

School of Health Sciences

CSJM University, Kanpur

Ordinance & Syllabus

for

**M. Sc. Human Nutrition
(M.Sc.-HN)**

Academic Programme

**Syllabus according to
NEP-2020**

**Duration: 2 years
(Four semesters)**

Ramkishore

Veer

Manish Kumar

Digvijay

M.Sc. Human Nutrition (M.Sc.-HN)

ORDINANCE

Chapter

"A"

PREAMBLE

According to several scientific studies, the food we eat has substantial impact on our health. Dietary changes can help prevent or control a variety of health problems, including obesity, diabetes, and some cancer and heart disease risk factors.

The biochemical and physiological process by which an organism uses food to sustain its life is known as nutrition. Ingestion, absorption, assimilation, biosynthesis, catabolism, and elimination are all part of the process. Human Nutrition is the branch of research that investigates the physiological processes of eating. Dietetics is the study of the effects of diet and nutrition on human health. Dietetics has a great emphasis on public health and is dedicated about the significance of eating healthy foods.

TITLE OF THE PROGRAMME-The programme shall be called "Masters of Science (M.Sc.) Human Nutrition"

OBJECTIVES OF THE PROGRAMME

1. To learn and know how to use and apply information sources related to nutrition, food, lifestyle and health.
2. To Identify and classify food and foodstuffs, knowing their composition, properties, nutritive value, bioavailability, sensory characteristics, and the changes they undergo as a consequence of technological and culinary processes.
3. To understand the basic processes involved in the preparation, transformation and conservation of foods of both animal and vegetable origin.
4. To learn and interpret using food composition tables.
5. To understand the microbiology, parasitology and toxicology of food.
6. To design and carry out health status assessment protocols and identifying nutritional risk factors.
7. To understand the structure of food services, nutrition departments and hospital nutritionists, and identifying and developing the functions of a nutritionist-dietician in a multidisciplinary team.
8. To enable students to assess the structure and component of food system and analyze the relationships between nutritional health and food selection, use appropriate laboratory techniques and chemicals to enumerate, and identify the nutrients and microorganism in food.

COURSE OUTCOME

1. The student will understand the role of food and nutrients in health and disease.
2. The student will be able to provide nutrition counselling and education to individuals, groups, and communities using a variety of communication strategies.
3. The student will learn to evaluate nutrition information based on scientific reasoning for clinical community, and food service application.
4. The student will be able to apply technical skills, knowledge of health behaviour and decision-making skills when assessing and evaluating the nutritional status of individuals and communities and their response to nutrition intervention.
5. The student will learn to how to perform food management functions in business, health-care, community, and institutional arenas.









M.Sc. Human Nutrition (M.Sc.-HN)

1. "M.Sc. Human Nutrition" degree will be under the faculty of Medicine of C.S.J.M. University, Kanpur.

2. Duration of Course:

The total duration of the Course shall be of two years spread over in four semesters.

3. Seats:

30 (Thirty)

4. Admission:

Eligibility:

Admissions to M.Sc. program in Human Nutrition course shall be open to a person who holds a Bachelor's degree in any science stream.

Mode of Admission:

As per the University Norms.

5. Medium of Instruction

English shall be the medium of instruction for all the subjects of study and for examination of the course.

6. Method of Teaching:

The method of teaching adopted shall be a combination of lectures, demonstrations and practicals by the full time faculty, visiting or part time or guest faculty.

7. Examination:

As per the University norms.

Duration of examination:

As per the University norms.

8. Attendance to appear in the end semester examination :

The permission to appear in end semester examination shall be granted to such candidate only who have fulfill the condition of 75% attendance in each subject separately in theory and practical as per the university rule.

Regarding attendance requirements students will have to fulfill the condition of 75% attendance. 15% relaxation in attendance, in exceptional circumstances can be made by the Vice Chancellor on the recommendation of the Director/Coordinator/Head of the Institute/Department.











CHHATRAPATI SHAHU JI MAHARAJ UNIVERSITY, KANPUR

STRUCTURE OF SYLLABUS FOR THE PROGRAM: M.Sc. SUBJECT: HUMAN NUTRITION

Syllabus Developed by			
Name of BoS Convenors / BoS Members	Designation	Department	College/University
Prof. Sanjay Kala	Principal	Dean, Faculty of Medicine	GSVM. Medical College, Kanpur
Prof. Dolly Rastogi	Professor	Physiology	GSVM Medical College, Kanpur
Prof. Parvez Khan	Head	Ophthalmology	GSVM Medical College, Kanpur
Prof. Sanjay Kumar	Head	Orthopaedics	GSVM Medical College, Kanpur
Prof. MP Mishra	Ex. Director	JK Cancer Institute	GSVM Medical College, Kanpur
Dr. Chayanika Kala	Associate Professor	Pathology	GSVM Medical College, Kanpur
Dr. Ashok Verma	Head & Associate Professor	Radiology	GSVM Medical College, Kanpur
Dr. Digvijay Sharma	Director	School of Health Sciences	CSJM University, Kanpur
Dr. Munish Rastogi	Assistant Director	School of Health Sciences	CSJM University, Kanpur
Dr. Versha Prasad	Assistant Professor	School of Health Sciences	CSJM University, Kanpur
Dr. Ram Kishor	Assistant Professor	School of Health Sciences	CSJM University, Kanpur

1 ST YEAR / 1 ST SEM						
COURSE CODE	TYPE	COURSE TITLE	MIN CREDITS	CIA	ESE	MAX. MARKS
M020701T	CORE	Applied Physiology	4	25	75	100
M020702T	CORE	Nutritional Biochemistry	4	25	75	100
M020703T	CORE	Research Methodology	4	25	75	100
M020704T	CORE	Advances in Food Microbiology	4	25	75	100
M020705P	PRACTICAL	PRACTICAL	4	25	75	100
	PROJECT	DISSERTATION/PROJECT WORK	-	-	-	-
TOTAL			20			500
1 ST YEAR / II ND SEM						
M020801T	CORE	Food Science	4	25	75	100
M020802T	CORE	Nutrition during Life Cycle	4	25	75	100
M020803T	CORE	Biostatistics	4	25	75	100
M020804P	PRACTICAL	PRACTICAL	4	25	75	100
M020805R	PROJECT	DISSERTATION/PROJECT WORK	8	25	75	100
B140804T	MINOR	Sensory Evaluation	4	25	75	100
B140805T	ELECTIVE	Quality Control Food Standards and Food Laws				
	CLINICAL TRAINING	Diet Counselling Clinic	4	-	-	-
TOTAL			32			600

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II ND YEAR / III RD SEM						
M020901T	CORE	Therapeutic Nutrition and Dietetics	4	25	75	100
M020902T	CORE	Techniques of Food Analysis	4	25	75	100
M020903T	CORE	Advanced Nutrition	4	25	75	100
M020904T	ELECTIVE	Institutional Food Service Management	4	25	75	100
M020905T		Food Preservation				
M020906P	PRACTICAL	PRACTICAL	4	25	75	100
	PROJECT	DISSERTATION/PROJECT WORK	-	-	-	-
TOTAL			20			500
II ND YEAR / IV TH SEM						
M021001T	ANY FOUR ELECTIVES TO BE CHOSEN	Advanced Dietetics	4	25	75	100
M021002T		Food Product Development				
M021003T		Community Nutrition				
M021004T		Food Processing and Technology				
M021005T		Nutrition for Health Fitness				
M021006P	PRACTICAL	PRACTICAL	4	25	75	100
M021007R	PROJECT	DISSERTATION/PROJECT WORK	8	25	75	100
TOTAL			28			600
GRAND TOTAL			100			2200

NOTE:

1. *A MINOR ELECTIVE FROM OTHER FACULTY SHALL BE CHOSEN IN 1ST YEAR (EITHER 1st / IInd SEMESTER) AS PER AVAILABILITY.
2. In both years of PG program, there will be a Research Project or equivalently a research-oriented Dissertation as per guidelines issued earlier and will be of 4 credit (4 hr/week), in each semester. The student shall submit a report/dissertation for evaluation at the end of the year, which will be therefore of 8 credits and 100 marks
3. Research project can be done in form of Internship/Survey/Field work/Research project/Industrial training, and a report/dissertation shall be submitted that shall be evaluated via seminar/presentation and viva voce.
4. The student straight away will be awarded 25 marks if he publishes a research paper on the topic of Research Project or Dissertation.
5. Food Science (M020801T) and Nutrition during life cycle (M020802T) are Minor (interdisciplinary) open electives offered by School of Health sciences in 2nd sem for students of other disciplines / faculty.

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INTERNAL ASSESSMENT

- It will be for theory and practical both.
- It will be done through the whole semester.
- The candidate must obtain at least 40% marks in theory and practical separately in internal assessment to be eligible for the semester University examination.
- Internal assessment (Theory) will be done as follows:

a) Mid-sem./Class Test	= 10 marks
b) Assignments/Projects/Clinical Presentations	= 10 marks
c) Attendance	= 05 marks
Total	= 25 marks

Internal assessment (Practical) will be done as follows:

a) Laboratory manual	= 10 marks
b) Day to day performance	= 10 marks
c) Attendance	= 05 marks
Total	= 25 marks

Criteria for Passing:

As per the University Norms.

Maximum duration for completion for course

A candidate shall complete the course within four years from date of admission failing which the candidate will be discharged.

Division:

As per the University Norms.

Degree:

The degree of "**M.Sc. Human Nutrition**" course of the University shall be conferred to the candidates.

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Dissertation

Every candidate pursuing M.Sc.-HN degree course is required to carry out research work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of dissertation. Topic for dissertation shall be assigned by the guide.

If the subject of Thesis entails collaboration with other departments or specialties, the collaborative portion of the work will be supervised by Co-Guide, designated by the School of Health Sciences in consultation with the Guide. Where a Co-Guide is involved, the Thesis will be certified jointly by the Guide & Co-guide.

Every candidate shall submit synopsis to the University in the prescribed Performa containing particulars of proposed dissertation work, within 6 months from the date of commencement of the course on or before the dates notified by the university. The synopsis shall be sent through the proper channel. Such synopsis will be reviewed and the university will register the dissertation topic.

No change in the dissertation topic or guide shall be made without prior approval of the university. Guide will be only a facilitator, advisor of the concept and hold responsible in correctly directing the candidate in the methodology and not responsible for the outcome and results.

The dissertation should be written under the following headings.

1. Introduction
2. Aims or objectives of study
3. Review of literature
4. Material and methods
5. Results
6. Discussion
7. Conclusion
8. References
9. Master and Chart & Table (If Applicable)
10. Annexure (If Applicable)

The written text of dissertation/ research project shall not be less than 50 pages and shall not exceed 120 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of bond paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. A declaration by the candidate for having done the work himself should also be included, and the guide, head of the department and Director/Coordinator of the institute shall certify the dissertation/ research project.

Every candidate is required to give power point presentation before final submission of dissertation. Four copies of Dissertation/research project shall be submitted to the university, through proper channel, along with a soft copy (CD), 2 months before the final examination. It shall be assessed by two examiners appointed by the university, one internal and one external. There will be a power point open presentation of the submitted dissertation as per the schedule given by the university. This presentation shall be jointly evaluated by external and internal examiner as per the criteria given below:

Objective(s) of the work done, Methodology adopted, Result and Discussion, Conclusion & outcome

If the student failed to secure the minimum passing marks he will resubmit the dissertation 01 month before the supplementary exam.









Guide

I. Eligibility to be a guide

- (a) Full time faculty involved in teaching in the same Department/Institute or in the affiliated colleges or institutions of University.
- (b) M.Sc.-Human Nutrition/M.Sc. (Nutrition) with at least 02 years of teaching/professional experience.

The Vice Chancellor of the University can appoint a person as a guide whom he/she considers suitable.

II. Age of Guide

The age of guide should not exceed 62 years or as per university norms.

III. Change of Guide

In the event of registered guide leaving the department/institute or in the event of death of guide, guide may be change with prior permission from the university.

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COURSE OF STUDY

M.Sc. Human Nutrition First Semester (First Year)

S.N.	Course Title	Course Code	Teaching hours
1	Applied Physiology	M020701T	80
2	Nutritional Biochemistry	M020702T	80
3	Research Methodology	M020703T	80
4	Advances in food Microbiology	M020704T	80
5	Practical	M020705P	80
6.	Dissertation/Project Work	-	40

M.Sc. Human Nutrition Second Semester (First Year)

S.N.	Course Title	Course Code	Teaching hours
1	Food Science	M020801T	80
2	Nutrition During Life Cycle	M020802T	80
3	Biostatistics	M020803T	80
4	Practical	M020804T	80
5	Dissertation/ Project Work	M020805T	120
6	Sensory Evaluation	B140804T	80
7	Quality Control Food Standards and Food Laws	B140805T	80
8	Diet Counselling Clinic	-	80

M.Sc. Human Nutrition Third Semester (Second Year)

S.N.	Course Title	Course Code	Teaching hours
1	Therapeutic Nutrition and Dietetics	M020901T	80
2	Techniques of Food Analysis	M020902T	80
3	Advanced Nutrition	M020903T	80
4	Institutional Food Service Management	M020904T	80
5	Food Preservation	M020905T	80
6	Practical	M020906P	80
7	Dissertation/ Project Work	-	40

M.Sc. Human Nutrition Fourth Semester (Second Year)

S.N.	Course Title	Course Code	Teaching hours
1	Advanced Dietetics	M021001T	80
2	Food Product Development	M021002T	80
3	Community Nutrition	M021003T	80
4	Food Processing And Technology	M021004T	80
5	Nutrition For Health Fitness	M021005T	80
6	Practical	M021006P	80
7	Dissertation/Project Work	M021007R	120

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M.Sc. Human Nutrition-First Semester

APPLIED PHYSIOLOGY COURSE CODE-M020701T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable the student to understand the anatomy and function of human body

COURSE LEARNING OUTCOME

The student will be able to:

1. Understand the current level of knowledge regarding the human body's functioning organisation.
2. Gain a better understanding of how all of the body's organ systems work and how they interact.
3. Understand the patho-physiology of diseases that occur frequently.
4. Establish a link between physiology and a variety of illnesses and their patho-physiology.

COURSE CONTENT

Unit-1

Cell structure and functions of organelles, tissues, organs brief review Skeletal System- Review of structure & functions of bones and vertebral column

Unit-2

Nervous System -Review of structure and functions of neuron. Conduction of neuro impulse, synapses, Role of neurotransmitters.

Organisation of central nervous system. Structure and function of brain and spinal cord, afferent and efferent nerves, blood brain barrier. CSF, hypothalamus and its role in various body functions.

Unit-3

Digestive System - Review of structure and functions of Digestive system. Secretory, digestive and absorptive functions, role of liver, pancreas and gall bladder motility and hormones of GIT

Excretory System-Structure, function of nephron, urine formation, role of kidney in maintaining pH of blood, Diuretics

Unit -4

Respiratory System -Review of structure and functions, role of lung in exchange of gases. Transport of oxygen and CO₂.

Circulatory System -Structure and function of heart and blood vessels. Regulation of cardiac output and blood pressure, heart failure. Hypertension.

Unit-5

Endocrine System -Structure, function, role of hormones, regulation of hormones secretion. Disorders of endocrine glands.

Reproductive System - Male organs of reproduction. Female organs of reproduction. Menstrual cycle, fertilization, physiological changes in pregnancy.

SUGGESTED READINGS

1. Ganong W.F. (2003)-Review of Medical Physiology.21st ed. McGraw Hill.
2. Guyton A.C. and Hall J.E. (2000) Textbook of Medical Physiology.10th ed. India: Harcourt Asia.
3. Tortora G.J and Grabowski S.R. (2000) Principles of Anatomy and Physiology.9th ed. John Wiley and Sons.Inc.
4. West J.B. (1996): Physiological Basis of Medical Practice.12th Edition. B. I. Waverly Pvt.Ltd.MariebE.N(2001) Human Anatomy and Physiology (5th ed)Pearson Education, Inc, publishing as Benjamin Cummings.
5. Jain A. K (2014) Human Physiology for BDS (5th Edition), Publisher: Avichal Publishing Company; ISBN: 9788177394337.
6. Pal G.K and Pal Pravati (2016) Comprehensive Textbook of Medical Physiology (2Vols) Publisher: Jaypee Brothers Medical Pub (P) Ltd.) ISBN: 5551234080758;
7. Moran Campell E.J., Dickinson,C.J., Slater,S.D.Edwards.C.R.WandSikora,K.(1984) Clinical Physiology,5th Edition,ELBS,BlackwellScientific Publications.
8. Wilson, K.J.W. and Waugh,A.(1996): Ross and Wilson Anatomy and Physiology in Health and illness,8th Edition ,Churchilli Livingstone
9. McArdle,W.D., Katch, F.I. and Katch ,V.L. (1996): Exercise Physiology. Energy,Nutrition and Human Performance,4thEdition, Williams and Wilkins,Baltimore.

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M.Sc. Human Nutrition-First Semester

NUTRITIONAL BIOCHEMISTRY

COURSE CODE- M020702T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To provide a keen knowledge of absorbed nutrient's assimilation and understand the mechanisms adopted by human body for regulation of metabolic pathway and cycles.

COURSE LEARNING OUTCOME

1. Gained knowledge of biological catalysts essential for metabolism, its compositional structure, characteristics, biological functions, classifications, working activities, Factors affecting enzyme activities, inhibitors, Iso-enzymes, coenzymes essential in biological system or metabolism.
2. Understand of Biochemical composition of nutrient compounds on association of metabolism. Biological oxidation reactions and respiratory chain reactions with oxidative phosphorylation, regulation. Working in energy forming process of human body and its essentials.
3. Understand the biochemical events and processing of catabolism and anabolism held under the metabolism of macro nutrients: carbohydrates, proteins and fats including regulation of metabolism.
4. Gain knowledge of biochemistry of vitamins and minerals regarding its association with biological system.

COURSE CONTENT

Unit 1

Enzymes as biological catalysts, IUB system of classification, concept of active site, specific activities, turnover number. Units of enzymes activities. Effects of substrate concentrates, Effects of pH and temperature on enzyme catalyst reactions. Enzyme's inhibitors, Isoenzymes.

Unit 2

Biological oxidation, Enzymes of Biological oxidation, redox potential. Respiratory chain,oxidative phosphorylation. Mitchell's oxidative phosphorylation.

Unit 3

Intermediary Metabolism and its regulation, Carbohydrates: Glycolysis, HMP shunt pathway, gluconeogenesis.

Lipids: beta- oxidation and pathways of fatty acid's catabolism. Denovo synthesis of fatty acids. Metabolism of ketone bodies, cholesterol metabolism.

Unit 4

Protein Metabolism, An overview of protein metabolism, general reactions of protein catabolism, urea cycle, biosynthesis of protein.

Unit 5

Vitamin and minerals, Biological role, absorption and metabolism of vitamin A, D, E and K. B complex, Vitamin C. Macro and micro minerals.

SUGGESTED READINGS

1. Murray, R.K. Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry, Macmillan worth Publishers.
2. Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
3. Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley Liss Inc.
4. Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.,
5. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
6. Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.
7. Oser, B.L. (1965). 14th Ed. Hawk's Physiological Chemistry. Tata McGraw-Hill Publishing Co. Ltd.
8. Varley, H. Gowenlock, A.H. and Bell, M.(1980). 5th Ed. Practical Clinical Biochemistry, Heinemann Medical Books Ltd.,
9. Tietz, N.W.: (1976) Fundamentals of Clinical Chemistry. S.B. Saunders Co.,
10. Vogel, A.I. (1962): 3rd Ed. A. Textbook of Quantitative Inorganic Analysis. The English Language book Society and Longman
11. Raghuramulu, N : Madhavan nair and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Techniques NIN, ICMR.
12. Plummer, D. T. (1987). 3rd Ed. An Introduction to Practical Biochemistry McGraw-Hill Book Co.
13. Winton, A.L. and Winton, K.B. (1999). Techniques of Food Analysis. Allied Scientific Publishers.

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M.Sc. Human Nutrition-First Semester

RESEARCH METHODOLOGY COURSE CODE-M020703T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

1. To have a thorough understanding of presenting supporting evidences and how to conduct research.
2. To have an understanding of model of research and biostatistics.
3. To evaluate every procedure on the basis of evidences.
4. To understand the data analysis procedure and their significance in research

COURSE LEARNING OUTCOME

1. Students will be able to understand and apply concepts and terminology with in the area of Research.
2. Students will be able to describe research design and application of different methods to analyse the data collected to conduct and complete the research.

COURSE CONTENT

Unit 1

Research

- Introduction
- Research: Why? How? And When?
- Research – Definition, concept, purpose, approaches
- Internet sites of Nutrition

Unit 2

Research Fundamentals

- Define measurement
- Measurement framework
- Scales of measurement
- Pilot Study
- Types of variables
- Reliability & Validity
- Drawing Tables, graphs, master chart etc

Unit 3

Writing a Research Proposal, Critiquing a research article

- Defining a problem
- Review of Literature
- Formulating a question, Operational Definition
- Inclusion & Exclusion criteria
- Forming groups
- Data collection & analysis
- Results, Interpretation, conclusion, discussion
- Informed Consent
- Limitations

Unit 4

Research Design

- Principle of Designing
- Design, instrumentation & analysis for qualitative research
- Design, instrumentation & analysis for quantitative research
- Design, instrumentation & analysis for quasi-experimental research
- Design models

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Unit 5

Research Ethics

- Importance of Ethics in Research
- Main ethical issues in human subjects' research
- Main ethical principles that govern research with human subjects
- Components of an ethically valid informed consent for research

SUGGESTED READINGS

1. Agrawal C., Joshi S.P. and Sinha A Communication Research and development, The ISRO Experience, new Delhi, Nawray Rai concept Pub. Co.
2. Beaglehole R, Bonita R and Kjellstrom T (1993). Basic Epidemiology. World Health Organization, Geneva.
3. Best J. (1959): Research in education. Englewood, Cliffs. New Jersey Prentice Hall Inc. Bhattacharya DK (2004). Research Methodology. Published by Anurag Jain for excel books, New Delhi, India
4. Biderman A. and Drury T. (1976): Measuring work and Quality for social reporting New York, John Willy and Sons.
5. Brow F. (1988): Statistics for Behavioural Science, Boston, Allyn and Barm Inc. Centry Gofes Company, Inc. New York. Delhi, Sultan Chand and Sons. Design, Prentice Hale Inc. N.J.
6. Fowler FJ (2001). Survey Research Methods (3rd ed.). Sage Publications, Newbury Park
7. God V. Caiteer (1972): Essentials of Educational Research Methodology.
8. Good C.N. (1963): Introduction to Educational research, New York, Applatan
9. Gupta S.C. and Kapodi V.R. (1990) : Fundamentals of Applied Statistics, New Hinton P (2004). Statistics Explained: A Guide for Social Science Students. Routledge Publishing, London.
10. Kaul L. (1980): Methodology of Educational Research, Vani educational books, Vikas Pub., New Delhi.
11. Keenneth King. (1978): Final report Literacy Research in developing countries. Kerlinger F.N. (1965): Foundations of Behavioural Research, N., Holl Rinehart and Winston Inc.
12. Kothari C R (2008). Research Methodology: Methods and Techniques (2nd ed.). New Age International Publishers, New Delhi, India. Ltd., Ramnagar, Delhi
13. Methodology of Research in Education – Publishing Sidhu Sterling Publishers Pvt.Ltd. New Delhi.
14. Monly C.J. (1964): Tre Science of Educational Research, Einasia Pub. House New Delhi.
15. Patton Q.M. (1990): Qualitative evaluation and Research methods, sage Pub., Ratnapala N. (1993): New Horizons in Research methodology, Sri Lanka,
16. Rolverthorndike (1977): Measurement & Evaluation in Psychology & Education.4th ed. John Willy & Sons Sarvodaya Research Institute. Sciences, Tata McGraw Hill Pub. Co. Ltd., New Delhi.
17. Singh A.K. (1986): Tests, Measurement and Research Methods in Behavioural
18. Sproull N (2003). Handbook of Social Research Methods: A Guide for Practitioners and Students in the Social Sciences. The Scarecrow Press, Inc., New Jersey
19. Wandt Edwin (1968): A cross section of educational Research, David McKay workshop on education research with special research on literacy. Geneva

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M.Sc. Human Nutrition-First Semester

ADVANCES IN FOOD MICROBIOLOGY COURSE CODE-M020704T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable the student to gain deeper knowledge of role of micro- organisms in human environment and to understand the importance of micro- organism in food spoilage and to learn techniques in food preservation.

COURSE LEARNING OUTCOME

Students will be able to:

1. Understand the microbial flora associated with food; understand the beneficial effects of microorganisms and the relevance of food microbial safety.
2. Understand the conventional and rapid methods for detecting food borne pathogens and their toxins.
3. Understand the role of microbes in food spoilage.
4. Understand various biological and chemical methods of food preservation.

COURSE CONTENT

Unit 1: Food as a substrate for microorganisms, pH, moisture oxidation- reduction potential, nutrient content, inhibitory substance and biological structure.

Microorganism of importance in food, their classification, morphology, growth and reproduction, Industrial importance.

Unit 2 : Methods of isolation and detection of microorganisms or their products in food. Conventional methods, Rapid methods (newer Techniques). Immunological methods, Chemical methods.

Unit 3 : Spoilage of Food: sources of contamination, soil, water. Air, animal, plants, humans, sewage, equipment, ingredients product to product.

Spoilage of different groups of food: Cereal and cereal products vegetables and fruits, meat and meat products, egg and poultry, fish and other sea foods, mi11kand milk products, canned foods.

Unit 4 : Food preservation: Physical methods, chemical methods and biological based preservation systems.

Food borne diseases: Bacterial and viral borne diseases. Food borne important animal parasites, mycotoxins.

Unit 5 : Role of microbes in fermented and genetically modified foods.

SUGGESTEC READINGS

1. Pelczar, M.I. and Reid, R.D. (1933): Microbiology McGraw Hill Book Company, New York, 5th Edition.
2. Atlas, M. Ronald (1995) Principles of Microbiology, 1st Edition Mosby- year Book, Inc. Missouri, U.S.A.
3. Topley and Wilson's (1983) Principles of Bacteriology, Virology and Immunity, Edited by S.G. Wilson, A Miles and M.T. Parker Vol. I: General Microbiology and Immunity II: Systematic Bacteriology. 7th Edition Edward Arnold Publishers.
4. Block, J.G. (1999): Microbiology Principles and Explorations, 4th Edition John Wiley and Sone Inc.
5. Frazier, W.C. (1988): Food Microbiology, McGraw Hill Inc. 4th Edition.
6. Jay, James, M. (2000): Modem Food Microbiology, 6th Edition, Aspen Publishers Inc. Maryland.
7. Banwant, G. (1989): Basic Food Microbiology, 2nd Edition. CBS Publishers.
8. Garbutt, J. (1997): Essentials of Food Microbiology. 1st Edition, Arnold International Students Editions.
9. Doyle, P. Benehat, L.R. and Mantville, T.J. (1997): Food Microbiology, Fundamentals and Frontiers, ASM, Washington DC.
10. Adams, M.R. and M.G. Moss (1995): Food Microbiology, 1st Edition, New Age International (P) Ltd.
11. Bensaon, H. J. (1990): Microbiological applications, C. Brown Publishers U.S.A. Roday, S. (1999): Food Hygiene and Sanitation, 1st Edition. Tata Mac Graw Hill, New Delhi.
12. Venderzant C. and D.F. SplittsToesser (1992): Compendium of Methods for the Microbiological Examination of Foods 3rd Edition American Public Health Association, Washington DC.

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M.Sc. Human Nutrition-First Semester

PRACTICALS

COURSE CODE-M020705P

Min. Hrs. – Practical: 80 Hrs.

1. Estimation of albumin, globulin and albumin / globulin ratio in serum and urine.
2. Estimation of haemoglobin, measurement of blood pressure
3. Identification of blood groups.
4. Identification and counting of blood cells
5. Estimation of random blood sugar
6. Bleeding and clotting time.
7. Glucose: Estimation of glucose in blood and urine.
8. Cholesterol: Estimation of cholesterol in blood
9. Urea and Creatinine: Estimation of urea and creatinine in serum and urine.
10. Experiments related to the morphology of microbes.
11. Preparation of Media.
12. Staining techniques of micro-organisms.
13. Growth and growth curve of micro-organisms.
14. Microbial count

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M.Sc. Human Nutrition - First Semester

DISSERTATION

Min. Hrs -: 40 Hrs.

- Every candidate pursuing M.Sc.-Human Nutrition degree course is required to carry out research work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of dissertation. Topic for dissertation shall be assigned by the guide.
- If the subject of thesis requires collaboration with other departments or specialties, the collaborative portion of the work will be supervised by Co-Guide, designated by the School of Health Sciences in consultation with the Guide. Where a Co-Guide is involved, the thesis will be certified jointly by the Guide & Co-guide.
- The students will select various topics concerned with day to day recent trends in food, nutrition and dietetics.
- Before selection of the topic the student must go through various nutrition journals and study them elaborately to understand the recent trends and scientific research.
- A minimum of at least 5 topics must be scrolled by each student and out of this the most appropriate topic may be selected for his further synopsis preparation with the consent of guide.
- After selection of topic the student has to discuss the various aspects of the selected topic with his guide and strategically plan how he will proceed in his research work.
- Importance should be given to legitimate data collection and handling, sample size and the recent trends in the field Human Nutrition.

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M.Sc. Human Nutrition-Second Semester
FOOD SCIENCE
COURSE CODE-M020801T
Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To make the student aware about common food processing techniques and understand the physio-chemical properties of food.

COURSE LEARNING OUTCOME

After studying this paper, the student will be able to understand food processing techniques as well as the physical and chemical properties of various foods.

COURSE CONTENT

Unit 1

Colloidal chemistry as related to food, evaluation of food by subjective and objective method, carbohydrates in food sources and characteristics of sugar, starch, cellulose, pectin and gums characteristics in foods, effect of cooking and processing

Unit 2

Protein in food, plant and animal food chemical and physical properties related to food effect of cooking and processing technique, on fats, properties, uses, processing techniques, changes during heating and storage of fats and oils.

Unit 3

Classification, Importance, Composition function of fruits and vegetables and effect of cooking and processing on their nutritive value.

Unit 4

Classification and Importance of beverages, fruit pigments, browning reaction Definition, classification, uses and legal aspect of food additives classification, nature, and uses of leavening agents, flavours.

Unit 5

Definition, Importance of organic food and Nutraceuticals, Definition, type, different type of common adulterants law related to prevention of food adulteration

SUGGESTED READINGS

1. Charley, H. (1982): Food Science (2nd edition), John Willey & Sons, New York.
2. Potter, N. and Hotchkiss, J.H. (1996): Food Science, Fifth edition, CBS publishers and Distributors, New Delhi.
3. Belitz, H.D. and Gropsh, W. (1999): Food Chemistry (2nd edition), Springer, New York.
4. Abers, R.J. (Ed.) (1976): Foam, Academic Press, New York.
5. Cherry, J.P. (Ed.) (1981): Protein Functionality in Foods, American Chemical Society, Washington, D.C.
6. Pomeroy, Y. (Ed.) (1991): Functional Properties of Food Components, (2nd edition), Academic Press, New York.
7. Duckworth, R.B. (Ed.) (1978): Water Relation to Foods, Academic Press, London.
8. Parihar, P., Agarwal, R. Jain D.K. and Mandhyan, B.L. (1977): Status Report on Dehydration of Eggs. PHT / CAE / Publishers.
9. Marshall, K.R. and Harper, W.J. (1988): Whey Protein Concentrates, IDF Bulletin No.233.
10. Tindall, H.D. (1983): Vegetables in the Tropics, MacMillan, Press, London.
11. Julians, B.O. (Ed.) (1985): Rice Chemistry and Technology, (2nd Edition), American Association of Cereal Chemistry, St. Paul Minnesota, USA.

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M.Sc. Human Nutrition-Second Semester

NUTRITION DURING LIFE CYCLE COURSE CODE-M020802T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable the student to know physiological changes and nutritional requirements during various stages of life cycle and also to understand how Dietary Reference Intakes are derived for the population.

COURSE LEARNING OUTCOME

The student will be able to:

1. Analyse and calculate the needs for specific macronutrients.
2. Recognize important periods in growth and development, as well as the effects of malnutrition.
3. Determine nutritional needs at various age groups.
4. Recognize the consequences of bad and poor dietary and lifestyle choices.

COURSE CONTENT

Unit 1

RDA, Balanced diet, five food groups suggested by ICMR, Food Exchange List, Principles of Diet Planning

Unit 2

Nutritional requirements for infant, development during infancy low birth weight pre-term baby, weaning. Nutritional requirement for preschool children (1-6 year) Nutrition related problem for pre-schoolers PEM, vitamin A deficiency feeding programmes, ICDS.

Unit 3

Nutritional requirements for school children (6-12 years) feeding problems, packed lunches school lines programs

Nutritional requirements for adolescents, nutritional problems.

Unit 4

Nutritional requirements for adults, Nutritional requirement during old age, Process problem related to old age especially old women.

Unit 5

Nutritional requirements of expectant mother, psychological changes during pregnancy General dietary problems, complications. Nutritional requirements of lactating women.

SUGGESTED READINGS

1. Bamji, M.S., Krishnaswamy K. Brahmam G.N.V. (Eds). (2017). Textbook of Human Nutrition. 4th Edition. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
2. Cameron N. (2002). Human Growth and Development. USA: Academic Press, Elsevier Science.
3. FAO/WHO/UNU (2004). Human Energy Requirements. Report of a Joint Expert Consultation. Rome.
4. Gibson R S. (2005). Principles of Nutritional Assessment. 2nd ed. Oxford University Press.
5. ICMR (2020). Nutrient Requirements and SUGGESTED Dietary Allowances for Indians and its revised documents. New Delhi. ICMR.
6. Proceedings of NFI-WHO (SEARO) Symposium. (2006). Nutrition in Developmental Transition. New Delhi: NFI.
7. Report of a WHO Expert Committee. (1995). Physical Status: The Use and Interpretation of Anthropometry. Tech Rep Series 854, Geneva: WHO.
8. WHO (2006). WHO Child Growth Standards. Geneva: WHO.
9. WHO (2006). WHO Child growth standards: Length/height for age, weight for age, weight for length, weight for height and body mass index. Available at <http://www.who.int>.
10. Report of a joint WHO/FAO/UNU expert consultation (2007). Protein and Amino acid Requirements in Human Nutrition. WHO Technical Report Series 935. Geneva: WHO.
11. WHO (2007). WHO Reference Data for Children and Adolescents (5-19 years). Available at <http://www.who.int/growthref/en/>
12. WHO (2009). WHO Child growth standards: Growth velocity based on weight, length and head circumference. Available at <http://www.who.int>
13. Kumar, V. (1996): Aging- Indian Perspective and Global Scenario. Proceedings of International Symposium of Gerontology and Seventh Conference of the Association of Gerontology (India).
14. Bagchi, K. & Puri, S. (Ed.) (1999): Diet and Aging-Exploring Some Facets. Soc. For Gerontological Research, New Delhi and Help Age India, New Delhi

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M.Sc. Human Nutrition-Second Semester

**BIostatISTICS
COURSE CODE-M020803T**

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

1. To have a thorough understanding of presenting supporting evidences and how to conduct statistical analysis.
2. To have an understanding of model of biostatistics.
3. To evaluate every procedure on the basis of evidences.
4. To understand the data analysis procedure and their significance in research

COURSE LEARNIG OUTCOME

1. Students will be able to understand and apply concepts and terminology with in the area of biostatistics.
2. Students will be able to describe research design and application of different methods to analyse the data collected to conduct and complete the research.
3. Record, extract and analyse key information.

COURSE CONTENT

Unit 1

Biostatistics

- Introduction
- Definition
- Types
- Applications

Unit 2

Data

- Definition
- Types
- Presentation
- Collection methods

Unit 3

Measures of central value

- Arithmetic mean, median, mode. Relationship between them
- Partitioned values- Quartiles, Deciles, Percentiles
- Graphical determination

Unit 4

Measures of Dispersion

- Range
- Mean Deviation
- Standard Deviation

Unit 5

Normal Distribution Curve

- Properties of normal distribution
- Standard normal distribution
- Transformation of normal random variables.
- Inverse transformation
- Normal approximation of Biaxial distribution

Unit 6

Correlation analysis

- Bivariate distribution:
- Scatter Diagram
- Coefficient of correlation
- Calculation & interpretation of correlational coefficient
- T-test, Z-test, P-value

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Unit 7

Regression analysis

- Lines of regression
- Calculation of Regression coefficient
- Sampling distribution
- Standard error
- Types I & II error

Unit 8

Probability (in Brief)

Unit 9

Hypothesis Testing

- Null Hypothesis
- Alternative hypothesis
- Acceptance & rejection of null Hypothesis
- Level of significance

Unit 10

Parametric & non parametric tests

- Chi square test
- Mann-Whitney U test
- Wilcoxon Signed test
- Kruskal-Wallis test
- Friedman test
- T-test/student T test
- Analysis of variance

SUGGESTED READINGS

1. Agrawal C., Joshi S.P. and Sinha A Communication Research and development, The ISRO Experience, New Delhi, Nawray Rai concept Pub. Co.
2. Beaglehole R, Bonita R and Kjellstrom T (1993). Basic Epidemiology. World Health Organization, Geneva.
3. Best J. (1959): Research in education. Englewood, Cliffs. New Jersey Prentice Hall Inc. Bhattacharya DK (2004).
4. Research Methodology. Published by Anurag Jain for excel books, 1. Biderman A. and Drury T. (1976): Measuring work and Quality for social reporting New York, John Wiley and Sons.
5. Brow F. (1988): Statistics for Behavioural Science, Boston, Allyn and Barm Inc. CenturyGofes Company, Inc. New York. Delhi, Sultan Chand and Sons. Design, Prentice Hale Inc. N.J.
6. Fowler FJ (2001). Survey Research Methods (3rd ed.). Sage Publications, Newbury Park
7. God V. Caite (1972): Essentials of Educational Research Methodology.
8. Good C.N. (1963): Introduction to Educational research, New York, Applatan
9. Gupta S.C. and Kapodi V.R. (1990) : Fundamentals of Applied Statistics, New Hinton P (2004). Statistics Explained: A Guide for Social Science Students. Routledge Publishing, London
10. Kaul L. (1980): Methodology of Educational Research, Vani educational books, Vikas Pub., New Delhi.
11. Keennetb King. (1978): Final report Literacy Research in developing countries. Kerlinger F.n. (1965): Foundations of Behavioural Research, N., Holl Rinehart and Winston Inc.
12. Kothari C R (2008). Research Methodology: Methods and Techniques (2nd ed.). New Age International Publishers, New Delhi, India. Ltd., Ramnagar, Delhi
13. Methodology of Research in Education – Publishing Sidhu Sterling Publishers Pvt.Ltd. New Delhi.
14. Monly C.J. (1964): The Science of Educational Research, Einasia Pub. House New Delhi.
15. Patton Q.M. (1990): Qualitative evaluation and Research methods, sage Pub., Ratnapala N. (1993): New Horizons in Research methodology, Sri Lanka,
16. Rolverthorndike (1977): Measurement & Evaluation in Psychology & Education. 4th ed. John Wiley & Sons Sarvodaya Research Institute. Sciences, Tata McGraw Hill Pub. Co. Ltd., New Delhi.
17. Singh A.K. (1986): Tests, Measurement and Research Methods in Behavioural
18. Sproull N (2003). Handbook of Social Research Methods: A Guide for Practitioners and Students in the Social Sciences. The Scarecrow Press, Inc., New Jersey

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M.Sc. Human Nutrition-Second Semester

PRACTICALS COURSE CODE-M020804P

Min. Hrs. – Practical: 80 Hrs.

1. Microscopic structure of different granules; evaluation of food by subjective and objective methods; changes in colour, texture and flavour of foods due to processing
2. Effect of cooking on protein, fat and carbohydrates; product preparation using leavening agents. Recipe Preparation.
3. Handling of equipment and instruments
4. Estimation of food adulteration
5. Planning of diet for infants, adolescent, adults, pregnant and expectant mothers, old age people

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M.Sc. Human Nutrition-Second Semester
DISSERTATION / PROJECT WORK
COURSE CODE-M020805R
Min. Hrs.: 120 Hrs.

- Every candidate shall submit synopsis to the University in the prescribed Performa containing particulars of proposed dissertation work, within 6 months from the date of commencement of the course on or before the dates notified by the university.
- The synopsis shall be sent through the proper channel. Such synopsis will be reviewed and the university will register the dissertation topic.

Students will prepare their synopsis for dissertation in consultation with their guides.

Performa for synopsis:

1. Introduction
2. Aims and Objectives
3. Review of Literature
4. Methodology or Material and Methods
5. References

Note:

1. The copies of synopsis must be in bound properly.
2. The candidate have to submit 4 copies of synopsis.
3. Colour scheme for synopsis will be white.
4. Text writing
Paper to be used – A4 size (Bond Paper)
Printing – One side
Font - Title – 18 Pt. Bold
Heading – 16 Pt. Bold.
Sub Heading – 14 Pt. Bold
Running text (English) -12 Pt. – Times New Roman
Running Text (Hindi) 14 Pt. (CG12, Krutidev 10)
Spacing: Double
Margin: Left – 4 Cm, Top, Bottom, Right – 2.5 Cm.
Page Numbering– Properly numbered

5. Writing Reference

Should be numbered consecutively in the order in which they are first mentioned in the text (not in alphabetic order). Identify references in text, tables and legends by Arabic numerals in superscript. References cited only in tables or figure legends should be numbered in accordance with the sequence established by the first identification in the text of the particular table or figure.

Journal Articles

Shashi A, Jain SK and Pandey M: *In-vitro* evaluation of anti lthiatic activity of seeds of *Dolichos biflorus* and roots of *Asparagus racemosus* . International Journal of Plant Sciences 2008; 1:67-71.

A Book

Kalia AN: A Text Book of Industrial Pharmacognosy. CBS Publishers & Distributors, First Edition 2005.

A Chapter in a Book

Nadkarni KM: Indian Materia Medica. Popular Prakashan, Mumbai, Edition 3, Vol. I, 2000: 242-246.









Human Nutrition-Second Semester

SENSORY EVALUATION (Minor elective)

PAPER CODE- B140804T

Min. Hrs. – Theory: 80 Hrs.

Course Objectives:

Sensory evaluation and by product utilization of food is an interdisciplinary research field that is rapidly developing and expanding. The objective of lectures in the first year of the master's degree program is to ensure that students acquire essential knowledge of Sensory evaluation and by-product utilization of food in food industry, its acquaint with sensory quality parameters, and methods of sensory evaluation of foods.

Course Learning Outcomes: -

Upon successful completion of the course, the student will be able to:

- 1: To analyze the basic concepts of sensory evaluation and requirements of a sensory laboratory.
- 2: To illustrate criteria for selection of sensory panelists, sensory quality parameters and factors affecting sensory measurements.
- 3: To define different sensory tests like discrimination, descriptive, affective; flavor profile and tests; ranking tests, detection, threshold and dilution tests.
- 4: Summarizes by-product utilization of different fruits such as apple, grape, papaya, orange, citrus, mango.
- 5: The course will provide an understanding about nutritional quality of foods and its assessments like Digestibility, Biological value, NPU, PER, etc.

THEORY

Unit I

Introduction to sensory analysis, general testing conditions, Requirements of sensory laboratory; organizing sensory evaluation programmers.

Unit II

Selection of sensory panellists; Factors influencing sensory measurements; Sensory quality parameters -Size and shape, texture, aroma, taste, colour and Gloss.

Unit III

Different tests for sensory evaluation– discrimination, descriptive, affective; Flavour profile and tests; Ranking tests, Detection, threshold, and dilution tests.

Unit IV

Texture analyzer, Colorimeter, Electric tounge, Electric nose, Quality control; storage stability testing;

Unit V

Nutritional Quality of foods and its assessments: Physicochemical and phytochemicals parameters of different foods, Food proteins (Digestibility, Biological value, NPU, PER),

References Book

1. Herbert Stone, Joel L. Sidel, (2012), "Sensory Evaluation Practices", Academic Press Publishers.
2. Maynard A. Amerine, Rose Marie Pangborn, Edward B. Roessler, (2013), "Principles of Sensory Evaluation of Food", Elsevier Publications.
3. Harry T. Lawless, Hildegarde Heymann, (2010), "Sensory Evaluation of Food: Principles and Practices", Springer Science & Business Media.

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M.Sc. Human Nutrition-Second Semester

Quality Control Food Standards and Food Laws (Minor Elective)

COURSE CODE- B140805T

Min. Hrs. – Theory: 80 Hrs.

Course Objective: -

Purpose of this course is to enable the student to understand the concept and methods of quality assurance raw material and finished product quality analysis sensory evaluation techniques and different food standards and laws of national and international.

Course Learning Outcomes: - Student will be able to

1. Have a clear understanding about the quality assurance food quality and food safety.
2. Have knowledge of various quality parameters of raw material and finished food and evaluation procedure and have clear understanding of sensory analysis of food.
3. Understand about various food standards and laws of national international level and also have knowledge of nutritional labelling.
4. Will be able to describe the procedure of quality certification and accreditation.
5. Will have gained insight on water quality and its analysis and waste treatment using various methods.

THEORY

UNIT I

Quality Assurance: Introduction, Importance and Difference. Food Quality and Food Safety: Scope and difference.

UNIT II

Raw materials: Quality parameters and evaluation procedures. Finished product quality: Appearance, colour, texture. Viscosity, consistency, flavour.
Sensory evaluation: Selection of panel of judges. Sensory characteristics of foods, types of tests.

UNIT III

Food standards and laws: International — Concept of Codex alimentarius. HACCP, GMP. GHP, USFDA, ISO 9000, ISO 22000, ISO 14000. National — Introduction of BIS/IS, Food safety and standards —2006. Food Safety and standard regulation 2010, FPO, MPO. MMPO, Agmark.
Prevention of food adulteration Act: Food Adulteration: definition, common adulterants in different foods, contamination, methods of detection. Food additives and legislation; colouring matter, preservatives, poisonous metals, antioxidants and emulsifying and stabilizing agents, insecticides, and pesticides. PFA specification for food products. Nutritional labelling

UNIT IV

Quality Certification & Accreditation: Introduction and procedure.

UNIT V

Water Quality: Water standards and Analysis physical, chemical and microbiological characteristics of water analysis. Waste treatment: Fundamentals of Physical, Biological & Chemical waste treatments

Reference Books

1. Early R. 1995 Guide to Quality Management Systems for Food Industries. Blackie Academic.
2. Krammer A & Twigg BA. 1973. Quality Control in Food Industry. Vol. I, II. AVI Publ

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M.Sc. Human Nutrition-Second Semester

DIET COUNSELLING CLINIC (Clinical Training)

Min. Hrs. – Theory: 80 Hrs.

In dietary counselling clinic, student will counsel and provide individualized nutritional care and assist patients of OPD in prevention or treatment of nutrition-related illnesses such as cardiovascular disease, cancer, obesity, diabetes, and hyperlipidaemia etc. Students will have to maintain log book for it.

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M.Sc. Human Nutrition-Third Semester

THERAPEUTIC NUTRITION AND DIETETICS COURSE CODE- M020901T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To familiarize student about estimation of RDA, deficiency of nutrients, estimation of different nutrients and metabolites in normal and disease conditions.

To understand the causative factors and metabolic changes in various diseases/disorders and acquire knowledge on the principles of diet therapy and comprehend principles of dietary counselling.

COURSE LEARNING OUTCOME

Student will be able to:

1. Recognize the significance of nutritional assessment in patient care.
2. Learn about the reasons that cause diseases and disorders, as well as the metabolic changes that occur, and the food therapy principles that go along with them.
3. Understand the fundamentals of dietary counselling.
4. Understand the rationale behind disease/disorder prevention.

COURSE CONTENT

Unit 1

Introduction to Diet Therapy-Planning Therapeutic diet, Routine Hospital Diet: Regular diet, Soft Diet, Liquid Diet

Unit 2

Nutritional support systems and special feeding methods.

Unit 3

Nutritional Requirements, dietary management complications and counselling in Overweight, Obesity and Underweight

Nutritional Requirements, dietary management complications & counselling of Pre-operative and Post-Operative and stages. Gastro- intestinal diseases, Liver & Gall bladder. Allergy

Unit 4

Etiology-pathophysiology, metabolic aberrations, complications, prevention and dietary management of Cardiovascular, Renal diseases, Diabetes and Gout.

Unit 5

Metabolism and nutritional management of Genetic Disorders. Some common metabolic disorders like Phenylketonuria, Alkaptonuria, Galactosemia

SUGGESTED READINGS

1. Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company
2. Gibson SR. (2005). Principles of Nutritional Assessment. 2nd Edition. Oxford University press
3. Joshi YK. Basics of Clinical Nutrition. 2nd Edition. Jaypee Brothers Medical Publishers.
4. Lee RD & Neiman DC. (2009). Nutritional Assessment. 5th Edition. Brown & Benchmark.
5. Mahan, L. K. And Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier
6. Shils, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lipincott, William and Wilkins.
7. Williams, S.R. (2001) Basic Nutrition and Diet Therapy. 11^{ed}. Times Mirror Mosby College Publishing
8. World Cancer Research Fund & American Institute for Cancer Research (2007) Food, Nutrition, Physical Activity and the Prevention of Cancer- A Global Perspective. Washington E.D. WCRF.
9. Dave, Nilambari (2004). nutrition and Diet Therapy, 1st Edition, Dr. Nilambari Dave Head, Dept of home science Saurashtra University, Rajkot
10. Mahan, L.K. and Escott- stamp S. (2000) Krause's food nutrition and Diet therapy, 10th Edition W.B. Saunders.
11. Shills, M.E. Olsan, J.A. Shilke, M. and Ross A.C. (1999) . modern in health and disease, 9th Edition W.B. Saunders Ltd.,
12. Escott-Stump, S. (1998): Nutrition and Diagnosis Related care, 4th Edition Willams and Wilkins.
13. Garrow, J.S. James, W.P.T. and Ralph, A. (2000): Human nutrition and Dietetics, 10th Edition, Churchill Livingstone.
14. Williams, S.R. (1993); Nutrition and Diet therapy, 7th Edition. Times Mirror / Mosby Collage Publishing.
15. Davis. J. and Sherer. J. K. (1994); Approval nutrient in Paediatrics, Boston, Little, Brown, & Co.,

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M.Sc. Human Nutrition-Third Semester

TECHNIQUES OF FOOD ANALYSIS COURSE CODE-M020902T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

1. To introduce the students about basic concept of biochemical assessment and estimation quantitatively from food samples.
2. To introduce the principles and working techniques of advanced analytical instruments and equipment.

COURSE LEARNING OUTCOME

1. Gain the knowledge about physical chemical quality or characteristics of food which can be estimate qualitatively and quantitatively in biochemical and physics laboratories.
2. Understand the needs of analytical experiments in laboratories: equipment, glassware, small tools and devices required in lab. Infrastructure, electricity and water supply as the first step of food analysis is sampling of food to be estimated.
3. Gain knowledge about the proximate principles. Estimating quantity of particular nutrients from instruments based techniques.
4. Understand the principles, instrumentation and working techniques of advanced modern and automatic quick food analysers like electrophoresis, photo-fluorimeter, spectrometry, chromatography etc.
5. Knowledge gain about physical quality analysers and assessment of sensory quality of food.
6. Understand the analysis of bacteriological quality of food by enumeration of bacteria and yeast moulds counting.

COURSE CONTENT

Unit 1

Physiochemical quality of food, proximate and ultimate analysis of food. Preparation of various standard solutions. Sample and sampling techniques.

Unit 2

Principles, techniques and application of colorimetric, photo- fluorimeter, spectrophotometry, Advanced automatic food analysers. Flame photometry and electrophoresis.

Unit 3

Principles, techniques and application of Bomb calorimetric, techniques of vitamins and minerals analysis.

Unit 4

Principles, techniques and application of Chromatography (Paper chromatography, TLC, GLC, HPLC etc.

Unit 5

Sensory quality analysis: subjective and objective analysis. Microbiological quality analysis: enumeration of bacteria, yeast and moulds.

SUGGESTED READINGS

1. Boyer, R. (2000). 3rd Ed. Modern Experimental Biochemistry. Person Education, Asia.
2. Dawes, E.A. (1980)6th Ed. Quantitative Problems in Biochemistry. Longman Group Ltd.,
3. Khosla, B. D., Garg V. C. and Khosla, A. (1987) . 5th Ed. Senior Practical Physical Chemistry, R. Chand & Co., New Delhi.
4. Oser, B.L. (1965): 14th Ed. Hawk's Physiological Chemistry. Tata McGraw-Hill Publishing Co. Ltd.,
5. Joshi H D., (2004)- Methods of Analysis, Department of Home Science Saurashtra University, Rajkot.
6. Raghuramulu N.; Madhavan Nair and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Technique. NIN, ICMR.
7. Sharma, B.K. (1999). 8th Ed. Instrumental Methods of Chemical Analysis. Gel Publishing House.
8. Srivastava, A.K. and Jain P. C. (1986) (second edition) Chemical Analysis an instrumental approach. S. Chand & co. limited.
9. Varley, H; Gowenlock, A.H. and Bell, M. (1980). 5th Ed. Practical Clinical Biochemistry. Heinemann Books Ltd.,
10. Vogel, A.I. (1962) 3rd Ed. A Textbook of Quantitative Inorganic Analysis by The English Language Book Society and Longman

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M.Sc. Human Nutrition-Third Semester

ADVANCED NUTRITION COURSE CODE-M020903T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable the student to understand the recent trends in nutrition, function, deficiency and toxicity of different nutrients

COURSE LEARNING OUTCOME

Students will be able to:

1. Understand the classification functions, sources, requirement, digestion and absorption and deficiency disorders of Carbohydrates, Proteins and fat.
2. Understand the concept of body composition, biochemical composition of body and body composition measuring technique.

COURSE CONTENT

Unit 1

Definition, classification functions, sources, requirement, digestion and absorption of Carbohydrates, Functions and role of dietary fiber, Energy concepts of food, physiological fuel value-review measuring of energy expenditure. BMR thermic effect of feeding and physical activity

Unit 2

Basic requirement, Function, Source, digestion and absorption of protein, method of assessing protein quality. Basic of requirement, Functions, Source, digestion, absorption and deficiency disorders of lipids, essential fatty acid MUFA and PUFA

Unit 3

Requirement, Functions, Source deficiencies and toxicities of fat and water soluble vitamins.

Unit 4

Requirement, Functions, Sources, deficiency, Toxicity and factors affecting absorption and utilization of macro and minerals

Unit 5

Body composition, biochemical composition of body. Body composition measuring technique: calculation of body density Isotope electrolyte method body cell mass, lean body weight and fat free body. Water and electrolyte balance.

SUGGESTED READINGS

1. Annual Reviews of Nutrition. Annual Review Inc. California, USA.
2. Shils, M.E.: Olson, J: Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th edition. Williams and Williams. A Beverly Co. London.
3. Bodwell, C.E. and Erdman, J.W. (1988) Nutrient Interactions. MarccI Dekker Inc., New York.
4. World – Reviews of Nutrition and Dietetics.
5. WHO Technical Report Series.
6. Indian Council of Medical Research. Recommended Dietary Intakes for Indians – Latest Recommendations.
7. Indian Council of Medical Research. Nutritive value of Indian Foods – Latest Publication.
8. Bordanier, C.D. and Haargrove, J.L. (Ed.) (1996): Nutrients and Gene Expression: Clinical Aspects. Boca Raton, FL CRP Press.
9. Baeurle, P.A. (Ed.) (1994) Inducible Gene Expression. Part-I: Environmental Stress and Nutrients. Boston, Birkhauser.
10. Chandra, R.K. (Ed.) (1992): Nutrition and Immunology, ARTS Biomedical. St. John's Newfoundland.
11. JOURNALS 1. Nutrition Reviews 2. Journal of Nutrition 3. American Journal of Clinical Nutrition 4. British Journal of Nutrition 5. European Journal of Clinical Nutrition 6. International Journal of Vitamin and Nutrition Research

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Munish Kumar

Digvijay

M.Sc. Human Nutrition-Third Semester
INSTITUTIONAL FOOD SERVICE MANAGEMENT
COURSE CODE- M020904T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

1. To enable the students to compete globally as food service professional by developing a knowledge base about the personal, finance and food service management of different food service establishments.
2. To learn the facilities in terms of equipment, machineries, materials, skills etc. needed in different types of food service units with an individual in understanding and managing resources in a food service institution.

COURSE LEARNING OUTCOME

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The student will be able to:

1. Eligible and expertise to deal as a food service manager in all segment of establishment.
2. Gain knowledge about modern structure and techniques used in computerized services in various food service systems.
3. Understand about human and non-human resources and able to manage these resources in accordance to type of food service institution.
4. Practically understand and experience in managing institutional kitchens, food material, storage, preparations and so on for food service establishments.
5. Gain knowledge about quality control process and food assurance.

COURSE CONTENT

Unit 1

Introduction and food service system and their development. Waiter, Cafeteria food services and room service.

Unit 2

Management: Definition, principles and functions catering of management. Tools and styles of management. Types of organization chart. Budgeting: Definition and types.

Unit 3

Space, Equipment and material management, planning, layout and selection of equipment, purchase and maintenance of equipment. Types of menu, factors affecting menu planning.

Unit 4

Personal management: man power planning, placement, Recruitment, induction training, motivation and performance appraisal.

Unit 5

Quality assurance, food quality, food laws and standards, PFA and FSSAI standards, Weights and measure acts.

SUGGESTED READINGS

1. West B Bessie & Wood Levelle (1988) Food Service in Institutions 6th Edition Revised by Hargar FV, Shuggart SG, &Palgne Palacio June, Macmillian Publishing Company New York.
2. Sethi Mohini (2005) Institution Food Management. New Age International Publishers
3. Kazarian E A (1977) Food Service Facilities Planning 3rd Edition Von Nostrand Reinhold New York.
4. Kotas Richard & Jayawardardene. C (1994) Profitable Food and Beverage Management Hodder& Stoughton Publications.
5. Kotler Philip. (2001) Marketing management Millennium Edition Prentice Hall of India
6. Taneja S and Gupta SL (2001) Entrepreneurship development, Galgotia Publishing
7. Dessler Gary (2007) Human Resource Management 11th edition Prentice Hall New Jerse.
8. Luthans Fred (2004) Organisational Behaviour 10th Edition McGraw Hill International.

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M.Sc. Human Nutrition-Third Semester

FOOD PRESERVATION COURSE CODE-M020905T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable student

1. To acquire knowledge of food preservation and preservation technique.
2. To know the importance and basic principles of food preservation.

COURSE LEARNING OUTCOME

The student will be able to gain knowledge about principles and techniques of food preservation.

COURSE CONTENT

Unit 1

Introduction to food preservation.

- Principles of food preservation. Definition of food spoiling and food preservation, importance of Food preservation.
- Common terms used in food preservation.
- Classification of food on the basis of pH value, technology, physiology changed condition, moisture content.
- Principles of food preservation.

Unit 2

Methods of food preservation

- Different methods used in the preservation of food i.e. high concentration of sugar, pickling, dehydration etc. Principals involved merits and demerits.
- Preservation by using Preservatives
- Types of Preservatives

Unit 3

Preparation of different products

- Preparation of product by using Salt as preservative (any two)
- Preparation of product by using Sugar as a preservative (any two)
- Preparation of product by using Oil as preservative (any two).
- Preparation of product by using Chemical Preservative (any two)

Unit 4

Preservation by drying

- Concept, history Types of drying
- Treatments prior to drying

Unit 5

Preservation by use of high temperature & Low Temperature

- Concept and importance
- Various methods used – Pasteurization, Boiling, Canning
- Effect of high temperature on microbial content of food.
- Types of preservation methods by low temperature
- Different equipment used for preservation by low temperature

SUGGESTED READINGS

1. PrakashTriveni : Food Preservation, Aadi Publication, Delhi.
2. M. Shafiur Rahman: Hand Book of Food Preservation, Marcel Dekker Inc, New York.
3. McWilliams and Paine : Modern Food Preservation, Surjeet Publication

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M.Sc. Human Nutrition-Third Semester

**PRACTICALS
COURSE CODE-M020906P**

Min. Hrs. – Practical: 80 Hrs.

1. Formulation of Food Exchanges, Therapeutic modifications of diet in terms of nutrients, consistency and composition for various disorders and diseases.
2. Standardization of recipes: planning and preparation, modification of basic recipe, Use of left over foods.
3. Techniques related to estimation of nutrients in food

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M.Sc.-Human Nutrition - Third Semester

DISSERTATION

Min. Hrs -: 40 Hrs.

- Students will continue research work as per the synopsis.
- Data should be collected as per the ethical norms and the sample size.
- Day to day discussions and presentation of the collected data before the guide needs to be done periodically.
- After discussion the concerned changes may be made in the research work to improve its quality.

Care should be taken to avoid plagiarism and the research work should be genuine.

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M.Sc. Human Nutrition-Fourth Semester

ADVANCED DIETETICS COURSE CODE- M021001T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To familiarize the student with newer concept in dietary management of various disorders and disease and also better understanding of the etiologic, physiological, and metabolic abnormalities, and to provide appropriate nutrition care for the prevention and treatment of many ailments and diseases.

COURSE LEARNING OUTCOME

1. Develop a thorough understanding of the etiologic, physiological, and metabolic abnormalities associated with a variety of acute and chronic illnesses and diseases.
2. Learn to assess nutrition and conduct a food history survey.
3. Gain knowledge and skills about the impact of various illnesses on nutritional status, nutritional requirements, and dietary needs.
4. Develop a nutritional care plan for the prevention and treatment of various ailments and diseases using critical thinking and clinical reasoning.
5. Using the best evidence, use the nutrition care approach to medical nutritional therapy of nutritionally fragile persons.

COURSE CONTENT

UNIT 1

Patho-physiology, clinical & metabolism aspect of PEM, Anaemia, Diet in Infection and Fever- Causes, types and dietary considerations

Unit 2

Patho-physiological, clinical and metabolic aspects. Understanding of special nutritional requirements, nutritional goals in critical illness like-Stress, trauma cancer.

Unit 3

Clinical and metabolic aspects & nutrition goals of; AIDS, Hepatic failure and transplants, GIT surgery and complications

Unit 4

Complications of nutritional support systems including Re-feeding syndrome, Allergy

Unit 5

Definition of Dietician, functions and role of Dietician in a health care team in hospital and community.

SUGGESTED READINGS

1. Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier
2. Joshi Y K. (2008) Basics of Clinical Nutrition 2nd Ed .Jaypee Brothers Medical Publishers
3. Shills, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lipincott, William and Wilkins.
4. Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company
5. Garrow, J.S., James, W.P.T. and Ralph, A. (2000) Human Nutrition and Dietetics. 10th ed. Churchill Livingstone.
6. Marian M, Russel M, Shikora SA. (2008) Clinical Nutrition for Surgical Patients. Jones and Bartlett Publishers.
7. Dave, Nilambari (2004). nutrition and Diet Therapy, lest Edition, Dr.Nilambari Dave Head, Dept of home science Saurashtra University, Rajkot
8. Mahan, L.K. and Escott- stamp S. (2000) Kreuse's food nutrition and Diet therapy, 10th Edition W.B. Sanders.
9. Shills, M.E. Olsan , J.A. Shilke , M. and Ross A.C. (1999). modern in health and disease, 9th Edition W.B. Saunders Ltd.,
10. Escott-Stump, S. (1998): Nutrition and Diagnosis Related care, 4th Edition Williams and Wilkens.
11. Garrow, J.S. James, W.P.T. and Ralph, A. (2000): Human nutrition and Dietetics, 10th Edition, Churohill Livingstone.
12. Williams, S.R. (1993); Nutrition and Diet therapy, 7th Edition. Times Mirror I Mosby Collage Publishing.
13. Davis. J. and Sheerer. J. K. (1994); Approval nutrient in Paediatrics, Boston, Little, Brown, & Co.,
14. Walker, W.A. and Watkins, J.B. (Ed.) (1985); Nutrition and Paediatrics, Boston, little, Brown, & Co.,
15. Guyton, A.C. and Hall, Textbook of medical Physiology, 9th edition W.B. Saunders Co.,

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M.Sc. Human Nutrition-Fourth Semester

**FOOD PRODUCT DEVELOPMENT
COURSE CODE- M021002T**

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

1. To enable the student to understand the concept of product development, their sensory evaluation and quality control.
2. To enable the students to learn about the concept and steps of formulation and development of new food products and launch for marketing as accordance to needs of its packaging and labelling under the norms and standards.

COURSE LEARNING OUTCOME

1. Comprehension about the innovation through value addition in formulation of new therapeutic and other high quality food products.
2. Gained the knowledge of process of evaluation of food for standardization.
3. Eligible in packaging and labelling skill of developed products
4. Learning of food safety aspects and assurance of food quality.
5. Practiced in therapeutic new food products formulation and development.

COURSE CONTENT

Unit-1

Basic principles of food product development. Sensory properties of food and their role in product development. Formulation and evaluation of recipes at laboratory level. Bulk food preparation for food institutions and enterprises: servings, nutritive value and costing.

Unit-2

Evaluation of food- Objective and subjective methods, selection and training of judges, development of score cards and analysis of data.

Unit-3

Consumer evaluation-development of schedule and data analysis Packaging material, types for different products. Food labelling.

Unit-4

Food safety issues in product development, food quality regulations and standards, quality control and HACCP. Product formulation and development for general and therapeutic use.

SUGGESTED READINGS

1. Aaron M. 1993. Low Calorie Foods. Mrcal Dekker
2. Goldberg I. 1994. Functional Food; Designer Food, pharma foods, Nutraceuticals. Springer.
3. Matz. 2004. Formulating & processing Dietetic Foods. CHIPS Publications.

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M.Sc. Human Nutrition-Fourth Semester

COMMUNITY NUTRITION COURSE CODE- M021003T Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable the student to study the current strategies and programmes to combat malnutrition and to study the methods of assessment of nutritional status of community.

COURSE LEARNING OUTCOME

Student will be able to:

1. Understand the concept of public health nutrition and the current issues.
2. Gain a thorough understanding of the National Health Care Delivery System.
3. Recognize the causes and implications of community nutritional issues.
4. Understand the causes, effects, and prevention measures for community nutritional issues.
5. Understand the strategies for enhancing community nutrition and health.

COURSE CONTENTS

Unit 1

Assessment of the nutritional status at individual, household and institutional level: direct and indirect methods.

Unit 2

Ecological, socio-cultural, economic and demographic correlations of malnutrition: prevalence, aetiology, biochemical and metabolic changes in Vitamin A deficiency, PEM, Iron deficiency anaemia, Iodine deficiency disorders.

Unit 3

Major nutritional problems of the state, nation and world. Nutrition Intervention-Definition, importance, methods of nutrition intervention and their impact evaluation.

Unit 4

National nutritional programmes and policies; Anaemia Prophylaxis Program, Vitamin D deficiency control Program, IDD

Unit 5

Nutritional surveillance, National programmes and policies regarding food production and distribution.

SUGGESTED READINGS

1. Gopaldas T & Seshadri S. 1987. Nutrition Monitoring and Assessment. Oxford University Press.
2. Jeannette B Endres. 1990 Community Nutrition challenges and Opportunities.
3. Merrill. Joliffe DB. 1966. The Assessment of the Nutritional status of the Community. WHO.
4. Joliffe N. 1962. Clinical Nutrition. Hoeber Medical Division.
5. McLaren DS. 1977. Nutrition in the Community. John Wiley & son. Nutrition Foundation of India Bulletin. New Delhi. Nutrition News. NIN, Hyderabad.
6. Park JE & park K 2000. Text book of preventive and social Medicine. Banarsidas Bhanot Publ.
7. Rao BSN, Deothaleyg & Pant KC. 1998 (Revised and updated). Nutritive value of Indian Food by Gopalan C, Ramashastry BV & Balasubramaniam SC. NIN, Hyderabad.
8. Shukal PK. 1982. Nutritional Problems of India. Prentice Hall of India
9. Gibney M J, Margetts B M, Kearney J M Arab (1st Ed) (2004) Public Health Nutrition, NS Blackwell Publishing
10. Gopalan C (Ed) (1987) Combating Under nutrition- Basic Issues and Practical Approaches, Nutrition Foundation of India
11. Kaufman M (2007) Nutrition in promoting the public health strategies, principles and practices. Jones and Barletta Publishers
12. Park K (24th Ed) (2017) Park's Textbook of Preventive and Social Medicine, Jabalpur M/s. Banarsidas Bhanot
13. Dietary Guidelines for Indians (2nd ed) (2011) Dietary Guidelines for Indians: A manual, IN
14. IFCT (2017) Indian food composition table, NIN
15. Ross A C (Eds) (2012) Nutrition in health and disease, Lippincott Williams & Wilkins
16. Shils M E (Eds) (1998) Nutrition in health and disease, Lippincott Williams & Wilkins
17. NNM: <http://www.icds-wcd.nic.in/nnm/home.html>
18. Vir S (2011) Public health nutrition in developing countries, Wood head Publishing India limited.

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M.Sc. Human Nutrition-Fourth Semester
FOOD PROCESSING AND TECHNOLOGY
COURSE CODE-M021004T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To know processing technology of various food stuffs, physical and chemical principles in food processing and ways of quality control.

COURSE LEARNING OUTCOME

The student will be able to understand the processing of various food stuffs, physical and chemical principles in food processing.

COURSE CONTENT

Unit 1

Physical principles in Food Processing Operations: Food deterioration, methods of preservation and processing. Thermal processing, refrigeration. freezing. dehydration. ionizing radiations, fermentation, concentration.

Unit 2

Chemical Principles of Food Processing: Preservation, processing by sugar. salt. smoke. acid and chemicals. Chemical and biochemical reactions affecting food quality and safety.

Unit 3

Processing technology of foods and nutritional implications for Cereals and pulses- wheat grain characteristics and products, rice processing, pulses processing and their elimination of toxic factors. Fermentation and germination.

Nuts and oilseeds- nuts oilseeds processing. solvent extraction purification, hydrogenation and tempering products- butter. margarine.

Unit 4

Fruits and Vegetables: Physiological and biochemical changes during ripening. Handling and storage and fruit processing. Processing of vegetables-canning, freezing, dehydration, pickles and chutneys.

Fleshy foods: Processing and their products (meat and fish)

Unit 5

Milk and milk products- classification, standardization pasteurization, homogenization and packing of milk. Milk Products- fortified milk, skim milk concentrated milks. Cream, butter, cheese, ice cream and indigenous milk products. khoa. Paneer, curd. yoghurt, ghee.

Recent concepts in food technology- biotechnology in food, algae as food, low cost nutrient supplement

SUGGESTED READINGS

1. Saiauel, A. Matz., The Chemistry and Technology of cereals of Foods and Feed", BS Publishers and Distributors, 1996.
2. G.C. Banerjee, Poultiy, Oxford and IBH Publishing CODUB Ltd., New Delhi.
3. GiridhariLal ,G.S.Sidhappa and G.L. Tandon-Preservation of fruits and vegetables, ICAR, New Delhi,1994.
4. RaghurentChinatamini, Advances in Agro Industry and Food Processing, Dominant Publishers and Distributors, 1999.
5. Shakuntala Manay, N., Shadak Cheraswamy, M., Food Facts and Principles, Wiley Eastern Ltd., 1987.
6. R & D at the CFTRI, Three decades M.R. Raghavendra Rao, K.R. Bhatt Achaiya and J.V. Shankar CFTRI, Mysore.
7. Research and Development at CFTRI, 1950 — 2000, CFTRI, Mysore.
8. Potter, N.W. Food Science, AVI Publishing Co., Connecticut, 1960.
9. Processed food Industry-Journal of Indian food industry
10. D.K. Salunkhe, S.S. Kadam-Handbook of vegetable science and technology, Marcel Dekker Inc, New York, 2005.

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M.Sc. Human Nutrition-Fourth Semester

NUTRITION FOR HEALTH FITNESS COURSE CODE- M021005T

Min. Hrs. – Theory: 80 Hrs.

COURSE OBJECTIVE

To enable the student to know the recent technique and metabolism, health and specific fitness inter-relationship

COURSE LEARNING OUTCOME

Student will be able to understand the definition, components of specific fitness and health status and significance of physical fitness and nutrition.

COURSE CONTENT

Unit 1

Definition, components of specific fitness and health status. Energy input & output, diet and exercise, types of exercise physical fitness & health inter- relationship.

Unit 2

Review of different energy systems for endurance and power activity: shifts in carbohydrate and fat metabolism. Mobilization of fat stores during exercise.

Unit 3

Nutrition in sports: Sports specific requirements, diet manipulation, pre-game and post-game meal. Diets for persons with high energy requirements, stress and injury.

Unit 4

Significance of physical fitness and nutrition in prevention and management of weight control, obesity, CV disorder.

Unit 5

Alternative systems for health and fitness like Ayurveda, Yoga, Meditation. Yogic concepts in diet.

SUGGESTED READINGS

1. Mahan, L.K. & Ecott-Stump. S. (2000): Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
- 2.Sizer, F. & Whitney, E. (2000): Nutrition – Concepts & Controversies, 8th Edition, Wadsworth. Thomson Learning.
3. Whitney, E. N. & Rolfes, S.R. (1999): Understanding Nutrition, 8th Edition, West / Wadsworth, An International Thomson Publishing Co.,
4. Ira Wolinsky (Ed.)(1998): Nutrition in Exercise and Sports, 3rd Edition, CRC Press.
5. Parikova, J. nutrition, Physical activity and health in early life, Ed. Wolinsky, I., CRC Press.
6. Shils, M.E., Olson, J.A., Shike, N. and Rossa, A.C. (Ed.) (1999): Modern Nutrition in Health & Disease, 9th Edition, Williams & Wilkins.
7. McArdle, W. Katch, F. and Katch, V. (1996). Exercise Physiology. Energy, Nutrition and Human performance 4th edition, Williams and Wilkins, Philadelphia.
8. Journals-Medicine and Science in Sports and Exercise and International Journal of Sports Nutrition

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M.Sc. Human Nutrition-Fourth Semester

PRACTICALS

COURSE CODE-M021006P

Min. Hrs. – Practical: 80 Hrs

1. Survey of a selected population.
2. Preparation of therapeutic diets.
3. Development and sensory evaluation of new food product.
4. Assessment of nutritional status of OPD patients and submission of report.

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M.Sc. Human Nutrition-Fourth Semester

**DISSERTATION / PROJECT WORK
COURSE CODE- M021007R**

Min. Hrs.: 120 Hrs.

- No change in the dissertation topic or guide shall be made without prior approval of the institute.
- Guide will be only a facilitator, advisor of the concept and hold responsible in correctly directing the candidate in the methodology and not responsible for the outcome and results.
- The dissertation should be written under the following headings.
 1. Introduction
 2. Aims or objectives of study
 3. Review of literature
 4. Material and methods
 5. Results
 6. Discussion
 7. Conclusion
 8. References
 9. Master and Chart & Table (If Applicable)
 10. Annexure (If Applicable)

The written text of dissertation/ research project shall not be less than 50 pages and shall not exceed 120 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of bond paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. A declaration by the candidate for having done the work himself should also be included, and the guide, head of the department and Director/Coordinator of the institute shall certify the dissertation/ research project.

Every candidate is required to give power point presentation before final submission of dissertation. Four copies of Dissertation/research project shall be submitted to the university, through proper channel, along with a soft copy (CD), 2 months before the final examination. It shall be assessed by two examiners appointed by the university, one internal and one external. There will be a power point open presentation of the submitted dissertation as per the schedule given by the university. This presentation shall be jointly evaluated by external and internal examiner as per the criteria given below:

Objective(s) of the work done, Methodology adopted, Result and Discussion, Conclusion & outcome.

If the student failed to secure the minimum passing marks he will resubmit the dissertation 01 month before the supplementary exam.







