets & cultural perspectives from a biological & nutritional perspective
2. Explain relationships of cultural pressures, cultural environments, natural environments, health, nutrition, disease, & hunger
3. Engage in nutritional anthropologic research by analysing diets, food perceptions, and environmental biases.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Bio cultural perspectives in Nutritional anthropology	2	2
2. Ecological models of food and nutrition	• Physical & social economic environment, social, organisation, ideology & technology	2	2
3. Ecological models of food and nutrition	• Nutritional anthropology as a systems model	2	2
4. Biocultural framework for study of diet & nutrition	• Biological makeup & nutrient needs, physical, sociocultural, economic & political environments	2	2
5. Process of adaptation	• Genetic, physiological, sociocultural adaptation	2	2
6. Food systems in nutritional anthropology	• Food production, processing, distribution, marketing	2	2
7. Food systems in nutritional anthropology	• Hunting/gathering food systems, pastoralism, etc	2	2
8. Food and culture	• Determinants of food intake, culture, characteristics of culture	2	2
9. Socialization	• Acquisition of food habits, influences, social functions of food	2	2
10. Food habits/ choices	• Advertising & food habits, choices & theories, factors responsible	2	2
11. Food categorization	• Ancient & modern categories, limitations, consumer classification	2	2
12. Cuisine	• Foods chosen, preparation, flavours, meal behaviour	2	2
13. Cuisine	• Meal plans	2	2
14. Methodological directions	• Ethography, strategies of field research in nutritional anthropology	2	2
15. Methodological directions	• Ethography, strategies of field research in nutritional anthropology	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practicals, Tutorials, Discussions, Self-study	

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading materials

1. Goodman, AH, Dufour, DL, and Pelto, GH (2000) Nutritional Anthropology. Biocultural Perspectives on Food & Nutrition. Mountainview, California: Mayfield Publishing Company

5.10.4 FST4207 Food and Nutrition Security

a) Course Type: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

International, regional, national food and nutrition situation; population characteristics and food supply; food & nutrition security vulnerability mapping; attributes of food and nutrition security; food aid procurement, distribution, organization, and transport mechanisms & constraints; effects of epidemics and social distress; food aid intervention approaches and goals; sustainable food and nutrition policies in urban & rural areas; coping strategies to food and nutrition insecurity; poverty, hunger, and famines; market failures and food & nutrition policies; structural adjustment programs and food and nutrition security planning; food and nutrition security programming and food demand projections; and, nutrition and human rights – the human right to adequate food. Relate food security to food systems in local contexts.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Food security and nutritional problems in the developing countries
2. Factors that contribute to food and nutritional insecurity at different levels
3. Intervention programmes in place to deal with the problem of food and nutrition insecurity
4. Food systems and it is elements
5. Concept of local food system resilience in light of the disruptions brought to those systems pandemics.
6. Adverse impacts of pandemics on local food systems' actors & expected direct effects on their food security

d) Learning outcomes

At the end of this course, the student should be able to:

1. Explain food security and nutritional problems in the developing countries
2. Explain factors that contribute to food and nutritional insecurity at different levels
3. Identify intervention programmes in place to deal with the problem of food and nutrition insecurity
4. Describe food systems and it is elements
5. Explain concept of local food system resilience in light of disruptions brought to those systems pandemics
6. Explain adverse impacts of pandemics on local food systems' actors & expected direct effects on food security

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	PH
1. Introduction	• Dimensions of food and nutrition security • Conceptual framework of food & nutrition security	2	2
2. Introduction	• Poverty, hunger and famine	2	2

Topic by week	Content	Time allocation (h)	
		LH	PH
3. Types and causes of food and nutrition insecurity	• Attributes of food security • Conditions for achieving food and nutrition security • Entitlements	2	2
4. Types and causes of food and nutrition insecurity	• Groups vulnerable to food insecurity • Interventions to food insecurity	2	2
5. The socio-organizational aspects	• Levels of food and nutrition security • Assessment & interventions in food & nutrition Security	2	2
6. The socio-organizational aspects	• Coping mechanisms and strategies	2	2
7. The socio-organizational aspects	• Food security interventions at household, community and national levels	2	2
8. Over view of human rights and gender issues in relation to the right to food	• International Bill of Human Rights • The Right to Food in International Law	2	2
9. Over view of Human rights and gender issues in relation to the right to food	• Convention on the Rights of the Child • The Right to Food in East African Countries	2	2
10. Over view of human rights and gender issues in relation to the right to food	• ICESCR States Parties Obligations	2	2
11. Human rights & gender issues in relation to right to food	• Voluntary guidelines to support the progressive realization of the right to food	2	2
12. Other cross cuttings issues with food & nutrition	• HIV and AIDS, globalization, gender, conflicts/crises & natural disasters	2	2
13. Food security monitoring systems	• Food and Nutrition Information Systems • Early Warning Systems	2	2
14. Food systems & food security	• Food systems and it is elements, Concepts of local food system resilience in light of the disruptions brought to those systems pandemic	2	2
15. Food systems & food security	• How local food systems' actors & their impact food security	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. The State of Food Security and Nutrition in the World 2020
2. Food Security and Nutrition, 2020 1st Ed, edited by Charis Galanakis, eBook ISBN: 9780128209325
3. Savage, A., McIver, L., & Schubert, L. (2020). The nexus of climate change, food & nutrition security & diet-related non-communicable diseases in Pacific Island countries and territories. *Climate & Dev't*, 12(2), 120-133.

5.10.5 HMN4204 Behavioral Science

a) **Course Type**: Core, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30TH), **Duration:** 15 weeks

b) Course description

Behavior-based knowledge and principles in studying the behavior of individuals, groups, and societies. Knowledge from disciplines of psychology, social psychology, health psychology, & medical sociology. Interpersonal relationships, behavior at work, and health & illness.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Basic principles and concepts of behavioral science & the origin and scope of Behavioral Science
2. Procedures of research design and data collection methods
3. Human perception and learning
4. Key theories of work motivation, job satisfaction, human abilities, and personality

d) Learning outcomes

At the end of the course, students should be able to:

1. Explain the basic principles and concepts of behavioral science & the origin and scope of Behavioral Science
2. Explain the procedures of research design and data collection methods
3. Discuss human perception and learning
4. Give an account of key theories of work motivation, job satisfaction, human abilities, and personality

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocation (h)	
		LH	PH
1. Introduction	• Methods used in behavioral sciences; Empiricism and scientific approach; Experimental research; Correlational research.	2	2
2. Individual behavior	• Co-operative learning; Group dynamics; Cooperation & competition	2	2
3. Nature/nurture debate	• Nature/nurture debate	2	2
4. Behaviorism and learning theories	• Pavlov's classical conditioning; Skinner's operant conditioning; Bandura's social learning theory; Behaviour Therapy	2	2
5. Behavior Modification	• Behavior Modification	2	2
6. Science of Relationships	• Non-verbal communication; Elements of non-verbal communication; Significance of non-verbal communication: Effective communication	2	2
7. Interpersonal relationships	• Types of relationships; Interpersonal conflict	2	2
8. Friendship and Love	• What makes a good friendship? Theories of Romantic Love; Gender differences in friendship & romantic love	2	2
9. Behavior at work	• Adjustment to work; career choice; changing work life; work-life balance	2	2
10. Motivation at work	• Group dynamics; Decision-making	2	2
11. Health & illness behavior	• What is health? - physical & mental health? health determinants	2	2

Topic by week	Content	Time allocation (h)	
		LH	PH
12. Psychopathology	• Schizophrenic; Mood disorders; anxiety disorder; Cognitive disorder	2	2
13. Behaviour Therapy/ Psychotherapies	• Behaviour Therapy/Psychotherapies	2	2
14. Stress & coping	• Nature of stress; stress response; factors influencing stress tolerance	2	2
15. Healthy lifestyles	• Types of leisure; Benefits of leisure	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Practical hours/Self-study and presentations	30 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Buchanan D and Huczynski A., 2006, Organisational Behaviour: An Introductory Text, 6th Ed., Prentice-Hall
2. MacDonagh J, Linehan C, Weldridge R., 2002. Behavioural Science for Marketing and Business Students, 2nd Ed., Gill and Macmillan Dublin
3. Martin O Grady 2001, An Introduction to Behavioural Science, First Ed., All, Gill and Macmillan Dublin

ELECTIVE COURSES (TO SELECT ONE)

5.10.6 EEE4220 Organizational Management and Leadership

a) **Course Type:** Elective, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30TH), **Duration:** 15 weeks

b) **Course description**

General management concepts & applications including the evolution and the development of management thought; understanding organizations with reference to public and private farmer-led organizations. Analysis of the management process including key management concepts; management functions; and staffing and human resource development with a gender perspective, especially in agricultural service organizations of the public & private nature.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Define the concept of management, its classical theories and principles
2. Analyze organizations as systems consisting of inputs, processes and outputs
3. Describe management and leadership functions and their application in agriculture
4. Discuss the significance of gender in organizational development

d) Learning outcomes

At the end of this course, students will be able to:

1. Define the concept of management, its classical theories and principles
2. Analyze organizations as systems consisting of inputs, processes and outputs
3. Describe management and leadership functions and their application in agriculture

4. Discuss the significance of gender in organizational development

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Outline and Method of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Organization, management, supervision, importance	2	2
2. Evolution of management thought	• Pre-scientific management, Scientific Management; administrative management	2	2
3. Evolution of management thought	• Human relations management; Modern management – systems approach; contingency approach		
4. Understanding formal organizations as systems	• System elements: Inputs/ resources; outputs/ products, services/ ideas; technology; environment; Purposes; Behaviour and Processes; Culture and Structure	2	2
5. Organizational functions	• Primary functions & Support functions	2	2
6. Management Functions defined	• Planning; Organizing; Leading; Controlling, Management Functions based on activities, Managerial Skills	2	2
7. Planning as a management function	• Planning Approaches; Types of plans; Characteristics of effective planning	2	2
8. Planning as a management function	• Barriers to effective planning; Management by Objectives; Strategic Planning; Decision Making		
9. Organizing as a management function	• Organizational charts; Types of Organization; Span of Management; Departmentalization; Mechanistic Versus Organic Systems	2	2
10. Organizing as a management function	• Types of Authority; Power; Accountability; Committees-standing, ad hoc and task forces	2	2
11. Organizing as a management function	• Staffing and Human Resource Management	2	2
12. Leading as a management function	• Leadership defined; Types of leaders; Leadership functions – leading, communicating, and motivating Leadership theories: trait and situational leadership theories, Leadership behaviour	2	2
13. Motivating employees	• Motivating employees, Maslow's Hierarchy of Needs, McGregor's Theory X and Theory Y;	2	2
14. Communication in Organizations	• Communication in organizations; non-verbal communication and interpersonal relations, Values and ethics	2	2
15. Control as a management function	• Types of Control; performance standards; measurement and adjustment/ corrective action	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Tutorials/Discussions/Assignments	15 h
Independent study hours based on handouts and reading list	15 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Watson, C. E. (1998). Results Oriented Management: The Key to Effective Performance
2. Burton, E. S., Bentz, R. P. and Sonfanko, A. J. (eds.). (1997). Improving Agricultural Extension. A reference Manual. FAO, Rome. Chapters 13, 14 & 15

5.10.7 FST4206 Cereals, Legumes and Root Crop Technology

a) Course Type: Elective**, Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30PH), **Duration:** 15 weeks

b) Course description

Types of composition of locally grown cereals. Cereal chemistry. Cereal processing techniques: pre-milling and milling operations. Wet versus dry milling. Production of cereal products. Optimization of quality and nutritive value during processing. Types of composition of legumes (e.g. Soya beans, peas, beans etc.) and root crops (e.g. cassava, potato, yams etc.). Product development of legumes and root crops for improved nutritional value.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Different cereals, legumes, roots and tubers produced and used Uganda for the production of human foods.
2. Characterization of the chemical and physical properties of cereal legumes roots and tubers in relation to nutritional values and functional properties.
3. Various milling technologies and their application in food processing.
4. Good quality products from cereals, legumes, roots and tubers using drying, milling, baking, frying, extrusion, fermentation, bottling and other technologies.

d) Learning outcomes

At the end of the course, students will be able to:

1. Identify different cereals, legumes, roots and tubers in Uganda for the production of human foods.
2. Characterize the chemical and physical properties of cereal legumes roots and tubers in relation to nutritional values and functional properties.
3. Discuss the various milling technologies and their application in food processing.
4. Make good quality products from cereals, legumes, roots and tubers using drying, milling, baking, frying, extrusion, fermentation, bottling and other technologies.

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Methods of Instruction

Topic by week	Content	Time allocated (h)	
		LH	PH
1. Introduction	• Cereals, legumes, root crops importance, production and utilization	2	2
2. Cereals	• Classification, distribution and uses • Post-harvest handling: harvesting and threshing operations, grain drying, role of temperature and humidity, storage of cereals	2	2
3. Cereals	• Functional changes, grading, end-use quality determining factors	2	2
4. Cereals	• Structure of cereal grains & physical properties • Chemical properties: composition, nutritional value, anti-nutrients and toxic components in cereals	2	2
5. Cereals	• Functional properties: starch and starch granules, proteins, non-starch polysaccharides, lipids, enzymes	2	2
6. Cereals	• Pre-milling (pre-treatment and quality assurance of the grain)	2	2

Topic by week	Content	Time allocated (h)	
		LH	PH
	• Dry milling (wheat as reference): process and equipment; products; flour treatment, quality (classification and grading).		
7. Cereals	• Wet milling (maize as reference): processing operations and equipment, production of starch, sweetener, oil and protein. • Rice, oat and barley processing: Malting.	2	2
8. Cereals	• Chemistry and functionality of baking ingredients • Baking (Yeast/chemical-Leavened products and soft wheat products): breads, cakes, doughnuts, etc	2	2
9. Cereals	• Durum wheat products: Pasta, noodles, cereal-based snack foods and breakfast cereals. • Developing nutritionally-enhanced cereal-based foods	2	2
10. Legumes	• Production, characteristics, classification and uses • Post-harvest handling: harvesting and threshing operations, • Physical properties, chemical properties: composition, nutritional value, antinutrients and toxic components in legumes	2	2
11. Legumes	• Physical properties, chemical properties: composition, nutritional value, antinutrients and toxic components in legumes	2	2
12. Root & tuber crops	• Production, role in nutrition; consumption; general characteristics • Post-harvest handling: drying; storage; control of infestation	2	2
13. Root & tuber crops	• Physical properties, chemical properties: composition, nutritional value, antinutrients and toxic components	2	2
14. Root & tuber crops	• Functional properties: starch, proteins, lipids, enzymes	2	2
15. Root & tuber crops	• Drying, milling into flour and substitution with wheat flour & extrusion	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of time needed

Lectures	30 h
Laboratory hours	18 h
Field/industry learning visits	06 h
Group presentations/seminars	06 h

h) Course assessment

Continuous assessment	60%
University examination	40%

i) Recommended reading list

1. Kent's Technology of Cereals 5th Ed. Kurt A. Rosentrater and A.D. Evers (Eds). Woodhead Publishing 2018. Selected online articles and resources
2. Deep Frying Chemistry, Nutrition, & Practical Applications. Erickson M. D. Elsevier Science 2015.
3. Bakery Products Science and Technology, Second Edition. Weibiao Zhou, Y. H. Hui, I. De Leyn, M. A. Pagani, C. M. Rosell, J. D. Selman, N. Therdthai (Eds). John Wiley & Sons Ltd 2014.
4. Extrusion Processing Technology: Food and Non-Food Biomaterials. Jean-Marie Bouvier, Osvaldo H. Campanella. John Wiley & Sons Ltd 2014.

5.10.8 EEE4221 Gender and Agricultural Development

a) Course Type: Elective, **Credit Units:** 3 CU, **Contact Hours:** 45 Hours (30 LH, 30TH), **Duration:** 15 weeks

b) Course description

Concepts in gender and agricultural development. Basic skills in gender analysis and gender responsive agricultural programming. Role of gender in agricultural development; Historical evolution of gender & development approaches.

c) Course objectives

The objectives for this course are to equip students with basic knowledge on:

1. Positive attitude towards gender responsiveness at a personal and professional level.
2. Relevance of gender and social diversity issues to agricultural and rural development
3. Gender-based constraints in agriculture & effective strategies for addressing them

d) Learning outcomes

At the end of the course, students will be able to:

1. Demonstrate positive attitude towards gender responsiveness at a personal and professional level.
2. Explain the relevance of gender and social diversity issues to agricultural and rural development
3. Explain gender-based constraints in agriculture & describe effective strategies for addressing them

e) Mode of delivery

A blended & interactive approach including lectures, case studies, and student presentations

f) Course Content and Method of Instruction

Topic by week	Content	Time allocated (h)	
		LH	TH
1. Introduction	• Gender and related concepts; sex and gender roles	2	2
2. Gender matters in agriculture	• Gender roles in sustainable development	2	2
3. Gender matters in agriculture	• How gender shapes and influences agriculture and rural development	2	2
4. Gender matters in agriculture	• How gender shapes and influences agriculture and rural development	2	2
5. Gender and development	• Gender & development trajectory: Women in development	2	2
6. Gender and development	• Gender & development trajectory: Women in development	2	2
7. Gender and development	• Global gender declarations and initiatives	2	2
8. Gender issues in agriculture	• Explanation of gender issues in agricultural value chains	2	2
9. Gender analysis	• Gender Analysis process, Relevance of gender analysis in policy	2	2
10. Gender analysis	• Programme and project intervention	2	2
11. Gender analysis	• Gender-analysis frameworks	2	2
12. Addressing gender-based constraints	• Concept women empowerment, facets of women's empowerment	2	2
13. Addressing gender-based constraints	• Concept women empowerment, facets of women's empowerment	2	2
14. Addressing gender-based constraints	• Women empowerment indicators & women empowerment frameworks	2	2

Topic by week	Content	Time allocated (h)	
		LH	TH
15. Addressing gender-based constraints	• Women empowerment indicators & women empowerment frameworks	2	2
	• Weeks 16-17; Revision and University Examination		

g) Summary of Time Needed

Lectures	30 h
Tutorials/Discussions/Assignments	30 h

h) Course Assessment

Continuous assessment	60%
University examination	40%

i) Recommended Reading List

1. Action Aid et al (2012). What Works for Women: Proven approaches for empowering women smallholders and achieving food security http://www.actionaid.org/publications/what-works-women-proven-approaches-empowering-women-smallholders-and-achieving-food-sec
2. Narayan (2015) Measuring Empowerment: Cross Disciplinary Perspectives D. Narayan (Ed.) Retrieved from https://openknowledge.worldbank.org/handle/10986/7441

6. RESOURCES AND INFRASTRUCTURE

6.1 Physical Infrastructure and Equipment

The School of Food Technology, Nutrition & Bio-engineering has facilities that can support teaching and research, namely:

- Six lecture rooms and a conference hall
- Four well equipped laboratories (Food Microbiology, Food Chemistry, Sensory Evaluation & Nutrition labs)
- A computer laboratory with unlimited internet and functional computers with a student/ computer ratio of 7 to 1.
- Two equipped pilot processing plants
- The Food Technology and Business Incubation Center that can be used to simulate food industrial operations
- A well-stocked library with a range of books, journals etc on the courses to be covered under the programme.
- A biotechnology lab in the School of Agricultural Sciences (Mak) can be used to teach molecular microbiology
- Makerere University Agricultural Research Institute Kabanyoro can be used for agricultural production practicals

6.2 Financial Resource

Financial resources will be obtained from students' functional fees, tuition and other fees paid by private students (Recess Term and Field Attachment/Internship fees). A detailed breakdown of the financial resources is given in table 9.

6.2.1 Fees Structure

A detailed breakdown of the financial resources is given in table 9.

Table 9: Fee structure for the BHND programme

Item	East African Students (UGX)	International Students (UGX)
Functional Fees - Semester 1	860,954	1,516,253
Functional Fees - Semester 2	132,250	132,250
National Council for Higher Education Fees (per year)	20,000	20,000
UNSA Subscription Fee (per year)	20,000	20,000
Internship (per semester for semester 1 and 2 of year 2 and 3)	100,000	100,000
Tuition (per year)	3,650,100	6,758,768

6.2.2 Budget breakdown

The programme has been enrolling between 18-35 students over the years with an average of 25 students. The numbers are expected to rise to an average of 30 over the next five years. Hence, the program will target to attract 30 students from Uganda, the East African region and internationally. The budget estimates (Table 10) are based 30 students from the East African region. In addition, the budget indicates other revenue streams and expenditure.

Table 1: Budget for the BHND programme

Item description	Units	No. of Units	Unit cost (UGX)	Fees/Revenue (UGX)	Expenditure (UGX)
Tuition Year I (Semester I & II)	Students	30	3,650,100	109,503,000	
Tuition Year II (Semester I & II)	Students	30	3,650,100	109,503,000	
Tuition Year II (Internship)	Students	30	200,000	6,000,000	
Tuition Year III (Semester I & II)	Students	30	3,650,100	109,503,000	
Tuition Year III (Internship)	Students	30	200,000	6,000,000	
Tuition Year IV (Semester I & II)	Students	30	3,650,100	109,503,000	
Council Contribution (25%)					137,643,360
College Contribution (5%)					27,528,672
In-semester Practicals Semester I - Materials	Course units	24	3,000,000		72,000,000
In-semester Practicals Semester II - Materials	Course units	24	3,000,000		72,000,000
Internship attachment host fees, placement and supervision	Students	60	200,000		12,000,000
Stationery and office supplies	Semesters	2	10,000,000		20,000,000
Curriculum Review	Program	1	15,000,000		15,000,000
Equipment and software					93,839,968
TOTAL				**450,012,000**	**450,012,000**

6.3 Human Resource

The human resource to teach on the BHND programme are shown in Table 10. Some of the courses are taught by staff in the Makerere; Department of Agricultural and Biosystems Engineering, School of Agricultural Science, & College of Health Sciences. Additional support staff from Agro-food processing industry, government regulatory agencies and departments.

Table 11: Human Resource Teaching Course on the BHND Programme

	Status					Teaching Loads (Per Week)		
	Name	**F/M**	**Highest Qualification**	**Area(s) of specialisation**	**Current Rank**	**Current**	**Proposed Extra**	**Total**
	Staff From DFTN							
1	Gaston Tumuhimbise	M	PhD	Food & Nutrition Sciences	Senior Lecturer	7	3	10
2	Hedwig Acham	F	PhD	Human Nutrition	Senior Lecturer	8	3	11
3	Margaret Kabahenda	F	PhD	Human Nutrition, Clinical Nutrition & Dietetics	Senior Lecturer	8	3	11
4	Agnes Nabubuya	F	PhD	Food & Nutrition Science	Senior Lecturer	8	3	11
5	Fred Brany Lukwago	M	MSc	Human Nutrition,	Assistant Lecturer	8	3	11
6	Robert Fungo	M	PhD	Indigenous and local food systems, Maternal and Child Nutrition, Food Security,	Lecturer	12	0	12
7	Denis Male	M	PhD	Food Safety, Environmental Safety, and Policy Research	Lecturer	10	3	13
8	John Muyonga	M	PhD	Food processing, functional foods, meat, poultry and fish technology, food chemistry, food by-products valorisation	Professor	8	3	11
9	Charles Muyanja	M	PhD	Food Safety and Food Microbiology	Professor	10	3	13
10	Archileo N. Kaaya	M	PhD	Food Science & Technology	Professor	9	0	9
11	Dorothy Nakimbugwe	F	PhD	Food Tech & Nutrition	Assoc. Prof	8	0	8
12	Yusuf Byaruhanga	M	PhD	Food Chemistry, Cereal Technology & Quality Assurance	Assoc. Prof	10	0	10
13	Ivan M. Mukisa	M	PhD	Food Science, Food Microbiology	Assoc. Prof	8	3	11
14	Abel Atukwase	M	PhD	Postharvest Technology, Food Safety & Food Processing	Senior Lecturer	4	6	10
15	Robert Mugabi	M	PhD	Food Process Engineering	Lecturer	9	0	9
16	Stellah Byakika	F	PhD	Food Science, Food Microbiology and Food Safety	Assistant Lecturer	8	3	11
17	Joseph Balamaze	M	PhD	Food Science & Technology, Food Analysis	Chief Technician	3	0	3
	Staff from Other Units in CAES (Mak)							
18	Nelson Turyahabwe	M	PhD	Agricultural Extension	Professor	6	3	9

	Status					Teaching Loads (Per Week)		
	Name	**F/M**	**Highest Qualification**	**Area(s) of specialisation**	**Current Rank**	**Current**	**Proposed Extra**	**Total**
19	Johnny Mugisha	M	PhD	Agricultural Economics	Professor	9	0	9
20	Losira Nasirumbi Sanya	F	PhD	Agricultural Extension	Lecturer	3	6	6
	Staff from CHS (Mak)							
22	Godfrey S Bbosa	M	PhD	Pharmacy, Clinical Pharmacology, Functional Foods	Lecturer	6	3	9
23	Joshua Nfambi	M	PhD	Medicine, Physiology	Lecturer	6	3	9
24	Ezekiel Mupere	M	PhD	Medicine, Child Nutrition, Clinical Nutrition, Epidemiology	Assoc. Prof	9	3	12
	Mwana Mugimu Nutrition Unit, Mulago							
25	Esther Babirekere	F	PhD	Medicine, Paediatrician		0	3	3
	Staff from CHUSS							
26	Peter Atekyereza	M	PhD	Sociology and Anthropology	Professor	3	0	3
	Staff from CONAS (Mak)							
27	Besweri Wandera	M	MSc	Sports Science, Exercise Health Science	Assistant Lecturer	12	0	12

6.4 Programme Coordinator

Name of Program Coordinator	Agnes Nabubuya
Qualification of Program Coordinator	PhD (Food Science) MSc Applied Human Nutrition Bachelor of Veterinary Medicine
Rank of Program coordinator	Senior Lecturer

7. APPENDICES

7.1 Initial Stakeholder Review of the BFST Curriculum

The running BHND curriculum was shared with stakeholders (employees and former students) electronically between August to September 2021. The stakeholders were also presented with a questionnaire (using Google Forms). The questionnaire covered; general evaluation of the DFTN graduates, clarity of program description, admission requirements, program content, program resources, program instruction, future growth areas that would impact or change (for employers); graduate satisfaction with the program, any other matters to raise about the curriculum, experiences in studying the course, the best and worst courses in the curriculum they studied, their comment and opinion about the mode of teaching of the curriculum, areas of training they think will shape their discipline in the coming years, and; what they would change about the curriculum if they had an opportunity to do so (for graduates). The list of stakeholders who gave feedback and a summary of their feedback are shown in Tables 12 and 13, respectively.

Table 12: List of stakeholders who participated in the initial review

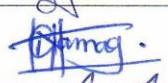
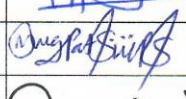
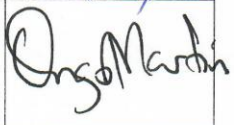
#	Name	Affiliation	Contact (Phone/Email)	Stakeholder Type	Signature
1	Sarah Ngalombi	Ministry of Health, Uganda	+256772429271 sngalombi@yahoo.com	Alumna	
2	Catherine Acio	HMH Rainbow Ltd	+256777269826 katlineacio@gmail.com	Alumna	
3	Namagembe Grace	SR Afro Chicks and Breeders Ltd	+256705150480 namagembegrace@yahoo.com	Alumna	
4	Patrick Muganga	Recast Agrisystems	0782988853 pmuganga10@gmail.com	Alumnus/Employee	
5	Martin Ongol	Uganda National Council of Science and Technology	+256787465458 m.ongol@uncst.go.ug	Alumnus	
6	Diana Moyo	Current Dietetics Technician Registered student at Tarrant County College (TCC), Dallas, Tx.	+1 (817) 363-0591 dianakulivadklm@gmail.com	Ugandan living in the US for the last 15 years	

Table 13: Key issues raised by stakeholders and the rationale

#	Comment/Suggestion	Rationale given
1	Consider renaming the course to cater for the component of dietetics	Adding a strong component of dietetics will require that it is reflected in the name. This will also ensure that the Allied Health Professionals' Council registers the graduates & allows them to practice clinical dietetics
2	Include some courses on leadership and management were introduced	Graduates were weak on leadership and program planning and monitoring skills. Including courses on these topics will help fill this gap
3	Aspects of food systems and health systems should be included	The current curriculum has a narrow scope on the multidimensional and multisector skillset required to address malnutrition.
4	The content of some of the course units should be updated. Some course units have outdated content.	Human Nutrition and Dietetics has many topics, overlapping with many other disciplines including biochemistry, physiology, cell biology, dietetics, medicine, communications and public health that provide students with a holistic skillset to address our nutrition needs. Changes in these aspects should be captured in all course units
5	Include a course on nutrition ethnics	Nutritionists need to understand that ethics are crucial for their job. The BHUN curriculum did not have a dedicated course unit to meet this gap.
6	Geriatric nutrition, maternal & childhood nutrition should be covered in the course	Mothers, children and the elderly are part of the life cycle. Their nutrition should be covered in the course of Human Nutrition Through the Life Cycle.

7.2 Engagement of DFTN alumni using social media (WhatsApp)

The committee engaged DFTN alumni in a discussion on several topics related to: (i) their experience on the BFST programme, (ii) the curriculum (satisfaction with the courses, gaps in the program and mode of teaching), and (iii) trending issues likely to shape the profession in the coming years. This discussion was carried out on the DFTN alumni WhatsApp platform which comprises a total of 255 alumni of the DFTN from inception of the programme to 2020. Members of the curriculum review committee moderated the discussion and transcribed the key issues raised with regards to reviewing the curriculum. This discussion was held in August 2021. A list of participants and a summary of the key issues raised are shown in Tables 14 and 15, respectively. Figure 1 shows a sample of the WhatsApp screenshot messages of the BHUN curriculum review discussion.

Table 14: List of participants in the DFTN Alumni WhatsApp group discussion for curriculum review

#	Name	Affiliation/Place of Work	Contact	Stakeholder Type
1	Grace Namagembe	SR Afro Chicks & Breeders Ltd	0705-150480	Alumna
2	Sanyu Rose		0706-792490	Alumna
3	Annet Kyomuhangi	Dairy Development Authority	0701-208110	Alumna
4	Gloria Arinaitwe	Food Safety Associates	0704-972706	Alumna
5	Florence Basiimwa Tushemerirwe	School of Public Health, Makerere University	0772-531445	Alumna
6	Hillary Byamugisha		0773-460649	Alumnus
7	Geoffrey Sempiri		0773-690740	Alumnus
8	Maureen Naggayi		0757-885934	Alumna
9	Abbas Kisambira		0703-533970	Alumnus
10	James Matindo		0701-459612	Alumnus/Employer
11	Martin Ssali	SMART Foods Ltd	0782-285608	Alumnus/Employer

#	Name	Affiliation/Place of Work	Contact	Stakeholder Type
12	Rosette Nakalema	Recipe Manager, Kellogg's R&D Unit	+(517) 348-5476	Alumni
13	Wilber Ntambi		0700-457277	Alumnus
14	Albert Mugabi		0750-093153	Alumnus/Supervisor
15	Deborah Wendiro		0755-464502	Alumna /Supervisor
16	Stephen Odara		0702-012645	Alumnus
17	Brighton Kansiime-Mukama		0784-988484	Alumnus
18	Andrew Owen Kalule		0752-435294	Alumnus
19	Sharon Bagaya		0782-098043	Alumna
20	Carol Auma		+44 7940125947	Alumna
21	Lameck Musoke	URA	0776-675865	Alumnus
22	Angela Nalukonge		0703-554401	Alumna
23	Steven Kabwama		0753-024727	Alumnus
24	Lucy Mwamisha	Food Quality Manager, Unilever Nairobi, Kenya	+254726-342737	Alumna
25	Roza Kobel		0782-334833	Alumnus
26	Hilda Naddumba		0774-250135	Alumna
27	Vincent Ssekaja		0782-744348	Alumnus
28	Isaac Kabazzi	UNHCR	0771-893566	Alumnus/Supervisor
29	Dennis Seninde		+ (785) 770-5496	Alumnus
30	Dennis Kasule	Samalina Beverages	0706-702450	Alumnus/Employer
31	Joseph Mulindwa	NaCORI	0705-394117	Alumnus
32	Alex Amanya		0777-049267	Alumnus

Table 15: Key issues raised by alumni and the rationale given

#	Comment/Suggestion	Rationale given
1	The duration of the program should be increased from 3 to 4 years	The current curriculum is packed and often some content is not covered completely or is omitted.
2	There is need to introduce some courses on economics & entrepreneurship were introduced	These courses will impart skills and competencies required for setting up & managing nutrition and dietetics related businesses
3	The courses HMN1301 Environmental Health and Sanitation done in recess term of year 1 should be given more time	This is important which relates aspects of environmental hygiene to nutrition. It is always taught in a very short time & is thus inadequately covered. It could be move to one of the semesters
4	Avoid duplication of courses taught on the BFST and BHUN program e.g Biochemistry (Biomolecules & Nutritional Biochemistry) & Microbiology	These courses could be merged and taught together since the content is generally similar
5	The component of dietetics practice/internship should be strengthened	Students need to gain more practical skills in developing and administering special diets for special conditions. The BHUN curriculum only strongly focuses on aspects of clinical management of malnutrition

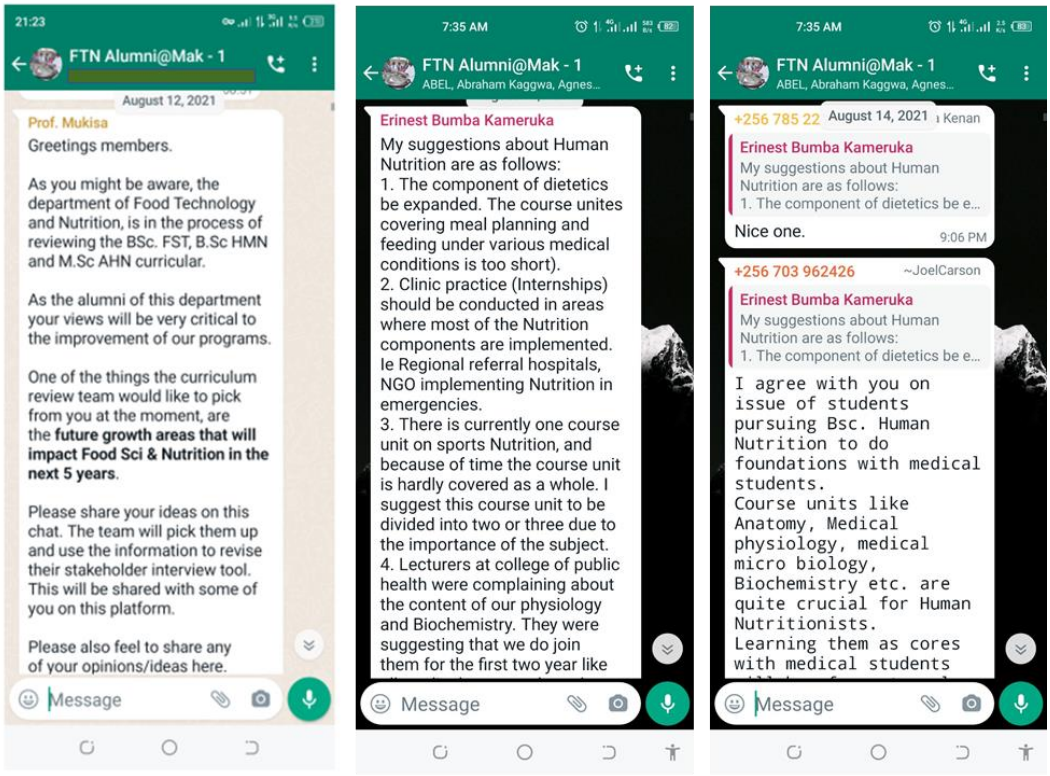


Figure 1: Samples of WhatsApp screenshots messages of the discussion on BHUN curriculum review

7.3 Stakeholder validation workshop

The DFTN held an online workshop via Zoom on 29th and 30th March 2022 during which the revised curriculum was presented to stakeholders (employers, alumni and staff) to validate the revisions made. The list of participants/attendance list is shown in Table 16. A summary of the proceedings and resolutions is presented in Table 17.

Table 16: List of participants in the stakeholder validation workshop for the BFST curriculum

#	Name	Title and Affiliation	Contact (Email/Phone)	Stakeholder Type	Signature
1	Bumba Erinest	PhD candidate, Bayero University Kano Nigeria	bumbaerinest@gmail.com 0788850166	Alumnus	
2	Peterson Kato Kikomeko	Kyambogo University.	katspk2003@gmail.com 0752425296	Kyambogo University Staff	
3	Patrick Muganga	Agricultural Market Systems Specialist Recast Agrisystems and Aceli Africa	pmuganga10@gmail.com 0782988853	Alumnus/Employer/ Supervisor	
4	Namagembe Grace	Slaughter House Manager SR Afro chicks& breeders Ltd	namagembegrace@yahoo.com 0705150480	Alumna	
5	Richard Kajura	Research Fellow, School of Public Health Makerere University	rkajura@musph.ac.ug 0773001154	Alumnus	
6	Amanda Murungi Eunice	Nutritionist, Mulago National Referral Hospital	mrungiamanda@gmail.com 0785737545	Alumna/Employer/ Supervisor	
7	Rita Kayeny	Nutrition Coordinator, PALM Corps	ritakayeny@gmail.com 0786933126	Alumna	
8	Desire Oyenyboth	Field Nutrition Coordinator, Save the Children International	oyeny90dee@gmail.com 0770790807	Alumna	
9	Ezekiel Mupere	Assoc. Prof, College of Health Sciences, Makerere	mupez@yahoo.com 0776161327	Makerere Staff	
10	Gerevasio	Nutritionist,	vasariho@gmail.com	Alumnus	

#	Name	Title and Affiliation	Contact (Email/Phone)	Stakeholder Type	Signature
	Ariho	Freelance	0782442238		
11	Tom Bbosa	PhD Student, KU Leuven Belgium	tombosax19@gmail.com 0777105779	Alumnus	
12	Isaac Kabazzi	Associate Nutrition and Food Security Officer, UNHCR, Uganda	kabazzi@unhcr.org 0782110222	Alumnus/Employer/ Supervisor	
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Table 17: Summary of the proceedings and resolutions made during the stakeholder validation workshop for the BHND curriculum

#	Comment/Suggestion	Rationale given and how the issue was resolved
1	Overall, the stakeholders appreciated the changes made to the curriculum in response to their earlier gaps identified and suggestions made. For example increasing the number of years from 3 to 4, including latest techniques for nutritional status assessment, inclusion of aspects of Food Policy and Legislation, Food Systems, economics and business management…	This was in response to changes made by the DFTN team after the stakeholder consultation discussions and interviews. Suggestions from the stakeholders are show in tables 13 and 15.
2	Strengthen the component of food systems.	Planning and execution of nutrition interventions involves multi-sectoral collaboration and thus needs a systems thinking approach. Components of food systems were incorporated in these course units i.e HMN1105 Introduction to Foods, Nutrition and Health, and FST4207 Food & Nutrition Security.
3	Need to clearly specify where the nutrition and dietetics practice at the end of the second and third years will be done.	Students should do internship in the hospital setting to understand practical management of malnutrition. They also need to do internship in different settings e.g schools, prisons, and the community etc to enhance their skills in diet planning and diet therapy. The two internships were clearly differentiated with the first focussing on the hospital setting and the second on other places.
4	Strengthen the aspect of social and behavioural change communication (SBCC)	SBCC is very key to ensuring that nutrition education is effective in bringing about the much needed changes to realise improvement in nutrition status. SBCC was included in the course HMN4201 Nutrition Education
5	The Nutrition Assessment course should include emerging technologies for assessments e.g. use of isotope dilution for body composition/nutrition assessment	There are new techniques for nutrition assessment that have been developed. Students need to get acquainted with them.

========== THE END ==========

BSc in Human Nutrition and Dietetics Curriculum 2023 MAK