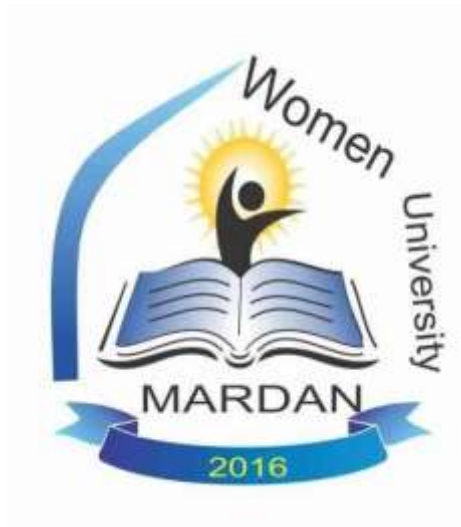


Curriculum for BS-Human Nutrition & Dietetics



**DEPARTMENT OF HUMAN NUTRITION & DIETETICS
WOMEN UNIVERSITY MARDAN**

**DEPARTMENT OF HUMAN NUTRITION &
DIETETICS**

Scheme of studies

Semester-I				
Course Code	Course Name	Credit Hours	General Education Course /Major/Interdisciplinary	Marks
BBA-322	Entrepreneurship	02	General Education Course	
PSY-301	Introduction to psychology	02	General Education Course	
ENG-301	Functional English	03	General Education Course	
ISL-301	Islamic Studies	02	General Education Course	
PSC-301	Civic and Community Engagement	02	General Education Course	
BCHM-301	Introduction to Biochemistry	03	Interdisciplinary	
HND-311	Fundamentals of Human Nutrition	03	Major	
Semester Credit Hours		17		
Semester-II				
CS-301	Application of Information and Communication Technology	3 (2+1)	General Education Course	
ENG-302	Expository Writing	03	General Education Course	
ISL-302	History of Islamic civilization	02	General Education Course	
PSC-302	Ideology and Constitution of Pakistan	02	General Education Course	
MTH-433	Quantitative Reasoning 1 Mathematics	03	General Education Course	
HND-321	Essential of Food Science	03	Major	
Semester Credit Hours		16		
Semester-III				
MTH-444	Quantitative Reasoning II	03	General Education Course	
BOT-	Introduction to Biology	3(2+1)	General Education Course	
HND-411	Human Physiology	03(02+1)	Disciplinary Major	

HND-412	Macronutrients in Human Nutrition	03	Disciplinary Major	
HND-413	Micronutrient	3(2-0)	Disciplinary Major	
Semester Credit Hours		15		
Semester-IV				
MIC-	Food Microbiology	3(2+1)	Interdisciplinary	
HND-421	Human Physiology II	3(2+1)	Disciplinary Major	
HND-422	Molecular Genetics	03	Interdisciplinary	
HND-423	Assessment of Nutritional Status	3(2-1)	Disciplinary Major	
HND-424	Nutrition Through the Life Cycle	3(3-0)	Disciplinary Major	
HND-624	Lab Methods in Nutrition	3(1-2)	Disciplinary Major	
Semester Credit Hours		18		
Semester-V				
HND-511	General Pathology	3(2-1)	Interdisciplinary	
HND-512	Dietetics-I	3(2-1)	Disciplinary Major	
HND-513	Nutrition and Psychology	3(3-0)	Disciplinary Major	
HND-514	Nutritional Education and Awareness	3(2-1)	Disciplinary Major	
HND-515	Meal Planning and Management	3(2-1)	Disciplinary Major	
HND-516	Public Health Nutrition	3(2-1)	Disciplinary Major	
Semester Credit Hours		18		
Semester-VI				
HND-521	Dietetics-II	3(2-1)	Disciplinary Major	
HND-522	Functional Foods and Nutraceuticals	3(3-0)	Disciplinary Major	
HND-523	Nutrition Through Social Protection	3(2-0)	Disciplinary Major	
HND-524	Sports Nutrition	3(2-1)	Disciplinary Major	
HND-525	Infant and Young Child Feeding	3(2-1)	Disciplinary Major	
HND-526	Clinical Biochemistry	3(1-2)	Disciplinary Major	
Semester Credit Hours		18		
Semester-VII				
HND-611	Dietetics-III	3(2-1)	Disciplinary Major	
HND-612	Global Food Issues	3(3-0)	Disciplinary Major	
HND-613	Research Methods in Nutrition	3(3-0)	Disciplinary Major	
HND-614	Nutritional Practices in Clinical Care	3(2-1)	Disciplinary Major	

HND-615	Field Experience	03	Field Experience	
Semester Credit Hours		15		
Semester-VIII				
HND-621	Nutrition Policies and Programs	3(3-0)	Disciplinary Major	
HND-622	Preventive Nutrition	3(3-0)	Disciplinary Major	
HND-623	Food Supplements	3(2-0)	Disciplinary Major	
HND-625	Nutrition in Emergencies	3(2-0)	Disciplinary Major	
	Capstone Project	03	Capstone Project	
Semester Credit Hours		15		
Total Credit Hours		132		

BS-HUMAN NUTRITION & DIETETICS

Framework for BS Human

Nutrition and Dietetics (4 years Program)

Total Credit Hours:132

Domains	Number of Courses	Number of Credit Hours
General Courses	12	30
Interdisciplinary	04	12
Major Disciplinary Specific	25	84
Field Experience	01	03
Capstone Project	01	03
Total CHrs		132

Course Break down 1st
semester

1ST

Semester-I				
Course Code	Course Name	Credit Hours	General Education Course /Major/Interdisciplinary	Marks
BBA-322	Entrepreneurship	02	General Education Course	
PSY-301	Introduction to psychology	02	General Education Course	
ENG-301	Functional English	03	General Education Course	
ISL-301	Islamic Studies	02	General Education Course	
PSC-301	Civic and Community Engagement	02	General Education Course	
BCHM-301	Introduction to Biochemistry	03	Interdisciplinary	
HND-311	Fundamentals of Human Nutrition	03	Major	
Semester Credit Hours		17		

SEMESTER

BBA-322

Entrepreneurship

Credit Hours 02

COURSE OBJECTIVE

With more than half of the new jobs being created in the world economy by small businesses, the particular problems and experiences encountered in starting and developing new enterprises are clearly worth studying. This course of Entrepreneurship has been designed to provide the participants with an overall understanding of the concept of entrepreneurship and small business management. Participants will be prepared to start, survive, and succeed in their own businesses.

COURSE CONTENT

Week 1	Entrepreneurship: an evolving concept Entrepreneurship – a perspective
Week 2	The Role of Entrepreneurship Kinds of Entrepreneurs Role and Functions of Entrepreneurs

Week 3	Understanding strategic issues in business plan development
Week 4	Pitfalls in selecting new ventures
Week 5	Innovation: the creative pursuit of ideas Opportunity identification: the search for new ideas
Week 6	Reason for failures of new ventures
Week 7	Legal challenges for entrepreneurial ventures
Week 8	Sources of capital for entrepreneurial ventures
Week 9	Mid-Term Examination
Week 10	Assessment of entrepreneurial plan
Week 11	Marketing challenges for entrepreneurial ventures
Week 12	Developing an effective business plan
Week 13	Strategic entrepreneurial growth
Week 14	Problems Faced by Newly Established Company Post and Field Problems Faced by a New Enterprise
Week 15	Franchising and the Entrepreneur
Week 16	Final-Term Examination

Recommended Books:

- Small Business Management: Entrepreneurship and Beyond, Timothy S. Hatten. South-Western, Cengage Learning
- Norman M. Scarborough., Essentials of Entrepreneurship and Small Business Management. Pearson Education
- Donald F. Koratko , Entrepreneurship –Theory Process Practice (10th Edition), South Western -Cengage Learning.
- David L. Kurtz & Louis E. Boone, Contemporary Business (latest edition).
- Philip Kotler & Gary Armstrong, Principles of marketing (latest edition).
- Any Other Resources such as: Internet and Resource Notes and Modules
- Local and international newspapers and financial journals

PSY-301

Introduction to Psychology

Credit Hours: 03

Objectives

To ensure that the students are aware of the nature, origin, history and scope of Psychology as a modern discipline and its relationship with other sciences and to have a working knowledge of the application and the practice of psychology in real life.

Course Outline

Introduction to Psychology:

- Nature and Application of Psychology with special reference to Pakistan.
- Historical Background and Schools of Psychology (A Brief Survey)

Methods of Psychology:

- Observation
- Case History Method
- Experimental Method
- Survey Method
- Interviewing Techniques

Biological Basis of Behavior:

- Neuron: Structure and Functions
- Central Nervous System and Peripheral Nervous System
- Endocrine Glands

Sensation, Perception, and Attention

Sensation:

- Characteristics and Major Functions of Different Sensations
- Vision: Structure and functions of the Eye.
- Audition: Structure and functions of the Ear

Perception:

- Nature of Perception
- Factors of Perception: Subjective, Objective and Social
- Kinds of Perception
 - Spatial Perception (Perception of Depth and Distance)
 - Temporal Perception
 - Auditory Perception

Attention:

- Factors
 - Subjective
 - Objective
- Span of Attention
- Fluctuation of Attention
- Distraction of Attention (Causes and Control)

Recommended Books

1. Atkinson R. C., & Smith E. E. (2000). *Introduction to psychology* (13th ed.). Harcourt Brace College Publishers.
2. Fernald, L. D., & Fernald, P. S. (2005). *Introduction to psychology*. USA: WMC Brown Publishers.
3. Glassman, W. E. (2000). *Approaches to psychology*. Open University Press.
4. Hayes, N. (2000). *Foundation of psychology* (3rd ed.). Thomson Learning.

5. Lahey, B. B. (2004). *Psychology: An introduction* (8th ed.). McGraw-Hill Companies, Inc.
6. Leahey, T. H. (1992). *A history of psychology: Main currents in psychological thought*. New Jersey: Prentice-Hall International, Inc.
7. Myers, D. G. (1992). *Psychology* (3rd ed.). New York: Wadsworth Publishers.
8. Ormord, J. E. (1995). *Educational psychology: Developing learners*. PrenticeHall, Inc

ENG-301

Functional English-I

Credit hours:03

Course Description:

This course introduces the students with the basic grammatical / structural rules of English Language. It will help the students in improving their basic Language Skills to an optimum level so as to enable them to communicate effectively in English language through proper usage of vocabulary & knowledge of English grammar.

Outcomes:

1. Students will be familiarized with the technical methods of reading / comprehension.
2. They will be exposed to different reading materials, which will help them in improving their vocabulary, grammar and sentence structure etc.
3. The experience of this course will also help them to overcome those problems due to which they are unable to express themselves properly Parts of Speech

Course Contents:

- Vocabulary (Frequently confused / misused words,
- Phrases,
- synonyms,
- antonyms,
- idioms & General vocabulary),
- Practical Use of Grammar (Nouns, Pronouns, Verbs, Adjectives, Adverbs, Prepositions, Conjunctions, Articles, Interjections & Tenses),
- Sentences (Types of sentences, Parts of sentences),
- Direct and Indirect Speech,
- Active & Passive Voice & Conditional Sentences),

Recommended Books:

1. High School English Grammar & Composition by Wren and Martin.
2. Practical English Grammar by A.J. Thomson &A.V. Martinet. Exercises 1 & 2. 3rd edition. Oxford University Press.
3. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand& Francoise Grellet. Oxford

Supplementary Skills. 4th Impression 1993. 4. Reading. Upper Intermediate. Brian Tomilson & Rod Ellis. Oxford
Supplementary Skills. 3rd Impression 1992.

4. Précis writing by R. Dhillon.

5. Systems Student Companion English for lower secondary schools by Magdalene Chew & Surinder Kaur.

ISL-301

Islamic Studies

Credit Hours 2

Aims and Objectives

The course is aimed

- To learn about Islam and its application in day to day life.
- To provide basic information about Islamic studies.
- To improve students skill to perform prayers and other worships.
- To enhance the skills of the students for understanding of issues related to faith and religious life.

Course outline

- Holy Quran
- Sunnah
- Fundamentals Doctrine of Islam
- Life of Holy Prophet
- Islamic Economic system
- Islam and science
- Political system of Islam
- Social System of Islam
- Introduction to Islamic law and jurisprudence
- Islamic culture and civilization

Recommended Books

1. Hafiz Ahmed Yar, Madhamin.e.Quran
2. Prof. Arif Naseem, Islamiyat for degree classes.
3. Hameed Ullah Muhammad, Introduction of Islam.
4. Islamiyat, Compulsory for degree classes Published by Allama Iqbal University.
5. Syed Suleman Nadvi, Nabi Rehmat (P.B.U.H).

PSC-301

Civic and Community Engagement

02

Learning Outcomes:

- ✚ Understand, critically think about, and reflect upon the history of democracy and civic engagement in the Pakistan.
- ✚ Identify and utilize - civic/community engagement skills such as: (advocacy, organizing, communications) and knowledge- (working in groups and teams, leadership, diversity, how systems work)
- ✚ Create civic sense and establish importance of civic and community engagement.
- ✚ Identify and explain the values and ethics for community engagement.
- ✚ Carry out a civic engagement activity incorporating some of their new knowledge and skills of civic engagement and reflect on their learning about the community, the issue addressed, and about themselves.

Course Contents-

Divided into categories for in-depth comprehension-

Category A: General

1. The historical background of civic and community engagement
2. Conceptual understanding of Human Rights and Minority Rights
3. Dimensions of Citizens engagement in Community: Political, Social, Economic
4. Rights and duties of Citizens in Community
5. Organizations (National & International) and Groups
6. Role of non-governmental organizations and their contributions
7. NGOs: Nature and Scope
8. International Commission for Red Cross (ICRC)
9. Amnesty International
10. Asia Watch

Category B: Pakistan's context

1. Role of Citizens in Governance of Pakistan
2. Democratic Accountability and Civic Engagement
3. Enhancement of leadership skills among women and youth of Pakistan through civic community engagement programs

Recommended Books

1. Hoefler, R. (2012). Advocacy
2. for Practice. 3rd Edition. Chicago, IL: Lyceum Books, Inc. (ISBN-13: 978-1935871828)
3. Putnam, R. and Feldstein, L (2003). Better Together. New York, NY: Simon and Schuster. (ISBN-13: 978-0743235471)
4. Civic Engagement—What Is It and Why Is It Important? Kerry J. Kennedy
5. Universal Human Rights in Theory and Practice by Jack Donnelly
6. Adamantia Pollis and Peter Schwab, Human Rights Cultural and Ideological Perspectives. Preager Publishers, Preager Publishers, London, 1980.
7. Promoting and Protecting Minority Rights- A Guide for Advocates by United Nations.

8. Human Rights in International Law, Council of Europe press, 1992.
9. United Nations, Human Rights Status of International Instruments, United Nations, Baltimore, New York, 1987.

HND-311

Fundamentals of Human Nutrition

CreditHours3(3-0)

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 to human nutrition, food, nutrients, nutrition, malnutrition. Basic Definitions of Nutrients including their basic Chemistry and their major roles in body. Diet, balanced diet, food groups. Water and its major functions in body. Carbohydrates: types, role in body. Fats and oils: types and major roles in body. Proteins. Vitamins: classification, types, sources, role in body; Mineral elements: types, requirements, sources, role in body; Digestion

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.

BCHM-312

Introductory Biochemistry

CreditHours3(2-1)

Learning Outcomes:

- To acquaint knowledge about the nomenclature, structures and properties of chemical constituents
- To grasp the knowledge about the energy yielding cycle like glycolysis, Krebs cycle, β -oxidation etc.

Theory:

Introduction, scope and importance of biochemistry; Brief introduction of prokaryotic and eukaryotic cells; Bio-macromolecules: composition and organization; Energy and Principles of bioenergetics; Water: Properties of water, acid/base properties, dissociation of water and pH value, pH buffering capacity, transportation mechanisms across bio-membranes and osmosis, Proteins: Amino acids - structure, nomenclature, classification, Primary structure of proteins - peptide bond, sequencing, synthesis, Secondary structure - α -helices, β -sheets, Three dimensional structure of proteins, methods for protein structural determination - X-ray, NMR and homology modeling, tertiary and quaternary structures of proteins, protein denaturation, Methods for purifying and studying proteins; Enzymes: functions, mode of action, specificity and inhibition, classification and nomenclature, factors affecting enzymes activity; Introduction to carbohydrates (Glycobiology) : biosynthesis, metabolism, glycolysis, Krebs cycle, Mitochondrial electron transport chain and ATP synthesis; Lipids: introduction, lipogenesis, lipids and lipoproteins in

relation to lipid storage diseases, sterol and steroids; Overview of nucleic acids.

Practical:

Model visualization of prokaryotic and eukaryotic cells; Solution preparation; Preparation of different buffers and their pH adjustment; Activity of different enzymes like amylase in saliva; Enzyme purification; DNA extraction; Gel electrophoresis; Determination of amino acid profile using HPLC/Amino acid analyzer; Energy estimation through Bomb Calorimeter.

Suggested Readings:

2. Ahmad, M. 2000. Essentials of Medical Biochemistry, 7th ed. Ilmi Book House, Urdu Bazar, Lahore.
3. Nelson, D.L. and M.M. Cox. 2013. Lehninger Principles of Biochemistry, 6th ed. W.H. Freeman & Co Ltd., New York, USA.
4. Rodwell, V.W., D.A. Bender, K.M. Botham, P.J. Kennelly and P.A. Weil. 2012. Harper's Illustrated Biochemistry, 30th ed. The McGraw-Hill Education, New York, USA

Course Breakdown

Semester 2nd

Semester-II				
CS-301	Application of Information and Communication Technology	3 (2+1)	General Education Course	
ENG-302	Expository Writing	03	General Education Course	
ISL-302	History of Islamic civilization	02	General Education Course	
PSC-302	Ideology and Constitution of Pakistan	02	General Education Course	
MTH-443	Quantitative Reasoning 1 Mathematics	03	General Education Course	
HND-321	Essential of Food Science	03	Major	
Semester Credit Hours		16		

CS-301 Applications of Information and Communication Technologies Credit Hours: 3 (2+1)

Course Content

- Brief history of Computers.
- Types of computers (Super, Mainframe, Mini and Micro Computer)
- Computer elements: Hardware, software, Storage Devices, Input Devices, Output Devices.
- Software: Operating Systems, Programming and Application Software.
- Introduction to Programming Languages.
- Databases and Information Systems.

- Data Communication and Networks.
- The internet: browsers and search engines.
- Email, collaborative computing, and social networking.
- E-commerce.
- IT Security and other issues.
- Use of Microsoft Office tools (MS Word, MS Powerpoint, MS Excel).

Recommended Books

1. Charles S. Parker, Understanding Computers: Today and Tomorrow, Course Technology, 25 Thomson Place, Boston, Massachusetts 02210, USA
2. Livesley, Robert Kenneth. An introduction to automatic digital computers. Cambridge University Press, 2017.
3. Zawacki-Richter, Olaf, and Colin Latchem. "Exploring four decades of research in Computers & Education." Computers & Education 122 (2018): 136-152.
4. Sinha, Pradeep K., and Priti Sinha. Computer fundamentals. BPB publications, 2010.
5. Goel, Anita. Computer fundamentals. Pearson Education India, 2010.
6. Introduction to Computers, Peter, N. McGraw-Hill

ENG-302

Expository Writing

Credit Hour: 03

Course Description:

This course will introduce students to the basic principles of effective / skillful writing and will develop the understanding of the students on academic and technical writing skills. Students will understand and know how to follow the stages of writing process and will apply these to technical and workplace writing tasks. Students will learn how to incorporate clarity and utility in their writing, learn stylistic methods for effective writing and to be aware of ethical issues in technical writing. Also, Students will read, analyze, and interpret material from technical fields, and will practice research and writing skills appropriate for technical topics.

Outcomes:

1. Students will be familiarized with basic sources and methods of research and documentation on topics including on-line research.
2. They will be able to synthesize and integrate material from primary and secondary sources wedded to their own ideas in research papers.

Course Contents:

- Topic sentence
- Paragraph writing:
- Essay writing:
- Introduction and Practice: Essay types: descriptive, narrative, discursive, argumentative.

- CV and job application
- Letter and memo writing
- Minutes of meetings
- Summary and précis writing
- Comprehension

Recommended Books:

1. Boutin, M., & Brinand, S., & Grellet, F. (1993). Oxford Supplementary Skills. Fourth Impression. Pages 45-53.
2. Nolasco, R. (1992). Oxford Supplementary Skills (3rd ed.). Fourth Impression.
3. Langan, J. (2004). *College Writing Skills*. Mc-Graw-Hill Higher Education.

ISL- 302

Islamic Culture & Civilization

Credit Hour: 02

Objectives of the Course

1. Definition of Islamic Culture & Civilization
2. Analysis of the Rise and Fall of Islamic Culture in various parts of the World
3. A Critical Study of the Effect and benefits of Islamic Civilization on other Cultures

Course Description

	Title	Description
1	Introduction to civilization- 1	Introduction of Civilization Foundation of Civilization Elements of Civilization
2	Important Civilization in the Pre-Islamic Era	Greek Civilization Roman Civilization
3	Important Civilization in the Pre-Islamic Era	Egypt Civilization Hindu Civilization
4	Principles of Islamic Civilization	Pillars of Culture & Civilization
5	Foundations of Islamic Civilization in the Era of the Prophet (SAW) and the Caliphates	Reasons for the evolution of Islamic Civilization in the Era of the Prophet (SAW)
6		Islamic Civilization in the Era of the Caliphates
7		Elements of Islamic Civilization in the era of Caliphates
8	Islamic Civilization in the era of Banu Ummayads- 1	Introduction of Banu Ummayads Intellectual development among the Banu Ummayads Educational Centers for the Banu Ummayads
MID TERM		
9	Islamic Civilization in the era of Banu Ummayads- 2	Social developments of the Banu Ummayads Causes of the civilization development of the Banu Ummayads Results of the civilization development of the Banu Ummayads
10	Islamic Civilization in the era of Banu Ummayads- 3	Religious Movements in the era of Ummayads Internal Disputes in Ummayads era Reasons for the decline of the Ummayads
11	Islamic Civilization in the era of Abbasids- 1	Beginning of Abbasid civilization Educational movements of the Abbasid period
12	Islamic Civilization in the era of Abbasids- 2	Cultural development in the Abbasid period Social development in the Abbasid period

		A Comparative study of the Islamic Culture of Abbasids with other Civilization
13	Islamic Civilization in the era of Abbasids- 3	Battles of Crusades Battlers of Tartarians The Causes of the Fall of the Abbasids and its Effects on Islamic Civilization
14	Islamic Civilization in Spain	Causes of the spread of Islamic civilization in Spain Manifestations of Islamic civilization in Spain Influence of Islamic civilization in Spain on European civilization
15	Islamic Culture and Civilization in the Sub-Continent	Islamic civilization achievements in the Sub-Continent Reasons for the spread of Islamic cultural in Sub-Content
16.		The effects of the publication of Islamic civilization in the Sub-content on other civilization

Recommended Books

1. Muslim History and Civilization by Ehsan ul Karim
2. Islamic Religion History and Civilization, Seyyed Hossein Nasr
3. Tareekh-e-Islam Shah Nadvu Moin-ud-din
4. Islamic History by Dr. Kabeer Ali
5. An Atlas of Islamic History, H.W.Hazard
6. A Short History of Islam, S.F.Mehmood

7. تاریخ تمدن اسلامی، شاه معین الدین ندوی

8. تاریخ اسلام، اکبر شاه نجیب آبادی

PSC-302 Ideology and Constitutional Development of Pakistan 02

Learning Objectives

- ✚ To develop critical thinking for understanding Constitutional development in Pakistan;
- ✚ To develop understanding of the legal and constitutional structure of the state;
- ✚ To develop comprehension of the interconnectivity between the Constitutional provisions and political practice;
- ✚ To develop the understanding of students regarding ideological basis of Pakistan as well as role of ideology in building national character.

Contents of the Course

Course is divided into two sections to cover the maximum portion of the course.

Section A: Ideological understanding and development of Pakistan

1. Basis of Ideology of Pakistan and Two Nations Theory
2. Ideology of Pakistan: Vision of Quaide e Azam and Allama Iqbal
3. Role of ideology in building national character
4. Democratic system of Pakistan (Issues)

5. Major causes of the Imposition of martial Law (1958, 1969, 1977&1999).

Section B: Constitutional Development of Pakistan

6. Pakistan's Constitutional Development from 1947 onward.
7. An Overview of the Constitution of Pakistan (Features of 1973 Constitution).
8. Basic Concepts—Federalism and the 1973 Constitution.
9. Islam and the Constitution of Pakistan -1973.
10. Constitutional Amendments and Reforms- 1973.

Recommended Books:

1. Constitution of Pakistan
2. The Constitutional History of Pakistan—1947-2012, Malik Muhammad Owais Khalid, 2012
3. Constitutional History and Political Development, Hamid Khan, 2005
4. Constitutional Development in Pakistan, G.W. Chaudhary
5. Constitution Making in Pakistan 1947-85, Dr. Baz Muhammad
6. Allen Gledhill, Pakistan: The Development of its Laws and Constitution
7. “Military, State and Society in Pakistan” by Hasan Askari Rizvi, 2000.
8. Kazmi, Raza, Pakistan Studies, Karachi Oxford University Press.
9. Qureshi, I. H., A Short History of Pakistan, University of Karachi Press.
10. Qureshi, I. H., Struggle for Pakistan, University of Karachi Press.
11. Sayeed, K. B., Pakistan Formative Phase, National Book Service
12. Ziring, Lawrance, Pakistan in Twentieth Century: A Political History, London; Oxford University Press
13. Government and politics in Pakistan by Mushtaq Ahmad
14. Ideology and Dynamics of Politics in Pakistan by Muhammad Asif Malik

MTH-433

QR-I---Exploring Quantitative Skills Credit

Hours: 03

Specific Objectives of the Course:

Introduce students to importance of quantitative reasoning skills, history of mathematics and numbers in the real World.

Course Outline:

- Different types of standard numbers and their operations.
- Understanding relationship between parts and whole
- Practical life scenarios involving parts & whole
- Money management (profit, loss, discount, zakat, simple interest, compound interest and taxation)
- Practical life scenarios involving units and rate, percentage, ratio, proportions
- Basic of Geometry (line, angles, circles, polygon etc)
- Golden ratio in sculptures
- Equating two expressions in one variable & using it to solve practical problems

- Sets and their operations, Venn diagrams
- Relations, Functions and their graphs
- Algebraic solution of quadratic equations and inequalities
- System of linear equations and their solutions
- Introduction to logic, prepositions, logical connectives, truth tables etc

Recommended Books:

- Bennett, J. & Briggs, W. (2015). Using and understanding mathematics (6th Edition). Pearson Education, Limited.
[http://xn--webeducation-dbb.com/wp-content/uploads/2019/09/Jeffrey-Bennett-William-Briggs-Using-Understanding-Mathematics -A-Quantitative-Reasoning-Approach-Pearson-2015.pdf](http://xn--webeducation-dbb.com/wp-content/uploads/2019/09/Jeffrey-Bennett-William-Briggs-Using-Understanding-Mathematics-A-Quantitative-Reasoning-Approach-Pearson-2015.pdf)
- Blitzer, R. (2014). Precalculus. (5th Edition). Pearson Education, Limited.
https://www.ilearnacademy.net/uploads/3/9/2/2/3922443/precalculus_edition_5f.pdf

HND-321

Essentials of Food Science & Technology

Credit Hours 3(2-

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, Food sources including cereals, legumes, vegetables, fruit etc. in detail with their season and areas of growth. Animal based foods. Global food situation; Food constituents; Food classification based on perishability 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 labelling.

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

Semester-III				
MTH-444	Quantitative Reasoning II	03	General Education Course	
BOT-301	Principal of biological sciences	3(2+1)	Natural Sciences	
HND-411	Human Physiology	03(02+1)	Disciplinary Major	
HND-412	Macronutrients in Human Nutrition	03	Disciplinary Major	
HND-413	Micronutrient	3(2-0)	Disciplinary Major	
Semester Credit Hours		15		

MTH-444

QR-II----Tools for Quantitative Reasoning

Credit Hours: 03

Specific Objectives of the Course:

Introduce students to variables, sampling data and statistical approach in decision making.

Course Outline:

- Investigating relationships between variables
- Exploring tools to find relationship between variables
- Population and samples,
- Exploring and summarizing data
- Finding a representative value in a data
- Measure and spread of a data, measuring degree of relationship among variables
- Measure of central tendency, dispersion, data interpretation
- Basic probability theory
- Basics of estimation and confidence interval
- Testing hypothesis
- Statistical inferences in decision making
- Survey sampling

Recommended Books:

- Heumann, Christian, and Schomaker, Michael. Introduction to Statistics and Data Analysis: With Exercises, Solutions and Applications in R. Switzerland, Springer International Publishing, 2023.
- James, Gareth, et al. An Introduction to Statistical Learning: With Applications in R. Germany, Springer New York, 2013.
- Reid, Howard M.. Introduction to Statistics: Fundamental Concepts and Procedures of Data Analysis. United States, SAGE Publications, 2013.

BOT-301

Principle of Biological sciences Credit Hours 3(2-0)

Objectives:

The aims of the teaching and study of sciences are to encourage and enable students to: develop inquiring minds and curiosity about science and the natural world.

Course Outline

I. Biological Sciences

The Basis of Life: Cell Structures and Functions (Sub-cellular Organelles such as Nucleus, Mitochondria and Ribosomes).

Biomolecules: - Proteins, Lipids, Carbohydrates and Enzymes.

Common diseases and Epidemics: Polio, Diarrhoea, Malaria, Hepatitis, Dengue their Causes and Prevention.

a. Science

Environment and Pollution: The Atmosphere (Layered Structure and Composition), Hydrosphere (Water Cycle, Major Water Compartments), Biosphere (Major Biomes) and Lithosphere (Minerals and Rocks, Rock Types, Plate Tectonics).

b. Food Science

Concept of Balance Diet: Vitamins, Carbohydrates, Protein, Fats and oil, Minerals, Fiber.

Quality of Food: Bioavailability of Nutrients, Appearance, Texture, Flavor, Quality of Packed and Frozen Food, Additives, Preservatives and Antioxidants

Food Deterioration and its control: Causes of Food Deterioration, Adulteration, Food, Preservation.

Recommended Books:

- Exploring Life Science 1975 Walter A. Thurber, Robert E. Kilburn, Peter S. Howell
- Principles of Animal Biology 2011 Lancelot Hogben.
- Forensic Science Fundamentals & Investigation 2008 Anthony J. Bertino.
- Basics of Environmental Science 2002 Michael Allaby.
- Food Science 1998 Norman N. Potter, Joseph H. Hotchkiss.
- Environmental Science: Systems and Solutions. 5th ed. 2013 Michael L. McKinney, Robert Schoch and Logan Yonavjak.
- Environmental Science: A Global Concern 2012. William P. Cunningham, Barbara Woodworth Saigo.

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.

Suggested Readings:

1. Gillian, P. and C.D. Richards. 2006. Human Physiology: The Basis of Medicine, 3rded. Oxford University Press, London.
2. Guyton A.C. and J.E. Hall. 2006. Textbook of Medical Physiology, 11thed. J.F. Kennedy Blvd., Philadelphia, USA.
3. Rahman, Z.U., B. Aslam, J.A. Khan and T. Khaliq. 2007. Manual of Physiology-I, 2nded. 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, 12thed. John Wiley & Sons, Inc., New York, USA.

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:

Macro nutrients and their types based of their chemistry and their major food sources. Carbohydrates: nature, structures; Classification and functions of carbohydrates: monosaccharaides, disaccharides, oligosaccharides, polysaccharides. Proteins: structural features, characteristics, functions. Amino acids: food sources (on the basis of their functions in human body). Lipids – nature, classification; Fatty acids: saturated, unsaturated, polysaturated, glycerol, cholesterol, sterol; Lipoprotein systems (blood lipids);

Fats. Lipids, phospholipids and sphingolipids; cholesterol, sterol; Essential fatty acids: sources, health benefits.

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.

Gropper, S.S. and J.L. Smith JL. 2013. *Advanced Nutrition and Human Metabolism*, 6th ed. Cengage Learning, Belmont, CA, USA.

HND-413 Micronutrients in Human Nutrition Credit Hours: 3(3-0)

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, 6th ed. Wadsworth Cengage Learning, Belmont, CA, USA.

Course Breakdown
Semester 4th

Semester-IV				
MIC- 301	Food Microbiology	3(2+1)	Interdisciplinary	
HND-421	Human Physiology II	3(2+1)	Disciplinary Major	
HND-422	Molecular Genetics	03	Interdisciplinary	
HND-423	Assessment of Nutritional Status	3(2-1)	Disciplinary Major	
HND-424	Nutrition Through the Life Cycle	3(3-0)	Disciplinary Major	
Semester Credit Hours		15		

MIC-301

Food Microbiology

Credit Hours: 3(2-1)

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, 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. Food contamination and factors affecting contamination. Basics of food hygiene and sanitation.

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.
4. Frazier, W.C., D.C. Westhoff and K.N. Vanitha. 2013. Food Microbiology, 5th ed. McGraw- Hill

Book Co., New York, USA.

5. Montville, T.J., K.R. Mathews and K.E. Kniel. 2012. Food microbiology: an introduction, 3rd ed. ASM Press, Washington DC, USA.

6. Ray, B. and A. Bhunia. 2013. Fundamentals of Food microbiology, 5th ed. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.

HND-421

Human Physiology-II

Credit Hours:3(2-

1) 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:

Utilization of nutrients in human body, 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.

HND-422 Introductory Molecular Genetics Credit Hours 3(2-1) Theory:

Introduction to molecular genetics. Molecular basis of heredity. Structure and types of nucleic acids. Watson and Crick's model of DNA. DNA replication: models, mechanism and enzymes of replication. Genetic code. Properties and evidences, deviation from universality. Gene expression in pro and

eukaryotes: Promoters and various consensus sequences, types of RNA polymerase initiation and termination of transcription, differences in pro and eukaryotes. Mechanism of splicing and its control, translation of the message, post translational modifications. Introduction to Gene regulation in pro and eukaryotes. Gene recombination. Molecular mechanisms of DNA recombination, gene conversion. Mutation: kinds and mutagenic agents. DNA damage and repair mechanisms.

Practicals:

- Bacteriological culture media preparation, autoclave handling, inoculation and handling of bacterial cultures.
- Agarose Gel Preparation
- Gel Electrophoresis

Recommended Books:

1. Weinzierl R. O. J. , Mechanisms of Gene Expression : Structure, Function and Evolution of the Basal Transcriptional Machinery, World Scientific Pub Co; 1999
2. Sarah C. R. Elgin, J. L. Workman, Chromatin Structure and Gene Expression (Frontiers in Molecular Biology, 2nd edition, Oxford University Press, 2001.
3. Hardin C.C., C. C. Harbin, Cloning, Gene Expression and Protein Purification : Experimental Procedures and Process Rationale, Oxford University Press, 2001.
4. Vaillancourt P. E., E. coli Gene Expression Protocols (Methods in Molecular Biology, Vol 205, Humana Press, 2002.
5. Rapley, R. Molecular analysis and genome discovery. John Wiley & Sons. 2004.
6. Lewin, B. Genes-VIII. 8th Ed. Oxford University Press, UK. 2004.

HND-423 Assessment of Nutritional Status Credit Hours: 3(2-1)

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. 4 Basic Nutritional assessment methods: anthropometrics, biochemical, clinical, dietary. Measuring food consumption at national level: food balance sheets, total diet consumptions. 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.

Practical:

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

Local visits to Nutritional Rehabilitation Units.

Suggested Readings:

1. Driskell, J.A. and Wolinsky, I. 2011. Nutritional Assessment of Athletes, 2nded. 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, 6thed. The McGraw-Hill Companies Inc., New York, USA.
4. McGuire, M. and Beerman, K.A. 2011. Nutritional Sciences: From Fundamentals to Food. Cengage Learning, Belmont, CA, US

HND-424 Nutrition Through the Life Cycle Credit Hours: 3(3-0)**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. Nutrition during pregnancy: status of pregnancy outcomes, embryonic and fetal growth & development, pregnancy weight gain, nutrition and outcome of the pregnancy, 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-schooler 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 Clinical Nutrition, 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 Throughout the Life Cycle. The McGraw-Hill Education, Maidenhead, Berkshire, U.K.

Semester-V				
HND-511	General Pathology	3(2-1)	Interdisciplinary	

HND-512	Dietetics-I	3(2-1)	Disciplinary Major	
HND-513	Nutrition and Psychology	3(3-0)	Disciplinary Major	
HND-514	Nutritional Education and Awareness	3(2-1)	Disciplinary Major	
HND-515	Meal Planning and Management	3(2-1)	Disciplinary Major	
HND-516	Public Health Nutrition	3(2-1)	Disciplinary Major	
Semester Credit Hours		18		

HND-511

General Pathology

Credit Hours:3(2-1)

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: infectious diseases, hypertension, acute & chronic inflammation, immunity, allergy, hypersensitivity, ulcer (peptic,

duodenal), leukemia or blood cancer, environmental and nutritional diseases; Pathogens and their mechanisms of infection including H. pylori, Salmonella, Shigella, Brucella, Mycobacterium. 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 routine urinalysis, faecal examination and skin scraping; Blood smears, staining and examination; Haematology 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 Saunders, 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, New York, USA.

HND-512

Dietetics-I

Credit Hours:3(2-1)

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 caloric 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, 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.

Practical:

Interpretation of food guide pyramid, MyPyramid, MyPlate, EatwellPlate; Energy value of different foods: carbohydrates, fats, proteins; Calculating energy requirements; Balanced diet and menu planning using exchange lists, food composition tables & databases; Food intake analysis.

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, 5th ed. 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.

HND-513 Nutrition and Psychology Credit Hours: 3(3-0)**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 level 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.

- Booth, D.A. 1994. *The Psychology of Nutrition*. Taylor & Francis Inc., Bristol, PA, USA.
- Elmes, D.G., B.H. Kantowitz and H.L. Roediger. *Research Methods in Psychology*, 9th ed. Wadsworth Cengage Learning, Belmont, CA, USA.
- Jane O. 2010. *The Psychology of Eating: From Healthy to Disorders Behavior*, 2nd ed. Wiley Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

HND-514

Nutritional Education and Awareness

Credit Hours: 3(2-

1) 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 oriented communication skills, 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 counselling; 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:

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

HND-515

Meal Planning and Management

Credit Hours: 3(2-

1) 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; 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; Kitchensafetyandsettings;Foodlabelling;Menusforschools,geriatricandhealthcarecenters.

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,preparationandserviceofmealsfordifferentoccasionsatdifferentincomelevels;Understandingfood labels; Market visits for cost and quality and food marketing regulations. Food service visits(Restaurants ,School, Colleges, Hospitals).

Suggested Readings:

- Brown,A.2015.UnderstandingFoodPrinciples&Preparation,5thed.CengageLearning,Belmont,CA, USA.
- McWilliams,M.2012.FundamentalsofMealManagement,5thed.DorlingKindersleyIndiaPvt.Ltd., New Delhi,India.
- Narvaez-Soriano,S.2004.AGuidetoMealManagementandTableServices.Rex BookStore,Manilla, Philippine.
- Sethi,M.2008. InstitutionalFoodManagement. NewAgeInternationalPvt. Ltd.NewDelhi,India.

HND-516

Public Health Nutrition

Credit Hours: 3(2-

1) 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, ethics. Food Security, Food Availability.

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:

- Edelstein,S.2011.NutritioninPublicHealth: A Handbook for Developing Programs and Services, 3rded.

- Jones & Bartlett Learning, Sudbury, M.A, USA.
- Gibney, M.J., B.M. Margette and J.M. Kearney. 2004. Public Health Nutrition. Blackwell Science Ltd. Oxford, UK.
 - Lawrence, M. and T. Worsley. 2007. Public Health Nutrition: From Principle to Practice. Allen & Unwin Book Publishers, Australia.
 - McKenzie, J.F. and R.R. Pinger. 2015. An Introduction to Community & Public Health. 8th ed. Jones & Bartlett Learning, LLC Burlington, MA, USA.
 - Spark, A. 2007. Nutrition in Public Health: Principles, Policies and Practice. CRC Press, Taylor & Francis, Boca Raton, FL, USA.

Semester-VI				
HND-521	Dietetics-II	3(2-1)	Disciplinary Major	
HND-522	Functional Foods and Nutraceuticals	3(3-0)	Disciplinary Major	
HND-523	Nutrition Through Social Protection	3(2-0)	Disciplinary Major	
HND-524	Sports Nutrition	3(2-1)	Disciplinary Major	
HND-525	Infant and Young Child Feeding	3(2-1)	Disciplinary Major	
HND-526	Clinical Biochemistry	3(1-2)	Disciplinary Major	
Semester Credit Hours		18		

HND-521 DIETETICS-II

Credit Hours 3 (2-1)

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, pancreatic 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; 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): types of therapeutic diet, E.g DASH Diet, common diseases in therapeutic diet e.g hypertension, diabetes, hypercholesterolemia, osteoporosis etc. Strategic actions and for promoting healthy diets. Nutrition education and primary health care camp. obesity, leanness and underweight; coronary heart disease: dyslipidemia, ischemic heart disease, heart failure; fevers and infections; diseases of respiratory system: cystic fibrosis, asthma; rheumatic diseases: rheumatoid arthritis, osteoarthritis & gout.

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: preoperative 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, 5th ed. 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.

HND-522

Functional Foods and Nutraceuticals

Credit Hours: 3(3-0)

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, their sources and major roles in body: Isoflavones, lycopene, polyphenols, dietary fiber, omega-3 & -6 fatty acids, conjugated linoleic acid, antioxidants, prebiotic and probiotic; Functional foods from different food groups: cereals, fruits and vegetables; Regulatory systems governing the production and distribution of functional food -national and international; 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.
3. Shi, J., G. Mazza and M. L. Maguer. 2002. Functional Foods: Biochemical and Processing Aspects, Vol. 2. CRC Press, Taylor & Francis Group, Boca Raton, New York, USA.
4. Wildman, R. E. C. 2006. Handbook of Nutraceuticals and Functional Foods, 2nd ed. CRC Press, Taylor & Francis Group, Boca Raton, New York, USA.

HND-523

Nutrition through social protection

Credit Hours: 3(2-0)

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; Behaviour 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

HND-524**Sports Nutrition****Credit Hours: 3(2-1)****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 mineral supplementation for fitness; High and low intensity exercise, cross training, walking for weight control and case studies; Introduction to muscle

contraction, fast and slow fibers, 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 sports man.

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.
2. Driskell, J. A. 2007. Sports Nutrition Fats and Proteins. CRC Press, Taylor and Francis Group, Boca Raton, FL, USA.
3. Fink, H. H., A. E. Mikesky and L. A. Burgoon 2011. Practical Applications in Sports Nutrition, 3rd ed. Jones & Bartlett Learning Burlington, MA, USA.
4. 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.

HND-525

Infant and Young Child Feeding

Credit Hours: 3(2-

1) 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

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, 1sted. 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, 4thed. Jones & Bartlett Learning, Mississauga, Canada.
 4. WHO. 2003. Global Strategy for Infant and Young Child Feeding. World Health Organization, Geneva, Switzerland.
- WHO/UNICEF/GOP (World Health Organization/United Nations Children's Fund/Government of Pakistan). 2008. Infant and young child feeding counselling: an integrated course. Nutrition Wing, Ministry of Health, Government of the Pakistan, Islamabad.

HND-526**Clinical Biochemistry****Credit Hours 3(1-2)****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

Clinical laboratory based diagnosis, Metabolic disorders, Principles of equipment used in clinical biochemistry laboratories, Reagents for purpose of diagnosis, nutritional disorders. Lipid profile, atomic absorption etc.

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, RB C and uric acid; Sero-diagnosis of infectious diseases; Visit to clinical laboratory/concerned organization.

Suggested Readings:

2. Ahmed, N. 2011. Clinical Biochemistry. Oxford University Press, Oxford, UK.
 3. Bain, B. J., I. Bates, M. A. Laffan and S. M. Lewis. 2012. Practical Haematology, 11thed. Churchill Livingstone, Elsevier Ltd., New York, USA.
 4. Burtis, C., E. Ashwood and D. Burns. 2006. Tietz Text Book of Clinical Chemistry and Molecular Diagnostics, 4th ed. Elsevier Saunders Company, Philadelphia, USA.
 5. Chawala, R. 2014. Practical Clinical Biochemistry: Methods and Interpretations, 4thed. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, India.
 6. Devlin, T. M. 2005. Textbook of biochemistry with clinical correlations, 6thed. Wiley-Liss, Inc., U.S.A.
- HND-364 Dietetics-II Credit Hours: 3(2-1)

Semester-VII				
HND-611	Dietetics-III	3(2-1)	Disciplinary Major	
HND-612	Global Food Issues	3(3-0)	Disciplinary Major	
HND-613	Research Methods in Nutrition	3(3-0)	Disciplinary Major	
HND-614	Nutritional Practices in	3(2-1)	Disciplinary Major	

	Clinical Care			
HND-615	Field Experience	03	Field Experience	
Semester Credit Hours		15		

HND-611

Dietetics-III

Credit hours: 3(2-1)

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:

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; Phenylketonuria, Maple syrup urine disease, galactosemia, glycogen storage disease; renal diseases; burn; surgical conditions; bacterial overgrowth; infections; AIDS; food allergy;; micronutrient deficiencies; Policy principles for promotion of healthy diets;

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, 5th ed. 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.

HND-612

Global Food Issues

Credit Hours: 3(3-0)

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 behavior; 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.

HND-613

Research Methods in Nutrition

Credit Hours: 3(3-0)

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 the thesis and projects
- To be aware of ethical considerations 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. Routledge 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.

HND-614

Nutritional Practices in Clinical Care

Credit Hours: 3(2-1)

Learning Outcomes:

- To understand and create a patient-centered nutrition care plan based on sound nutrition principles, scientific evidence and biomedical reasoning
- To assess various physiological conditions and prepare diet plans accordingly
- To acquaint hands-on training in the field of enteral and parenteral 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 to patients: selection, nutritional requirements; Tube feeding: 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.



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Suggested Readings:

- 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.
1. 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.
 2. Katz, D.L. 2008. Nutrition in Clinical Practice, 2nd ed. Lippincott Williams & Wilkins, Philadelphia, PA, USA.
 3. Rolandelli, R.H., R. Bankhead, J. I. Boullate and C.W. Compher. 2005. Clinical Nutrition; Enteral and Tube Feeding. 4th ed. Elsevier Saunders Publishers, USA.
 4. Rolfes, S.R., K. Pinna and E. Whitney. 2015. Understanding Normal and Clinical Nutrition, 10th ed. Thomson and Wadsworth Publishers, USA.

HND-615

Field Experience

03

Student will visit Hospitals, public health departments, public and private nutrition based programs, nutrition analysis laboratories, community nutrition based clinics, and national and international NGEOS, school nutrition programs, nutrition awareness centers, nutrition Educational programs for three hours per week. Proper attendance of student and certification of field visit providing institute and a report of field visit under supervision of faculty from Department of Human Nutrition and Dietetics will mark the field visit report for final marking in transcript.

Semester-VIII				
HND-621	Nutrition Policies and Programs	3(3-0)	Disciplinary Major	
HND-622	Preventive Nutrition	3(3-0)	Disciplinary Major	
HND-623	Food Supplements	3(2-0)	Disciplinary Major	
HND-624	Lab Methods in Nutrition	3(1-2)	Disciplinary Major	
HND-625	Nutrition in Emergencies	3(2-0)	Disciplinary Major	
	Capstone Project	03	Capstone Project	
Semester Credit Hours		16		
Total Credit Hours		132		

HND-621

Nutrition Policies and Programs

Credit Hours: 3(3-0)

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



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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.

HND-622

PREVENTIVE NUTRITION

Credit Hours: 3(3-0)

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 polypharmacy, preventive nutrition throughout the life cycle; Cancer prevention: upper GIT cancer, prostate cancer, dietary supplements and cancer risks, soy and cancer prevention, micronutrients 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, 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, behavioural 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 behavioural 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.



WOMEN UNIVERSITY MARDAN

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.

HND-623

FOOD SUPPLEMENTS

Credit Hours: 2(2-0)

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 legislations 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 Academies 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.



WOMEN UNIVERSITY MARDAN

HN-624

Laboratory Methods in Nutrition

Credit hours 3 (2-2)

Safe practices in laboratory

General principles of safety, health and hygiene, clothing gloves. Food handling house keeping, use of flammable substances. Handling of blood handling of compressed gas cylinders, handling of chemicals, working alone in the lab.

Methods for protein quality evaluation and energy determination in foods

Introduction to chemical and biological methods for protein quality, amino acid score. Nitrogen balance. Protein efficiency ratio (PER) net protein utilization (NPU) biological value (BV), apparent and true digestibility. Digestibility by marker ratio calorimeter. Working principle determination of caloric values of food items.

Centrifugation

Introduction to centrifugation working principle use of the technique, relative centrifugal force (RCF) sedimentation coefficient, desk top, high speed and ultra centrifuge, parts of centrifuge and their functions.

Introduction to spectrophotometer, light spectrum and wave length, absorbance and transmittance of light, working principle of colorimeter and spectrophotometer. Use of the technique, standard and test solutions, standard curve, parts of colorimeter and spectrophotometer and their functions.

Atomic absorption spectroscopy

Introduction to atomic absorption, working principle. Use of the technique sample preparation standard curve parts of atomic absorption, and their functions.

Flame photometry

Introduction to flame photometry working principle use of the technique sample preparation standard curve parts of flame photometer and their functions.

Chromatography

Introduction to chromatography liquid and gas chromatography, ion exchange chromatography, gas liquid chromatography, gel permeation chromatography. Thin layer chromatography, high performance liquid chromatography working principle of each chromatography use of chromatographic techniques.

Electrophoresis

Introduction to electrophoresis, working principle use of the technique types of electrophoresis, determination of molecular weight by electrophoresis.

Practical

- Preparation of percent normal molar meq, ppm, ppb, solutions. Conversion from one strength to another.
- Computation of amino acid score protein efficiency ratio, digestibility biological values and net protein utilization of different foods.
- Separation of plasma from blood by centrifuge
- Determination of hemoglobin, plasma glucose, triglycerides, and free fatty acids by spectrophotometer.
- Determination of sodium and potassium by flame photometer.
- Determination of zinc and iron of wheat flour by atomic absorption.
- Determination of caloric values by calorimeter in foods.

Text book

- Instrumental methods of analysis. Sixth Ed. 1981. Willard H.H., Merrit, L.L., Dean, J.A. and settle, F.A. Wardsworth publishing Co., Belmont, CA.

Reference book

- The tools of biochemistry cooper T.G 1977.

HND-625

NUTRITION IN EMERGENCY

Credit Hours: 3(3-0)

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



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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. Pakistan IDP's.

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.

HND-626

Capstone project

Credit Hours: 3(3-0)

Mini project for research purpose, review reports, case studies, cohort studies, experimental studies, observational studies based on primary and secondary data relevant to field of nutrition and dietetics will be part of capstone projects, A panel of evaluators will evaluate the project and marking of evaluation team will be considered for final transcripts.