SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY

PESHAWAR

APPROVED CURRICULUM OF
BS HUMAN NUTRITION AND DIETETICS
DEPARTMENT OF FOOD AND NUTRITION

BY

1st Meeting of Board of studies and 8th Meeting of Board of Faculties

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

Introduction to Department of Food and Nutrition

The first ever department of its kind for women in Khyber Pakhtunkhwa offering full fledged program, competent to explore the field of Food and Nutrition widening their scope in areas of Food Industry, Nutritionist, Diet Therapist, Aerobic consultant, Food specialists, child-care experts and much more. Being an all women university, the main focus is on producing well-groomed, research-oriented skilled females in the field of nutrition, child and health care. The Undergraduate program of Food and Nutrition at the University is committed to the professional and personal growth of undergraduate students through the development of new scientific knowledge, critical thinking, problem–solving strategies, active learning, self-realization and participation in research discoveries. It is our mission to create a stimulating and personal growth that environment for our students. We strive to provide ample opportunities for professional and personal growth that will allow our graduates to excel in future endeavor, such as industrial work in food and nutrition.

Vision and Mission Statement of Department

Vision

The Department of Food and Nutrition will serve national, regional and local communities through discovery of the ways in which foods and their bioactive components contribute to health and the prevention of diseases through effective application of nutrition knowledge to improve human health and well-being and to assure the security of food through scientific approaches and to become a working and sustainable component of the university in teaching, research, and community services.

Mission statement of the Department

The Department of Food and Nutrition creates and shares knowledge to;

- ensure a safe, healthy, and appealing food supply that supports the well-being and prosperity of people and the environment.
- provide quality education and learning experience for female students and to mold them into competent professionals in the field of Food sciences and nutrition with provision of opportunities for career development for both students and staff.
- prepare students for the development of critical thinking and problem-solving skills through innovative teaching methods and updated research.

- provide students with the provision of a stimulating, exciting and collaborative scientific environment, which will contribute in their future effective teaching, quality research, and relevant community service and to develop them into well-rounded responsible individuals.

Objectives of the Program:

The program aims to skill the female with knowledge of the field to gain profitable scopes in matters of career. The Nutrition Specialties such as: Sports nutritionist, Holistic nutritionist, Clinical dietician, Certified Nutritional specialist, Public Health Nutritionist, Food safety auditor, Nutritional therapist, Nutrition Educator, School & College Nutritionist, Paediatrics Nutritionist, Exercise Science Jobs. The certified Dietician may further give medical nutrition therapy (MNT), across the following focus areas:

- Maternal and Child nutrition
- Adolescence nutrition
- Geriatric nutrition
- Therapeutic nutrition
- Sports and exercise nutrition
- Food Sciences
- Product development, pro-biotic and pre-biotic food safety and food preservation
- Oncology
- Pediatrics
- Diabetes
- Nephrology
- Nutrition support
- Extended care
- Weight management and obesity
- Wellness and prevention
- Behavioral health
- Eating disorders and disordered eating
- Intellectual and developmental disabilities
- Mental illness
- Addictions
- Food and culinary and supermarkets
- Integrative and functional medicine
- Sustainable resilient healthy food and water systems
- Communities and public health
- Education
- Management

In a nutshell, this exclusive program for women will not only provide awareness, education and knowledge in the field of human Nutrition and Dietetics but will open the doors of opportunities for females in schools, hospitals and other medical facilities, long-term care facilities, corporations, food manufacturing industries, food inspection departments, community and public health organizations,

government agencies, and non-profit organizations. Other job locations are also open to registered dietitians, dietetic technicians, licensed nutritionists and even non-licensed nutritionists, including retail stores, holistic healing centers and alternative medicine clinics.

SCHEME AND COURSES OF STUDIES FOR BS IN HUMAN NUTRITION AND DIETETICS

DEPARTMENT OF FOOD AND NUTRITION

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

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SCHEME OF STUDIES HUMAN NUTRITION AND DIETETICS BS 4-YEAR PROGRAM (SESSION- 2020-2024)

S.NO	SEMESTER	COURSE TITLE	COURSE CODE	Theory	Practical	CREDIT HOURS
1.	1st	Fundamentals of Human Nutrition	HND-311	3	0	3
2.		Essentials of Food Science & Technology	FST-312	2	1	3
3.		Mathematics / Essential of Biology	MT-313	3	0	3
4.						
5.		English-I	ENG-301	3	0	3
6.		Principles of Biochemistry	BCHM-301	3	1	4
		Islamic Studies/Ethics	ISL-301	2	0	2
			Total Credit Hours	**16**	**2**	**18**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
7.	2nd	Macronutrients in Human Nutrition	HND-313	3	0	3
8.		English-II	ENG-302	3	0	3
9.		Pakistan Studies	PST-323	2	0	2
		Introduction to information and communication Technology	CSC-301	2	1	3
10.						
11.		Fundamentals of Human Physiology	HND-314	2	1	3
12.		Fundamentals of Sociology	-	3	0	3
			Total Credit Hours	**15**	**2**	**17**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
13.		Micronutrients in Human Nutrition	HND-411	3	0	3

14.	**3rd**	Advance Human Physiology	HND-412	2	1	3
15.		English-III	ENG-410	3	0	3
16.		Fundamentals of Genetics	BCHM-402	2	1	3
17.		Food Microbiology	FST-413	2	1	3
18.		Food Safety and Quality Management	FST-414	3	0	3
			Total Credit Hours	**15**	**3**	**18**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
19.	**4th**	Bio-Statistics	STAT-401	2	1	3
20.		Human Anatomy	HND-415	2	1	3
21.		Assessment of Nutritional Status	HND-416	2	1	3
22.		Nutrition Through the Life Cycle	HND-417	3	0	3
24.		General Pathology	HND-418	2	1	3
		Food Analysis	FST-419	1	2	3
			Total Credit Hours	**12**	**6**	**18**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
7.	**5th**	Fundamental of Dietetics	HND-511	2	1	3
8.		Nutrition and Psychology	HND-512	3	0	3
9.		Nutritional Education and Awareness	HND-513	2	1	3
10.		Meal Planning and Management	HND-514	2	1	3
11.		Public Health Nutrition	HND-515	2	1	3
		Food and Drug Laws	FST-516	2	0	2
			Total Credit Hours	**13**	**4**	**17**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
13.	**6th**	Advance Dietetics	HND-517	2	1	3
14.		Functional Foods and Nutraceuticals	HND-518	3	0	3

15.		Nutrition Through Social Protection	HND-519	2	0	2
16.		Sports Nutrition	HND-521	2	1	3
17.		Infant and Young Child Feeding	HND-522	2	1	3
18.		Clinical Biochemistry	BCHM-561	2	1	3
			Total Credit Hours	**13**	**4**	**17**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
19.	**7th**	Dietetics in Managing Diseases	HND-611	2	1	3
20.		Global Food Issues	HND-612	3	0	3
21.		Research Methods in Nutrition	HND-613	3	0	3
22.		Nutritional Practices in Clinical Care	HND-614	2	1	3
23.						
		Elective I	HND-	3	0	3
		Elective II	HND-	3	0	3
			Total Credit Hours	**15**	**2**	**17**
S.NO	**SEMESTER**	**COURSE TITLE**	**COURSE CODE**			**CREDIT HOURS**
24	**8th**	Nutrition Policies and Programs	HND-615	**3**	**0**	3
25						
26		Food Service Management	HND-616	**3**	**0**	3
27						
		Elective III	HND-	**3**	**0**	3
		Elective IV	HND-	**3**	**0**	3
		Research **OR** Internship + One Elective course **OR** Two Elective Courses	HND-699 OR HND-698	**0**	**6/3 +3**	6
			Total Credit Hours	**12**	**6**	**18**
			Total	**111**	**29**	**140**

***Optional**

COURSE TITLE	COURSE CODE
Sociology	SOC-
Educational Psychology	EDU-508
Understanding Psychology	PSY-
Foundation of Education	EDU-506
Marketing and Management	
Philosophy	PHIL-
Logic	LOG-
Ethics	ETH-

* any of these course s available

Elective Courses

HND-621	Nutritional Immunology	3(3+0)
HND-622	Drug-Nutrient Interactions	3(3+0)
FST-623	Food Chemistry	3(3+0)
HND-624	Preventive Nutrition	3(3+0)
HND-625	Nutrition in Emergencies	3(3+0)
HND-626	Food Toxins & Allergens	3(3+0)
HND-627	Nutritional Deficiency Disorders	3(3+0)
HND-628	Food Supplements	3(3+0)
HND-629	Metabolism of Nutrients	3(3+0)
HND-631	Nutrition Epidemiology	3(3+0)

Breakup of courses into Compulsory, Major and General/Minor courses

Compulsory courses

MT-313	Mathematics / Essential of Biology	3+0
ENG-301	English	3+0
ISL- 301	Islamic Studies/Ethics	2+0
ENG-302	English-II	3+0
PST-323	Pakistan Studies	2+0
CSC-301	Introduction to information and communication Technology	2+1
ENG-410	English-III	3+0
STAT-401	Bio-Statistics	2+1

Major courses

HND-311	Fundamentals of Human Nutrition	**3+0**
HND-313	Macronutrients in Human Nutrition	**3+0**
HND-411	Micronutrients in Human Nutrition	**3+0**
HND-416	Assessment of Nutritional Status	**2+1**
HND-417	Nutrition Through the Life Cycle	**3+0**
HND-511	Fundamental of Dietetics	**2+1**
HND-512	Nutrition and Psychology	**3+0**
HND-513	Nutritional Education and Awareness	**2+1**
HND-514	Meal Planning and Management	**2+1**
HND-515	Public Health Nutrition	**2+1**
HND-517	Advance Dietetics	**2+1**
HND-519	Nutrition Through Social Protection	**2+0**
HND-521	Sports Nutrition	**2+1**
HND-522	Infant and Young Child Feeding	**2+1**
HND-611	Dietetics in Managing Diseases	**2+1**
HND-613	Research Methods in Nutrition	**3+0**
HND-614	Nutritional Practices in Clinical Care	**2+1**
HND-615	Nutrition Policies and Programs	**3+0**

General/Minor courses

FST-312	Essentials of Food Science & Technology	**3+0**
BCHM-301	Principles of Biochemistry	**3+1**
HND-314	Fundamentals of Human Physiology	**2+1**
-	Fundamentals of Sociology	**3+0**
HND-412	Advance Human Physiology	**2+1**
BCHM-402	Fundamentals of Genetics	**2+1**
FST-413	Food Microbiology	**2+1**
FST-414	Food Safety and Quality Management	**3+0**
HND-415	Human Anatomy	**2+1**
HND-418	General Pathology	**2+1**
FST-419	Food Analysis	**1+2**
FST-516	Food and Drug Laws	**2+0**
HND-518	Functional Foods and Nutraceuticals	**3+0**
BCHM-561	Clinical Biochemistry	**2+1**
HND-612	Global Food Issues	**3+0**
HND-616	Food Service Management	**3+0**

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF HUMAN NUTRITION AND DIETETICS (4 YEARS PROGRAM)

SEMESTER – I

Course Name: FUNDAMENTALS OF HUMAN NUTRITION	**Course Code: HND-311**
Course Structure: 3 LECTURES	**Credit Hours: 3(3+0)**
Prerequisites: None	

Learning Outcomes:

To familiarize with the role of macro- and micro-nutrients in human nutrition

To understand the absorption, digestion and metabolism of nutrients in the human

To abreast knowledge about the health disorders due to consumption of non-optimal quantities of the nutrients

Theory:

Introduction: food, nutrients, nutrition, malnutrition - global and local scenario, diet, balanced diet, food groups, foundations of healthy diet, meal planning; Water functions, regulation in body, dietary requirements, electrolytes and acid-base balance; Carbohydrates: types, role in body, dietary fiber, bulk and alternative sweeteners, recommended intake and energy value; Fats and oils: types, functions, recommendations concerning fat intake, fat substitutes; Proteins: amino acids, protein synthesis and degradation, classification, functions, quality of proteins, dietary requirements; Vitamins: classification, types, sources, role in body; Mineral elements: types, requirements, sources, role in body; Digestion: alimentary tract, digestive juices, secretions; Absorption and metabolism of nutrients: carbohydrates, protein, lipids; Nutrient and dietary deficiency disorders and special nutrient requirements.

Suggested Readings:

1. Awan, J.A. 2011. Elements of Food and Nutrition. Unitech Communications, Faisalabad, Pakistan.
2. Bamji, M.S., K. Krishnaswamy and G.N.V. Brahmam. 2009. Textbook of Human Nutrition, 3rd ed. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, India.
3. Eastwood, M. 2003. Principles of Human Nutrition, 2nd ed. John Wiley & Sons, Inc., New York, USA.
4. Geissler, C. and H. Powers. 2011. Human Nutrition, 12th ed. Churchill Livingstone, London, UK.

Course Name: ESSENTIALS OF FOOD SCIENCE &TECHNOLOGY	**Course Code: HND-312**
Course Structure: 3 Lectures 1 practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To understand the role of food science & technology towards ensuring food security

To acquaint knowledge about the food constituents, food classification and spoilage agents

To comprehend the role of various food processing and preservation methods in shelf life extension and availability of food around the year.

Theory:

Introduction: food science and technology, food processing and preservation; Food safety and security; Food sources and global food situation; Food constituents and their functions: water, carbohydrates, lipids, proteins, vitamins and minerals; Food classification based on perish-ability and pH; Spoilage agents in food: enzymes, microorganisms, insects, rodents, birds and physical factors; Principles of food preservation; Preparatory operations in food processing; Food preservation techniques - high temperature: pasteurization, sterilization, canning; low temperature – refrigeration, freezing; removal of moisture – drying, dehydration; use of chemical additives; fermentation techniques – alcoholic, acetic, lactic; Irradiation technology; food packaging and labeling.

Practical:

Bottling/canning of selected fruits and vegetables; Cold storage of fruits and vegetables; Freezing of fruits and vegetables; Dehydration of fruits and vegetables; Blanching of fruits and vegetables; Use of chemicals in preservation of food products; Preparation of fermented food products – vinegar, preparation; Evaluation of bottled, frozen and dehydrated products.

Suggested Readings:

1. Awan, J.A. and S.U. Rehman. 2011. Food Preservation Manual. Unitech Communications, Faisalabad, Pakistan.
2. Awan, J.A. 2011. Food processing and Preservation. Unitech Communications, Faisalabad, Pakistan.
3. Awan, J.A. 2011. Food Science and Technology. Unitech Communications, Faisalabad, Pakistan.
4. Potter, N.N. and J.H. Hotchkiss. 1995. Food Science, 5th ed. The AVI Pub. Co. Inc., Westport, Connecticut, USA.

Course Name: MATHEMATICS (Calculus)	**Course Code: MT-313**
Course Structure: 3	**Credit Hours: 3+0**
Prerequisites: None	

Course:

Aims:

To give the basic knowledge of Mathematics and prepare the students notmajoring in mathematics.

Objectives:
After completion of this course the student should be able to:

- Understand the use of the essential tools of basic mathematics;
- Apply the concepts and the techniques in their respective disciplines;
- Model the effects non-isothermal problems through different domains;

Contents:
Algebra:
Preliminaries: Real and complex numbers, Introduction to sets, setoperations, functions, types of functions. Matrices: Introduction to matrices,types of matrices, inverse of matrices, determinants, system of linearequations, Cramer's rule. Quadratic equations: Solution of quadraticequations, nature of roots of quadratic equations, equations reducible toquadratic equations. Sequence and Series: Arithmetic, geometric andharmonic progressions. Permutation and combinations: Introduction to permutation and combinations, Binomial Theorem: Introduction to binomialtheorem. Trigonometry: Fundamentals of trigonometry, trigonometricidentities. Graphs: Graph of straight line, circle and trigonometric functions.

Recommended Books:

1. Swokowski. E. W., '*Fundamentals of Algebra and Trigonometry*', LatestEdition.
2. Kaufmann. J. E., '*College Algebra and Trigonometry*', PWS-KentCompany, Boston, Latest Edition.

Course Name: English I (Functional English)	**Course Code: ENG-301**
Course Structure: 3 Lectures	**Credit Hours: 3+0**
Prerequisites: None	

Objectives:
Enhance language skills and develop critical thinking.

Course Contents:
Basics of Grammar
Parts of speech and use of articles
Sentence structure, active and passive voice
Practice in unified sentence
Analysis of phrase, clause and sentence structure
Transitive and intransitive verbs
Punctuation and spelling

Comprehension:
Answers to questions on a given text

Discussion:
General topics and every-day conversation (topics for discussion to be at the discretion of the teacher keeping in view the level of students)

Listening:
To be improved by showing documentaries/films carefully selected by subject teachers

Translation skills

Urdu to English
Paragraph writing:
Topics to be chosen at the discretion of the teacher

Presentation skills:

Introduction

Note: Extensive reading is required for vocabulary building

Recommended Books:

1. **Functional English**

a) Grammar
   1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492
   2. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506

b) Writing
   1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Francoise Grellet. Oxford Supplementary Skills. Fourth Impression1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.

c) Reading/Comprehension
   1. Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.

d) Speaking

Course: PRINCIPLES OF BIOCHEMISTRY	**Course Code:BCHM-301**
Course Structure: 3 Lectures 1 Practical	**Credit Hours: 4**(3+1)
Prerequisites: None	

Learning Outcomes: This course provides fundamental concepts in biochemistry, which focuses upon the major macro-molecules and chemical properties of living systems.
Primary topics include the structure, properties and functions of proteins, carbohydrates, lipids and nucleic acids.

Theory:

A general introduction to the science of biochemistry; importance and the scope of biochemistry; forms, functions and brief classification of prokaryotes; cellular architecture and diversity of eukaryotes; structure, physical properties and importance of water; unique properties of carbon and other elements found in biological molecules; nature of organic matter; isomerism; general reactions of different functional groups; biologically important organic compounds/solvents; overview of biological molecule and their structures including proteins, carbohydrates, lipids and nucleic acids; prebiotic molecular evolution and rise of living systems; review of the variety and ecology of the living world; evolution of life; use and significance of radioisotopes in biochemistry.

Practical:

Safety measures in laboratory; preparation of solutions routinely used in biochemical experiments (e.g., percent, normal and molar solutions); pH determination using various methods; preparation of buffers.

Suggested Readings:

RECOMMENDED BOOKS:

1. Fundamentals of Biochemistry. (2008) 3rd Ed. by D. J. Voet, G.J. Voetand C. W. Pratt. J. Wiley & Sons Inc.
2. Text Book of Biochemistry (1970) by E. West & W. Todd Macmillan.
3. Biochemistry. (1999) 3rd Ed. by C. K. Mathews, K. E. Van Holde, & K.G.Ahern. Prentice Hall.
4. Harper's Illustrated Biochemistry, 27th Ed. by R.K. Murray, D.K. Grannar,V. W. Rodwell. McGraw-Hill.
5. Lehninger Principles of Biochemistry (2008) 5th Ed. by D. L. Nelson, M.M. Cox. W. H. Freeman Publishers.

Course Name: ISLAMIC STUDIES/ETHICS (Compulsory)	**Course Code: ISL-301**
Course Structure: 2 Lectures	**Credit Hours: 2+0**
Prerequisites: None	

Objectives:

This course is aimed at:

1 To provide Basic information about Islamic Studies
2 To enhance understanding of the students regarding Islamic Civilization
3 To improve Students skill to perform prayers and other worships
4 To enhance the skill of the students for understanding of issues related to faith and religious life.

Detail of Courses:

Introduction to Quranic Studies

1) Basic Concepts of Quran
2) History of Quran
3) Uloom-ul -Quran

Study of Selected Text of Holly Quran

1) Verses of Surah Al-Baqra Related to Faith(Verse No-284-286)
2) Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18)
3) Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11)
4) Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77)
5) Verses of Surah Al-Inam Related to Ihkam(Verse No-152-154)

Study of Selected Text of Holly Quran

1) Verses of Surah Al-Ihzab Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.) Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment
2) Verses of Surah Al-Saf Related to Tafakar,Tadabar (Verse No-1,14)

Seerat of Holy Prophet (S.A.W) I

1) Life of Muhammad Bin Abdullah (Before Prophet Hood)
2) Life of Holy Prophet (S.A.W) in Makkah
3) Important Lessons Derived from the life of Holy Prophet in Makkah

Seerat of Holy Prophet (S.A.W) II

1) Life of Holy Prophet (S.A.W) in Madina
2) Important Events of Life Holy Prophet in Madina
3) Important Lessons Derived from the life of Holy Prophet in Madina

Introduction to Sunnah

1) Basic Concepts of Hadith
2) History of Hadith
3) Kinds of Hadith
4) Uloom –ul-Hadith
5) Sunnah& Hadith
6) Legal Position of Sunnah

Selected Study from Text of Hadith Introduction to Islamic Law & Jurisprudence

1) Basic Concepts of Islamic Law & Jurisprudence
2) History & Importance of Islamic Law & Jurisprudence
3) Sources of Islamic Law & Jurisprudence
4) Nature of Differences in Islamic Law
5) Islam and Sectarianism

Islamic Culture & Civilization

1) Basic Concepts of Islamic Culture & Civilization
2) Historical Development of Islamic Culture & Civilization
3) Characteristics of Islamic Culture & Civilization
4) Islamic Culture & Civilization and Contemporary Issues

Islam & Science

1) Basic Concepts of Islam & Science
2) Contributions of Muslims in the Development of Science
3) Quran & Science

Islamic Economic System

1) Basic Concepts of Islamic Economic System
2) Means of Distribution of wealth in Islamic Economics
3) Islamic Concept of Riba
4) Islamic Ways of Trade & Commerce

Political System of Islam

1) Basic Concepts of Islamic Political System
2) Islamic Concept of Sovereignty
3) Basic Institutions of Govt. in Islam

Islamic History

1) Period of Khlaft-E-Rashida
2) Period of Ummayyads

3) Period of Abbasids

Social System of Islam

1) Basic Concepts of Social System of Islam
2) Elements of Family
3) Ethical Values of Islam

Reference Books:

1) Hameedullah Muhammad, "Emergence of Islam" , IRI, Islamabad
2) Hameedullah Muhammad, "Muslim Conduct of State"
3) Hameedullah Muhammad, 'Introduction to Islam
4) Mulana Muhammad YousafIslahi,"
5) Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law" leaf Publication Islamabad, Pakistan.
6) Ahmad Hasan, "Principles of Islamic Jurisprudence" Islamic Research Institute, International Islamic University, Islamabad (1993)
7) Mir Waliullah, "Muslim Jurisprudence and the Quranic Law of Crimes" Islamic Book Service (1982)
8) H.S. Bhatia, "Studies in Islamic Law, Religion and Society" Deep & Deep Publications New Delhi (1989)
9) Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia"AllamaIqbal Open University, Islamabad (2001)

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF FOOD AND NUTRITION (4 YEARS PROGRAM)

SEMESTER– II

Course Name: Macronutrients in Human Nutrition	**Course Code: HND-313**
Course Structure: 3 Lectures	**Credit Hours: 3+0**
Prerequisites: None	

Learning Outcomes:

To abreast knowledge about the normal nutrient metabolism in healthy human

To understand interactions between the intake, absorption, transport, processing, storage, catabolism and excretion of nutrients and the regulation of metabolic homeostasis in the intact organism

Theory:

Carbohydrates:nature,structures;Classificationandfunctionsofcarbohydrates:monosaccharaides,disaccharides,oligosaccharides,polysaccharaides; Digestion and absorption of carbohydrates: glycolitic pathway, glycolysis, glycogenesis, glycogen catabolism, tricarboxylic acid cycle and pentose phosphate pathway; Biosynthesis of carbohydrates: gluconeogenesis; Regulation of carbohydrate metabolism pathways; CHO metabolism in diabetes; Proteins: structural features, characteristics, functions; Amino acids: biosynthesis and degradation, food sources (on the basis of their functions in human body);. Digestion and absorption; Metabolic fates of amino acids: deamination, transamination, Urea cycle, Ketogenic amino acids, Glucogenic amino acids, Protein metabolism in liver and kidney diseases, Protein energy malnutrition; Lipids – nature, classification; Fatty acids: saturated, unsaturated, polysaturated, glycerol, cholesterol, sterol; Lipoprotein systems (blood lipids); Fats biosynthesis: lipids, phospholipids and sphingolipids; Lipid biosynthesis: cholesterol, sterol; Lipid oxidation; Essential fatty acids: sources, health benefits; Adipose tissues; Digestion, absorption, metabolism and transportation of lipids; Oxidation of fatty acids (beta oxidation); Ketone bodies.

Suggested Readings:

1. Berdanier, C.D. and J. Zempleni. 2009. Advances Nutrition: Macronutrients, micronutrients and Metabolism. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
2. Byrd-Bredbenner, C., G. Moe, D. Beshgetoor and J. Berning. 2015. Wardlaw's Perspectives in Nutrition, 10th ed. McGraw-Hill Education, Columbus, OH, USA.
3. David L.N., A.L. Lehninger and M.M. Cox. 2013. Lehninger Principles of Biochemistry, 6th ed. W.H. Freeman and Company, New York.
4. Gropper, S.S. and J.L. Smith JL. 2013. Advanced Nutrition and Human Metabolism, 6th ed. Cengage Learning, Belmont, CA, USA.

Course Name: English II (Communication Skills)	**Course Code: ENG-302**
Course Structure: 3 Lectures	**Credit Hours: 3+0**
Prerequisites: None	

Objectives:

Enable the students to meet their real life communication needs.

Course Contents:

Paragraph writing
Practice in writing a good, unified and coherent paragraph

Essay writing
Introduction

CV and job application
Translation skills
Urdu to English

Study skills
Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

Academic skills
Letter/memo writing, minutes of meetings, use of library and internet

Presentation skills
Personality development (emphasis on content, style and pronunciation)

Note: documentaries to be shown for discussion and review **Recommended Books:**

Communication Skills:

a) Grammar
   1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19 431350 6.

b) Writing
   1. Writing. Intermediate by Marie-ChrisitineBoutin, Suzanne Brinand and Francoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 019 435405 7 Pages 45-53 (note taking).
   2. Writing. Upper-Intermediate by Rob Nolasco. Oxford Supplementary Skills. Fourth Impression 1992. ISBN 0 19 435406 5 (particularly good for writing memos, introduction to presentations, descriptive and argumentative writing).

c) Reading
   1. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.
   2. Reading and Study Skills by John Langan
   3. Study Skills by RiachardYorky.

Course Name: PAKISTAN STUDIES (Compulsory)	**Course Code: PST-323**
Course Structure: 2 Lectures	**Credit Hours: 2 (2-0)**
Prerequisites: None	

Introduction/Objectives

Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.

Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Outline:

1. **Historical Perspective**
   a. Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-e-Azam Muhammad Ali Jinnah.
   b. Factors leading to Muslim separatism
   c. People and Land
      i. Indus Civilization
         ii. Muslim advent
         iii. Location and geo-physical features.

2. **Government and Politics in Pakistan**
   Political and constitutional phases:
   a. 1947-58
   b. 1958-71
   c. 1971-77
   d. 1977-88
   e. 1988-99
   f. 1999 onward

3. **Contemporary Pakistan**
   a. Economic institutions and issues
   b. Society and social structure
   c. Ethnicity
   d. Foreign policy of Pakistan and challenges
   e. Futuristic outlook of Pakistan

Recommended Books:

1. Burki, ShahidJaved. *State & Society in Pakistan,*The MacMillan Press Ltd 1980.
2. Akbar, S. Zaidi. *Issue in Pakistan's Economy.* Karachi: Oxford University Press, 2000.
3. S.M. Burke and Lawrence Ziring. Pakistan's Foreign policy: An Historical analysis. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. *Pakistan Political Roots & Development.* Lahore, 1994.
5. Wilcox, Wayne. *The Emergence of Bangladesh,* Washington: American Enterprise, Institute of Public Policy Research, 1972.
6. Mehmood, Safdar. *Pakistan KayyunToota,* Lahore: Idara-e-Saqafat-e-Islamia,

Club Road, nd.
7. Amin, Tahir. *Ethno - National Movement in Pakistan,* Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. *Enigma of Political Development.* Kent England: WmDawson& sons Ltd, 1980.
9. Zahid, Ansar. *History & Culture of Sindh.* Karachi: Royal Book Company, 1980.Afzal, M. Rafique. *Political Parties in Pakistan,* Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
10. Sayeed, Khalid Bin. *The Political System of Pakistan.* Boston: Houghton Mifflin, 1967.
11. Aziz, K.K. *Party, Politics in Pakistan,* Islamabad: National Commission on Historical and Cultural Research, 1976.
12. Muhammad Waseem, Pakistan Under Martial Law, Lahore: Vanguard, 1987.
13. Haq, Noor ul. *Making of Pakistan: The Military Perspective.* Islamabad: National Commission on Historical and Cultural Research, 1993.

Course Name: Introduction to Information and Communication Technology	**Course Code: ICT-301**
Course Structure: 2 Lectures 1 Practical	**Credit Hours: 2 (2+1)**
Prerequisites: None	

Course Description: This is an introductory course on Information and Communication Technologies. Topics include ICT terminologies, hardware and software components, the internet and World Wide Web, and ICT based applications. After completing this course, a student will be able to: Understand different terms associated with ICT • Identify various components of a computer system• Identify the various categories of software and their usage• Define the basic terms associated with communications and networking • Understand different terms associated with the Internet and World Wide• Web. Use various web tools including Web Browsers, E-mail clients and search • utilities. Use text processing, spreadsheets and presentation tools • Understand the enabling/pervasive features of ICT •

Course Contents: Basic Definitions & Concepts Hardware: Computer Systems & Components Storage Devices, Number Systems Software: Operating Systems, Programming and Application Software Introduction to Programming, Databases and Information Systems Networks Data Communication The Internet, Browsers and Search Engines The Internet: Email, Collaborative Computing and Social Networking The Internet: E-Commerce IT Security and other issues ProjectWeekReviewWeek37

Textbooks/Reference Books:

1. Introduction to Computers by Peter Norton, 6th International Edition, McGraw-Hill
2. Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6th ed., McGraw-Hill
3. Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer

4. Fundamentals of Information Technology by Alexis Leon, Mathews Leon, Leon Press.

Course Name: Fundamentals of Human Physiology	**Course Code: HND-314**
Course Structure: 2 Lectures 1 Practical	**Credit Hours: 2 (2+1)**
Prerequisites: None	

Learning Outcomes: To familiarize about the functions of different body organs• To understand risk parameters related to assessment and prognosis of• different diseases

Theory: Introduction to human physiology, organization level and cell physiology; Digestive system: oral cavity, salivary glands, teeth, tongue; oesophagus, pharynx, larynx, stomach, small intestine, large intestine, accessory glands associated with GIT (liver, gallbladder and pancreas); Urinary system: introduction, functions of kidney and nephron, Glomerular filtration, tubular reabsorption, tubular secretion, urine excretion and plasma clearance, fluid and acid base balance; Cardiovascular system: functions of heart and blood vessels, electrical activity of heart, mechanical events of heart, cardiac output and its control.

Practical: Blood grouping; Hb estimation; Counting of blood cells; complete blood count (CBC); Electrolyte estimation; Hydration test; Determination of coagulation time, blood pressure, pulse recording; Heart activity – electrocardiography; Test for saliva; Respiratory movement, maximum breathing capacity, pulmonary function test; Intestinal motility; Renal function tests and urine analysis.

Suggested Readings:

1. Gillian, P. and C.D. Richards. 2006. Human Physiology: The Basis of Medicine, 3rd ed. Oxford University Press, London.
2. Guyton A.C. and J.E. Hall. 2006. Textbook of Medical Physiology, 11th ed. J.F. Kennedy Blvd., Philadelphia, USA.
3. Rahman, Z.U., B. Aslam, J.A. Khan and T. Khaliq. 2007. Manual of Physiology-I, 2nd ed. MAS Computers, Faisalabad, Pakistan.
4. Rahman, Z.U., B. Aslam, Khan, J.A. and T. Khaliq. 2007. Manual of Physiology-II, 2nd ed. MAS Computers, Faisalabad, Pakistan.
5. Tortora, G.J. 2008. Principles of Anatomy and Physiology, 12th ed. John Wiley & Sons, Inc., New York, USA.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF FOOD AND NUTRITION (4 YEARS PROGRAM)

SEMESTER – III

Course Name: Micronutrients in Human Nutrition	**Course Code: HND-411**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To understand the functional roles of vitamins and minerals in human nutrition with special reference to metabolism

To familiarize with the deficiency symptoms and health disorders associated with improper intake of vitamins and minerals

To analyze losses of micronutrients during food processing

Theory:

Vitamins: nomenclature, history, development of the vitamins concept; Fat and water soluble vitamins: sources, chemistry, absorption, transport and storage, metabolism, function, deficiency, bioassay, interaction with other nutrients, recommended daily allowances and toxicities; Diagnosis, treatments and prevention of vitamin deficiencies in human; Stability of vitamins under different storage conditions; Vitamin like compounds; Losses of vitamin during food processing; Minerals: types, history and developments of the minerals concept; Criteria of essentiality of minerals and their classification; Minerals distribution in human body; Macro- and micro-minerals: dietary sources, absorption, metabolism, metabolic function, deficiency symptoms and disorders, recommended daily allowances, diagnosis, treatments and prevention of mineral deficiencies in human; Water and electrolytes.

Suggested Readings:

1. Allen, L. 2006. Guidelines on Food Fortification with Micronutrients. World Health Organization, Geneva, Switzerland.
2. Bender, D.A. 2009. Nutritional Biochemistry of Vitamins, ^{2th} ed. Cambridge University Press, Cambridge, UK.
3. DiSilvestro, R.A. 2004. Handbook of Minerals as Nutritional Supplements. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
4. Gropper, S.S. and Smith, J.K. 2012. Advanced Nutrition and Human Metabolism, 6^{th} ed. Wadsworth Cengage Learning, Belmont, CA, USA.

Course Name: Advance Human Physiology	**Course Code: HND**-412
Course Structure: 3 Lectures 1 Practical	**Credit Hours:** 3(2+1)

Prerequisites: None	

Learning Outcomes:

To understand the functions of respiratory, endocrine, nervous, immune and reproductive systems

To acquaint knowledge about hormonal and neural interactions on metabolism

Theory:

Respiratory system: respiratory mechanics, gas transport and exchange mechanisms, control of respiration, respiratory capacities and volumes, non-respiratory functions of lungs; Immune system and lymphatic system: body defence system and regulation; Endocrinology and reproduction: reproductive physiology, role of hormones in spermatogenesis, menstrual cycles and pregnancy, energy balance and temperature regulation; Nervous system: principles of neuronal and hormonal communication systems, functional organization of nervous system, central, peripheral and autonomic nervous system, action potentials, types of neurotransmitters and their role in pathophysiological integration in body; Musculoskeletal system: principles of neuromuscular physiology.

Practical:

Demonstration of the location of endocrine glands in laboratory animal; Adrenalectomy and the effect of adrenaline on metabolism in rats; Effect of adrenaline on metabolism; Nerve muscle preparation, effect of temperature on single muscle twitch, muscle and nerve irritability, neuromuscular fatigue, normal heart activity; Hormonal assay: digestive, growth & reproductive.

Suggested Readings:

1. Brar, R.S., H.S. Sandhu and A. Singh. 2002. Veterinary Clinical Diagnosis by Laboratory Methods. Kalyani Publishers Ludhiana, New Delhi, India.
2. Gillian, P. and C.D. Richards. 2006. Human Physiology: The Basis of Medicine, 3rd ed. Oxford University Press, London.
3. Guyton A.C. and J.E. Hall. 2006. Textbook of Medical Physiology, 11th ed. J.F. Kennedy Blvd., Philadelphia, USA.
4. Rahman, Z.U., B. Aslam, J.A. Khan and T. Khaliq. 2007. Manual of Physiology-I&II, 2nd ed. MAS Computers, Faisalabad, Pakistan.
5. Tortora, G.J. 2008. Principles of Anatomy and Physiology, 12th ed. John Wiley & Sons, Inc., New York, USA.

Course Name: English-III	**Course Code: ENG-410**
Course Structure: 3 Lectures	**Credit Hours:** 3(3-0)
Prerequisites: None	

Objectives:

Enhance language skills and develop critical thinking

Course Contents:

Presentation skills

Essay writing
Descriptive, narrative, discursive, argumentative

Academic writing
How to write a proposal for research paper/term paper
How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency)

Technical Report writing
Progress report writing

Note: Extensive reading is required for vocabulary building

Recommended Books:

Technical Writing and Presentation Skills:

a) Essay Writing and Academic Writing
   1. Writing. Advanced by Ron White. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 435407 3 (particularly suitable for discursive, descriptive, argumentative and report writing).
   2. College Writing Skills by John Langan. McGraw-Hill Higher Education. 2004. Patterns of College Writing (4th edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press.

b) Presentation Skills

c) Reading
   The Mercury Reader. A Custom Publication. Compiled by norther Illinois University. General Editiors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).
   1.

Course Name: Food Microbiology	**Course Code: FST-413**
Course Structure: 3 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To identify various types of microorganisms on the basis of morphological, cultural and physiological characteristics

To grasp knowledge about the microbial contamination of foods and factors affecting the growth of microorganisms

To familiarize students about food borne infections, intoxications and role of probiotics in our daily life

Theory:

Food microbiology: introduction and scope; Important microbial genera in foods: bacteria, mold, yeast and yeast like fungi, viruses general, morphological, cultural

and physiological characteristics; Factors affecting the growth and survival of microorganisms in food: intrinsic, extrinsic and implicit; Contamination and spoilage of perishable, semi perishable and stable foods: sources, transmission, microorganisms; Food microbiology and public health: food-borne infections: intoxications; Microbiological risk assessment; Microbiology in food sanitation: food sanitizers and pathogen reduction a case study; Food fermentation; Probiotics in human health.

Practical:

Isolation, identification and characterization of microorganisms: morphology, biochemical; Enumeration of microorganisms in food and water samples (total count, viable count, MPN); Examination of foods for pathogenic organisms (*Escherichia coli*, Coliform, *Salmonella* and *Listeria*monocytogenes); Preparation of fermented and probiotic enriched food products.

Suggested Readings:

1. Adams, M.R. and M.O. Moss. 2006. Food Microbiology. The Royal Society of Chemistry, Cambridge, UK.
2. Adams, M.R., M.O. Moss and P. McClure. 2016. Food Microbiology, 4th ed. Royal Society of Chemistry, Cambridge, UK.
3. Brown, M. and M. Stringer. 2002. Microbiological risk assessment in food processing. Woodhead Publishing Ltd. Cambridge, UK. Frazier, W.C., D.C. Westhoff and K.N. Vanitha. 2013. Food Microbiology, 5th ed. McGraw-Hill Book Co., New York, USA.
4. Montville, T.J., K.R. Mathews and K.E. Kniel. 2012. Food microbiology: an introduction, 3rd ed. ASM Press, Washington DC, USA.
5. Ray, B. and A. Bhunia. 2013. Fundamentals of Food microbiology, 5th ed. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.

Course Name: FOOD SAFETY AND QUALITY MANAGEMENT	**Course Code: FST-414**
Course Structure: 3 Lectures	**Credit Hours: 3+0**
Prerequisites: None	

Learning Outcomes:

To understand principles lying under safety and quality of foods to ensure their safe production

To implement the food safety and quality management systems in a food business in a precise and systematic way

Theory:

Food safety, security and quality: definitions and importance; Different terminologies used in food safety & quality; Categories of hazards: Physical, chemical, biological. Good manufacturing practices; Good storage practices; Plant design layout; Global Food Safety Imitative; Global Food Safety Systems: HACCP, BRC, FSSC 22000, ISO 22000; Quality Management System (ISO 9001:2008); Food safety laws in Pakistan—West Pakistan Pure Foods Ordinance 1960,

Cantonments Pure Food Ordinance Act 1966, West Pakistan Pure Food Rules 1965, The Punjab Pure Food Rules 2007 & 2011.

Suggested Readings:

1. Ali, I. 2003. Food Quality Assurance: Principles and Practices. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
2. David A.S. and F.S. Norah. 1998. Principles and Practices for the Safe Processing of Foods. Woodhead Publishing Limited, Cambridge, England.
3. Early, R. 1995. Guide to Quality Management Systems for the Food Industry. Springer Science + Business Media, LLC., New York, USA.
4. Motarjemi, Y and Lelieveld, H. 2014. Food Safety Management: A Practical Guide for the Food Industry. Academic Press, Elsevier Inc., San Diego, CA, USA.
5. Sun, D. 2012. Handbook of Food Safety Engineering. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
6. Theuvsen, L., A. Spiller, M. Peupert and G. Jahn. 2007. Quality Management in Food Chains. Wageningen Academic Publishers, The Netherlands.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF FOOD AND NUTRITION (4 YEARS PROGRAM)

SEMESTER – IV

Course Name: Bio-Statistics	**Course Code: STAT-401**
Course Structure: 2 Lectures 1 Practical	**Credit Hours: 3(2+1)**
Prerequisites: None	

Definition and importance of Statistics in Agriculture, Data Different types of data and variables. Classification and Tabulation of data, Frequency distribution, stem-and-Leaf diagram, Graphical representation of data Histogram, frequency polygon, frequency curve. Measure of Central tendency, Definition and calculation of Arithmetic mean, Geometric mean, Harmonic mean, Median quantiles and Mode in grouped and un-grouped data.

Measure of Dispersion, Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.

Practical:

a. Frequency Distribution
b. Stem-and-Leaf diagram
c. Various types of Graphs
d. Mean, Geometric mean Harmonic Mean,
e. Median, Quartiles Deviation, mean Deviation.
f. Standard Deviation, Variance, Coefficient of variation,
g. Skewness and kenosis

Recommended Books:

1. Introduction to Statistical Theory Part- I by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. A. Concise Course in A. Level Statistic with world examples by J. Crashaw and J. Chambers (1994)
4. Basic Statistics an Inferential Approach 2nd ed. (1986) Fran II. Dietrich-II and Thomas J. Keans

Course Name: HUMAN ANATOMY	**Course Code: HND-415**
Course Structure: 2 Lectures 1 Practical	**Credit Hours: 2+1**
Prerequisites: None	

Learning Outcomes:

To acquaint knowledge about structural components of body

To know about histology and blood composition for the identification of diseases

Theory:

Introduction: grass anatomy, histology; Terminology: bones & joints, muscles, cartilage, body structure, tissue, cell, organs; Digestive system: oral cavity, stomach, small & large intestine; Urinary system/ excretory: kidneys, ureter, bladder, urethra; Cardio-vascular system: heart and Pericardium, Arteries system, venous system/ Major arteries & veins; Respiratory system: Upper respiratory- Pharynx, Larynx, Trachea sinuses; Lower respiratory- Bronchus, Lungs, Diaphragm; Reproduction system: Male-Testis, Spermatic cord, Penis, Prostate, Bulbourethral gland/ other glands; Female: Ovaries, Fallopian tubes, Uterus, Vagina, Vulva, Breast; Endocrinology: Pituitary, Thyroid, Parathyroid, Thymus, Adrenal, Renal, super renal; Lymphatic system: Lymph, Lymph vessel, lymph node; Nervous system: Brain, Spinal cord, Cranel nerves, Brachial plexus, Sciatic nerve; Sensory organs: Eyes, Ears, Taste buds, Smell, Touch.

Practical:

Four primary tissues of body - Epithelium tissues: Introduction, types, epithelial glands - endocrine & exocrine, connective tissues: loose connective tissue, collagenous, elastic and reticular fiber; Te-cell of loose cartilage (fibroblast, fat cell, plasma cell, macrophages, mast cell); Blood: leukocytes, WBC, RBC & Platelets; Cartilage and its types; Muscle and its types; Histology in: GIT, respiratory, urinary systems, breast, uterus. Microscopy and preparation of histological slides.

Suggested Readings:

1. Agur, M.R. and F.D. Arthur. 2009. Grant's Atlas of Anatomy. Lippincott Williams and Wilkins, New York, U.S.A.
2. David, C. 2007. Anatomy of Hatha Yoga: A Manual for Students, Teachers and Practitioners. National Banarisdass Publishers (Pvt.) Ltd., New Delhi, India.
3. Gerard, J. T. and T.N. Mark. 2009. Principles of Human Anatomy. John Wiley and Sons, Inc., New York, USA.

Course Name: Assessment of Nutritional Status	**Course Code: HND-416**
Course Structure: 3 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To impart hands-on training in nutritional assessment techniques to diagnose health problems

To understand and apply dietary guidelines for standard nutrient intake To select an appropriate method for measuring dietary needs of hospitalized patients.

Theory:

Nutritional assessment systems: nutrition surveys, nutrition surveillance, nutrition screening. Nutritional assessment methods: Anthropomorphic, biochemical, clinical, dietary. Measuring food consumption at national level: food balance sheets, total diet consumption. Food consumption at the household levels: food account, household food records, household 24-hour food record. Measuring food consumption at individual levels: 24-hour recall, repeated 24-hour recall, weighed food records, diet history, food frequency questionnaire. Selecting an appropriate method: determining the mean nutrient intake, calculating the population at risk, ranking individuals by food and nutrient intake.

Practical:

Practicing methods of nutritional assessment (ABCD of Nutritional assessment); Comparison of the data with references values for drawing conclusions.

Suggested Readings:

1. Driskell, J.A. and Wolinsky, I. 2011. Nutritional Assessment of Athletes, 2nd ed.

CRC Press, Taylor & Francis Group, New York, USA.
2. Gibson, R.S 2005. Principles of Nutrition Assessment. Oxford University Press Inc., New York, USA.
3. Lee, R.D. and Nieman, D.C. 2012. Nutritional Assessment, 6th ed. The McGraw-Hill Companies Inc., New York, USA. McGuire, M. and Beerman, K.A. 2011. Nutritional Sciences: From Fundamentals to Food.Cengage Learning, Belmont, CA, USA.

Course Name: Nutrition Through the Life Cycle	**Course Code: HND-417**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To analyze the nutritional needs during conception, infancy, childhood, adolescence, male and female adults, pregnancy, lactation and during aging

To suggest dietary recommendations in special clinical conditions

Theory:

Preconception nutrition: overview, reproductive physiology, nutrition related disruption in fertility, nutrition and contraceptives, other nutrition concerns, premenstrual and polycystic ovary syndrome, obesity and fertility, diabetes prior to pregnancy, disorders of metabolism. Nutrition during pregnancy: status of pregnancy outcomes, embryonic and fetal growth & development, pregnancy weight gain, nutrition and outcome of the pregnancy, common health problems during pregnancy, nutrient needs and dietary guidelines during pregnancy. Nutrition and lactation: human milk composition, benefits of breast feeding, breast milk supply and demand, maternal diet during lactation, factors influencing breastfeeding initiation and duration, common breast feeding conditions, medical contradictions in breast feeding. Infant nutrition: assessing new born health, energy and nutrient needs, development of infant feeding skills, common nutritional problems and concerns, infants at risk. Toddlers and pre-schooled nutrition: normal growth and development, energy and nutrient needs, common nutritional problems, nutrition related conditions, food allergies and intolerances. Child and pre-adolescent nutrition: normal growth and development, energy and nutrient needs, common nutritional problems, prevention of nutrition related disorders, dietary recommendations. Adolescent nutrition: normal physical growth and development, health and eating related behavior, energy and nutrient requirements, overweight and obesity, eating disorders. Adult nutrition: physiological changes of adulthood, maintaining a healthy body, dietary recommendations, nutrient recommendations, nutrition intervention for risk reduction. Geriatric nutrition: physiological changes, nutritional risk factors, dietary recommendations and food safety, nutrient recommendations, nutrition in special clinical conditions.

Suggested Readings

1. Brown, J.E. 2014. Nutrition through the Life Cycle, 5th ed. Cengage Learning, Belmont, CA, USA.

2. Rolfes, S.R., K. Pinna and E. Whitney. 2015. Understanding Normal and ClinicalNutrition, 10th ed. Thomson and Wadsworth Publishers, USA.
3. Shetty, P. 2002. Nutrition Through the Life Cycle. Leatherhead International Ltd. And Royal Society of Chemistry, Cambridge, U.K.
4. Worthington-Roberts, B.S. and S.R. Williams. 2000. Nutrition Throughoutthe Life Cycle. The McGraw-Hill Education, Maidenhead, Berkshire, U.K.

Course Name: General Pathology	**Course Code:HND-418**
Course Structure: 3 lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To understand the basic terminologies in different pathological states

To elaborate the cell injuries, necrosis, their types and practical applications of pathology

Theory:

Scope of pathology and concept of diseases; Definition and terminology: Ischemia, Hypoxia, Necrosis, Infarction, Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Plasia, Anaplasia; Response of body to injury and infection, growth disturbance, circulatory disturbances, wound healing and repair, neoplasia, fever, disturbance of mineral deposits and pigmentation, anaemia, diarrhoea, burn injury, infectious diseases, hypertension, acute & chronic inflammation, immunity, allergy, hypersensitivity, ulcer (peptic, duodenal), leukemia or blood cancer, environmental and nutritional diseases; Diagnosis and treatment of Cancer in general, fate, survival and prognosis with tumors.

Practical:

Selection, collection, preservation and dispatch of morbid material for laboratory examination; Study of pathological slides of various pathological conditions; Demonstration of blood sampling; Basic concepts of anemia; Demonstration of routine urinalysis, faecal examination and skin scraping; Blood smears, staining and examination; Hematology report interpretation, basic concepts of contents and interpretation of pathology report (serum enzymes and other markers of disease).

Suggested Readings:

1. Carton, J. 2012. Oxford Handbook of Clinical Pathology, 1st ed. Oxford University Press, New York, U.S.A.
2. Kierszenbaum, A.L. and L. Tres. 2015. Histology and Cell Biology: Introduction to Pathology, 4th ed. Elsevier Sunders, Philadelphia, PA, USA.
3. Kumar, V., A.K. Abbas, N. Fausto, and J.C. Aster. 2015. Robbins and Cotran Pathologic Basis of Disease, 9th ed. Saunders Elsevier, USA.
4. McPhee, S.J. and W.F. Ganong. 2014. Pathophysiology of Disease: An Introduction to Clinical Medicine, 7th ed. McGraw-Hill Education, Bew York, USA.

Course Name: Food Analysis	**Course Code: FST-419**
Course Structure: 1 Lecture 2 Practical	**Credit Hours:** 3(1+2)
Prerequisites: None	

Learning Outcomes:

To highlight the significance of food analysis in product development and overall quality

To comprehend commonly employed types of analysis for product characterization

To prepare and standardize commonly used lab solutions

Food analysis: significance; Sampling: techniques, preparation, preservation; Physical properties and analysis of foods and food products: appearance, texture, specific gravity, refractive index, rheology; Chemical analysis: significance; Proximate analysis: moisture, ash, proteins, lipids, carbohydrates, fiber, NFE, acidity, pH, sugars, mineral elements, vitamins – significance, methods; Chromatography: paper, thin layer; Spectroscopy: atomic emission, atomic absorption; Sensory evaluation of foods: attributes, difference and preference tests, consumer acceptance. Overview of the commonly employed statistical methods.

Practical :

Lab safety requirements; Preparation and standardization of laboratory solutions; Sampling; Determination of specific gravity, refractive index, moisture, ash, crude protein, crude fat, crude fiber, NFE, pH and acidity; Estimation of vitamin C; Determination of mineral elements through flame photometer and atomic absorption spectrophotometer; Paper and thin layer chromatography; Identification of toxins by TLC; Sensory evaluation of foods.

Suggested Readings:

1. AOAC. 2016. Official Methods of Analysis of AOAC International, 20th ed. Association of Official Analytical Chemists, Arlington, USA.
2. Awan, J.A. and S.U. Rehman. 2015. Food Analysis Manual. Unitech Communications, Faisalabad, Pakistan.
3. Cruz, R.M.S., I. Khmelinskii and M. Vieira. 2014. Methods in Food Analysis. CRC Press. Taylor & Francis Group, Boca Raton, F.L, USA.
4. Pomeranz, Y. and C.E. Meloan. 2000. Food Analysis: Theory and Practice, 3rd ed. Chapman & Hall, New York, USA.
5. Winton, A. and K.B. Winton. 2006. Techniques of Food Analysis. Agrobios Publishing Co., Jodhpur, India.

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DETAILED COURSE OUTLINE OF FOOD AND NUTRITION (4 YEARS PROGRAM)

SEMESTER – V

Course Name: Fundamentals of Dietetics	**Course Code: HND-511**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To understand the discipline of dietetics and its role in human wellbeing

To familiarize with the foundations of healthy diets and their role in disease prevention and management

To acquaint hands-on training for calorie calculation and menu planning using food composition table and data bases

To assess BMI and energy expenditures in relation to overweight and obesity

Theory:

Dietetics: definitions, history, importance; Dietitian: role in food service and clinical practice, responsibilities in multidisciplinary team, code of ethics; Foundations of healthy diet: Dietary Reference Intakes, Recommended Dietary Allowance, Food Guide Pyramid and allied approaches, Dietary Guidelines, Exchange system and menu planning; Energy expenditure and basal metabolism; Body mass index; Role of diet in disease conditions; Diet therapy and its principles; Food selection and factors affecting its acceptance; Nutrient density; Alternative patterns of food consumption; Nutritional counselling in clinical practice. Critical diet assessment. Nutrition and diet clinics.

Practical:

Interpretation of food guide pyramid, MyPyramid, Myplate, Eatwell Plate; Energy value of different foods: carbohydrates, fats, proteins; Calculating energy requirements; BMI in relation to obesity and overweight, energy and calorie requirements; Balanced diet and menu planning using exchange lists, food composition tables & data bases; Food intake analysis: Dietary Recall, Food Frequency Questionnaires, Food Surveys.

Suggested Readings:

1. Mahan, L.K., S. Escott-Stump and J.L. Raymond. 2012. Krause's Food, Nutrition & Diet Therapy, 13th ed. Elsevier Saunders, St. Louis, Missouri, USA.
2. Mudambi, S.R. and M.V. Rajagopal. 2007. Fundamentals of Foods, Nutrition & Diet Therapy, 5thed. New Age International Pvt. Ltd. Publishers, New Delhi.
3. Punekar, M. and J. D'Souza. 2010. Handbook of Applied Nutrition, Dietotherapy and Diet Management. SBS Publishers & Distributors Pvt. Ltd., New Delhi.
4. Rawat, S. 2015. Applied Nutrition. Random Publication, New Delhi.

Schlenker, E. and J.A. Gilbert. 2015. Williams' Essentials of Nutrition and Diet Therapy, 11th ed. Elsevier/Mosby Inc., Louis, Missouri.
5. Singh, J. 2008. Handbook of Nutrition and Dietetics. Lotus Press, India.

Course Name: Nutritional Psychology	**Course Code: HND-512**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To understand psychology, its types and importance in nutrition

To abreast the impact of psychological influences on appetite and attitude behavior relationship

Theory:

Psychology: introduction, types, classification; Psychology and nutrition adherence; Attitude and eating patterns and the field of cognitive psychology; Perception, visualization and eating patterns, errors in perception process; Eating disorders: diagnosis, assessment and treatment; Face perception; Conceptual model of food choice; Psychological influences on appetite; Process over the life course, integration of biological, social, cultural and psychological influences on food choice; Understanding behaviour: sensation, sense organs/special organs, attention and concentration, memory and its stages, methods for improvement, types and theories of thinking, cognition and levels of cognition, problem solving and decision making strategies, attitude behavior relationship; Measurement issues, indirect effects of attitude on behavior; The theory of reasoned action; Additional variables within the theory of planned behavior; Personality and intelligence; Stress management.

Suggested Readings:

1. Blackman, M.C. and C.A. Kvaska. 2011. Nutrition Psychology: Improving Dietary Adherence. Jones and Bartlett Learning Publishers, Ontario, Canada.
2. Booth, D.A. 1994. The Psychology of Nutrition. Taylor & Francis Inc., Bristol, PA, USA.
3. Elmes, D.G., B.H. Kantowitz and H.L. Roediger. Research Methods in Psychology, 9th ed. Wadsworth Cengage Learning, Belmont, CA, USA.
4. Jane O. 2010. The Psychology of Eating: From Healthy to Disorders Behavior, 2nd ed. Wiley Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

Course Name: Nutritional Education and Awareness	**Course Code: HND-513**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To learn the techniques of creating awareness about health issues in masses

To acquire information about different modes of communication and their effective use

To understand the ethical responsibilities for dissemination of knowledge**.**

Theory:

Nutrition education: introduction, history, need, competencies and skills, framework, training needs, new development; Nutrition education programs: scope and challenges of educating people about eating well; Biological influences, cultural and social preferences; Education and communication strategies for different groups and settings; Evaluation of nutrition education programs; Family and psychological factors; Expectancy-value theories of motivation, social and cognitive theory; Behavior change as a process, phases of change; Addressing multiple and overlapping influences on behavior; A logical model approach for planning a framework of nutrition education;
Understanding communication model, preparing/organizing oral presentations, delivering oral presentation, delivering nutrition education workshops, types of supporting visual aids, nutrition mass media communication campaigns, social marketing; Ethics in nutrition education, conflicts, participating process in community coalition; Non-government and public health organizations and their current programs.

Practical:

Nutritional counseling; Program designing for specific diseases like anemia, neural tube defects, rickets, etc.; Surveys and seminars in different educational institutions; Individual presentations by students on different nutrition topics; Visits of public places for nutrition awareness; Independent student projects.

Suggested Readings:

1. Contento, I.R. 2007. Nutrition Education: Linking Research, Theory and Practice. Jones and Bartlett Publishers, Ontario, Canada.
2. FAO. 1997. Nutrition Education for the Public: Discussion Papers of the FAO Expert Consultation. Food and Agriculture Organization of the United Nations, Rome, Italy.
3. Semba, A.D. and M.W. Bloem. 2008. Nutrition and Health in Developing Countries, 2nd ed. Humana Press, New York, USA.
4. Walter, W. 2013. Nutritional Epidemiology, 3rd ed. Oxford University Press, New York, USA.

Course Name: Meal Planning and Management	**Course Code: HND-514**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

- To understand the importance of meal planning and its role in everyday life
- To apply the principles of meal planning in the planning of balanced and appropriate meals keeping in mind the nutritional requirements, family budget and food requirements choices of different age groups
- To identify market trends and conditions while purchasing food keeping in mind food costs and quality

Theory:

Importance and principles of meal planning for family and occasions; Nutritional value of meal; Family meal budgeting; Rules for good menu planning; Menu planning for families; Selection of various foods in relation to season and market conditions; Composition and storage of food; Selection, use and care of table appointments; Study of different types of

table settings, table manners and etiquettes; Kitchen safety and settings; Basics of food hygiene and sanitation; Food labeling; Menus for schools, geriatric and healthcare centers.

Practical:

Survey and record keeping of market prices (retail & wholesale); Types of foods available in the market from different food groups. *e.g.* retail cuts of meat and types of milk; Comparison of weight, volume and effect of cooking on color, taste and texture of different foods; Planning, preparation and service of meals for different occasions at different income levels; Understanding food labels; Market visits for cost and quality and food marketing regulations. Food service visits (Restaurants, School, Colleges, and Hospitals).

Suggested Readings

1. Brown, A. 2015. Understanding Food Principles & Preparation, 5th ed. Cengage Learning, Belmont, CA, USA.
2. McWilliams, M. 2012. Fundamentals of Meal Management, 5th ed. Dorling Kindersley India Pvt. Ltd., New Delhi, India.
3. Narvaez-Soriano, S. 2004. A Guide to Meal Management and Table Services. Rex Book Store, Manilla, Philippine.
4. Sethi, M. 2008. Institutional Food Management. New Age International Pvt. Ltd. New Delhi, India.

Course Name: Public Health Nutrition	**Course Code: HND-515**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To figure out global and local scenario of public health nutrition

To understand the core concepts and assessment methods at the population level

To acquaint hands-on training for development of policies related to nutrition and possible gaps in the matrix of nutrition policies

Theory:

Public health nutrition: overview, concepts, determinants, foundations; Disease burden and its control; Health promotion and disease prevention; Modes of intervention, monitoring and surveillance; Safety and health at work place; Public health nutrition: assessment and programs. Nutritional surveillance and growth monitoring; Public health policies and strategies; Marketing nutrition programs in public; Public health nutrition: a field of practice; Public health nutritionist: competencies, duties, responsibilities, and ethics.

Practical:

Food and nutrition surveys for monitoring of public health; Community need assessment; Planning, implementation and monitoring nutrition intervention program based on the need assessment of the community; Marketing nutrition programs in the public; Visit of various public health departments.

Suggested Readings:

1. Edelstein, S. 2011. Nutrition in Public Health: A Handbook for Developing Programs and Services, 3rd ed. Jones & Bartlett Learning, Sudbury, M.A, USA.
2. Gibney, M.J., B.M. Margette and J.M. Kearney. 2004. Public Health Nutrition. Blackwell Science Ltd. Oxford, UK.
3. Lawrence, M. and T. Worsley. 2007. Public Health Nutrition: From Principles to Practice. Allen &Unwin Book Publishers, Australia.
4. McKenzie, J.F. and R.R. Pinger. 2015. An Introduction to Community & Public Health. 8th ed. Jones & Bartlett Learning, LLC Burlington, MA, USA.
5. Spark, A. 2007. Nutrition in Public Health: Principles, Policies and Practice. CRC Press, Taylor & Francis, Boca Raton, FL, USA.

Course Name: Food and Drug Laws	**Course Code: FST-516**
Course Structure: 2 Lectures	**Credit Hours:** 2(2+0)
Prerequisites: None	

Learning Outcomes:

To get know how about the existing food and drug laws prevailing in the country

To understand duties and authorities of food safety officers and drug inspectors

To familiarize with food and drug laws enforcement agencies in Pakistan

Theory

Punjab Pure Food Rules 2011: legal terms and definitions from the food industry; Rules for food additives, categories, permissible limits; Food packaging: rules, criteria for packaging material, labeling requirements; Duties and responsibilities of public analysts and food safety officer; The Drug Regulatory Authority of Pakistan Act, 2012; DRAP Alternative Medicines and Health Products Enlistment Rules 2014; Halal food dietary laws. Consumer protections laws in Pakistan; The Punjab Consumer Protection Rules 2009; The Punjab Consumer Protection Act 2005; The Pakistan Hotels and Restaurants Act, 1976; The Punjab Food Authority Act 2011; The Pakistan Halal Authority Act 2015; Pakistan National Accreditation Council; Punjab Halal Development Agency; Pakistan Standards and Quality Control Authority (PSQCA); Role of electronic and print media in public awareness and empowerment.

Suggested Readings:

1. GOP. 2005. The Punjab Consumer Protection Act 2005. Government of the Punjab, Lahore, Pakistan.
2. GOP. 2011. Punjab Pure Food Rules 2011. Health Department, Government of the Punjab, Lahore, Pakistan.
3. GOP. 2012. Drug Regulatory Authority of Pakistan Act, 2012 The *DrugRegulatory Authority of Pakistan,* Government of the Pakistan, Islamabad.
4. GOP. 2015. *Pakistan* Halal *Authority Act*, *2015. M*inister for Science and Technology, Government of the Pakistan, Islamabad.
5. Independent topics for readings.

SEMESTER – VI

Course Name: Advance Dietetics	**Course Code: HND-517**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To comprehend the principles of diet therapy and therapeutic nutrition

To understand the role of dietary management in various health disorders related to upper and lower gastrointestinal tract, hepatic, pancreas and coronary heart diseases

To acquaint hands-on training for the dietary modification of normal diets aligned with various health disorders

To prepare pre- and post-operative diets

Theory:

Introduction to diet therapy; Principles of diet therapy and therapeutic nutrition; Therapeutic modifications of normal diets; Dietary management in various health disorders (objective, physiology, food choices, diet plans): Diet in the diseases of the upper gastrointestinal tract – mouth, dental disease, pharynx, esophagitis; hiatal hernia; gastritis; peptic ulcer; Diet in the diseases of the lower gastrointestinal tract - constipation, diarrhoea, mal-absorption syndrome, lactose Intolerance, celiac disease, inflammatory bowel disease, Crohn's disease, ulcerative colitis, irritable bowel syndrome, diverticular disease, gastric surgery, dumping syndrome, small bowel resections, short bowel syndromes, blind loop syndrome, ileostomy or colostomy; Diet in the diseases of liver and accessory organs - hepatitis, hepatic steatosis, non-alcoholic hepatic steatosis, alcoholic liver disease, cirrhosis, hepatic encephalopathy; cholelithiasis, cholecystitis, cholangitis; Pancreatitis; Nutrition education and primary health care camp.

Practical:

Steps in nutrition care; Types of diets: regular diet, clear liquid diet, full liquid diet, soft diet, bland diet; Dietary modification for texture, energy, nutrients and fluids; Planning of energy modified diets: high calorie diet, restricted calorie diet, high fiber diet, low residue diet, modified carbohydrates diet, moderate carbohydrate diet, modified fat diet, restricted fats diet; Planning and preparation of diets for various pathological conditions; Nutrition in surgical conditions: pre- operative and post-operative diets; Enteral and parenteral feeding; Hospital visits and nutrition camps.

Suggested Readings:

1. Mahan, L.K., S. Escott-Stump and J.L. Raymond. 2012. Krause's Food, Nutrition & Diet Therapy, 13th ed. Elsevier Saunders, St. Louis, Missouri, USA.
2. Mudambi, S.R. and M.V. Rajagopal. 2007. Fundamentals of Foods, Nutrition & Diet Therapy, 5thed. New Age International Pvt. Ltd. Publishers, New Delhi.
3. Punekar, M. and J. D'Souza. 2010. Handbook of Applied Nutrition, Dietotherapy and Diet Management. SBS Publishers & Distributors Pvt. Ltd., New Delhi.
4. Rawat, S. 2015. Applied Nutrition. Random Publication, New Delhi.
5. Schlenker, E. and J.A. Gilbert. 2015. Williams' Essentials of Nutrition and

Diet Therapy, 11th ed. Elsevier/Mosby Inc., Louis, Missouri.

6. Singh, J. 2008. Handbook of Nutrition and Dietetics. Lotus Press, India.

Course Name: Functional Foods and Nutraceuticals	**Course Code: HND-518**
Course Structure: 3 Lectures	**Credit Hours:** 3(3-0)
Prerequisites: None	

Learning Outcomes:

To find out sources of functional foods &nutraceuticals and their impact on nutrition and health

To familiarize with the standards and regulations used globally regarding regulatory issues and usage of functional foods

To assess international trade and marketability of functional foods

Theory:

Functional foods and nutraceuticals: past, present, future and health claims; functional foods and their impact on nutrition and health obesity, diabetes, cardiovascular diseases, hypertension and cancer; Functional ingredients and bioactive molecules: Isoflavones, lycopene, polyphenols, dietary fiber, omega-3 & -6 fatty acids, conjugated linoleic acid, antioxidants, prebiotic and probiotic; Functional foods from different food groups: cereals, dairy, meat, fruits and vegetables; Regulatory systems governing the production and distribution of functional food - national and international; Standard and regulations of various agencies: FDA, EC, FAO/WHO, Health Canada; Guidelines for the assessment of functional foods; Marketing and regulatory issues; Conventional and emerging food processing technologies for functional food production; Toxicological and safety aspects of functional foods; Asian functional foods; Functional foods in international market and growth in Pakistan.

Suggested Readings:

1. FAO (Food and Agriculture Organization of the United Nations). 2007. Report on Functional Foods. Food and Agriculture Organization of the United Nations, Rome, Italy.
2. Shi, J., C.T. Ho and F. Shahidi. 2005. Asian Functional Foods. Marcel Dekker/CRC Press, New York, U.S.A. Shi, J., G. Mazza and M.L. Maguer. 2002. Functional Foods: Biochemical and Processing Aspects, Vol. 2. CRC Press, Traylor & Francis Group, Boca Raton, New York, USA.
3. Wildman, R.E.C. 2006. Handbook of Nutraceuticals and Functional Foods, 2nd ed. CRC Press, Traylor & Francis Group, Boca Raton, New York, USA.

Course Name: Nutrition Through Social Protection	**Course Code: HND-519**
Course Structure: 2 Lectures	**Credit Hours:** 2(2-0)
Prerequisites: None	

Learning Outcomes:

To acquaint knowledge about the role of social protection programs in poverty alleviation and overall welfare of the society

To understand the role of social protection programs in provision of financial support for scaling up nutrition

To identify the development partners and various social protection and scale up nutrition programs

Theory:

Food insecurity and vulnerability; Food and social class differences; Food society and environment; Introduction to sociology of nutrition; Food and nutrition in culturally diverse societies; Social change and rural development; Women empowerment and nutrition; Food choices and their determinants; Behavior change; Social construction and eating disorders; Challenges to combat malnutrition; Nutrition-sensitive and nutrition-specific interventions; Economic opportunities among the poor; Nutrition and gender sensitive policies and strategies of social protection sector; Social assistance, income generation, risk reduction and risk management; Current social protection programs in the public and private sector; Community development projects; Medical social services projects; Role of social welfare/protection sector to scale-up nutrition; Impact of individual financial assistance programs; Backyard poultry farming and backyard kitchen gardening; Social protection strategies in Pakistan and South Asia; Social safety nets for vulnerable group; Role of various development partners, (such as NGOs, INGOs, Asian Development bank, World Bank, USAID, and DFID) in social protection and scaling up nutritional status.

Suggested Readings:

1. FAO. 2015. Improving Nutrition Through Multisectoral Approaches. Food and Agriculture Organization of the United Nations, Rome Italy.
2. FAO. 2015. Nutrition and Social Protection. Food and Agriculture Organization of the United Nations, Rome Italy.
3. IFPRI. 2016. Global Nutrition Report 2016: From Promise to Impact: Ending Malnutrition by 2030. International Food Policy Research Institute, Washington, DC, USA.
4. World Bank, UNICEF, WFP, USAID, ADB and Government of Pakistan Reports

Course Name: Sports Nutrition	**Course Code: HND-521**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To emphasize the importance of proper fueling for physical activity, pre-and post-workout

To provide an overview about dietary supplements, how they are regulated and how to avoid use of contaminated dietary supplements

To highlight the risks associated with performance enhancing drugs including

anabolic androgenic steroids

Theory:

The principles of fitness, motivation and conditioning; Nutrition for the athletes, stress management, preventing accidents, stretching, posture and aerobics; Vitamins and minerals supplementation for fitness; High and low intensity exercise, cross training, walking for weight control and case studies; Introduction to muscle contraction, fast and slow fibres, energy storage, fuels used for exercise; Energy balance, fluid balance, fuelling cycle: Pre-exercise, during exercise and during recovery; Athletes eating plan, calorie goals, calorie values, carbohydrate goals, protein goals, fat, vitamins and mineral goals; Competition nutrition; Loosing, gaining and making weight for athletes; Eating disorder and athletes; Sports drink and supplementation; National and international regulations for supplements; Risks associated with performance enhancing drugs; Metabolic Equivalent Task; My pyramid for sportsman.

Practical:

Bioelectric impedance analysis; Sweat rate and hydration status calculation; Calculation of BMR and RMR; Diet planning for different sportsmen like body builders, athletes, swimmers, etc. Preparation of sports drinks and food products according to accelerated needs; Use of sports supplements. Visit of sports centers and fitness clubs.

Suggested Readings:

1. Antonio, J., D. Kalman, J.R. Stout, M. Greenwood, D.S. Willoughby and G.G. Haff. 2008. Essentials of Sports Nutrition and Supplements. Humana Press, New York, USA.

Driskell, J.A. 2007. Sports Nutrition Fats and Proteins. CRC Press, Taylor and

1. Francis Group, Boca Raton, FL, USA.
2. Fink, H.H., A.E. Mikesky and L.A. Burgoon 2011. Practical Applications in Sports Nutrition, 3rd ed. Jones & Bartlett Learning Burlington, MA, USA.
3. Lanham-New, S.A., S.J. Stear, S.M. Shirreffs and A.L. Collins. 2011. Sports and Exercise Nutrition. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
4. Maughan, R.J. 2000. Nutrition in Sport: The Encyclopedia of Sports Medicine. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

Course Name: Infant and Young Child Feeding	**Course Code: HND-522**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes

To identify problems affecting infant and young child feeding and provide a framework of essential interventions

To create an environment that will enable mothers, families and other caregivers to implement optimal feeding practices

Theory:

Infant young child feeding: introduction, global strategy, importance of breastfeeding,

local and international scenario, breastfeeding working; Breastfeeding practices: assessing a breastfeed, taking a feeding history, common breastfeeding difficulties, expressed breast milk; Breastfeeding counselling: listening and learning, building confidence and giving support, counselling for infant feeding decisions, counselling cards tools; Complementary feeding practices: importance, cup-feeding and hygienic preparation of food, replacement feeding in the first 6 months, foods to fill energy and micronutrients gap, quantity and frequency of feeding, feeding techniques, food demonstration; Breastfeeding related topics: growth charts, maternal illnesses and breast feeding, breast conditions, health care practices, International code of marketing of breast milk substitutes, checking understanding and arranging follow-up, feeding during illness and low-birth-weight babies; Feeding guidelines of various global agencies – WHO etc.; Complex challenges to implementing the global strategy for infant and young child feeding.

Practical:

Breastfeeding counselling; Preparation of indigenous complementary foods; Therapeutic foods; Infant formulas for various needs; Growth monitoring: APGAR (Appearance, Pulse rate, Grimace, Activity and Respiration) score, Growth charts. Visits of hospitals and day care centers.

Suggested Readings:

1. Behan, E. 2008. The baby Food Bible – A Complete Guide to Feeding Your Child from Infancy On, 1st ed. Random House Publishing Group, New York, USA.
2. Dykes, F. and V.H. Moran. 2009. Infant and Young Child Feeding: Challenges to Implementing a Global Strategy. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
3. Samour, P.Q. and K. King. 2010. Pediatric Nutrition, 4th ed. Jones & Bartlett Learning, Mississauga, Canada.
4. WHO. 2003. Global Strategy for Infant and Young Child Feeding. World Health Organization, Geneva, Switzerland.
5. WHO/UNICEF/GOP (World Health Organization/United Nation's Children Fund/Government of Pakistan). 2008. Infant and young child feeding counselling: an integrated course. Nutrition Wing, Ministry of Health, Government of the Pakistan, Islamabad.

Course Name: Clinical Biochemistry	**Course Code: BCHM-561**
Course Structure: 2 Lectures 1 Practical	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To understand the role and requirements of clinical laboratory and how chemical and biochemical analysis are applied to the study of disease

To discuss the function, structure, laboratory investigation and diseases of the different body systems

To correlate laboratory findings in clinical samples with various pathological

processes

Theory:

Clinical laboratory: organization and management, safety, good lab practices, quality control and assurance, reference range and normal values, laboratory data processing; Handling and processing of clinical samples; Effect of storage on composition of samples; Commonly used instruments in clinical laboratory: Microscope, Minilab apparatus, X-ray, ECG, MRI, ELISA reader, CT scan etc.; Symptomlogy and case histories of various diseases. Forensic science, Molecular basis of diagnosis.

Practical:

Blood sampling techniques; Complete blood picture (CBP) like Hb, PCV, ESR, TLC, DLC, bleeding time, clotting time, prothrombin time and blood groups; Pregnancy test; Liver function tests; Kidney function test; Cardiac enzymes; Lipid profile, total proteins, albumin and serum minerals; Urine analysis for bile pigments, protein, urea, pH, ketone bodies, sugars, creatinine, pus cells, RBCs and uric acid; Sero-diagnosis of infectious diseases; Visit to clinical laboratory/concerned organization.

Suggested Readings:

1. Ahmed, N. 2011. Clinical Biochemistry. Oxford University Press, Oxford, UK.
2. Bain, B.J., I. Bates, M.A. Laffan and S.M. Lewis. 2012. Practical Haematology, 11th ed. Churchill Livingstone, Elsevier Ltd., New York, USA.
3. Burtis, C., E. Ashwood and D. Burns. 2006. Tietz Text Book of Clinical Chemistry and Molecular Diagnostics, 4th ed. Elsevier Saunders Company, Philadelphia, USA.

Chawala, R. 2014. Practical Clinical Biochemistry: Methods and Interpretations, 4th

1. ed. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, India.
2. Devlin, T. M. 2005. Textbook of biochemistry with clinical correlations, 6th ed. Wiley-Liss, Inc., U.S.A.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF FOOD AND NUTRITION (4 YEARS PROGRAM)

SEMESTER – VII

Course Name: Dietetics in Managing Diseases	**Course Code: HND-611**
Course Structure: 2 Lectures 1 Lectures	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To understand the role of nutrition and dietetics in managing disease and preventing complications

To get hands-on training for the dietary modification of normal diets aligned with various health disorders

To comprehend the role of nutrition education and policies towards nutrition security

Theory:

Diet based regimen to improve the public health; Diet supplementation for diseased patients; Malabsorption and mineral deficiency; Health diets and lifestyles; Preventing diet related diseases; Nutritional implications of various diets; Managing disease and avoiding complications through diet diversification; Dietary management in various health disorders (objective, physiology, food choices, diet plans): obesity, leanness and underweight; coronary heart disease: dyslipidemia, hypertension, ischemic heart disease, heart failure; fevers and infections; diabetes mellitus; diseases of respiratory system: cystic fibrosis, asthma; rheumatic diseases: rheumatoid arthritis, osteoarthritis & gout; inborn errors of metabolism: Phenylketonuria, Maple syrup urine disease, galactosemia, glycogen storage disease; renal diseases; burn; surgical conditions; bacterial overgrowth; infections; AIDS; food allergy; protein energy malnutrition; micronutrient deficiencies; Policy principles for promotion of healthy diets; Incorporating nutrition objectives into development policies; Strategic actions and for promoting healthy diets; Drawing up of nutrition education programs; Role of specialist in dietetics and diseases.

Practical:

Planning of modified diet: consistent carbohydrate diet, moderate carbohydrate diet; Modified proteins diet: high protein diet, restricted protein diet; Modified fats diet: restricted fats diet; Modified micronutrients diet; Controlled sodium, potassium and phosphorus diet; Dietary management in various health disorders; Hospital visits and nutrition camps.

Suggested Readings:

1. Mahan, L.K., S. Escott-Stump and J.L. Raymond. 2012. Krause's Food, Nutrition & Diet Therapy, 13th ed. Elsevier Saunders, St. Louis, Missouri, USA.
2. Mudambi, S.R. and M.V. Rajagopal. 2007. Fundamentals of Foods, Nutrition & Diet Therapy, 5thed. New Age International Pvt. Ltd. Publishers, New Delhi.
3. Punekar, M. and J. D'Souza. 2010. Handbook of Applied Nutrition, Dietotherapy and Diet Management. SBS Publishers & Distributors Pvt. Ltd., New Delhi.
4. Rawat, S. 2015. Applied Nutrition. Random Publication, New Delhi.

5. Schlenker, E. and J.A. Gilbert. 2015. Williams' Essentials of Nutrition and Diet Therapy, 11th ed. Elsevier/Mosby Inc., Louis, Missouri.
6. Singh, J. 2008. Handbook of Nutrition and Dietetics. Lotus Press, India

Course Name: Global Food Issues	**Course Code: HND-612**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To acquaint knowledge about global food issues having impact on food and nutrition security

To understand the role of global organizations in food production, consumption and trade

To study the impact of climate change and other threats on global food availability

Theory:

World food situation; Food and nutrition security; The green revolution: Worldwide post-harvest losses; Global malnutrition: protein energy malnutrition and hidden hunger; Overweight & obesity; Worldwide food price fluctuations; Importance of per capita earning, consumption and purchase power; Irrational food consumption behaviour; Contribution of cereals, legumes, roots, tubers and animal products; World food policy; WTO's trade regulations; Food bioterrorism; International food laws: European and American; Potentials of modern biotechnology to combat food insecurity; Genetically modified foods. Organic, Kosher and Halal Foods; Millennium development goals to sustainable development goals. Global Trends. Climate change.

Suggested Readings:

1. Barbosa-Canovas, G., A. Mortimer, D. Lineback, W. Spices, K. Buckle and P. Colonna. 2009. Global Issues in Food Science and Technology. Academic Press, Elsevier Inc., Burlington, MA, USA.
2. Barrientos, S. and C. Dolan. 2006. Ethical Sourcing in the Global Food System. Earthscan, New York, USA.
3. Hajra, M.A. 2013. Global Food Security: Emerging Issues and Economic Implications. Nova Science Publishers, New York, USA.
4. Oosterveer, P. 2007. Global Governance of Food Production and Consumption: Issues & challenges. Edward Elgar Publishing Inc., Massachusetts, USA.
5. Phoenix, L.E. and L. Walter. 2009. Critical Food Issues: Problems and State of the Art Solutions Worldwide, Vol. I & 2. ABC-CLIO, LLC, Santa Barbara, California, USA.

Course Name: Research Methods in Nutrition	**Course Code: HND-613**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To apply tools and skills required to understand published research

To identify the types of methods best suited for investigating different types of problems and questions

To get hands-on training of writing successful research proposals for thesis and projects

To abreast ethical consideration in research and publications

Theory:

Research methods in nutrition: Introduction, objectives, types of research: basic and applied, quantitative and qualitative, clinical and diagnostic; Types of sampling: probability and non-probability; Collection of literature: printed and electronic sources, managing literature; Methods of data collection; Writing scientific documents: synopsis, research proposal, articles, references, internship report. Research designs: observational studies, cross-sectional, case-control, cohort (prospective, retrospective, time-series); Experimental studies: observational studies, clinical studies. Experimental data analysis: incidence/ prevalence rate; Research ethics.

Suggested Readings:

1. Awan, J.A. 2015. Scientific Presentations. Unitech Communications, Faisalabad, Pakistan.
2. Lovegrove, J.A., L. Hodson, S. Sharma and S.A. Lanham-New. 2015. Nutrition Research Methodologies. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
3. Lowe, M. 2007. Beginning Research: A Guide for Foundation Degree Students, 1st ed. Routedge Publications, New York, USA.
4. Starks, T.P. 2006. Trends in Nutrition Research. Nova Science Publishers, Inc., New York, USA.
5. Walliman, N. 2005. Your Research Project, A Step by Step Guide for The First-time Researcher, 2nd ed. Sage Publications, Thousand Oaks, CA, USA.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR
ETAILED COURSE OUTLINE OF FOOD AND NUTRITION (4 YEARS PROGRAM)

SEMESTER – VIII

Course Name: Nutrition Policies and Programs	**Course Code: HND-615**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To familiarize with global and local nutrition policies and programs in the domain of public health nutrition

To prevent and control specific micronutrient deficiencies through diet based approaches among the vulnerable

To promote appropriate diets and healthy lifestyles and access, analyze and monitor nutrition situations

Theory:

History and importance of nutrition intervention planning; World declaration on nutrition; Nutrition development partners; Policy guidelines; Community nutrition programs: national and international, supplementary feeding programs; Food fortification, supplementation and diet diversification; School feeding programs: interventions and impacts; Improving household food security; Protecting consumers through improved food quality and safety; Preventing and managing infectious diseases; Promoting breast feeding; Caring for socio-economically deprived and vulnerable; Preventing and controlling specific micronutrient deficiencies; Promoting appropriate diets and healthy lifestyle; Improving health care; Five years plan for Pakistan (Nutrition); Nutrition intervention: counselling for change; SUN movement; One health concept; National nutrition programs: food & nutrition program, Tawana Pakistan, school health program; Developing effective food and *nutrition policies* and programs.

Suggested Readings:

1. Edelstein, S. 2011. Nutrition in Public Health: A Handbook for Developing Programs and Services, 3rd ed. Jones & Bartlett Learning, Sudbury, M.A, USA.
2. IFPRI. 2016. Taking Actions: Progress and Challenges in Implementing Nutrition Policies and Programs. International Food Policy Research Institute, Washington, DC, USA.
3. Nnakwe, N.E. 2009. Community Nutrition: Planning Health Promotion and Disease Prevention. Jones and Bartlett Learning International, London, UK.
4. Semba, R.D. and M.W. Bloem. 2008. Nutrition and Health in Developing Countries, 2nd ed. Humana Press, New York, USA.
5. Spark, A. 2007. Nutrition in Public Health: Principles, Policies and Practice. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.

Course Name: Food Service Management	**Course Code: HND-616**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To describe the key milestones of food service industry

To relate the current trends in food service operations and evolution through the business life cycle

To explain the art underlying menu development and method for recipe standardization

To understand the planning considerations vital for creating a successful food service

operation

Theory:

Food service management: introduction; position, manage and leverage a successful food service operation; The compilation of management practices: tools and techniques, essential approaches. Food service industry: history, segmentation and managerial implication, menu planning and development, recipe standardization, costing and analysis, food supply chain management, distribution channels, supplier selection, purchasing, equipment selection, forecasting, storage management, product inventory management, human resource management, customer services, marketing. Food safety: GMP, HACCP.

Suggested Readings :

1. Barron, C.W., T. Power and D.R. Reynolds. 2012. Introduction to Management in the Hospitality Industry, 10th ed. John Wiley Sons Inc., Hoboken, New Jersey, USA.
2. Reynolds, D.R. 2014. Foodservice Management Fundamentals. John Wiley Sons Inc., Hoboken, New Jersey, USA.
3. Reynolds, D.R. and K.W. McClusky. 2014. Study Guide to Accompany Food service Management Fundamentals. John Wiley Sons Inc., Hoboken, New Jersey, USA.

ELECTIVE COURSES

Course Name: Nutritional practices in clinical care	**Course Code: HND-**
Course Structure: 3 Lectures	**Credit Hours:** 3(2+1)
Prerequisites: None	

Learning Outcomes:

To assess various physiological conditions and prepare diet plans accordingly

To acquaint hands-on training in the field of enteral and parental nutrition.

Theory:

Importance of clinical care nutrition support; Nutritional screening and assessment; The therapeutic process, stress of the therapeutic encounter, focus of care, phases of the care process; Quality patient care and collaborative roles of nutritionists and nurses; Modified diets for various physiological needs; Enteral nutritional: composition, nutritional prescription (dose), strategies to optimize delivery and minimize risks, pediatric enteral feeding; Total parenteral nutrition; composition, intravenous nutritional prescription (dose) for specific conditions; Percutaneous endoscopic gastrostomy and radiologically inserted gastrostomy; Complications in enteral and parenteral nutrition; Nutritional therapy in diseases of infancy and childhood; Drug-nutrient interactions: drug effects on food and nutrients, food effects on drug absorption, food effects on drug; Dietary supplements.

Practical:

Nutritional assessment of patients: selection, nutritional requirements; Tubefeeding: types, feeding equipment, preparation and application of enteral/naso-gastric diets, monitoring the tube-fed patient; Total parenteral nutrition: basic rules, techniques, prescription,preparation of total parenteral solution; Preparation of pre- and post-operative diets; Case studies and logbooks; Hospital visits.

Suggested Readings:

1. Block, A.S., J. Maillet, W.H. Howell and M.F. Winkler. 2007. Issues and Choices in Clinical Nutrition Practice. Lippincott Williams & Wilkins, Philadelphia, PA, USA.

2. Katsilambros, N., C. Dimosthenopoulos, M.D. Kontogianni, E. Manglara and K.A. Poulia. 2010. Clinical Nutrition in Practice, 1st ed. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

3. Katz, D.L. 2008. Nutrition in Clinical Practice, 2nd ed. Lippincott Williams & Wilkins, Philadelphia, PA, USA.

4. Rolandelli, R.H., R. Bankhead, J. I. Boullate and C.W. Compher. 2005. Clinical Nutrition; Enteral and Tube Feeding. 4th ed. ElasvierSauders Publishers, USA.

5. Rolfes, S.R., K. Pinna and E. Whitney. 2015. Understanding Normal andClinical Nutrition, 10th ed. Thomson and Wadsworth Publishers, USA.

Course Name: Nutritional Immunology	**Course Code: HND-**
Course Structure: 3 Lectures	**Credit Hours:** 3(3+0)
Prerequisites: None	

Learning Outcomes:

To understand relationship between nutrition and immunity. To evaluate, summarize and apply current research in the field of nutrition.

To determine and assess factors impacting nutritional and immunological status. To grasp knowledge about the interactions among the nutrients and immune responses.

Theory:

Nutritionalimmunology:overview,principles;Immunesystem;Psychoneuroimmunology; Effective detoxification protocols: anti-inflammatory, immune boosting, alkalizing, detoxification; Mechanisms of immune dysfunction in autoimmune conditions and cancer; Gerson therapy; Harmful effects of vaccinations and antibiotics and nutritional support; Supplementation requirements to treat immune dysfunctions, colds, flus, pandemics. Opportunistic infections.Genetic and immunity; Functional foods and Immunology; Immune boosters; Food Allergies; Cognitive function of nutrients; Immunization and its impacts.

Suggested Readings:

1. Calder, P.C., C.J. Field and H.S. Gill. 2002. Nutrition and Immune Function. CABI Publishing, New York, USA.

2. Gershwin, M.E., J.B. German and C.L. Keen. 2000. Nutrition and Immunology Principles and Practice. Humana Press, New York, USA.

3. Gershwin. ME., P. Nestel and C.L. Keen.2004. Handbook of Nutrition and Immunology. Humana Press, New York, USA.

4. Schat, K.A., B. Kaspers and P. Kaiser. 2014. Avian Immunology, 2nd ed. Academic Press, San Diego, CA, USA.

Course Name: Drug-Nutrient Interactions	**Course Code: FST-**
Course Structure: 3 Lectures	**Credit Hours: 2**(2+0)
Prerequisites: None	

Learning Outcomes:

To raise the awareness of potential drug-nutrient interactions and influence on clinical outcomes

To understand complex underlying mechanisms responsible for drug-nutrient interactions

To identify factors that can promote drug-nutrient interactions and contribute to nutrition and/or therapeutic failure

To integrate knowledge of pharmacology, nutrient-nutrient and drug-nutrient interactions into the nutrition care process

Theory:

Basic definitions and concepts: Role of nutrition therapy in pharmacotherapy; Pharmacologic aspects of food and drug interactions; Routes of drug administration; Pharmacodynamics; Pharmacokinetics, absorption, distribution, metabolism, elimination; Effects of food on drug therapy, drug absorption, drug distribution, drug metabolism and drug excretion; Effects of drugs on food and nutrition, nutrient absorption, metabolism and excretion; Effects of drugs on the nutritional status of patients e.g. taste, smell and type of intake; Enteral feeding: drug/nutrient interaction; Gastrointestinal effects, appetite changes; Nutrientassessment of drug-nutrient interactions; Dietary counselling for the prevention of food drug interactions.

Suggested Readings:

1. Boullata, J.I. and V.T. Armenti. 2010. Handbook of Drug-Nutrient Interactions, 2nd ed. Humana Press, New York, USA.
2. Mahan, L.K. and S. Escott-Stump. 2007. Krause's Food & Nutrition Therapy. Elsevier – Health Sciences Division. Philadelphia, USA.
3. McCabe-Sellers, B., E.H. Frankel and J.J. Wolfe. 2003. Handbook of Food-Drug Interactions, CRC Press, Taylor & Francis Group, Boca Raton, FL., USA.
4. Nelms, M.N. and K.P. Sucher. 2016. Nutrition Therapy and Pathophysiology, 3rd Ed. Cengage Learning, Belmont, CA, USA.

Course Name: Food Chemistry	**Course Code: FST-**
Course Structure: 3 Lectures	**Credit Hours: 2**(2+0)
Prerequisites: None	

Learning Outcomes:

To acquire knowledge and skills for understanding the main physical, chemical and functional properties of food

To understand and be able to control the major chemical and biochemical reactions that influence food quality with emphasis on food industry applications

To acquaint information about different food components and interactions among them to modulate the specific quality attributes of food systems

Theory:

Cellular basis of foods; Water: properties, types, water activity and its effect onshelf life of food; Carbohydrates: roles of in food structure, color, flavor andtexture; Lipids: roles in food structure, color, flavor and texture, rancidity, emulsifiers; Proteins: roles in food structure, color, flavor and texture; Enzymes: enzymatic & non-enzymatic browning reactions, influences on color, flavor and texture; Technologies in minerals and vitamins fortification of foods, stability of vitamins; Food colors: natural & artificial colors, pigments; Flavors: characteristics, taste, odor and astringency, off-flavor, aromatic compounds, Chemistry involved in ripening processes of fruits and vegetables; Food additives.

Suggested Readings:

1. Belitz, H.D, W. Groschm and P. Schieberle. 2009. Food Chemistry. Springer Verlag, Germany.
2. Coultate, T. 2009. Food: The Chemistry of Its Components. The Royal Society of Chemistry, Thomas Graham House, Science Park, UK.
3. Damodaran, S., K. Parkin and O.R. Fennema. 2007. Fennema's Food Chemistry, 4th ed. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
4. DeMan, J.M. 2007. Principles of Food Chemistry. Springer Verlag, Germany.
5. Velisek, J. 2014. The Chemistry of Food. John Wiley & Sons Inc., New York, USA.

Course Name: Preventive Nutrition	**Course Code: HND-**
Course Structure: 3 Lectures	**Credit Hours: 3**(3+0)
Prerequisites: None	

Learning Outcomes:

To acquaint knowledge about the preventive nutrition with special reference to historical perspective, public health benefits, ethnic and socioeconomic issues and its role throughout the life cycle

To understand the role of dietary components in the prevention and management of various health disorders.

Theory:

Preventive nutrition: a historical perspective, public health benefits, ethnic and socioeconomic issues, nutrition in the age of poly pharmacy, preventive nutrition throughout the life cycle; Cancer prevention: upper GIT cancer, prostate cancer, dietary supplements and cancer risks, soy and cancer prevention, micro-nutrients as intermediate biomarkers in chemotherapy; Cardiovascular disease prevention: omega-3 fatty acids from fish and plants, cardiovascular effects of trans fatty acids, antioxidants and B-vitamins and atherosclerosis, Prevention and nutritional management - TLC dietary patterns, AHA dietary patterns, DASH dietary patterns, weight reduction, increased dietary fiber, Omega-3 fatty acids, soy proteins, fruits and vegetables as antioxidant role, reduce dietary cholesterol; Diabetes and obesity: role of nutrition in pathophysiology, prevention and treatment, Adipokines, nutrition and obesity, obesity and insulin resistance in childhood and adolescence, obesity and chronic disease, meal replacement products and fat substitutes, prevention and treatment (dietary changes, calories restricted diet and other dietary regimens, exercise, behavioral modification); Growth, Immunity and Infection: Role of long chain fatty acids, polyunsaturated fatty acids and autoimmune diseases; Prevention and treatment for hypertension: weight reduction, adaptation of DASH diet, nutrition education for behavioral modification; Bone density: Osteoarthritis - role of nutrition and dietary supplements, calcium requirement during treatment of osteoporosis, Prevention and treatment - adequate calcium intake, adequate vitamin D intake, avoidance of excess phosphorous, lifestyle dietary modifications, exercise; Role of dietary fiber in preventing diseases (colon cancer, diabetes, constipation, diverticular disease, obesity, cardiovascular diseases); Health claims for foods and dietary supplements; Micronutrient and immunity in older people.

Suggested Readings:

1. Bendich, A. and R.J. Deckelbaum. 2001. Primary and Secondary Preventive Nutrition. Springer Science+Business Media, New York, USA.

2. Bendich, A. and R.J. Deckelbaum. 2010. Preventive Nutrition: The Comprehensive Guide

for Health Professional, 4th ed. Humana Press, New York, USA.

3. Coulston, A.M. and C.J. Boushey. 2008. Nutrition in the Prevention and Treatment of Diseases, 2nd ed. Academic Press, Elsevier Inc., San Diego, CA, USA.

4. Gerber, J.M. 2007. Handbook of Preventive and Therapeutic Nutrition. Aspen Publications, Silver Spring, MD, USA.

5. Thomson, C. 1996. Preventive and Therapeutic Nutrition Handbook. Chapman & Hall, UK.

Course Name: Nutrition in Emergency	**Course Code: HND-**
Course Structure: 3 Lectures	**Credit Hours: 3**(3+0)
Prerequisites: None	

Learning Outcomes:

To understand the context in which emergencies occur and nutritional assessment of the individuals and populations

To design and implement interventions for prevent and treatment of malnutrition

To familiarize with the role of national and international agencies in the management of emergencies.

Theory:

Introduction and concepts: understanding malnutrition, micronutrient malnutrition, causes of malnutrition; Nutrition needs assessment and analysis: individual and population assessment, health assessment and the link with nutrition, food security assessment and the link with nutrition, nutrition information and surveillance systems; Interventions to prevent and treat malnutrition: general food distribution, supplementary feeding, therapeutic care, micronutrient interventions, health and livelihood interventions, infant and young child feeding, HIV and AIDS nutrition; Nutrition information, education and communication; Monitoring and evaluation, standards and accountability; Role of national and international agencies: UNHCR, WFP, NDMA (National disaster management authority), Civil defence; Hygiene and sanitation; Emergency foods.**Suggested Readings:**

1. ENN (Emergency Nutrition Network). 2011. The harmonized training package (HTP): resource material for training on nutrition in emergencies, version 2. Nutrition Works, Emergency Nutrition Network, Global Nutrition Cluster. Oxford, U.K.
2. FAO. 2005. Protecting and Promoting Good Nutrition in Crisis and Recovery: Resource Guide. Food and Agriculture Organization of the United Nations, Rome, Italy.
3. SC (Save the Children Fund UK). 2004. Emergency nutrition assessment: guidelines for field workers. Save the Children, Westport, U.K.
4. WHO (World Health Organization). 2000. The management of nutrition in major emergencies. World Health Organization, Geneva, Switzerland.

Course Name: Food Toxins & Allergens	**Course Code: FST-**
Course Structure: 3 Lectures	**Credit Hours: 3**(3+0)
Prerequisites: None	

Learning Outcomes:

To identify the current trends in the use of dietary supplement and analysis of their global market

To demonstrate the impact of dietary supplements on health and disease prevention

To discuss safety issues and global legislation on food supplements.

Theory:

An overview of dietary supplements and their market; Forms of food supplements; Vitamins and mineral supplements; Essential fatty acids; Enzymes as supplements; Natural products and extracts; Probiotics and prebiotics in Health; Fish oil supplements; Non-essential nutrients as dietary supplements; Caffeine in food and dietary supplements; Medicinal plants as food supplements; Codex Alimentarius standards for food supplements; Safety of vitamins and minerals added to foods; Implications of mega doses; Global legislation on food supplements; DRAP Alternative Medicines and Health Products Enlistment Rules 2014.

Suggested Readings:

1. Caballero, B. 2009. Guide to Nutritional Supplements. Elsevier Ltd., Oxford, UK.
2. Ottaway, P.B. 2008. Food Fortification and Supplementation: Technological, Safety and Regulatory Aspects. Woodhead Publishing Limited, Cambridge, England.
3. Pray, L., A.L. Yaktine and D. Pankevich. 2014. Caffeine in Food and Dietary Supplements. The National Academes Press, Washington, DC, USA.
4. Ransley, J.K., J.K. Donnelly and N.W. Read. 2001. Food and Nutritional Supplements: Their Role in Health and Disease. Springer-Verlag Berlin Heidelberg, Germany.
5. Webb, G.P. 2011. Dietary Supplements and Functional Foods, 2nd ed. Blackwell Publishing Ltd., Oxford, UK.

Course Name: Nutritional Deficiency Disorders	**Course Code: HND-**
Course Structure: 3 Lectures	**Credit Hours: 3**(3+0)
Prerequisites: None	

Learning Outcomes:

To acquire an in-depth understanding of toxicology related to food and health

To understand various types of toxins from plant, animal and plant origins as well induced by extraneous chemicals. To familiarize with food allergens, their health implications and management

Theory:

Toxicology: introduction, dose-response, absorption, translocation, storage, excretion; Natural toxins of plant origin: goitrogens, cyanogenic glycosides, favism, lathyrogens, lecitins (hemagglutinins), mutagens in natural plant, caffeine, flavonoids and some others; Natural toxins of animal origin: animal liver, marine animals; Toxicity by extraneous chemicals: agricultural chemicals, food processing, packaging, additives, adulterants; Toxicity from water; Microbial toxins: mycotoxins – molds, mushrooms; Bacterial food intoxication; Bacterial food infection; Food allergies: introduction, incidence of food allergy, food allergens of protein families, animal origin and plant origin; Adverse allergic reaction, diagnosis, prevention, legislation and labeling, allergen management, food intolerance, emergency treatment of food-induced allergic reactions.

Suggested Readings:

1. Awan, J.A. and F.M. Anjum. 2010. Food Toxicology. Unitech Communications, Faisalabad, Pakistan.

2. Coutts, J and R. Fielder. 2009. Management of Food Allergens. John Wiley & Sons Ltd., Chichester, West Sussex, UK.

3. Jedrychowski, L. and H.J. Wichers. 2009. Chemical and Biological Properties of Food Allergens. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.

4. Metcalfe, D., H.A. Sampson, R.A. Simon and G. Lack. 2014. Food Allergy: Adverse Reaction to Foods and Food Additives, 5th ed. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

5. Shibamoto, T and L. Bjeldanes. 2009. Introduction to Food Toxicology, 2nd

.ed. Academic Press, London.

Course Name:Food Supplements	**Course Code: HND-**
Course Structure: 2 Lectures	**Credit Hours: 2**(2+0)
Prerequisites: None	

Learning Outcomes:

To identify the current trends in the use of dietary supplement and analysis of their global market

To demonstrate the impact of dietary supplements on health and disease prevention

To discuss safety issues and global legislation on food supplements.

Theory:

An overview of dietary supplements and their market; Forms of food supplements; Vitamins and mineral supplements; Essential fatty acids; Enzymes as supplements; Natural products and extracts; Probiotics and prebiotics in Health; Fish oil supplements; Non-essential nutrients as dietary supplements; Caffeine in food and dietary supplements; Medicinal plants as food supplements; Codex Alimentarius standards for food supplements; Safety of vitamins and minerals added to foods; Implications of mega doses; Global legislation on food supplements; DRAP Alternative Medicines and Health Products Enlistment Rules 2014.

Suggested Readings:

6. Caballero, B. 2009. Guide to Nutritional Supplements. Elsevier Ltd., Oxford, UK.
7. Ottaway, P.B. 2008. Food Fortification and Supplementation: Technological, Safety and Regulatory Aspects. Woodhead Publishing Limited, Cambridge, England.
8. Pray, L., A.L. Yaktine and D. Pankevich. 2014. Caffeine in Food and Dietary Supplements. The National Academes Press, Washington, DC, USA.
9. Ransley, J.K., J.K. Donnelly and N.W. Read. 2001. Food and Nutritional Supplements: Their Role in Health and Disease. Springer-Verlag Berlin Heidelberg, Germany.
10. Webb, G.P. 2011. Dietary Supplements and Functional Foods, 2nd ed. Blackwell Publishing Ltd., Oxford, UK.

Course Name:METABOLISMOF NUTRIENTS	Course Code: HND-
Course Structure: 2 Lectures	**Credit Hours: 2**(2+0)
Prerequisites: None	

Learning Outcomes:

To understand the metabolic roles of carbohydrates, fats, proteins, vitamins and minerals

To generalize the way in which nutrients are processed through major metabolic fates in order to perform various energetic and structural functions in the body

To establish the role of enzymes and hormones in metabolism of nutrients.

Theory:

Metabolic pathways: objectives, chemical reactions, enzymes, co-enzymes and prosthetic groups, metabolic pathways; Role of ATP in metabolism: objectives, functions, phosphorylation of ADP to ATP; Digestion and absorption: gastrointestinal tract, digestion and absorption of carbohydrates, fats and proteins; Absorption of vitamins and minerals; Metabolism of carbohydrates and fats; Protein nutrition and metabolism; Nitrogen balance and protein requirements; Protein synthesis and metabolism of amino acids; Integration and control of metabolism: pattern of metabolic regulation, intracellular regulation of enzyme activity, responses to fast acting hormone by covalent modification of enzyme proteins, slow acting hormones, changes in enzymes synthesis.

Suggested Readings:

1. Bender, D.A. 2014. Introduction to Nutrition and Metabolism, 5th ed. CRC Press, Taylor & Francis, Boca Raton, FL, USA.
2. Davidson, S., R. Passmore, R and M.A. Eastwood. 1986. Human Nutrition and Dietetics. Churchill Livingstone, New York, U.S.A.
3. Gropper, S.S. and J.L. Smith. 2013. Advanced Nutrition and Human Metabolism, 6th ed. Wadsworth Cengage Learning, Belmont, CA, USA.
4. Kohlmeier, M. 2015. Nutrient Metabolism: Structures, Functions, and Genes, 2nd Ed. Academic Press, San Diego, CA, USA.
5. Lanham-New, S.A., I.A. Macdonald and H.M. Roche. 2011. Nutrition and Metabolism, 2nd ed. Blackwell Publishing, Jones & Wiley Sons Ltd., Chester, West Sussex, UK.
6. Whitney, E.N. and S.R. Rolfes. 2016. Understanding Nutrition, 14th ed. Cengage Learning, Belmont, CA, USA.

Course Name: Nutrition Epidemiology	Course Code: HND-
Course Structure: 2 Lectures	**Credit Hours: 2**(2+0)
Prerequisites: None	

Learning Outcomes:

To learn the methodology and applications of nutritional epidemiology

To apply various epidemiological study designs for research in the domain

To study collection and handling of data related to socio-demographic

profile and dietary intake of the community.

Theory:

Principles of nutritional epidemiology: objective of nutritional epidemiological research, interpretation, systematic reviews, role of meta-analysis; Nutritionalepidemiological studies: classification, uses in research, selection of right study; Socio-demographic and psycho-social variables; Sampling, study size and power of study: types of sampling, variability, sample size, power of studies; Food consumption, nutrient intake and the use of food composition tables: food consumption tables and nutrient databases, calculation on nutrient intake from data on food intake and composition of foods, food groups and food scores; Household surveys: characteristics of household data, techniques, uses and limitations, using household surveys in epidemiological studies; Individual surveys: methods for assessment of present or recent data, measurement error in dietary assessment, energy adjustment, effects of measurement error on validity, adjustment of intake in the distant past, problems of retrospective assessment in population sub-groups; Validation of dietary assessment: the context of validation, validation techniques, factors affecting the design of validation studies, statistical techniques and interpretation.

Suggested Readings:

1. Frank, G.C. 2008. Community Nutrition: Applying Epidemiology to Contemporary Practice, 2nd ed. Jones and Bartlett Publishers Inc., Sudbury, MA, USA.
2. Margetts, B.M. and M. Nelson. Design Concepts in Nutritional Epidemiology, 2nd Ed. Oxford University Press, New York, USA.
3. Rothman, K.J., S. Greenland and T.L. Lash. 2008. Modern Epidemiology, 3rd ed. Lippincott & Wilkins, Philadelphia, PA, USA.

4. Spark, A. 2007. Nutrition in Public Health: Principles, Policies and Practice. CRC Press, Taylor & Francis, Boca Raton, FL, USA.

5. Walter, W. 2013.Nutritional Epidemiology, 3rd ed. Oxford University Press, New York, USA.

ITEM # III<u>ONE MEMBER FROM EACH BOARD OF STUDIES: WITHIN THE FACULTY TO BE NOMINATED BY BOARD OF STUDIES CONCERNED ON BOARD OF FACULTIES</u>

Proposed member

Serial no.	**Name**	**Address and Contact**
1	Assistant Professor Dr. Rehana Masood	Rehana.masood@sbbwu.edu.pk

List of experts for Food & Nutrition

Serial No.	Name	Address & contact
1.	Prof. Dr. Amjad Iqbal (Professor)	ChairmanDepartment of Food Science and Technology, Garden Campus, Abdul Wali Khan University Mardan Pakistan. Contact No: 03459008712, Email:amjadiqbal@awkum.edu.pk
2.	Dr. Malik Muhammad Hashim(Assistant Prof)	Chairman Institute of Food science & Nutrition, City Campus, Gomal University, D.I.Khan Contact No: 03459824020, Email: mhmalick@gmail.com
3	Dr. Majid Suhail(Assistant Prof)	Department of Food Science and Technology University of Agriculture Peshawar Contact No: 03339326976, Email: majidsuhail@aup.edu.pk
4.	Dr. Maaz Ullah Khan	Group Leader Food Technology and Nutrition Nuclear Institute for Food and Agriculture Peshawar Phone No. 92-91-2964060 Ext. 224. Email: maaznifa@yahoo.com or maaz@nifa.org.pk

5.	Dr. Tariq Kamal (Assistant Prof)	Department of Food Science and Technology University of Swabi Mobile No. 0302-8880037; Email: drkamal@uoswabi.edu.pk
6.	Dr. Muhammad Arif (Assistant prof)	Department of Human Nutrition University of Agriculture Peshawar Mobile No. 0321 5774383; Email: arif123@aup.edu.pk
7.	Dr. Mudassar Iqbal (Assistant Prof)	Department of Agricultural Chemistry University of Agriculture Peshawar Mobile No. 03346 9211142;Email: mudassariqbal@aup.edu.pk
8.	Dr. Zia ud Din (Associate prof)	Chairman Department of Human Nutrition, The University of Agriculture, Peshawar, KP, Pakistan. Contact No: + 92 300 9052355, email: ziaud.din@aup.edu.pk
9.	Dr. Imran Khan (Assistant prof)	Department of Human Nutrition, The University of Agriculture, Peshawar, KP, Pakistan. Contact No: + 92 346 5644996, email: i.khan@aup.edu.pk
10.	Prof. Dr. Said Wahab (Professor)	Chairman of Dept. Of Food science & Technology, The University of Agriculture, Peshawar, KP, Pakistan. Contact No: +92 300 5864644

		Email: drsaidwahab40@yahoo.com
11.	Dr. Anwar Ali Shad	Chairman/Associate Processor/Additional Director Nutraceuticals, Food Chemistry, Biochemistry and Plant Nutrition
12.	Dr. HumairaWasila	Assistant Professor Functional Foods Bioactive compounds
13.	Prof. Mohammad Ayub	Chairman/Professor Food Science and Technology (Post Harvest)
14.	Dr. IhsanMaboodQazi	Associate Professor Food safety/Security, food quality assurance, cereal technology.
15.	Dr. Zia ud Din	Associate Professor /Chairman Child growth and Nutrition & Associated Factors