

PIR MEHR ALI SHAH
ARID AGRICULTURE UNIVERSITY
RAWALPINDI
INSTITUTE OF FOOD AND NUTRITIONAL SCIENCES



Self Assessment Report
1st Cycle (Fall 2016- Spring 2018)
M. Sc. Hons. Human Nutrition and Dietetics

DEPARTMENT OF HUMAN NUTRITION AND
DIETETICS

Prepared by: Members of Program Self Assessment Team

Dr. Asma Sohail (Coordinator)
Dr. Kashif Sarfraz Abbasi (Member)
Mr. Muhammad Adeel Javed (Member)

CONTENTS		
		Page No.
Introduction		5
Criterion 1:	Program Mission, Objectives and Outcomes	6
Criterion 2:	Curriculum Design and Organization	31
Criterion 3:	Laboratories and Computer Facilities	37
Criterion 4:	Students Support and Guidance	39
Criterion 5:	Process Control	41
Criterion 6:	Faculty	44
Criterion 7:	Institutional Facilities	47
Criterion 8:	Institutional Support	48
Summary and conclusion		50
ANNEXURES		
Annexure I: Detailed course contents of M.Sc (Hons) HND		53
Annexure 1I: Resumes of Faculty Members		63

List of Tables

Table Nos.	Titles	Page Nos.
1	Program Objectives Assessment for M. Sc (Hons) HND	6
2	Relationship of Program Objectives with Program Outcomes	7
3	Performance measures for research activities	8
4	Courses offered in the Fall Semester 2016	19
5	Courses offered in the Spring Semester 2017	20
6	Courses offered in the Fall Semester 2017	20
7	Courses offered in the Spring Semester 2018	20
8	Course Requirements for M.Sc. Hons. in Human Nutrition and Dietetics	32
9	Courses Vs Outcome	33
10	Courses representing theoretical background, problem analysis and solution design	33
11	Faculty course review report	35
12	Full Time Faculty	44
13	Faculty Distribution by Program Areas in HND	44
14	Students Enrolled in M.Sc. (Hons) HND in 2016 and 2017	48

List of Figures

Figure Nos.	Titles	Page No.
1	Teacher Evaluation of HND-701	10
2	Teacher Evaluation of HND 707	11
3	Teacher Evaluation of HND 709	12
4	Teacher Evaluation of HND 703	13
5	Teacher Evaluation of HND 714	14
6	Teacher evaluation of HND 707	15
7	Teacher evaluation of HND 711	16
8	Teacher evaluation of HND 714	17
9	Teacher evaluation of HND 719	18
10	Teacher Evaluation of HND 720	19
11	Course Evaluation of HND 701	21
12	Course Evaluation of HND 707	21
13	Course Evaluation of HND 709	22
14	Course Evaluation of HND 703	22
15	Course Evaluation of HND 714	23
16	Course Evaluation of HND 707	23
17	Course evaluation of HND 711	24
18	Course Evaluation of HND 714	24
19	Course evaluation of HND 719	25
20	Course Evaluation of HND 720	25
21	Results of Survey of Graduating Students	27
22	Results of Faculty Survey	28
23	Results of Alumni Survey	29
24	Results of Employer Survey	30

INTRODUCTION

The Department of Human Nutrition and Dietetics in the Institute of Food and Nutritional Sciences at PMAS-Arid Agriculture University Rawalpindi offers postgraduate degree program in the Institute of Food and Nutritional Sciences since 2016. An extensive scheme of study (consisting of 22 courses) has been developed for post graduate degree program in the field of Human nutrition and Dietetics including all major aspects such as Processes in Clinical Nutrition, Nutritional Status Assessment, Clinical and Therapeutic Nutrition, Dietetics and Preventive Nutrition, Community Nutrition, Food Chain Management, Advances in Human Nutrition etc. The courses are supported by latest text books and research publications.

This degree program is in line as per guidelines of vision 2025 that envisages to develop healthy nation and to improve malnutrition status in Pakistan. The department has passed out more than 20 post-graduate students. This department is highly helpful to train manpower in the area of nutritional sciences, nutritional food product development, food analysis, nutraceuticals and development of value-added products to apply the knowledge for the betterment of health status of Pakistani Population. As a dietitian, trained man force will work with people to help them modify their food intake, offering practical advice to enable them to make dietary changes. Nutritionists/ dietitians are actively engaged as Govt and Non-Govt organization advisors, researchers, food industry managers, educators etc. The Department offers range of short courses suitable for persons interested in the area of food product development. In future short courses will be planned in the area of dietetics, nutrition, school teachers trainings in the area of nutrition and other health professionals.

This Self-Assessment Report (SAR) is based on eight criteria. The first criterion outlines the program mission and objectives. Criterion 2 provides information about the curriculum development. Criterion 3 enlists the laboratories and other relevant information. The fourth criterion is pertinent to the information about students' support and advising. The last four criteria provide information about process control, faculty characteristics and institutional facilities and support.

CRITERION 1:**PROGRAM MISSION, OBJECTIVES AND OUTCOMES****Standard 1.1 The program must have measurable objectives to support Mission**

Mission Statement: Human Nutrition and Dietetics program's basic mission is to achieve nutritional goals according to vision 2025. It addresses the population segment for their nutritional needs and improve health status of population. The aim of this department is to familiarize post graduate students with innovative research based issues which relates with the overall objective of improving health of an individual to community level.

A more precise mission of Human Nutrition Section is to conduct up to date researches with extended knowledge and information related to human health.

Objectives:

1. To provide post graduate study and research in Human Nutrition and Dietetics
2. To prepare competent nutritionists and dietetic practitioners for careers which improve the health of the nation through optimal food and nutrition practices.
3. To produce trained graduates with critical thinking and problem-solving skills for careers pertaining to the diverse global issues of food, nutrition and health.

Main elements of strategic plan to achieve mission and objectives:

1. Development and strengthening of Human Nutrition and Dietetics section through improved teaching and research.
2. Curricula designing including major subjects, minor subjects and internship and training programs.
3. Upgradation of laboratories for students as per available resources.
4. Publications of research and review articles, books etc
5. Developing linkages with Nutrition departments at various organizations

The assessment of the program objectives through different criteria is presented in Table 1.

Table 1. Program Objectives Assessment for M. Sc (Hons) HND

S. #	Objective	How Measured	When Measured	Improvement Identified	Improvement Made
1	Development of competent nutritionists and dietetic practitioners or consultants	1. Comprehensive examination, class tests, seminars 2. Evaluation through external coordinators at various hospitals	1. During the semesters and at the time of written & oral comprehensive exams 2. Internships	1. updating the existing courses 2. Avoid repetition in some courses 3. Basic courses need to be included	1. Courses are already updated 2. Revision of curriculum as per the requirement

2	To impart the knowledge about the current global issues	Assess knowledge about these aspects through comprehensive exams /presentations/ special problems	During the semesters and at the time of written & oral comprehensive exams	Updation of Courses related to global issues and trends	Courses are already updated
3	To conduct research studies on Human Nutrition and dietetics and its related issues	Assessing the interest of students, quality of their thesis research studies	Before start up of research studies and at the completion of thesis research	Students to make Presentations, publications and submit reports	Regular presentations are made in the faculty

Standard 1.2 The program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and that graduating students are capable of performing these outcomes

Program Learning Outcomes

Students of M.Sc. Hons. In Human Nutrition and Dietetics should possess the ability of:

- Identification of problems related to human nutrition and applies knowledge of the role of nutrition and healthy eating for disease prevention and wellness.
- Explain the structure and components of food systems and analyze the relationships between nutritional health and food selection.
- Preparation of problem-based research proposals and use of scientific study techniques.
- Communication skills through presentations, oral discussions, scientific writings and review articles, etc.

The relationship between program outcomes and objectives are given in Table 2.

Table 2. Relationship of Program Objectives with Program Outcomes

Program Objectives	Program Outcomes			
	Human Nutrition Skills	Relationships b/w health and Food	Research Proposals	Communication skills
Education	+++	++	++	++
Research	+++	+++	++	++
Global issues	++		+	+

+ = Moderately satisfactory ++ = Satisfactory +++ = Highly satisfactory

Standard 1-3: The results of Program's assessment and the extent to which they

are used to improve the program must be documented.

Regular assessment process will be continued and the results will be incorporated accordingly. Following are the strengths and weaknesses of the program identified.

Strengths of the Program

1. The department is having qualified teachers with full acquaintance of their respective subjects, knowledge of research to study the respective courses.
2. Faculty members are HEC approved supervisors who can supervise M.Sc. Hons. and Ph.D. students.
3. All faculty members are involved in research directly or indirectly as supervisor and committee members of post-graduate students.

Weaknesses of the Program

1. There is scarcity of space due to which department is facing difficulty in adjusting postgraduate classes (2016-2018).
2. Working and sitting place for postgraduate students is insufficient.
3. Coordination with federal and provincial departments/hospitals and other relevant organizations needs to be strengthened for research studies.

The evaluation process indicated high efficiency of system and satisfactory impact of outcomes.

Standard 1-4: The department must assess its overall performance periodically using quantifiable measures.

Table 3. Performance measures for research activities (total number)

Faculty	Publications in Journals
Prof. Dr. Asif Ahmad	87
Dr. Asma Sohail	18
Dr. Rai Muhammad Amir	20
Ms. Asia Latif	6
Dr. Kashif Sarfraz Abbasi	36
Dr. Tariq Masud (retired)	-

Future Plans

The Department has planned future research studies to address the issues of nutrition. Some of the salient activities are given in the following;

- 1.To improve quality of education through the provisions of latest literature, journals and other materials
- 2.To give trainings to different organizations about the basic knowledge of human nutrition and dietetics
- 3.To develop collaborations and linkages with different hospitals and other organizations to facilitate during research and internships.

Faculty satisfaction regarding the administrative services

- Office matters/files are disposed regularly and so far no complaint has been received from higher administrative authorities.
- Proper records/file of each employee and students are maintained.
- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required.

Program Assessment Results:

Teacher's evaluation

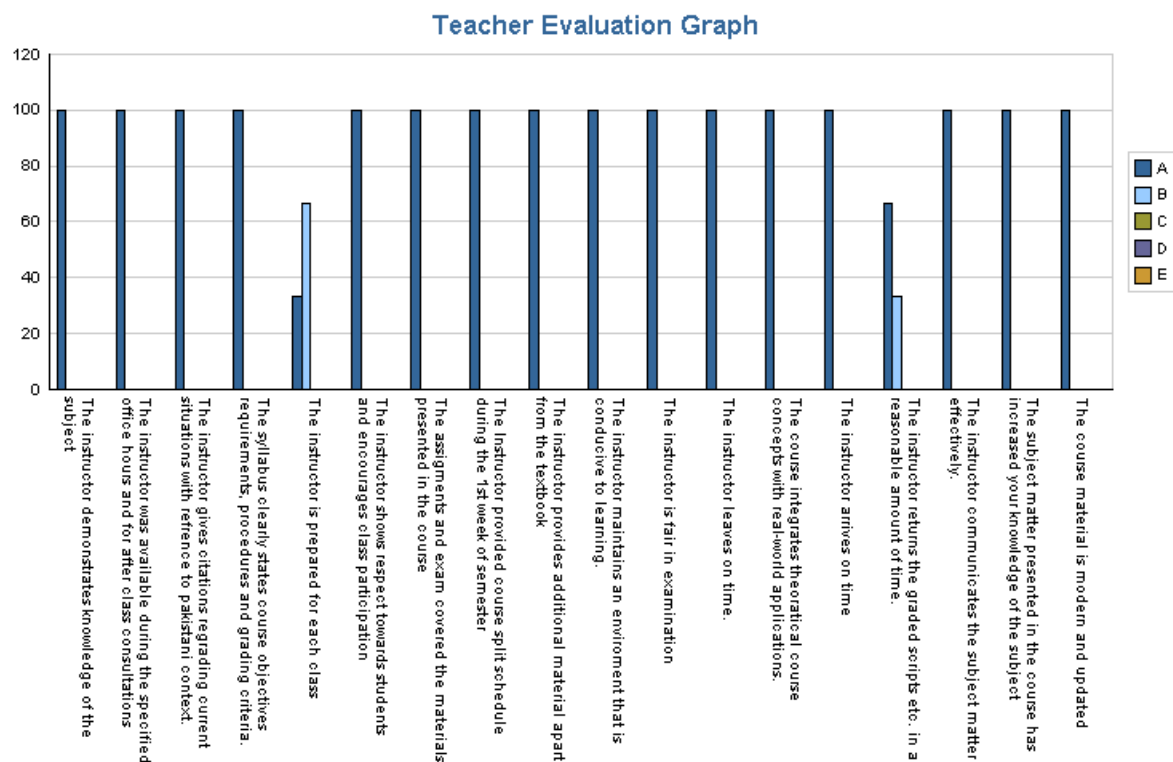
Following teachers are involved various courses in the discipline of Human Nutrition and Dietetics:

- | | |
|------------------------------|---------------------|
| 1. Dr. Asif Ahmad | Professor |
| 2. Dr. Asma Sohail | Associate Professor |
| 3. Dr. Rai Muhammad Amir | Assistant Professor |
| 4. Ms. Asia Latif | Lecturer |
| 5. Dr. Kashif Sarfraz Abbasi | Lecturer |
| 6. Dr. Tariq Masud (retired) | Professor |

The teachers were evaluated by the students at the end of course completion through the proforma-10. Details of teachers' performance are given in following Figures.

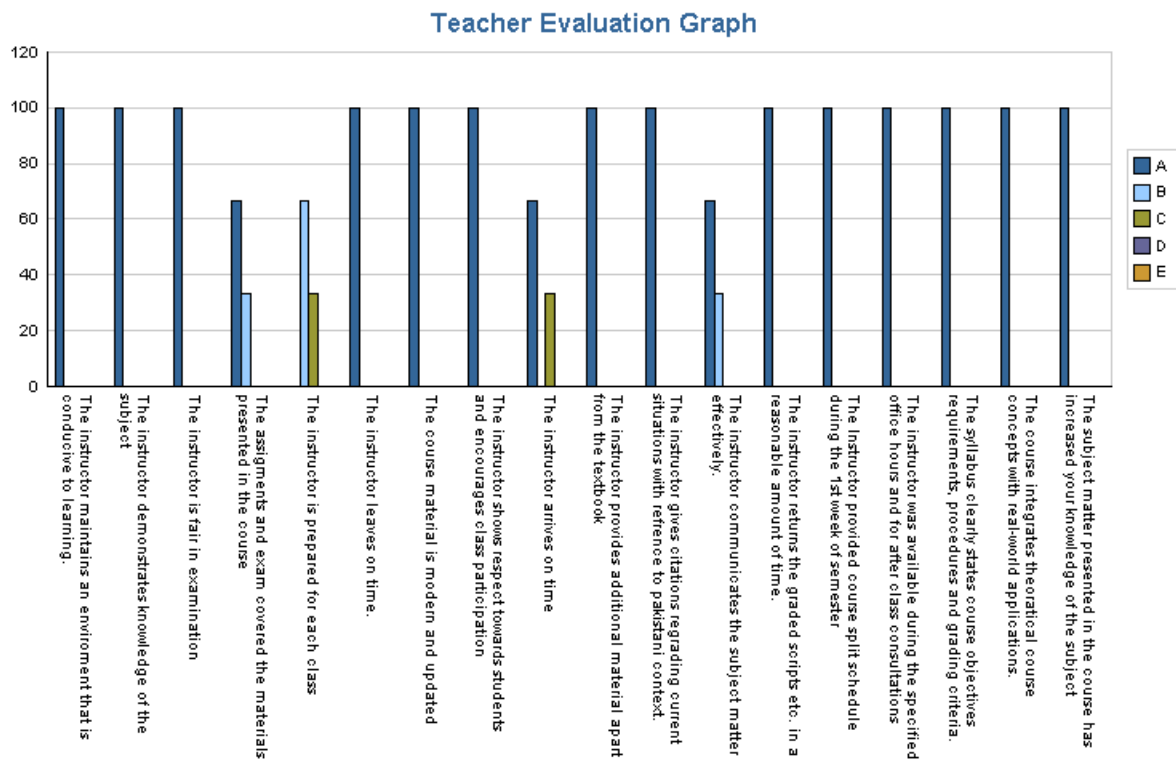
HND 701-Food Quality Assurance Management (Dr Asif Ahmad)

Fig # 1: Teacher Evaluation of HND-701



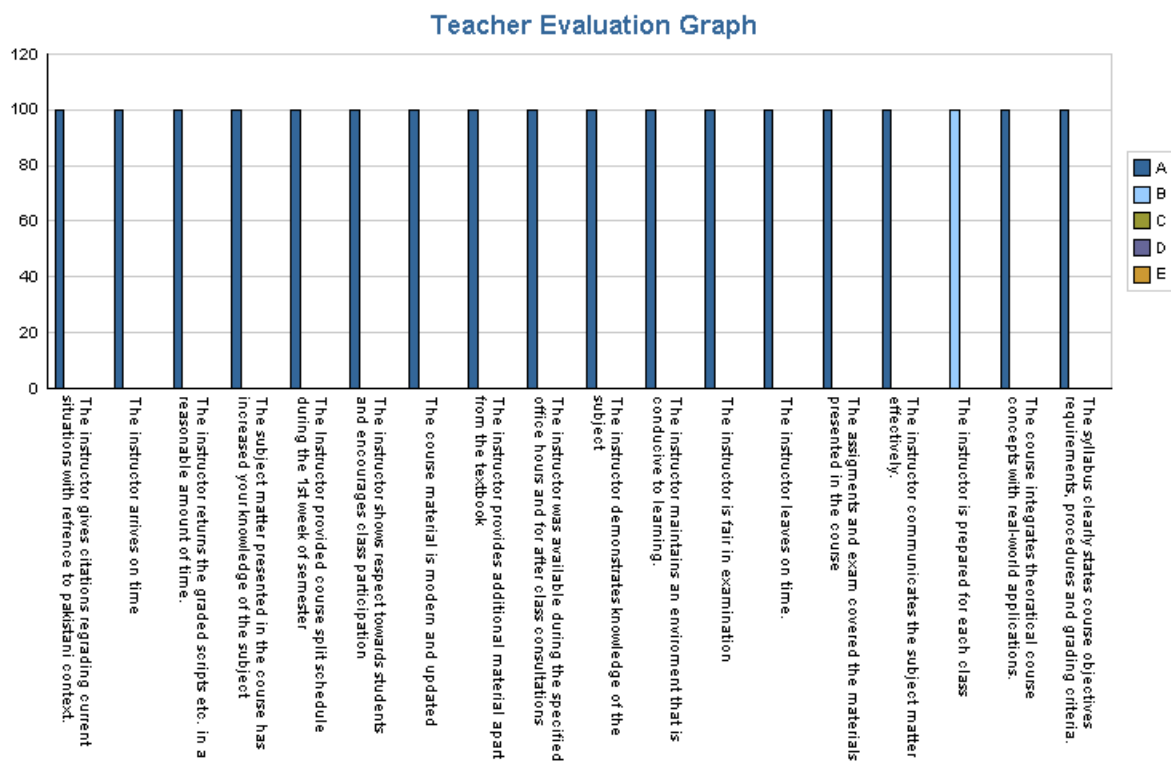
The students were satisfied regarding the abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material of the instructor.

HND 707-Nutritional Status Assessment (Ms Asia Latif)



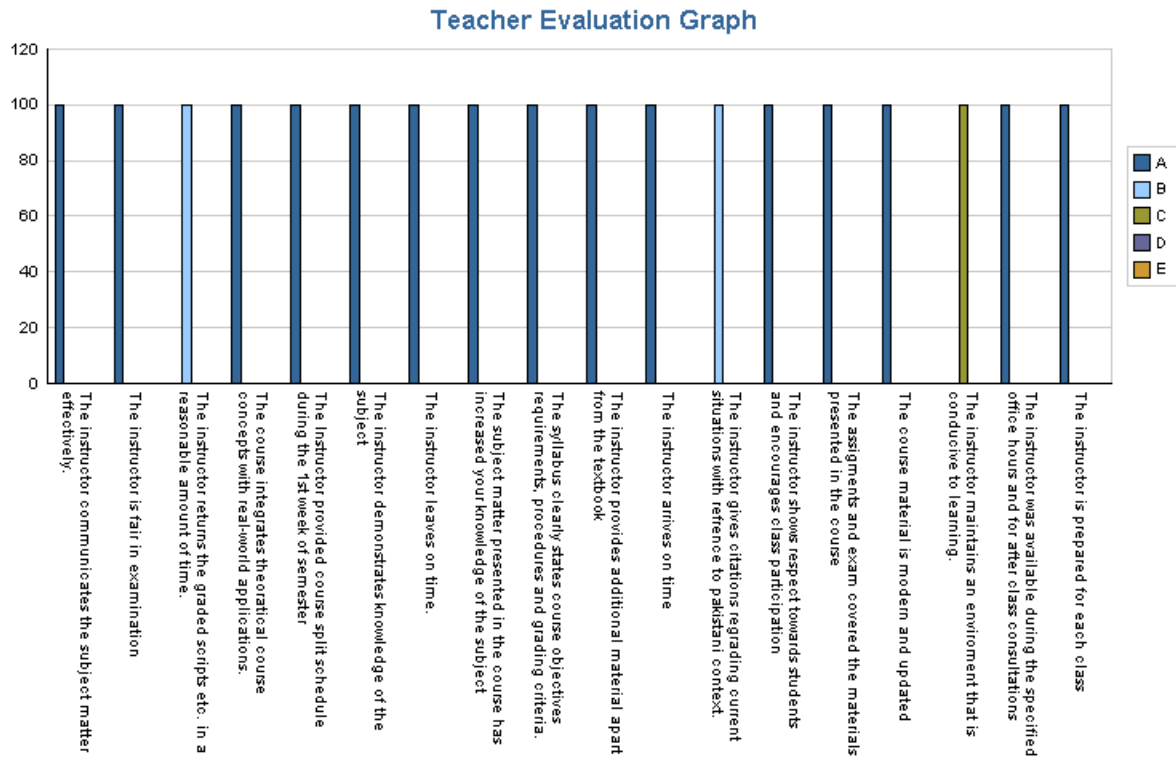
Fig#2: Teacher Evaluation of HND 707

Teacher's performance was good at all attributes of preparation, communication skill, participation, including modern concepts, punctuality and behavior.



Fig#3: Teacher Evaluation of HND 709

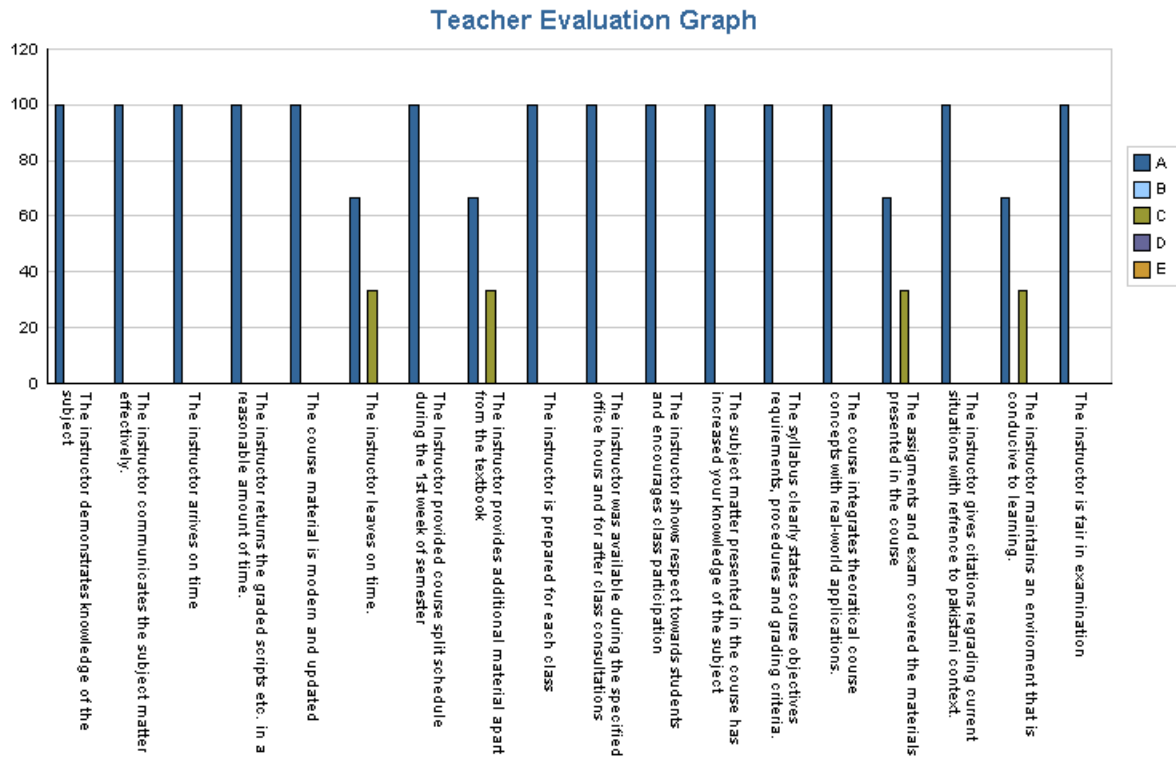
The students were highly satisfied with the provision of learning resources and feedback on assignments, knowledge, punctuality and preparedness etc.



Fig#4: Teacher Evaluation of HND 703

The students were highly satisfied regarding the abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material of the instructor

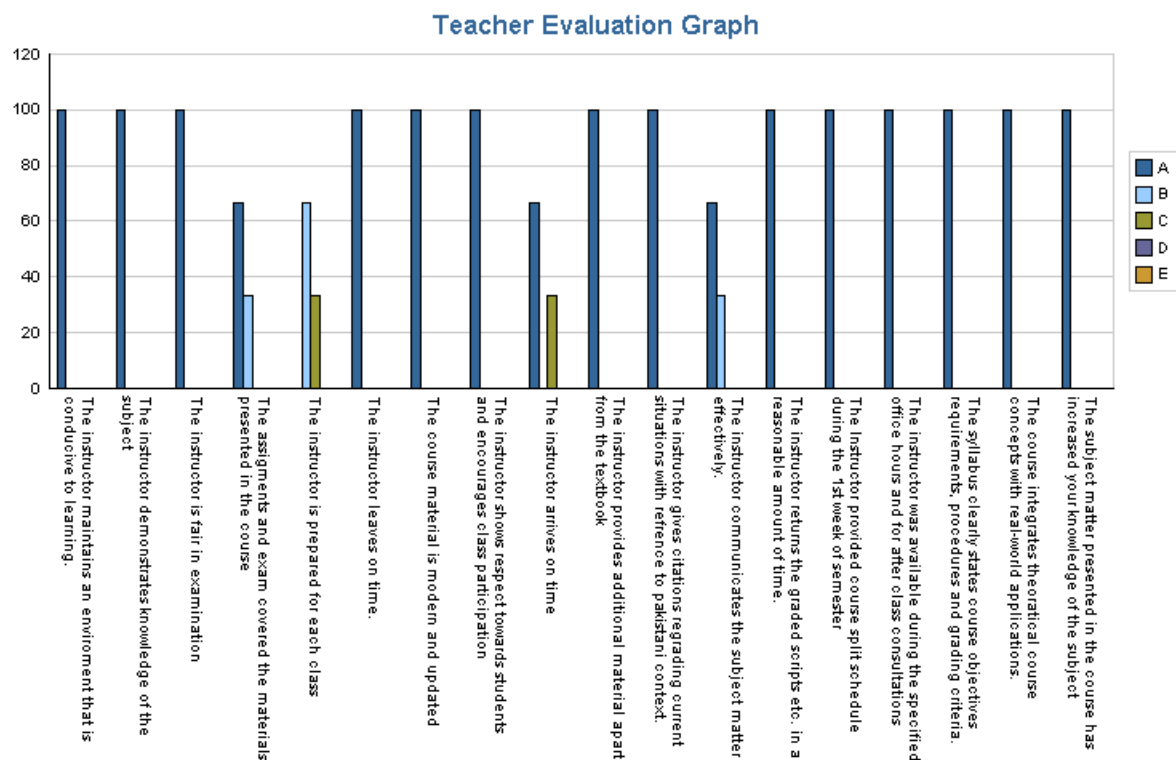
HND 714-Functional foods and nutraceuticals (Dr. Kashif Sarfraz Abbasi)



Fig#5: Teacher Evaluation of HND 714

Teacher was able to teach this course in a good manner, with all attributes of preparation, communication skill, participation, including modern concepts, punctuality and behavior, etc. and the instructor showed respect for the students.

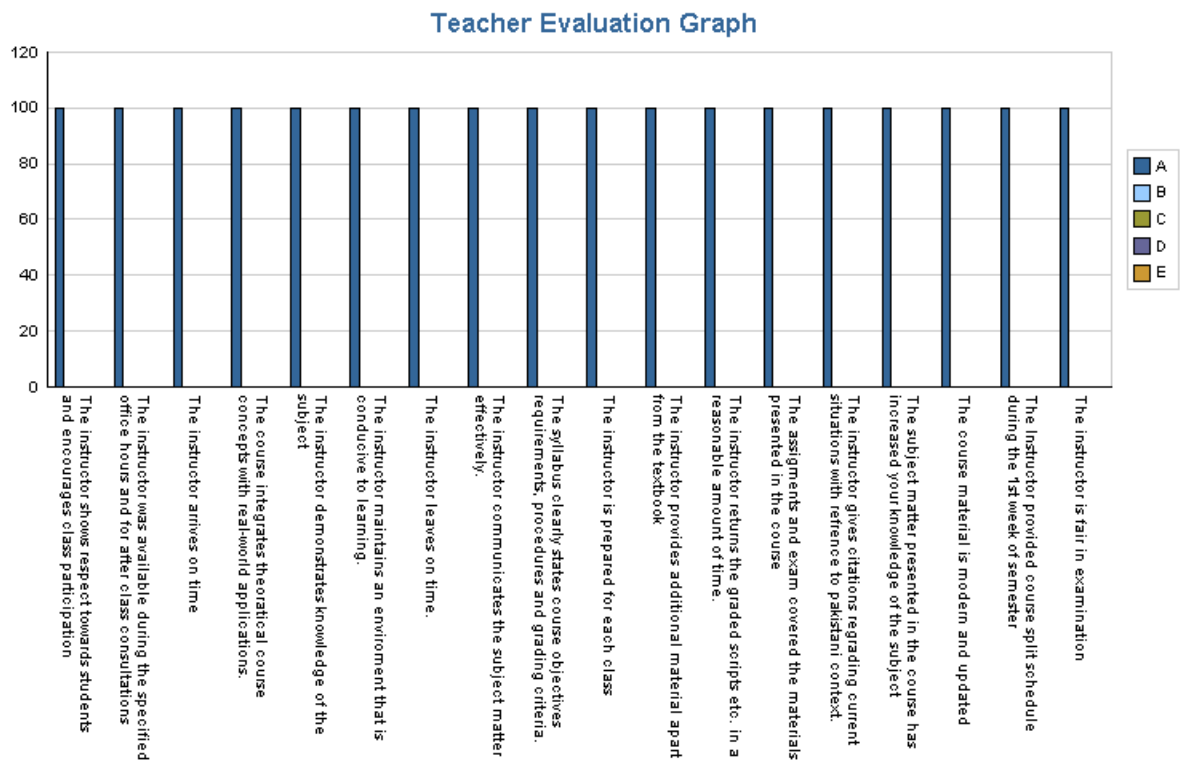
HND 707-Nutritional Status Assessment (Ms Asia Latif)



Fig#6: Teacher Evaluation of HND 707

Teacher was able to teach this course in a good manner, with all attributes of preparation, communication skill, participation, including modern concepts, punctuality and behavior, etc. and the instructor showed respect for the students.

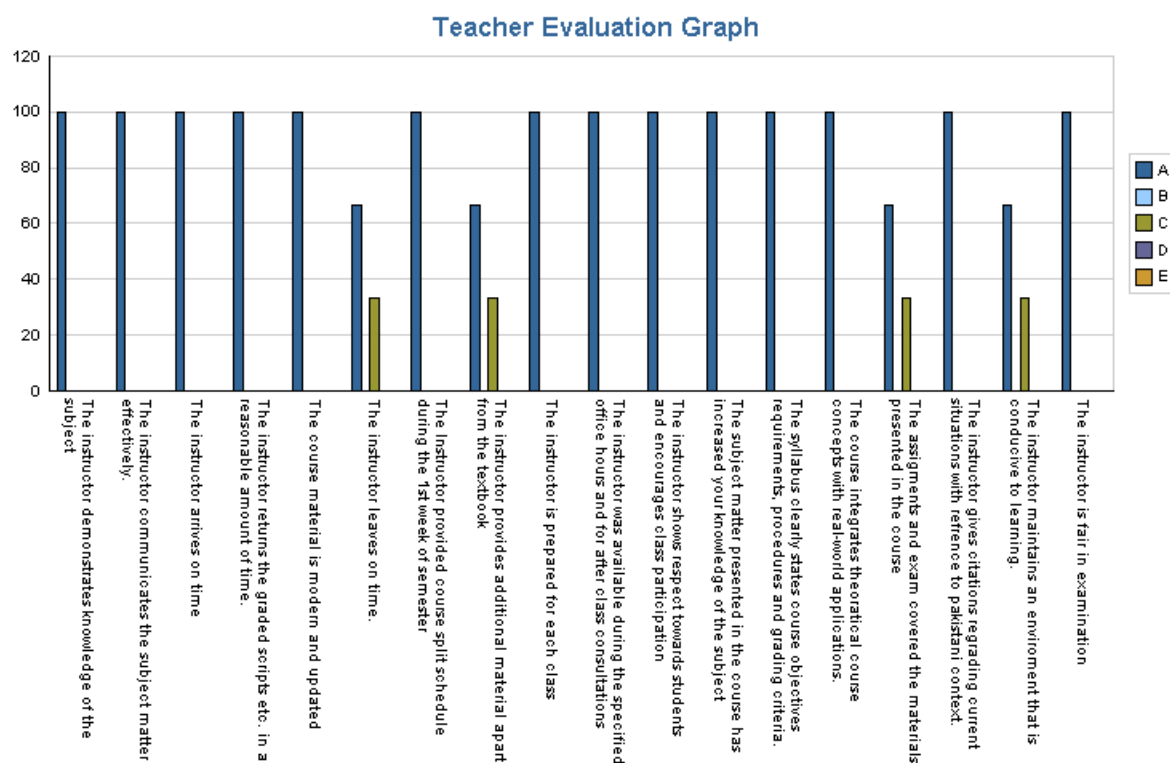
HND 711-Community Nutrition (Dr Rai Muhammad Amir)



Fig#7: Teacher evaluation of HND 711

The instructor was able to teach this course in a good manner, with all attributes of preparation, communication skill, participation, including modern concepts, punctuality and behavior, etc.

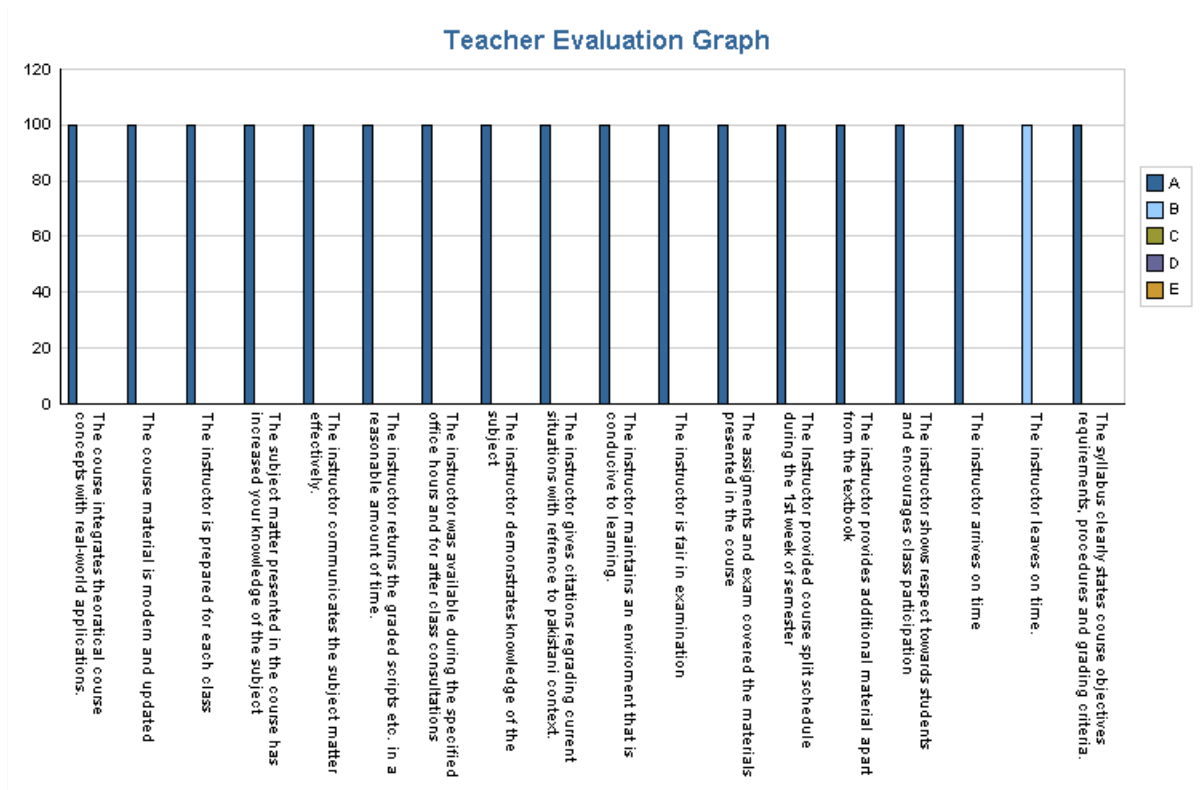
HND 714-Functional Foods and Nutraceuticals (Dr. Kashif Sarfraz Abbasi)



Fig#8: Teacher Evaluation of HND 714

The students were highly satisfied with the provision of learning resources and feedback on assignments, knowledge, punctuality and preparedness etc.

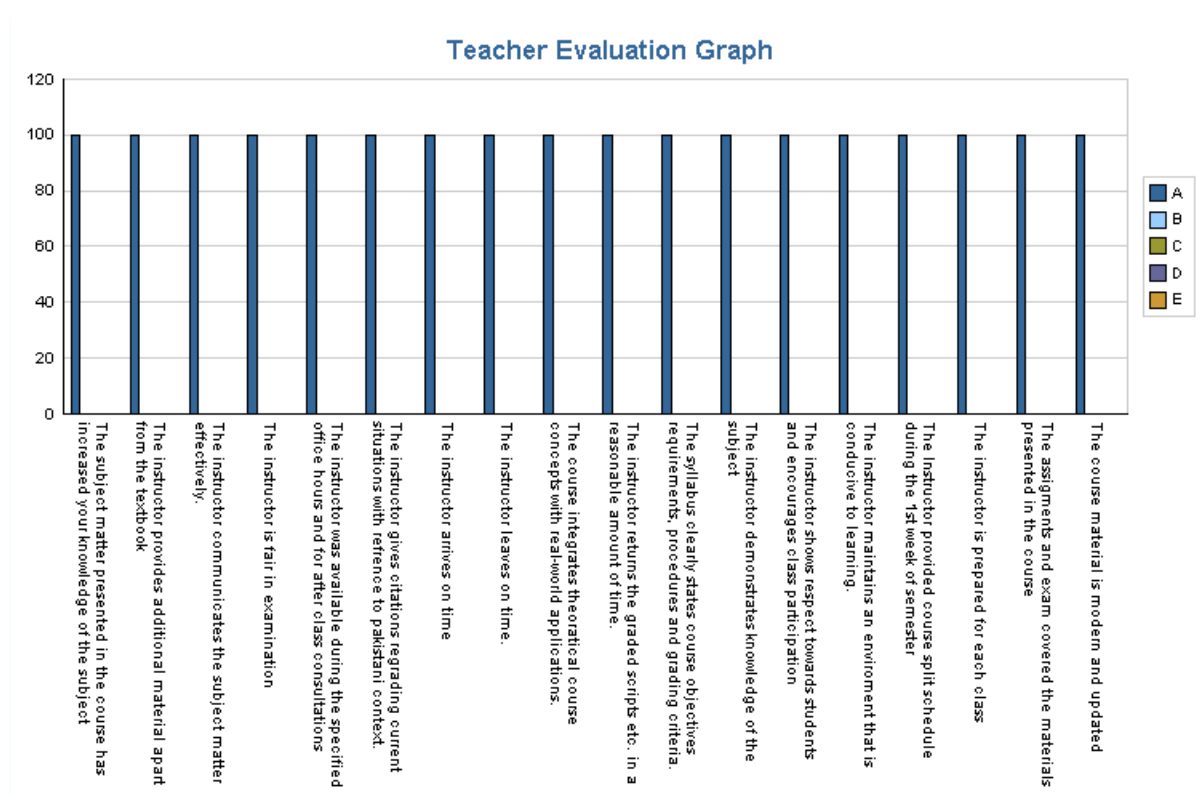
HND 719-Special Problem (Dr Tariq Masud)



Fig#9: Teacher evaluation of HND 719

The students were agreed regarding the abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material of the instructor.

HND 720-Seminar (Dr Tariq Masud)



Fig#10: Teacher Evaluation of HND 720

Teacher's performance was good at all attributes of preparation, communication skill, participation, including modern concepts, punctuality and behavior.

Course evaluation

Following courses were offered during Fall 2016-Spring 2018

Table 4. Courses offered in the Fall Semester 2016

Course No.	Course Title	Course No.	Teacher's Name
1.	Food Quality Assurance Management	HND-701	Dr. Asif Ahmad
2.	Nutritional Status Assessment	HND-707	Ms. Asia Latif
3.	Clinical and Therapeutic Nutrition	HND-709	Ms. Asia Latif

Table 5. Courses offered in the Spring Semester 2017

Course No	Course Title	Course Code	Teacher's Name
1.	Recent Advances in Food Science and Technology	HND-703	Dr. Asma Sohail
2.	Functional Foods and Nutraceuticals	HND-714	Dr. Kashif Sarfraz Abbasi
3.	Processes In Clinical Nutrition	HND-706	Visiting Faculty / Dr. Arshad Mehmood

Table 6. Courses offered in the Fall Semester 2017

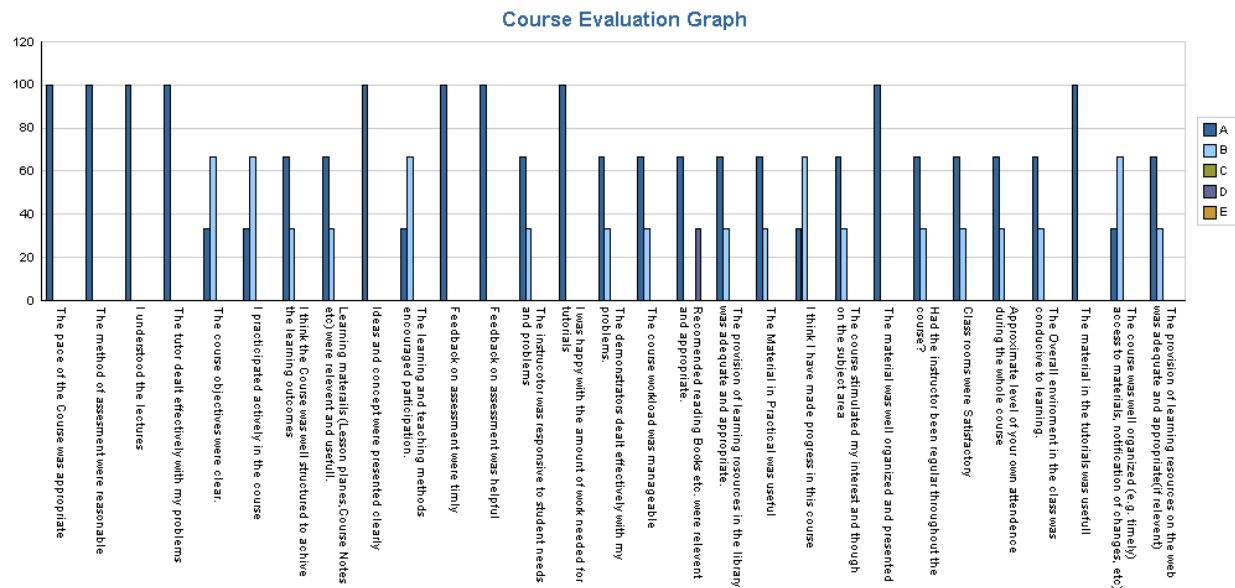
Course No.	Course Title	Course Code	Teacher's name
1	Nutritional Status Assessment	HND-707	Ms. Asia Latif
2	Clinical and Therapeutic Nutrition	HND-709	Visiting Faculty / Dr. Arshad Mehmood
3	Functional Foods and Nutraceuticals	HND-714	Dr. Kashif Sarfraz Abbasi
4	Community Nutrition	HND-711	Dr. Rai Muhammad Amir
5	Special Problem	HND-719	Dr. Tariq Masud
6	Seminar I	HND-720	Dr. Tariq Masud

Table 7. Courses offered in the Spring Semester 2018

Course No.	Course Title	Course Code	Teacher's name
1	Recent Advances in Food Science and Technology	HND-703	Dr. Asma Sohail
2	Community Nutrition	HND-711	Dr. Rai Muhammad Amir
3	Dietetics and Preventive Nutrition	HND-712	Visiting Faculty / Samra Jamil

The offered courses were evaluated by the students at the end of course completion through proforma-1. Details of course evaluation is given below as in following Figures:-

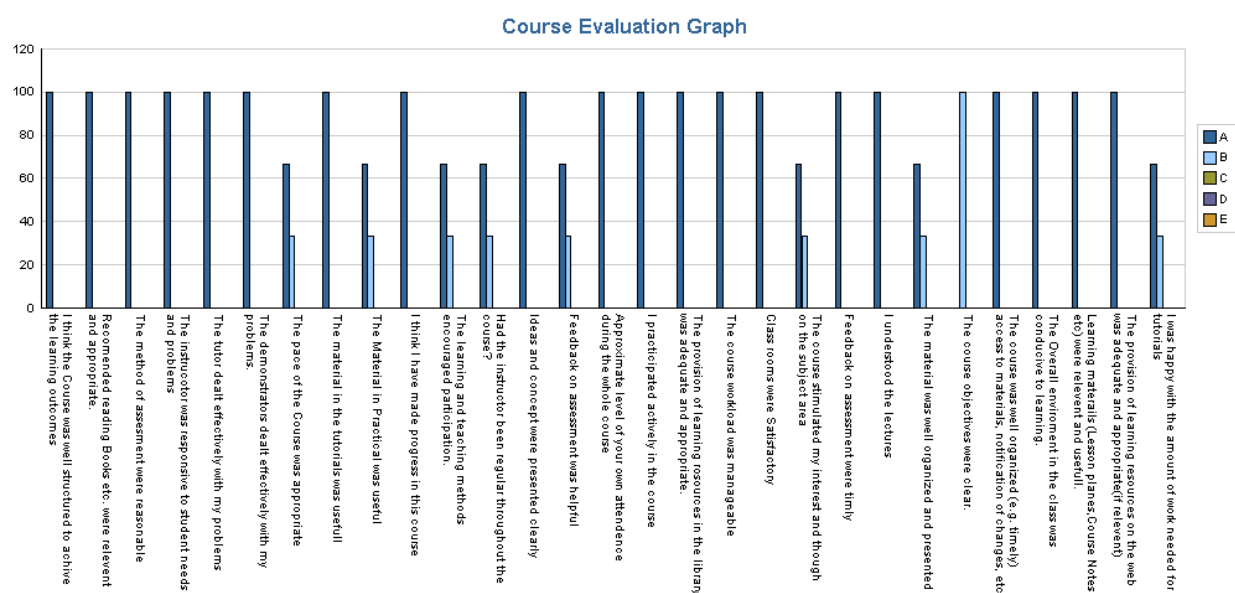
HND 701-Food Quality Assurance Management (Dr Asif Ahmad)



Fig#11: Course Evaluation of HND 701

All the students were either strongly agreed or agreed with the entire questions asked in this Proforma.

HND 707-Nutritional Status Assessment (Ms Asia Latif)

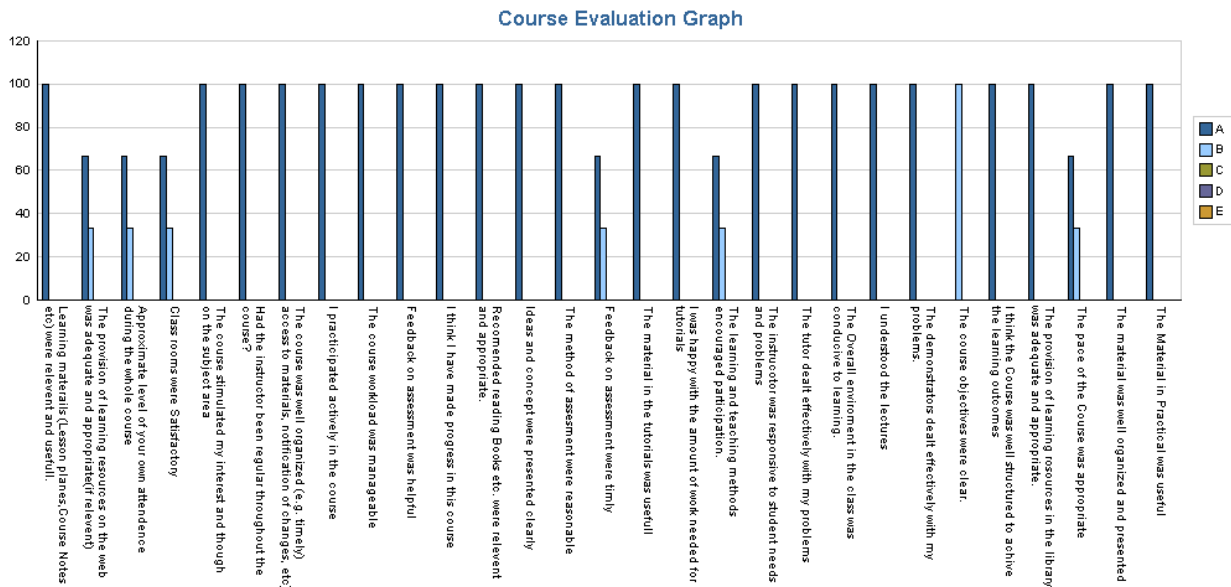


Fig#12: Course Evaluation of HND 707

The majority of the students were satisfied regarding the instructor's abilities, method of

teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material.

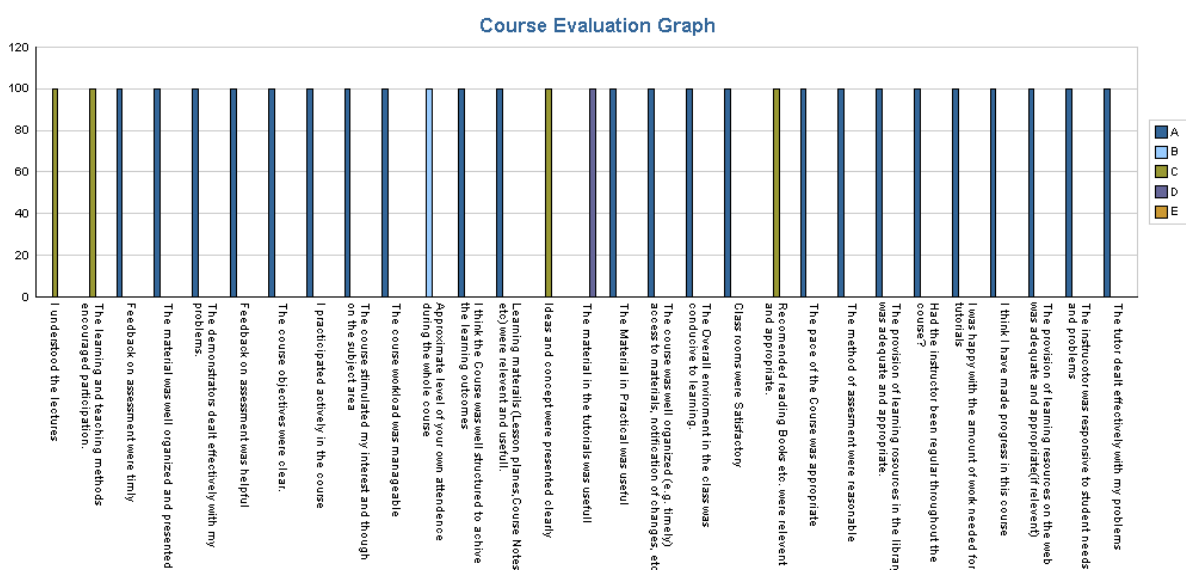
HND 709-Clinical and Therapeutic Nutrition (Ms Asia Latif)



Fig#13: Course Evaluation of HND 709

The majority of the students were satisfied regarding the instructor's abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material.

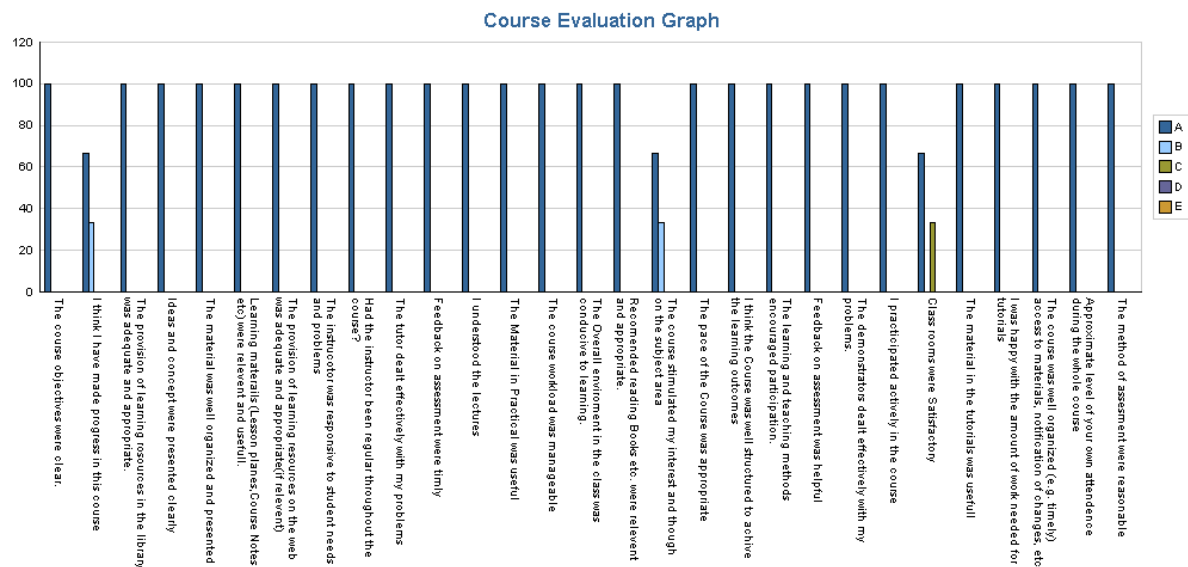
HND 703-Recent Advances in Food Science and Technology (Dr. Asma Sohail)



Fig#14: Course Evaluation of HND 703

All the students were either strongly agreed or agreed with the entire questions asked in this Proforma.

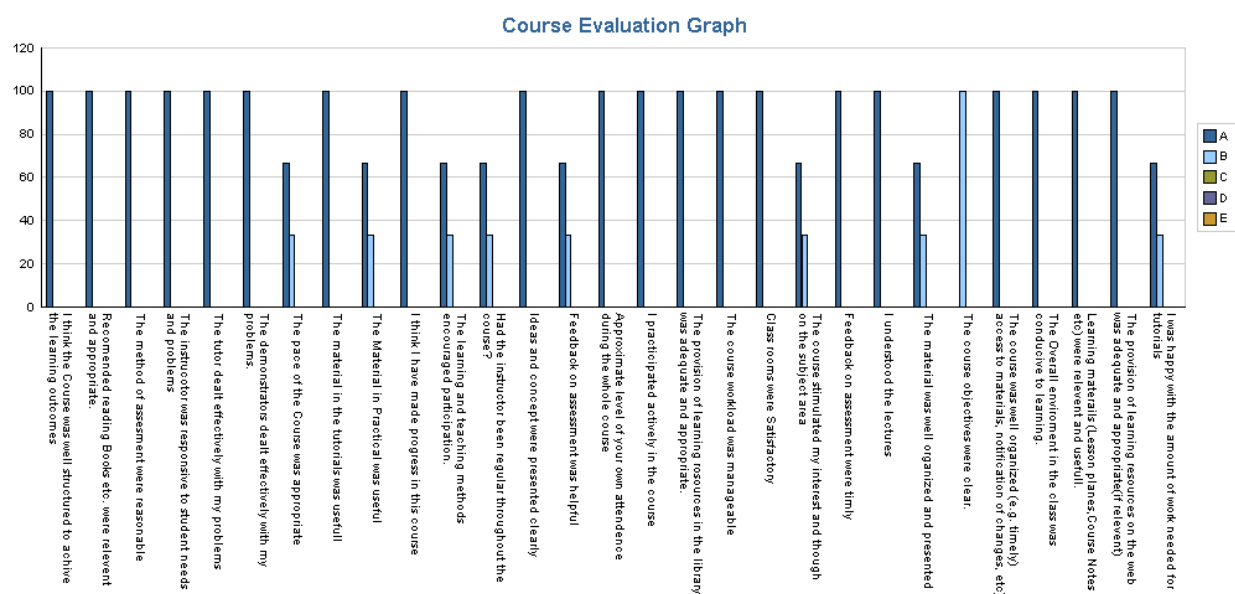
HND 714-Functional foods and nutraceuticals (Dr. Kashif Sarfraz Abbasi)



Fig#15: Course Evaluation of HND 714

All the students were either strongly agreed or agreed with the entire questions asked in this Proforma.

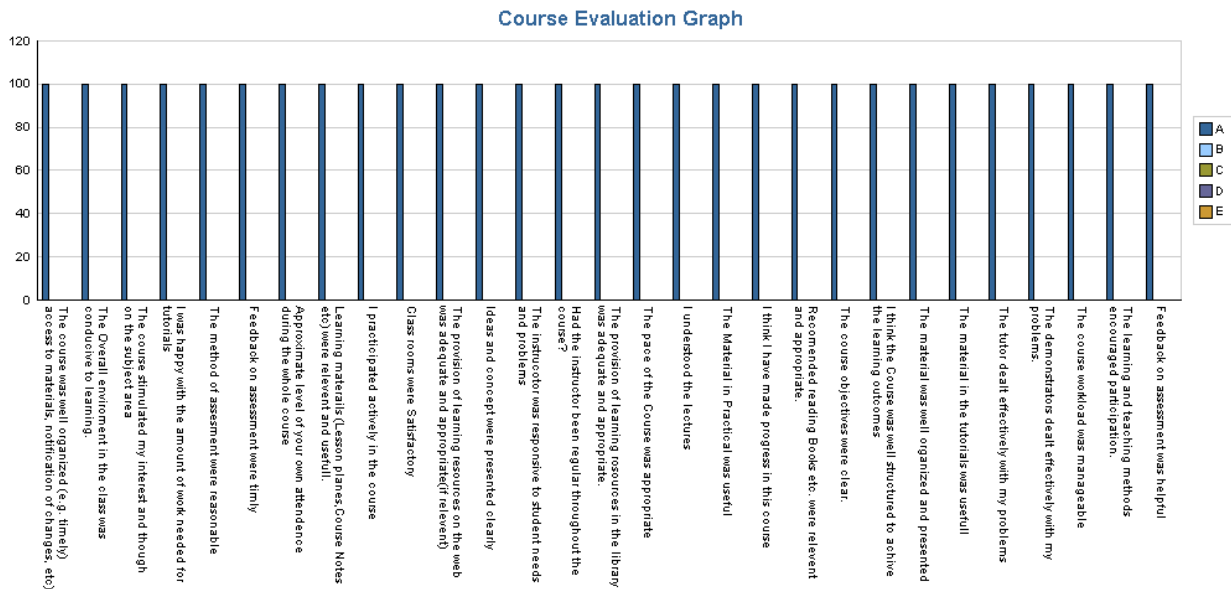
HND 707-Nutritional Status Assessment (Ms Asia Latif)



Fig#16: Course Evaluation of HND 707

All the students were either strongly agreed or agreed with the entire questions asked in this Proforma.

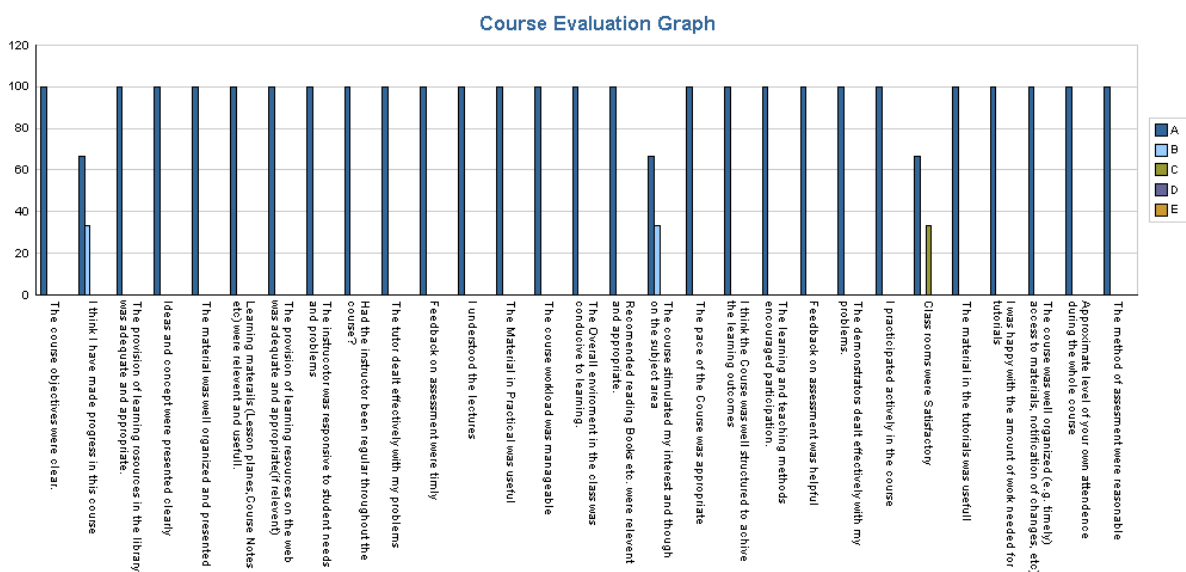
HND 711-Community Nutrition (Dr Rai Muhammad Amir)



Fig#17: Course Evaluation of HND 711

The students were satisfied regarding the instructor's abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material.

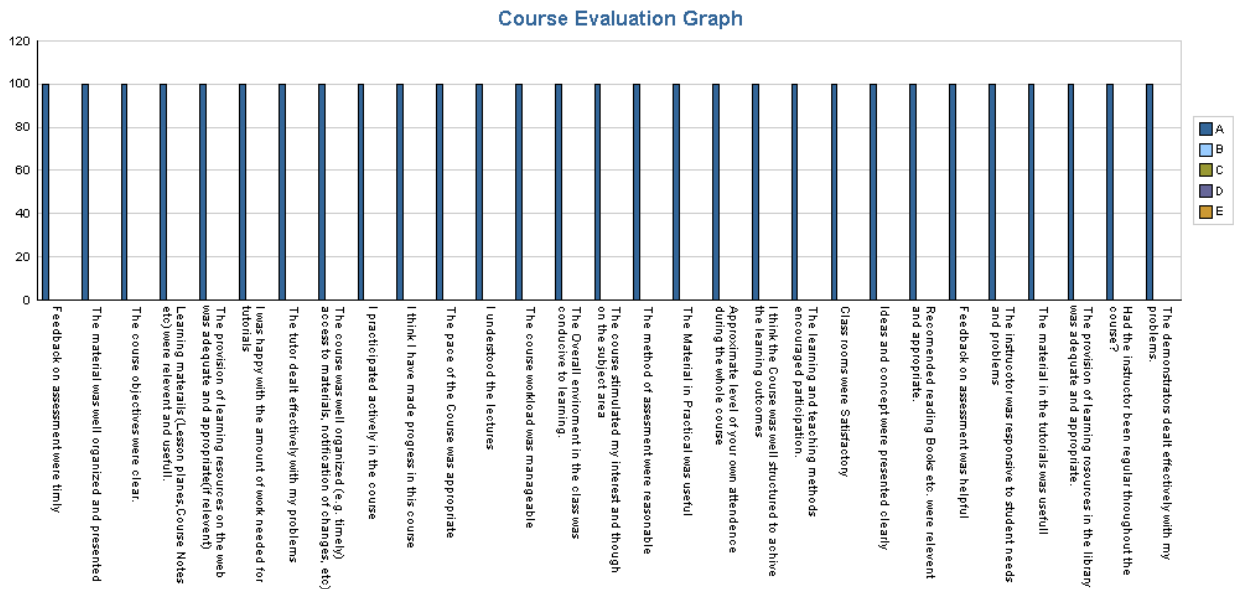
HND 714-Functional foods and nutraceuticals (Dr. Kashif Sarfraz Abbasi)



Fig#18: Course Evaluation of HND 714

The majority of the students were satisfied regarding the instructor's abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material.

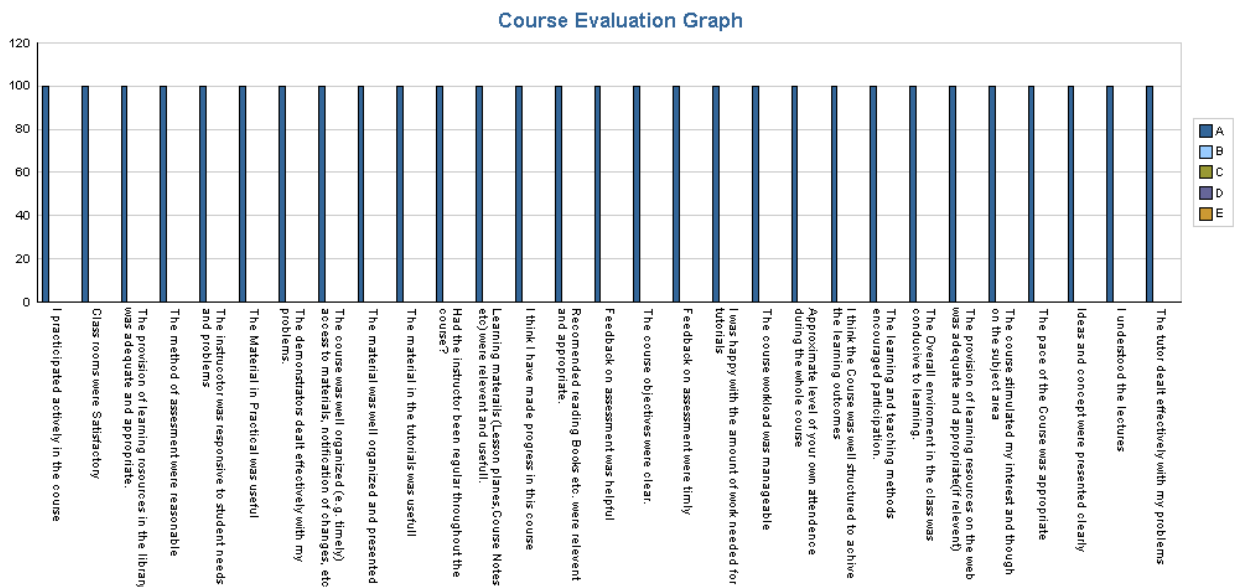
HND 719-Special Problem (Dr Tariq Masud)



Fig#19: Course Evaluation of HND 719

The students were satisfied regarding the instructor's abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material.

HND 720-Seminar (Dr Tariq Masud)



Fig#20: Course Evaluation of HND 720

The students were satisfied regarding the instructor's abilities, method of teaching, lecture preparedness, availability, punctuality, behavior and attitude and provision of course material.

Performa 4**RESEARCH STUDENT PROGRESS REVIEW FORM**

There were 12 student of the M.Sc (Hons) HND Program of the department during the year 2016-18. These students completed their course work in the third semester and total credit hours were 35. Research of these students initiated in 2017.

Q. No. 6: Cumulative Grade Point Average Secured

Almost 50% students carried more than 3.5 CGPA whereas 40% got more than 3.80 CGPA and 10% got more than 3.90 CGPA.

Q. No. 8: Do you have any comments on the level of supervision received?

All students were highly satisfied by the level of supervision received by their supervisory committee.

Q. No. 9: What do you plan to achieve over the next 6 months?

The plan of the next 6 months was the data analysis and writing up of thesis.

Q. No. 11: Do you have easy access to sophisticated scientific equipments?

All students have an easy access to all the sophisticated equipments available in the department.

Q. No. 12: Do you have sufficient research material / commodities available?

Students have sufficient research material and commodities available in the Department.

SURVEY OF GRADUATING STUDENTS

Results of survey of graduating students based on Proforma 3 (Annexure III) are given in Figures below. The graduating students in the last semester were surveyed before the award of degree. More than 30 % students showed their satisfaction regarding all the parameters on average, whereas 65 % of the students surveyed were highly satisfied regarding all information asked. The results of graduating students are summarized below.

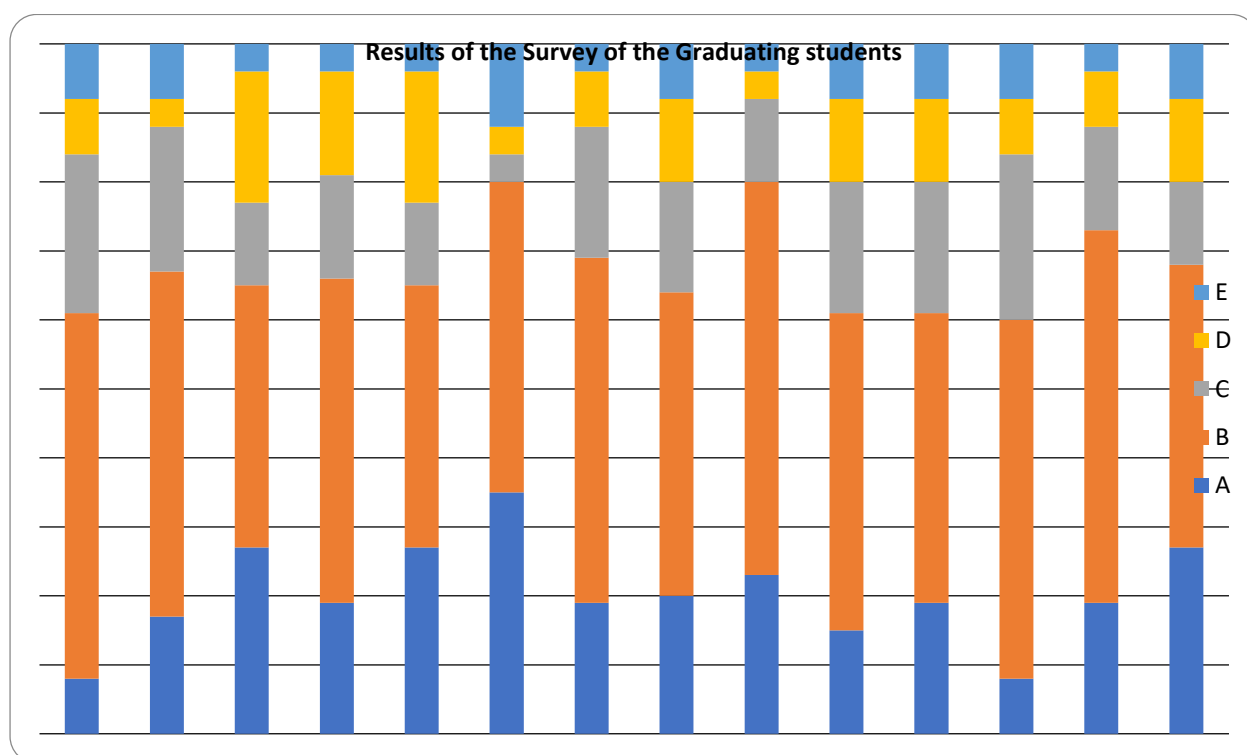
A. Very Satisfied B. Satisfied C. Uncertain D. Dissatisfied E. Very Dissatisfied

Weaknesses:

There is need for the development of infrastructure of the department.

Strength of the Pogramme

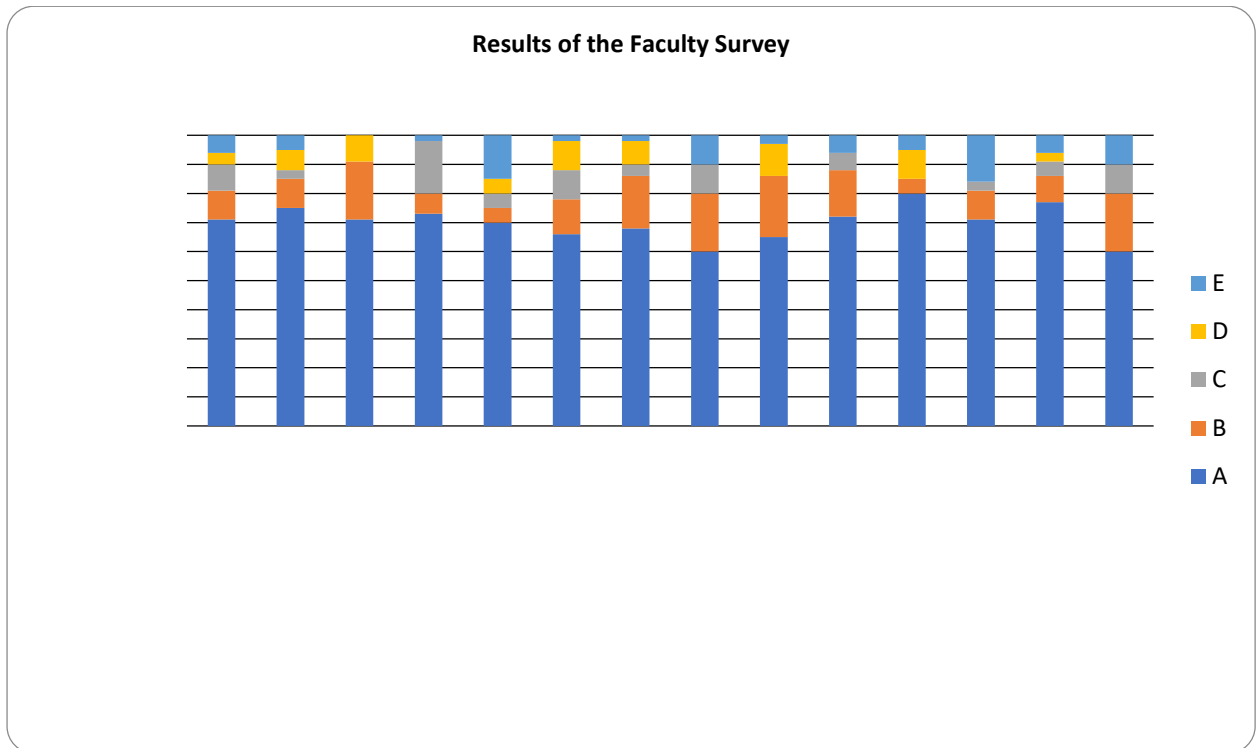
1. Highly qualified faculty
2. Helping attitude of the Director for all students in research and extra curricular activities
3. Timely advice



Fig#21: Results of Survey of Graduating Students

Faculty survey

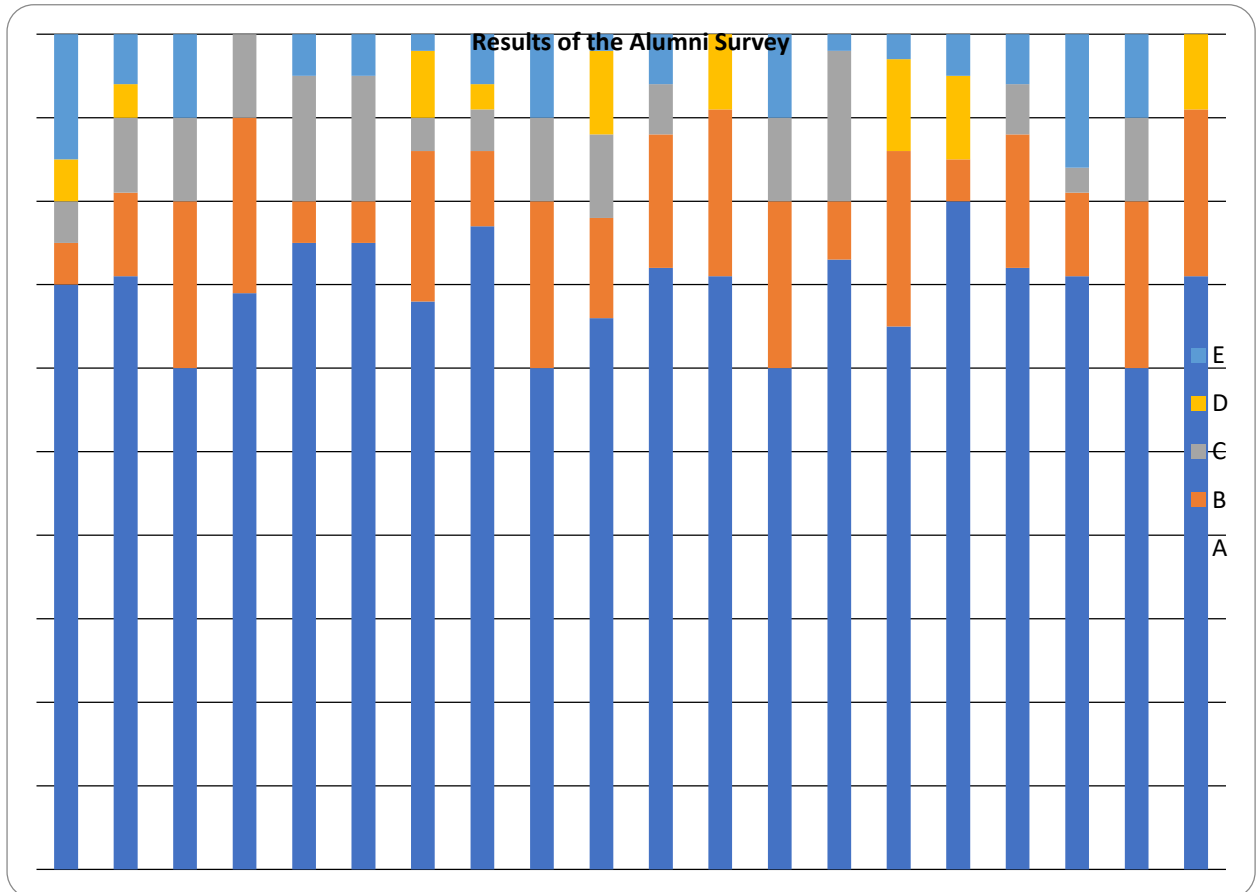
The purpose of this survey is to assess faculty members' satisfaction level and the effectiveness of programs in place to help them progress and excel in their profession (Performa 5). The survey manifested that the entire faculty is motivated to teach the students with best possible efforts.



Fig#22: Results of Faculty Survey

Alumni survey

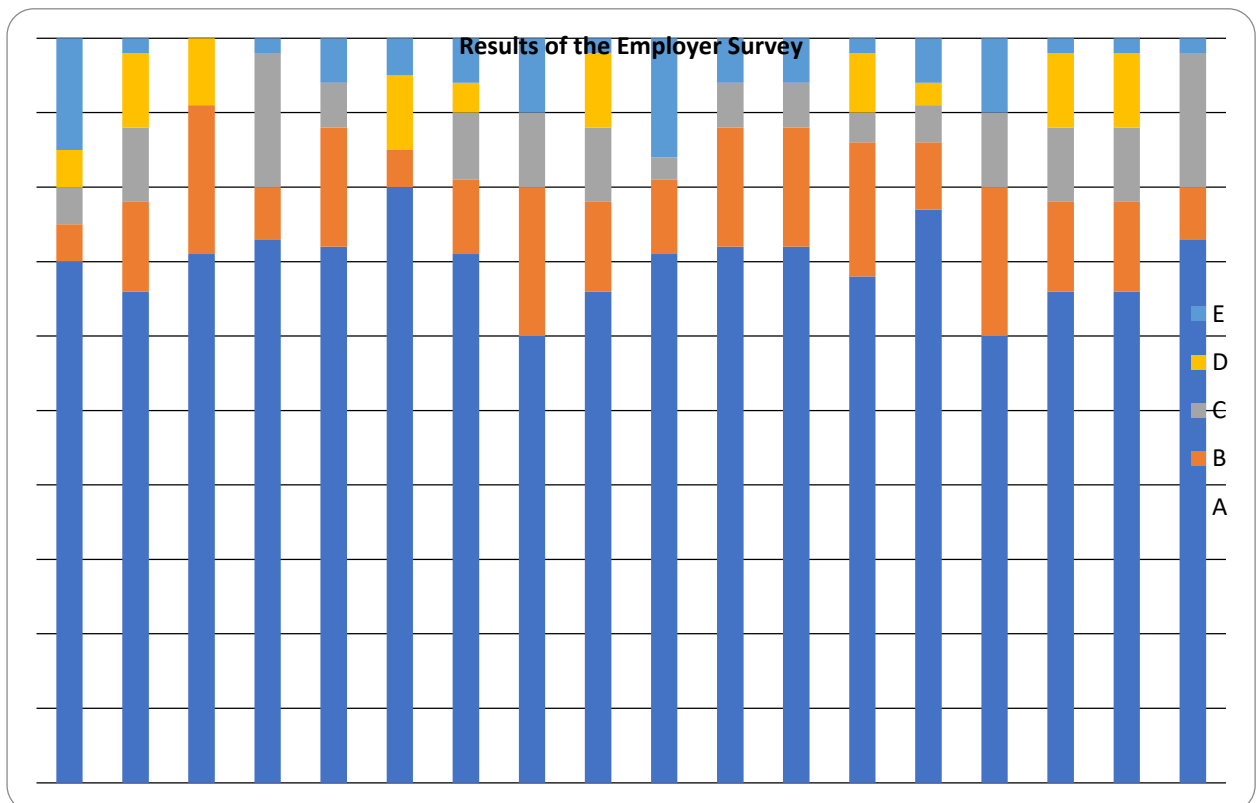
The purpose of this survey was to assess the students' satisfaction level and the effectiveness of programs in place to help them progress and excel in their profession (Performa 6). The survey manifested that all the students were motivated to excel their knowledge with best possible efforts.



Fig#23: Results of Alumni Survey

Employer Survey

A survey was conducted to get the employer's point of view about the working of our former students in their organizations (Proforma 8). This indicates that our graduates are well adaptable and show their better potential in any given environment. However, some employers have given general comments about some weaknesses, particularly the practical workability. The point has been well noted and will be tried to overcome for our future and current students.



Fig#24: Results of Employer Survey

CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION

A. Intent

All courses for M.Sc. Hons. HND were developed by Higher Education Commission of Pakistan. Curriculum and course contents are finally approved by the University Academic Council.

B. Definition of credit hour

One credit hour is one theory lecture or two hours laboratory practical per week. A credit hour carries 20 marks.

C. Degree plan - pre-requisites

B.Sc (Hons.) Human Nutrition and Dietetics or B.Sc (Hons.) Agriculture major in Food Technology/B.Sc (Hons.) Food Science and Technology (with deficiency courses)/B.Sc Home Economics major in Food and Nutrition or relevant degree or an equivalent examination for HEC recognized institution with at least CGPA of 2.50/4.00. The candidates must have passed University Entrance Test.

The selection criterion for each course is as follows;

- The course is relevant to the degree program
- It meets the requirements for the degree
- The course contents meet the program objectives as highlighted and provided by the Higher Education Commission of Pakistan.

Each course in the program is to be completed for credits specifying the following: Course title (HND)

- Course objectives and outcome (Given in course breakdown into lectures separately) Catalogue description (yes)
- Text book and reference (Given in course contents)
- Syllabus breakdown in lectures (yes supplied to QEC separately)

Computer usage: Internet facility is used by faculty members to update their knowledge regarding each course, research studies and recent references. Students also use this facility to solve their problems, assignments and presentations.

Laboratory facilities are provided to the students for their practical exercise, given in the curricula.

D. Degree requirements

M.Sc. Human Nutrition and Dietetics

The requirement is 45 credits comprising 35 credits of course work and 10 credits of research thesis. All M.Sc. students are required to pass a comprehensive examination and thesis evaluation and examination by an external examiner and supervisory committee.

Minimum Grade Point Average for obtaining the degree is 2.50. To remain on the roll of the university a student shall be required to maintain the following minimum GPA/CGPA in each semester.

Semester	CGPA
1st	1.50
2nd	1.75
3rd	2.00
4th	2.50

SCHEME OF STUDIES FOR M.SC. (HONS.) HUMAN NUTRITION AND DIETETICS

Table 8. Course Requirements for M.Sc. Hons. in Human Nutrition and Dietetics

Course No.	Course Title	Credit Hours
HND-701	Food Quality Assurance Management	3(3-0)
HND-702	Advanced Food Biotechnology	3(2-2)
HND-703	Recent Advances in Food Sciences and Technology	3(3-0)
HND-704	Advanced Food Microbiology	3(2-2)
HND-705	Advanced Food Chemistry	3(3-0)
HND-706	Processes in Clinical Nutrition	3(3-0)
HND-707	Nutritional Status Assessment	3(3-0)
HND-708	Nutritional Biochemistry and Physiology	3(3-0)
HND-709	Clinical and Therapeutic Nutrition	3(3-0)
HND-710	Nutritional Epidemiology and Research Methods	3(3-0)
HND-711	Community Nutrition	3(3-0)
HND-712	Dietetics and Preventive Nutrition	3(3-0)
HND-713	Food Chain Management	3(3-0)
HND-714	Functional Foods and Nutraceuticals	3(2-2)
HND-715	Advances in Human Nutrition	3(3-0)
HND-719	Special Problem	1(1-0)
HND-720	Seminar I & II	1(1-0)
HND-799	Research and Thesis	10(0-20)

Detailed course contents of post-graduate schemes of studies are given in annexure-I.

Standard 2.1: Assessment of the HND Curriculum

The assessment of curriculum given in the following table and the courses are cross tabulated according to the program outcomes.

Table 9: Courses Vs Outcome

Courses	Out comes		
	1	2	3
Major Courses	XXX	XXX	XXX
Elective Courses	XX	XX	XX
Practical (Field and Lab)	XXX	XXX	XXX
Research & Thesis	XXX	XXX	XXX

X = Moderately satisfactory
 XX = Satisfactory
 XXX = Highly satisfactory

- The curriculum fits very well and satisfies the core requirements for the program, as specified the respective accreditation body.
- The curriculum satisfied the general arts and professional and other discipline required for the program according to demands and requirements set by the Pakistan Higher Education Commission.
-

Standard 2-2: Theoretical backgrounds, problem analysis, solution design given as under.

Detail of courses showing theoretical backgrounds, problem analysis and solution design

Table 10: Courses representing theoretical background, problem analysis and solution design

Elements	Courses
i) Theoretical Background	All courses offered by the Department
ii) Problem Analysis	All courses of the Department Elective courses Research & Thesis
iii) Solution Design	All courses of the Department Elective courses Research & Thesis

Standard 2-4: The curriculum satisfied the core requirement laid down by accreditation bodies

Yes

Standard 2-5: The curriculum satisfied the major requirement laid down by HEC

The syllabus satisfies the major requirement laid down by HEC.

Standard 2-6. Information technology component of the curriculum must be integrated throughout the program

During curriculum development, all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program.

Standard 2-7. Oral and written communication skills of the student must be developed and applied in the program.

One seminar of one credit hour is compulsory for students.

Special problem (one credit hour) is offered to the students which require writing a comprehensive report on a topic and presenting it in the class.

Assignments are given to all students in each course on specific titles relevant to the course which are presented orally and given as written assignments by the students which improve their oral and written communication skills.

Faculty Course Review Report

According to evaluation the faculty is satisfied with curriculum. Questionnaire for evaluation has been filled and analyzed. There was internal evaluation with mid and final term examinations for all courses offered by department. Some of the teachers are keen to revise the courses as they are either outdated or lengthy.

Table 11: Faculty course review report

Course Code	Course Title	Semester	Credit Hours	Assesment Method/Exam	No. of Students	Comments on Curriculum	Changes for future	Teacher
HND-701	Food Quality Assurance Management	Fall 2016	3(3-0)	Mid Term and Final	12	Informative & interesting	No	Dr. Asif Ahmad
HND-707	Nutritional Status Assessment	Fall 2016	3(3-0)	Mid Term and Final	12	Informative	Yes	Ms. Asia Latif
HND-709	Clinical and Therapeutic Nutrition	Fall 2016	3(3-0)	Mid Term and Final	12	Must be revised	Yes	Ms. Asia Latif
HND-703	Recent Advances in Food Science and Technology	Spring 2017	3(3-0)	Mid Term and Final	12	Interesting	Yes	Dr. Asma Sohail
HND-706	Processes In Clinical Nutrition	Spring 2017	3(3-0)	Mid Term and Final	12	Excellent	No	Visiting Faculty/ Dr. Arshad Mehmood
HND-714	Functional Foods and Nutraceuticals	Spring 2017	3(2-2)	Mid Term and Final	12	Useful and interesting	Yes	Dr. Kashif Sarfraz Abbasi
HND-707	Nutritional Status Assessment	Fall 2017	3(3-0)	Mid Term and Final	23	Useful	Yes	Ms. Asia Latif

HND-709	Clinical and Therapeutic Nutrition	Fall 2017	3(3-0)	Mid Term and Final	23	Informative	No	Visiting Faculty/ Dr. Arshad Mehmood
HND-714	Functional Foods and Nutraceuticals	Fall 2017	3(2-2)	Mid Term and Final	23	Informative and interesting	Yes	Dr. Kashif Sarfraz Abbasi
HND-711	Community Nutrition	Fall 2017	3(3-0)	Mid Term and Final	12	Excellent	No	Dr. Rai Muhammad Amir
HND-703	Recent Advances in Food Science and Technology	Spring 2018	3(3-0)	Mid Term and Final	23	Motivating and excellent	Yes	Dr. Asma Sohail
HND-711	Community Nutrition	Spring 2018	3(3-0)	Mid Term and Final	23	Useful and informative	Yes	Dr. Rai Muhammad Amir
HND-712	Dietetics and Preventive Nutrition	Spring 2018	3(3-0)	Mid Term and Final	23	Good	No	Visiting Faculty/ Ms. Samra Jamil

CRITERION 3: LABORATORIES AND COMPUTER FACILITIES

There are four laboratories in the department. The facilities and shortcomings of these laboratories are listed as under.

- Laboratory Title: Food Technology/ Nutrition Lab --- for the General analysis of macro nutrients, Food Microbiology, Product Development Lab.
- Location and Area: Faculty of Agricultural Engineering and Technology building, Basement, Main Campus
- Objectives: Laboratories are used for practical exercises, demonstrations and research work for graduate and postgraduate students in their courses respectively. These are also used for implementing the projects funded by the University, HEC, and PSF.
- Major apparatus: Major equipments available in the Laboratories includes; Spectrophotometer, UV spectrophotometer, Bio-fermenter, viscometer, texture analyzer, microscopes, Laminar flow, orbital shaker, Autoclave, Soxhelt assembly, Centrifuge (Micro), Refrigerated centrifuge, dehydrator, desiccator, distillery, Muffle furnace.
- Shortcoming: Laboratories are not spacious and inadequate. The standard requirements in view of equipment, available resources and expansion program.
Latest and major apparatus for Nutritional assessment is missing.
- Safety Regulations: Safety measures are not available against fire (Extinguishers), minor hazards and accidents, injuries (First Aid Kit). However, the University maintains a Medical Dispensary for such incidents.

Standard-3.1: Laboratory manuals/documentation/instructions for experiments

The manuals used in the laboratories of IFNS are internationally accepted manuals. The University library is mostly used by the student for their recommended and reference books. However, teachers have their own books to prepare the lectures. Some manuals are also being prepared by the academic staff.

Standard-3.2: There must be support personal for instruction and maintaining the laboratories.

There are four lab attendants to maintain labs, equipments, glass wares, chemicals, etc. One lab assistant assists the students in practicals. The Lab Attendants have not relevant knowledge. On the other hand, the Laboratories have highly sophisticated equipments therefore this is imperative to have Lab. Technician in the department. Moreover, Lab attendants and technicians should be trained for the said purpose.

INSTITUTIONAL FACILITIES:

The institution must have the infrastructure to support new trends in learning such as e-learning including digital publications, journals etc.

- The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel. In- sufficient library's technical collection of books. Recommended books, relevant journals of the programs are not available to the students.
- These aspects need to be strengthened in number and space.
- Class rooms must be adequately equipped and offices must be adequate and equipped with modern facilities such as computer, printer, internet and telephone to enable faculty to carry out their responsibilities.

INSTITUTIONAL SUPPORT:

Unfortunately, this aspect is very weak.

- Due to unavailability of class rooms, classes are taken in the labs as a result of this research activities affected adversely.
- Space limitation is the major constraint in the development and strengthening of discipline.
- There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars.
- Insufficient secretarial support, technical staff and office equipment.

Standard 3-3: Computing Infrastructure and Facilities

- **Computing facilities support:** All faculty members do not have the university computer facility. They use their own laptops for office use. Students were given Laptops from prime minister laptop scheme. University library also has computer area for students.
- **Shortcoming in computing infrastructure:** Computers with internet facilities should be available to all faculty members and postgraduate students.

Safety Arrangements: There are no proper safety measurements and no security plan is available in case of emergency. The department is located on the 2nd floor; there are no emergency exits for the labs. No fire extinguishers have been installed in any laboratory. No first aid kits/facilities provided in the laboratories/department (2016-2018).

CRITERION 4: STUDENT SUPPORT AND ADVISING

The University organizes support programs for students and provide information regarding admission, scholarship schemes etc. Department in its own capacity arranges orientation and guided tours of the department. Director Students Affairs is also there and arranges various cultural activities and solves the students' problems. However currently there is no Parent/Teacher association.

Standard 4-1: Frequency of Courses

- Courses are taught as per criteria of HEC.

At post-graduate level subjects/ courses are offered as per scheme of study provided by the HEC and approved by Academic Council.

Standard 4-2: Structure of the Courses

To ensure effective interaction between students, faculty and teaching assistants, at the time of course formulation both theoretical and practical aspects are focused. Theoretical problems are explained and assignments are also given to the students whereas practical are carried out in the laboratories. The study tours to various research organizations and Hospitals are also organized to keep them update on the latest developments in the area and to stimulate them for discussion through teacher/student interaction.

- Courses are structured and decided in the board of studies meeting.
- At the commencement of the semester, faculty members interact frequently among themselves and with students. Students are welcome to ask question in class and even after the class.

Standard 4.3: Guidance to the students

Several steps have been taken to provide students guidance such as:

- Students are informed about the program requirement through the office of the head of the department.
- Through the personal communication of the teachers with the students.
- Monthly meetings are organized by the head of the department for counseling of the students. In addition, students can also contact with the relevant teachers whenever they face any problem.
- It is necessary for the students to participate in the monthly meeting.
- In case of some problem Director Student Affairs appointed by the university, helps the students.

Tutorial System in all departments has also been introduced. Two period on Thursday are

reserved for students for extracurricular activities. However, there is no such counseling Cell in the department.

- Student can interact with the teachers/scientist in universities or research organization whenever they needed.
- Realizing the need for exploring job opportunities for the university graduates, Directorate of Placement Bureau has been established.

CRITERION 5: PROCESS CONTROL

It includes student admission, students' registration, faculty recruitment activities, which are dealt by various statutory bodies and the university administration.

Standard 5.1: Program Admission Criteria

- The process of admission is well established and followed as per rules and criteria set by HEC. For this purpose an advertisement is published in the National News Papers by the Registrar Office.
- B.Sc (Hons.) Human Nutrition and Dietetics or B.Sc (Hons.) Agriculture major in Food Technology/B.Sc (Hons.) Food Science and Technology (with deficiency courses)/B.Sc Home Economics major in Food and Nutrition or relevant degree or an equivalent examination for HEC recognized institution with at least CGPA of 2.50/4.00. The candidates must have passed University Entrance Test.
- Admission criteria are revised every year before the announcement of admissions.

Standard 5.2: Process of Registration

- The student name, after completion of the admission process, is forwarded to the Registrar Office for proper registration in the specific program and the registration number is issued to the student.
- Students are evaluated through Mid, Final and Practical examinations and through assignments.
- Registration is done for one time for each degree but evaluation is done through the result of each semester. Only those students who fulfill the criteria of the University, they are promoted to the next semester.
- In general, the students are registered on competition bases keeping in view the academic and research standards.

Standard 5.3: Recruiting Process for Faculty

Recruitment policy followed by the University is recommended by the HEC. Induction of all posts is done as per rule:

- Vacant and newly created positions are advertised in the national newspapers, applications are received by the Registrar office, and call letters are issued to the short-listed candidates on the basis of experience, qualification, publications and other qualities/activities as determined by the University.
- The candidates are interviewed by the University Selection Board and Principal and alternate candidates are selected.

- Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period.
- Induction of new candidates depends upon the number of approved vacancies.
- Standards set by HEC are followed.
- At present, no procedure exists for retaining highly qualified faculty members. However, the revised pay scales structure is quite attractive.
- HEC also supports appointment of highly qualified members as foreign faculty Professors, National Professors and deutes them in concerned departments of the University.
- Recently, Tenure Track System (TTS) has been introduced by the University which is a good incentive for retaining highly qualified faculty members.

Standard 5.4: Teaching and Delivery of Course Material

To provide high quality teaching, department periodically revises the curriculum depending upon requirements, innovations and new technology.

- With the emergence of new fields, new courses are introduced, and included in the curriculum.
- Students usually buy less expensive Asian editions of technology books. These are also available in the University library, where documentation, copying and internet facilities are available.
- Notes are also prepared by the teachers and given to the students.
- Most of the lectures are supplemented by projectors, overheads, slides and pictures.
- All efforts are made that the courses and knowledge imparted meet the objectives and outcome. The progress is regularly reviewed in the staff meetings.
- Internet access is provided to students.

Standard 5.5: Completion of Program Requirements

- The controller of examinations announces the dates of commencement of examination. After each semester, the controller office notifies the results of the students. The evaluation procedure consists of quizzes, mid and final examinations, practicals, assignments and reports, oral and technical presentations. The minimum pass marks for each course is 40% for undergraduate and Master degree and 50 % for Ph.D. in theory and practical separately.

- In theory, weight age to each component of examination is as prescribed here under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

- Grade points are as follows

Marks obtained	Grade	Grade point	Remarks
80-100 %	A	4	Excellent
65-79 %	B	3	Good
50-64 %	C	2	Satisfactory
40-49 %	D	1	Pass
Below 40 %	F	0	Fail

- Gold medals are awarded to the students who secure highest marks. Degrees are awarded to the students on the annual convocation that is held late every year.

CRITERION 6: FACULTY

Standard 6.1: Full Time Faculty

Table 12: Full Time Faculty

Name	Position	Qualification	Specialization
Dr. Asif Ahmad	Professor	Ph. D.	Cereal Technology/ Post Harvest Tech./ Nutraceuticals
Dr. Asma Sohail	Assistant Professor	Ph. D.	Microbiology/ Nutraceuticals/Nutrition
Dr. Rai M. Amir	Assistant Professor	Ph. D.	Food Safety and Toxicology, Cereal Technology, Nutrition
Ms. Asia Latif	Lecturer	M. Sc. (Hons.)	Cereal Technology/ Functional Foods and Neutraceuticals
Dr. Kashif Sarfraz Abbasi	Lecturer	Ph. D.	Food Technology, Postharvest Technology, Functional foods and Nutraceuticals
*Dr. Tariq Masud (Retired w.e.f. 18-04-2018)	Professor	Ph. D.	Dairy Technology/ Nutrition

Table 13. Faculty Distribution By Program Areas In Human Nutrition And Dietetics

Program area of specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with Ph.D. degree
Human Nutrition	05	05	03
Food Quality	02	04	04
Food Microbiology	01	01	01
Functional Foods and Nutraceuticals	02	04	04
Nutrition policies	02	02	02
Recent advances / global issues	02	02	03
Dietetics / Nutritional Assessment	03	02	02

The resumes of faculty is given in Annex-II

Standard 6.2: Effective Programs for Faculty Development.

In each semester courses are offered according to work load of faculty members.

Division of students for supervision is made on the basis of faculty expertise/research interests

Existing faculty development programs at department and university level

- Faculty members attended conferences/workshops/seminars outside and within university.
- Laboratory, library and internet facilities are available for scholarly work and academic improvement
- Support for attending conferences lead to enhancement of research initiatives.
- All faculty members got financial support for research projects from HEC and university funded program specifically designed for junior faculty members.
- Incentives in the form of allowances to theses supervisors have been implemented lately to promote high standard research.

Standard 6.3: Faculty member motivation

- Time to time provision of enthusiasm to the young faculty by the senior faculty members. Avenues for research funding are provided to them through university research programs.

Results of the faculty survey

Overall Teachers showed Satisfactory response towards most of the parameters., However, faculty members are not very satisfied from the long awaited promotions. Work load burden is very high due to less number of faculty members.

Best Program Features:

- Supervision of students for research
- Cooperation from colleagues
- Conducive environment at the department
- Teaching and research together
- Clear job description
- Funds for Research projects

Programs that could improve your motivation:

- Research Laboratories need to be upgraded with more equipment
- More equipment and facilities needed
- More computer and internet facilities for students
- Improvement in teaching aids
- Opportunities for improving teaching skills and knowledge

CRITERION 7: INSTITUTIONAL FACILITIES

Standard 7-1: Infrastructure:

The faculty has access to E-library which is very helpful for the high quality education and producing research of international standard. They also have access to the internet. However the department has the following shortcomings/problems:

- Majority of the faculty members do not have access to the PCs. Computers are not provided by the university.
- The internet services provided by the university are poor. The speed of internet is slow and often internet does not work. The telephones are also connected with the internet and the services are often breached.
- Majority of equipments are outdated.
- Latest and modern apparatus for nutritional assessments are lacking.
- Untrained supporting staff.
- Faculties lack practical knowledge of modern techniques.
- Scanty budget for consumables.

Standard 7-2: Library Facilities:

The University Central Library has very limited number of books, journals and periodicals. It's a small library in term of space and facilities with no catalogue systems. It does not meet the standards of a University Library. However department itself owns few books. Department is lacking own library facility.

Standard 7.3: Class Room and Faculty Offices

Currently the class rooms are not enough and the space is not only limited but also some basic facilities are lacking. Multimedia are not available for the lecture halls. Practical lab space is also lacking. This affects the quality of teaching.

CRITERION 8: INSTITUTIONAL SUPPORT

The university administration has been struggling hard to strengthen all the departments and up gradation of departments and establishing new faculties and Institutes. The university is also trying to attract highly qualified faculty.

Standard 8-1: Support and Financial Resources

- At present department is having a very meager financial resource to maintain the present needs of the department. Individual research grants for students and faculty are mainly supporting the departmental research activities. There is a dire need for increasing the financial resources allocated to the department to establish a library, laboratories and computer facilities. Suggestions and factors that can contribute to the motivation of the faculty are given as follows:
- Research grants for young faculty members may be allocated.
- Trainings should be arranged in abroad to train the faculty members.

A detail of the Students enrollment from 2016 to 2018 is given in the following Table.

Table 14: Students Enrolled in M.Sc. (Hons) HND in 2016 and 2017

Discipline	2016	2017
M.Sc. (Hons) HND	12	23

Standard 8-3: Financial Resources

Total budget of the Institute of IFNS for research activities for the financial year 2016-2018 was **Rs. 50,000/-** which hardly fulfill the departmental needs particularly for the purchase of equipments, chemicals for laboratories and books for the department library.

Strength of the Department:

The main strength of the department is the availability of highly qualified teachers, with full acquaintance of their respective subjects, having vast knowledge of nutrition, local food industry problems. Majority of the faculty members have local degrees and are experts in their fields.

Weakness Identified in the Program:

Advanced teaching and research is being handicapped due to lack of lab equipments Latest literature and reviews are hardly available. There is a need for short term foreign training to faculty members. Scarcity of budget for research is also a big problem. Lack of space in Labs require to construct more Labs and Lecturer rooms.

SUMMARY AND CONCLUSIONS

The Department of Human Nutrition and Dietetics started Post-graduate degree program in 2016. Currently, more than 30 students are enrolled in this program. The main thrust of the Department is the application of Human Nutrition and Dietetics in the disease management through nutritional counselling, meal planning, functional aspects of foods in relation to human physiology to cope with the challenges and concerns regarding food and nutrition. Globally there has been a significant development in the disease management through diet & nutrition during the last two decades and consequently the demand of Human Nutrition and Dietetics graduate has increased tremendously. The department is educating the students by providing latest knowledge about new and modern approaches in nutritional counselling, food quality, food microbiology, functional foods, nutraceuticals, global issues and dietetics on nutritional assessment. Consequently, students are engaged in their research projects/internships that has definite practical implications.

Through the self-assessment report of the Department of Human Nutrition and Dietetics, the program's mission and outcomes are evaluated and forthcoming strategies are presented to achieve the core objectives. It may be concluded that the outcomes of the said program is up to the mark. Evaluation of teachers conducted by the students unveiled satisfactory standards.

Syllabus design, improvement and organization is constructed upon approved criteria. Pre-requisites are comprehensively observed, examinations are conducted as per calendars and academic outlines/schemes are prepared in advance. The number of courses, titles, total credit hours and course contents have been developed for each semester. The effectiveness of courses which was quantified through multiple criterions, ranged between satisfactory to highly satisfactory.

The lab facilities and limitations have been discussed. It was revealed that the existing laboratories for postgraduate students require improvement to further strengthen the discipline on pure systematic lines. The students have been guided for program requirements, future prospects, communication skills enhancement, tours to hospitals/medical care centers, research organization tours, etc. They are well informed of scientific societies relevant to human nutrition, job opportunities and other related events. Improvements needed in this regard have been suggested.

Special rules fixed by Higher Education Commission and University regarding the process control including admission, registration, recruiting policy, courses, delivery of material, academic requirements, grading system and performance, are properly followed.

The faculty members are highly qualified in their respective areas. However, faculty members need motivation for advanced knowledge on the theory and research. Faculty survey results were variable but still satisfactory. Institutional facilities were measured through Criterion 3; infrastructure, library, class room and faculty offices and in each case, shortfalls and constraints are highlighted. Institutional facilities need to be strengthened. Accordingly, institutional support will greatly promote and strengthen academic, research, management and leadership capabilities.

In conclusion, performance of Human Nutrition and Dietetics Department can be enhanced in view of the following points.

- Conducive environment is desirable in the class room for teaching and learning.
- Modern teaching and research is being handicapped due to the unavailability of state of the art labs and equipment.
- Faculty staff should be hired on regular basis.
- Refresher courses are direly needed for the teachers pertaining to teaching methodology, education psychology and student evaluation.
- A short term foreign training for faculty members is the need of the hour to improve their existing skills.
- There is a need to improve mix of research and teaching proportion to produce professionally sound graduates.
- The survey has also pointed out the shortage of personal computers. Improvement in this area will also improve the level of research and teaching.
- Presently, there is no departmental library. Allocation of space and sufficient funds for this purpose will be helpful in subscribing reputed journals and purchase of books that will ultimately boost quality of learning, teaching and research.
- Scarcity of funds is also a big concern.

Major Future Improvement Plans:

- Improvement of education quality through audio visual aids and modern tools along with provision of latest literature, journals, books, reviews and access to internet.
- Human Resource development to meet future challenges in disease management through medical nutrition therapy.
- Problem oriented research will be emphasized by keeping global issues in view.
- Overall enhancement of knowledge and skills of faculty members in relation to the latest global advancements in this discipline through exchange programs, short training and collaborative research projects within and outside Pakistan.

Detailed Course Contents of M.Sc (Hons) Human Nutrition and Dietetics

HND-701

FOOD QUALITY ASSURANCE MANAGEMENT

3(3-0)

Theory:

Philosophical approaches to quality: TQM, Deming's, Juran's, Crosby's etc. Statistical quality control: Seven QC tools: Graph, Pareto analysis, check sheets, Histogram, Scattered diagram, Cause & Effect diagram, Control Charts. Quality control plans, Codex standards, Quality & food safety management system certification from 3rd party, Pre requisite program, GMP, GFSI recognized food safety management system: FSSC-22000, BRC, IFS, Global GAP etc., Principle of quality Management, Quality management system: ISO 9001, ISO 17025. Halal standard & certification. Biosecurity programs. Supplier development programs, training manuals and programs, Internal and external audits.

Recommended Books:

1. Ali, I. 2014. Food quality assurance: principles and practices. 2nd. CRC Press, USA.
2. Medina, D. A. and Laine, A. M. 2011. Food quality: control, analysis and consumer concerns. Nova publishers, USA.
3. Clute, M. 2008. Food industry quality control systems. Culinary and Hospitality Industry Publication Services, USA.
4. Evans, J.R. 2005. Total quality: management, organization and strategy. Westport Pub. Co., New York.
5. Hoyle, D. 2001. ISO 9000: Quality system handbook, 4th ed. Butterworth-Heinemann, Oxford, UK.
6. Blanchfield, J.R. 1998. Good manufacturing practice. Institute of Food Science and Technology, London, UK.
7. McDonald, D.J. and Engel, D. 1996. A guide to HACCP. Highfield Pub. Sprotborough, UK.

HND-702

ADVANCED FOOD BIOTECHNOLOGY

3(2-2)

Theory:

Food Biotechnology: recent advances and trends, techniques and applications. Introduction to recombinant DNA technology: restriction endonucleases, vector systems, cloning strategies, expression systems, gel electrophoresis, PCR, Sequence analysis. Use and issues of GMMs in Fermentation: Types, equipment, factors affecting the fermentation, and control of fermentation conditions. Fermentation kinetics, stoichiometry, bioreactors, solid state bioprocessing and transformation. Yeast based products: Alcoholic beverages, industrial alcohols, baker yeast, bread and related products. Bacteria based fermented products, dairy, meat and fish, vegetable, vinegar and organic acids, bacterial biomass. Mold based products.

Other microbial based products: Enzymes, sweeteners, flavors, amino acids and vitamins. Food Safety: Safety evaluation of novel food products, genetically modified foods.

Practical:

Isolation, purification and maintenance of yeast and bacterial cultures, aerobic and anaerobic fermentation and production of various fermented food products. Genomic DNA and plasmid extraction. PCR cloning and transformation Agarose gel electrophoresis. Production of metabolites and enzymes, their purification.

Recommended Books

1. Joshi, V.K. and Singh R. S. 2012. Food biotechnology. 1st .IK International Publishing House, India.
2. Shetty, K. 2005. Food biotechnology. 2nd. Marcel Dekker, Inc., New York, NY, USA.
3. Thomas and R.L. Fuchs. 2002. Biotechnology and safety assessment. Taylor & Francis, Philadelphia, USA.
4. Capuccino, J.G. and N. Sherman. 1996. Microbiology and laboratory manual. The Benjamin Cummings Pub. Co., New York, USA.
5. Lee, B.H. 1996. Fundamentals of food biotechnology. VCH Publishers, Inc, New York, USA.
6. Mittal, G.S. 1992. Food biotechnology: techniques and applications. Technomic Pub Inc. Lancaster, USA.

HND-703

RECENT ADVANCES IN FOOD SCIENCE AND TECHNOLOGY 3(3-0)

Theory:

Emerging technologies: Fats and oils, cereals, dairy, beverage, fruits and vegetables and meat industry. Emerging food safety issues. Supercritical fluid extraction, Biofortification, Nanotechnology: concept and applications, Novel ideas in food packaging, Emerging coating techniques (Electrostatic coating of foods). High pressure processing, Ohmic heating, Membrane processing, Application of ultrasounds and microwaves in food processing. Extrusion technology. Genetically modified foods: Nutritional aspects, safety issues and legislation. Modern quality standards. Microscopic imaging for analysis of micro and nano-structures (colloidal assemblies, polymer interactions etc.) of foods. Recent news in food science and technology.

Recommended Books:

1. Food technology journals. Website.
2. Buttriss, J. and Saltmarsh, S. 2000. Functional foods. Royal Society of Chemistry, Cambridge, UK.
3. Nielsen, S.S. 2003. Food Analysis. Kluwer Academic Pub., New York, USA.
4. Otles, S. 2009. Handbook of food analysis instruments. CRC Press, New York, USA.
5. Sun, D.W. 2005. Emerging technologies for food processing. Elsevier Academic Press, CA, USA.
6. Gibson, G. R. and Williams, C. R. 2000. Functional foods-concept to product. CRC press, Boca Raton, Florida, USA.
7. Otles, S. 2009. Hand book of food analysis instruments. CRC press, Boca Raton, Florida, USA.

HND 704
ADVANCED FOOD MICROBIOLOGY**3(2-2)****Theory:**

Food microbiology: Advances and trends. Physiology and biochemistry of food borne microorganisms. Culture Types: Collection and maintenance. Detection of microorganisms in foods: Principles and techniques, rapid methods vs. conventional methods, estimation of microbial toxins, metabolites, inhibitory substances and pathogens. Differentiation of bacterial strains by electrophoretic protein profiles. Microbiology of Food Preservation. Food microbiology and public health. Bacterial agents of food borne illnesses. Fermented and microbial foods. Food borne pathogenesis: disease burden and economic implications. Probiotic and proteolytic properties of different bacteria. Isolation and titration of bacteriophages. Traditional and current approaches to microbial food safety and quality. Application of genetically modified microorganisms in foods. Genetics and molecular biology of food associated microbes. Microbial physiology and metabolism of food-borne microbes, bioenergetics, biofilms formation. Advanced technologies in food microbiology: rapid method for the detection of food borne pathogens. Probiotics and prebiotics; predictive modeling and risk assessment.

Practical:

Microbial preservation techniques: lyophilization, detection of microorganism in food samples, detection of automated rapid and conventional methods for microbial toxins, metabolites, inhibitory substances, pathogens and bacteriophages through HPLC, GC, ELISA, PCR and cell culturing etc. Electrophoretic protein profiles of bacteria.

Recommended Books:

1. Willey, J.M. 2014. Prescott's microbiology. Paperback, McGraw Hill Higher Education, USA.
2. Ray, B. and Bhunia, A. 2013. Fundamental food microbiology. 5th. CRC press, USA.
3. Montville, T.J., Matthews, K.R. and Kniel, K.E. 2012. Food microbiology: An introduction. ASM press, USA.
4. David, A.A., Janet, E.L., Corry, B.S., and Rosamund, M.B. 2005. Essentials of the microbiology of foods: a textbook of advanced studies. John Wiley and Sons, New York, USA.
5. Thomas, A.M. 2003. Detecting pathogens in food. CRC press, USA.
6. Spencer, J.F.T. and De Spancer, A.L.R.. 2001. Methods in biotechnology: food microbiology protocols. Human Press, New Jersey, USA.
7. Doyle, M.P., Beuchat L.R. and Montvile, T. 2001. Food microbiology: fundamentals and frontiers. Centre for Food Safety, University of Georgia, Georgia, USA.
8. Jay, M.J. 1996. Modern food microbiology. CBS Publishers, New Delhi, India.

HND-705**ADVANCED FOOD CHEMISTRY****3(2-2)****Theory:**

Introduction. Phase transition of foods containing water. Synthetic amino acids utilized for increasing the biological value of food (food fortification). Chemical and enzymatic reactions during and after food processing. Food dispersion systems: emulsions, foam, sol, aerosol.

Redox reactions in biological systems: hydrogenation, antioxidant tests. The Maillard reaction: products and by-products. Chemical Changes during Storage and Preservation processes of various food products. Vegetable products chemistry: dehydrated, canned, frozen and pickled vegetables. Fruit ripening: Respiration Rate, Metabolic Pathways, Individual Constituents. Technological importance of phenolic compounds. Spices, Salt and Vinegar: Composition, production. Drinking Water: Hardness, Treatment, Mineral Water. Antioxidants: natural and synthetic, action mechanism. Minerals in food processing. Toxins generated during heat treatment of foods. Food contamination. Interaction of food components and their synergistic mechanisms.

Practical:

Isolation and extraction of different food components. Titrametric determination of sugars, vitamin C, Iodine etc. Separation of natural food colors. Extraction of pectin from fruit waste. Estimation of starch, cholesterol, total dietary fiber, glucose, pigments etc.

Recommended Books:

1. Velisek, J. 2014. The chemistry of food. John Wiley & Sons Inc., New York, USA.
2. Belitz, H.D, Groschm, W. and Schieberle, P. 2009. Food chemistry. 4th . Springer Verlag, Heidelberg, Germany.
3. Coultate, T. 2009. Food: The chemistry of its components. The Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge CB4 0WF, UK.
4. Damodaran, S., Parkin, K.L. and Fennema, O.R. 2008. Fennema's food chemistry. 4th. CRC Press, Taylor & Francis Group, Boca Raton, Florida, USA.
5. DeMan, J.M. 2007. Principles of food chemistry. 3rd. Springer Verlag, Heidelberg, Germany.

HND 706

PROCESSES IN CLINICAL NUTRITION 3 (3-0)

THEORY

Foods and nutrients and their implications in health and disease; dietary patterns and dietary interventions; nutritional science, nutrigenomics, and medical nutrition therapy; translational research; dietetics practice and public health; nutrition epidemiology and biostatistical applications in nutrition research; food science and biotechnology; foodservice systems; leadership and management in food and nutrition systems and application of public policy; and medical nutrition and dietetics education

RECOMMENDED BOOKS

1. L. Kathleen Mahan, Sylvia Escott-Stump, Janice L. Raymond, Marie V. Krause, 2012. Food, Nutrition & Diet Therapy Elsevier Health Sciences.
2. Jones & Bartlett Learning; 1 edition, 2011. Clinical Case Studies For The Nutrition Care. 1st ed. Process Jones & Bartlett Learning.
3. Marcia Nelms, Kathryn P. Sucher, Karen Lacey, Sara Long Roth, 2010. Nutrition Therapy and Pathophysiology. 2nd ed. Cengage Learning, USA.
4. Joseph E. Pizzorno Jr. ND, Michael T. Murray ND, Herb Joiner-Bey ND, 2007. The Clinician's Handbook of Natural Medicine. 2nd ed. Churchill Livingstone

HND-707

NUTRITIONAL STATUS ASSESSMENT 3(3-0)

Theory

Introduction to Nutritional Assessment: Introduction to nutritional status assessment, Methods of nutritional assessment, Importance of nutritional assessment, Anthropometric Assessment: Anthropometric Assessment, its application and usefulness, Classification to categorize malnutrition (under nutrition and over nutrition), Anthropometric assessment parameters: Weight, height, skin-fold measurement, mid upper arm circumference, waist circumference, hip circumference, waist to hip ratio, Biochemical Assessment: Biochemical techniques and methods: Theory and practice, Assessment of nutritional status by biochemical techniques, Spectrophotometry, chromatography, centrifugation, flame photometry, atomic absorption, analysers like blood chemistry analysers, haematology analysers etc., Dietary and Clinical Methods of Assessment: Introduction and significance of dietary and clinical assessment, Methods of dietary and clinical assessment, Classification of dietary assessment methods, Application of dietary and clinical assessment methods along with merits and demerits, Clinical assessment associated with nutritional deficiencies of macronutrients, vitamin and minerals.

Recommended Books

1. Rolfes, Pinna and Whitney. 2012. Understanding normal and clinical nutrition, 9th ed. Thomson and Wadsworth Publishers, USA.
2. Coulston, A. and C.J. Boushey. 2008. Nutrition in the prevention and treatment of disease, 2nd ed. Academic Press, London.
3. Lee, D.C. and D.C. Nieman. 2007. Nutritional assessment, 4th ed. The McGraw-Hill Companies, Inc., New York.
4. Whiteney, E. and Roltes, S.R. 2005. Understanding nutrition, 10th ed. Thomson and Wadsworth Publishers, USA.
5. Mann, J. and A. S. Truswell. 2002. Essentials of human nutrition, 2nd ed. Oxford University Press, London.

HND-708

NUTRITIONAL BIOCHEMISTRY AND PHYSIOLOGY 3(3-0)

Theory

Nutritional Biochemistry: Course introduction and fundamentals of nutritional biochemistry, Overview of energy metabolism and effect of under and over energy intake on nutritional status and health, Carbohydrates: Definition and classification, functions, properties, metabolism, glycemic index, glycemic load, dietary fibre, Proteins: Definition, classification, properties, functions, metabolism, quality of protein, biochemical role of protein in nutrition, Lipids / Fats: Definition, classification, properties, functions, metabolism, quality of lipids / fats, biochemical role of fats in nutrition, Water: Functions and biochemical role of water in human nutrition, Vitamins: Definition, classification, properties, functions, metabolism, deficiency diseases, biochemical role of fat soluble and water soluble vitamins in human body, Minerals: Definition, classification, properties, functions, metabolism, deficiency diseases, biochemical role of macro- & micro- minerals in human body. Enzymes: Definition, classification, mechanism of action of various enzymes, enzyme activity & factors affecting enzyme activity, role of enzymes in nutrition. Physiology: Introduction to human physiology and basic concepts, Cell: Types of cells, components of cell and their functions, communication between cells, apocrine and paracrine, transport across the cell membrane, cell division, Electrical properties of cells, Muscle tissues and muscular system: Types, functions, muscle contractile activities, Important organs of the body like brain, liver, kidney, heart, stomach, small intestine, large intestine, lungs etc. Blood and other body fluids: Composition, flow, function, maintenance and regulation, Human body systems: Various types of systems in their functions (nervous system, circulatory system, cardiovascular system, digestive system, renal system, endocrine physiology).

Recommended Books

1. Ensminger, M.E., I.E. Oldfield and W.W. Heinemann. 1990. Feeds and nutrition. The Ensminger Publishing Company, California, USA.
2. Guyton, A.V. 1995. Text book of Medical physiology. Prentice Hall., USA.
3. Martin, D.W., P.A. Mayes and V.M. Rodwell. 1998. Harper's reviews of biochemistry. Lange Medical Publication, Maruzen, Asia, Singapore.
4. Davidson, S., R. Passmore, R and M.A. Eastwood. 1986. Human nutrition and dietetics. Churchill Livingstone, New York, U.S.A.
5. Sarwar, M. and Zia-ul-Hasan. 2000. Nutrients metabolism in ruminants. University of Agriculture Press, Faisalabad, Pakistan.

HND-709

CLINICAL AND THERAPEUTIC NUTRITION

3(2-2)

THEORY

Nutritional assessment therapy in patient care. The therapeutic process, stress of the therapeutic encounter, focus of care, phases of the care process. Nutritional assessment: data base and analysis, anthropometrics, biochemical tests, clinical observations, dietary personal histories, analysis and initial planning, data analysis, problem list, problem oriented medical record, nutritional intervention, food plan and management, some basic concepts, managing the mode of feeding, evaluation, general considerations. Quality patient care, collaborative roles of nutritionist and nurse. Drug-nutrient interactions, nutrient drug interaction and malnutrition, drug effects on food and nutrients, food effects on drug absorption, food effects on drug. Distribution and metabolism, vitamin effects on drug action, enteral nutrition. Enteral feeding in clinical, nutrition, complete enteral formulas. Nutritional therapy in diseases of infancy and childhood. Introduction to the course, Role of various nutrients for maintenance, growth, production, reproduction and health; various abnormalities related to poor nutrition; role of different hormones and enzymes in relation to utilization of various nutrients; remedial approach through diet for various metabolic problems; Nutrient requirements in infection, burn and diseased condition.

PRACTICAL

Patients selection, nutritional requirement of patient, pre-operative and post-operative diets. Parenteral nutrition. Basic rules for TPN use, TPN techniques, TPN prescription, preparation of TPN solution. Tube feeding, feeding equipments, monitoring the tube-fed patient.

RECOMMENDED BOOKS

1. Hark, L. 2003. Medical nutrition and disease: a case based approach, 3rd ed. Blackwell Pub. Co., Massachusetts, U.S.A.
2. Lahodavios, D and Haffgee, A. 1994. Handbook of clinical nutrition. Oxford University Press, London.
3. Peggy, S.S. 1992. Nutrition and diet therapy, 2nd ed. Jones and Bartlett Pub., Boston, London, U.K.
4. Phyllis, A.B. 2000. Prescription for nutritional healing. Avery Penguin Putnam Inc., New York, U.S.A.
5. Ahmad, M. 2000. Essentials of medical biochemistry, Vol. I., 7th ed. Merit Publishers, Multan, Pakistan.
6. Davidson, S., R. Passmore, R and M.A. Eastwood. 1986. Human nutrition and dietetics. Churchill Livingstone, New York, U.S.A.
7. Guyton, A.V. 1995. Text book of medical physiology. Prentice Hall., U.S.A.
8. McDowell, L.R. 2000 Vitamins in animal and human nutrition. Academic Press Inc., London.
9. Moren, L.A. 1994. Biochemistry. Neil Peterson Publishers, Prentice Hall Inc., U.S.A.

10. Schlenker, E. and S.L. Roth. 2011. Williams' essentials of nutrition & diet therapy, 10th ed. Elsevier Sci Sci. Pub., London.

HND-710

NUTRITIONAL EPIDEMIOLOGY AND RESEARCH METHODS

3(3-0)

Theory

Epidemiology & Public Health: Introduction and definitions of epidemiology, Types of epidemiology: clinical, occupational, experimental, Epidemiological methods and types of studies: Cross sectional, cohort, case control, prospective, retrospective, nested, meta-analysis etc, Epidemiologic consideration in disease process, Sampling methodology: procedure, sample size, various sampling techniques, sampling error, bias, risk, data collection of infectious disease cases, antibiotic resistance profile of infectious agents; Screening tests, accuracy of screening tests, predictive value, reliability; hypothesis testing, statistical significance, (p values, confidence interval etc), Disease pattern in community and social diversity, Surveillance and monitoring of diseases, Applied epidemiology: rationale, strategies and concepts of control and eradication of diseases. Nutritional Intervention Planning: Planning process - assessment of nutritional problems, Complete nutrition intervention planning and implementation. Research Methods in Human Nutrition: Research process, Types of research in human nutrition & dietetics, Various experimental designs and their application in nutrition research designs, Data analysis techniques in human nutrition, Various ways and methods of data presentation & interpretation.

Books Recommended

1. Frank G.C. 2008. Community nutrition applying epidemiology to contemporary practice, 2nd Ed. Jones and Bartlett Publishers, Sudbury, Massachusetts, USA
2. Mann, J. and Truswell, A. 2002. Essentials of human nutrition, 2nd Ed. Oxford University Press, UK.
3. Rolfes, Pinna and Whitney. 2012. Understanding normal and clinical nutrition, 9th Ed. Thomson and Wadsworth Publishers, USA.
4. Whitney, E. and Rolfes, S.R. 2005. Understanding nutrition, 10th Ed. Thomson and Wadsworth Publishers, USA.

HND-711

COMMUNITY NUTRITION

3(3-0)

Theory

Importance of Community Nutrition: Introduction to community nutrition and its importance, Scope of community nutrition in preventive health, Community needs assessment, Professional Approach To Community Nutrition: Avenues of opportunity in community nutrition, Requirements for conducting community nutrition research, Important issues relevant to community nutrition research, Primary Prevention of Diseases: Communicable and non-communicable diseases, Food-borne illnesses and their prevention, Food service sanitation procedures, Preparing for community emergencies, Preventing Nutrition Linked Diseases: Designing and planning community nutrition interventions, Food security, Hunger related disorders (Protein energy malnutrition), Hidden hunger disorders (Micro-nutrient deficiencies), Nutritional Education and Awareness: Need for Nutrition Education, Nutrition education programmes, Scope and challenges of educating people about eating well, Implications for competencies and skills for nutrition education, Understanding communication model: Preparing/organizing oral presentations, Delivering nutrition education workshops, Nutrition mass media communication campaigns, Social marketing & ethics in nutrition education, Non-government and public health organizations relevant to nutrition and their current programmes.

Books Recommended

1. Boyle, M.A. 2003. Community nutrition in action - a entrepreneurial approach, 3rd Ed. Thomson Learning, USA.
2. Gopalan, C. 1994. Recent Trends in Nutrition. Oxford University Press, Lahore, Pakistan.
3. Hdnhe, R. C. 2002. Prospects in Improving Nutrition in Eastern Europe and Central Asia. The World Bank Pub., USA.
4. Kind, F.S. and R. Ann, 1992. Nutrition for Developing Countries (2nd Ed.). Oxford University Press, Lahore, Pakistan.
5. Labodarios, D. and A. Haffejee, 1994. Hand Book of Clinical Nutrition. Oxford University Press, Lahore, Pakistan.

HND-712

DIETETICS AND PREVENTIVE NUTRITION

3(3-0)

Theory

Nutrition, Health and Hospital Dietetics: Background: Dietetics and its role in health and diseases, Communication and nutrition counselling skills Relationship between nutrition and dietetics, The hospitalized patient and its nutritional needs, Introduction to diet therapy and classification of diets. Nutritional care and Management in Chronic Diseases: Hypertension, Cardiovascular diseases, Diabetes. Disorders of the Gastrointestinal Tract and Nutritional Management: The gastrointestinal tract and its functions, Disorders of the mouth, pharynx and oesophagus, Disorders of the stomach and duodenum, Disorders of the small and large intestine, Nutrition Support during Injury, Surgery and Fever: Nutritional needs of injury, surgery and fever patients, Nutrition support-enteral feeding, Nutritional support-parenteral feeding, The special needs of patients with burns. Nutritional Care for Disorders of the Liver, Gall-Bladder and Pancreas: Review of normal functions, Hepatitis/ Cirrhosis, Hepatic Encephalopathy, Cholelithiasis and Cholecystitis, Pancreatitis, Nutritional Care for Renal Diseases: The organs of the urinary system, Nephritic syndrome, Glomerulonephritis and nephrosclerosis, Acute & chronic renal failure, Haemodialysis, Renal stones.

Recommended Books:

1. Bendich, A. and R. J. Deckelbaum. 2005. Preventive nutrition, 3rd ed. Humana Press, New Jersey, U.S.A.
2. Shils, M. E., M. Shike, A. C. Ross, B. Caballero and R. J. Cousins. 2005. Modern nutrition in health and disease, 10th ed. Williams and Wilkins, Baltimore, U.S.A.

HND-713

FOOD SUPPLY CHAIN MANAGEMENT

3(3-0)

Theory:

Food consumer and the supply chain, Supplier management: Supplier pre-assessment and review, supplier documentation, internal audits, external audits, study of regulatory compliance, food quality management sanitation programs in the supply chain, food safety assessment, employee training, environmental monitoring, foreign material control, label control programs and consumer packaging, product and ingredient tracing, product testing, control of non-conforming product, consumer complaints, recalls and market withdrawals, crisis management. Supply chain: catering and food retail industries, the scope and structure of the food supply chain, supply chain management, inter-firm relationships in food and drinks supply chain, relationship with state holders and responsibilities, Supply chain perspectives,

internationalization of the food chain. Management of the supply chain: strategic supply and management of relationships, logistics and information management, human resource management. The future of food supply chain management.

Recommended Books:

1. [Eastham](#), J., [Sharples](#), L. and [Ball](#), S. 2001. Food supply chain management. By Routledge, New York, USA.
2. Business Day. 2010. Mc Donald's Corporation.
3. Michman, R.D. and Mazze, E.M. 1998. The food industry wars: marketing triumphs and blunders. Greenwood Publishing Group,
4. Royle, T. and Towers, B. 2002. Labour relations in the global fast food industry. Routledge, New York, USA.

HND-714

FUNCTIONAL FOODS AND NUTRACEUTICALS

3(2-2)

Theory:

Concept of functional foods and nutraceuticals. Phytonutrients and their classification. Sources of biomolecules: cereals, herbs/spices, fruits/vegetables, animal and dairy products. Functional role of active ingredients and their allied health benefits. Technologies and processing operations in the extraction of functional ingredients. Designer food formulations; antioxidants, dietary fiber, prebiotics & probiotics, mineral & vitamins. Diet based therapies against metabolic diseases. Efficacy of functional foods and nutraceutical products. Safety and regulatory issues. Consumer acceptance regarding nutrified foods. Microencapsulation and nanotechnology in nutraceuticals delivery system. Emerging trends and technologies.

Practical:

Extraction of phytonutrients, phytochemical screening tests, antioxidant assays, characterization of active ingredients, development of various designer foods.

Suggested Readings:

1. Pathak, Y.V. 2011. Handbook of nutraceuticals. volume ii: scale-up, processing and automation. CRC Press Inc, USA.
2. Tiwari, B.K., Brunton, N.P. and Brennan, C.S. 2013. Handbook of plant food phytochemicals: sources, stability and extraction. John Wiley & Sons, UK.
3. Ghosh, D., Das, S., Bagchi, D., Samarta, R.B. 2013. Innovation in healthy and functional foods. CRC Press, Boca Raton, FL, USA.
4. Wildman, R.E.C. 2006. Handbook of nutraceuticals and functional foods. 2nd. CRC Press, New York, USA.
5. Shi, J., Ho, C.T. and Shahidi, F. 2005. Asian functional foods. Marcel Dekker/CRC Press, New York, USA.

HND-715

**ADVANCES IN HUMAN NUTRITION
THEORY****3(3-0)**

Fundamentals of nutrition and its application to culture, lifestyle, and health. Macro and micro nutrients and their importance in human health. Energy Metabolism and Macronutrients, Carbohydrates: types, role in body, dietary fiber, sweeteners, recommended intake and energy value. Fats and oils: types, functions, recommendations concerning fat intake, fat substitutes. Proteins: amino acids, protein synthesis and degradation, classification, functions, quality of proteins, dietary requirements. Energy Homeostasis in Humans, Proteins and Amino Acids, Lipids, Management of Public Health Menace: Obesity, Protein-Energy Malnutrition. Micronutrients, Vitamins: classification, role in body. Mineral elements: types, requirements, sources, functions Non-nutritive components of food. Antioxidant Nutrients, Dietary Supplements and Fortified Foods. Eating food: smell, taste, satiety. human digestion: alimentary tract, digestive juices, secretions. Absorption and metabolism of nutrients: carbohydrates, protein, lipids. Nutrient and dietary deficiency disorders and special nutrient requirements.

RECOMMENDED BOOKS

1. Denis M Medeiros, Emeritus, Robert H Friis, Denis M Medeiros, Robert E. C. Wildman, 2013. Advanced Human Nutrition. 3th ed. Jones & Bartlett Publishers, U.S.A.
2. Robert E.C. Wildman 2009. The Nutritionist: Food, Nutrition, and Optimal Health, 2nd ed. Routledge, NY.
3. Sareen S. Gropper, Jack L. Smith, 2009. Advanced Nutrition and Human Metabolism, 5th ed. Cengage Learning, USA
4. Bender, D. A. 2007. Introduction to nutrition and metabolism, 4th ed. University College, London, U.K.
5. Davidson, S., R. Passmore, R and M.A. Eastwood. 1986. Human nutrition and dietetics. Churchill Livingstone, New York, U.S.A.
6. Whitney, E.N. and S.R. Rolfes. 2002. Understanding nutrition, 9th ed. Wadsworth Thomson learning, California, U.S.A.