Course Curriculum & Syllabus

Ph. D. (Home Science) Foods and Nutrition

College of Community Science
Vasantrao Naik Marathwada Krishi Vidyapeeth
Parbhani

Department of Foods & Nutrition

Ph. D. Foods and Nutrition
List of Courses

S. No	Course No	Title of the course	Credits	Semester
1	FN 601	Advances in Carbohydrates, Proteins And Lipids	4(3+1)	I
2	FN 604	Advances In Food Science And Technology	3(2+1)	I
3	FN 609	Global Nutrition Problems	2(2+0)	I
4	FN 603	Minerals In Human Nutrition	3(2+1)	II
5	FN 610	Maternal And Child Nutrition	3(2+1)	II
6	FN 602	Advances in Vitamins and Hormones	2(2+0)	III
7	FN 606	Nutrition and Agriculture Interface	3(3+0)	III
8	FN 691	Doctoral Seminar I	1(0+1)	III
9	FN 692	Doctoral Seminar-II	1(0+1)	IV
10	FN 699	Doctoral Research	15(0+15)	IV
11	FN 699	Doctoral Research	15(0+15)	V
12	FN 699	Doctoral Research	15(0+15)	VI

Department of Foods & Nutrition

Summary of Credit Load/ Course Layout

S. No.	Subjects	Credit Load
1	Major subjects	15
2	Minor subjects	8
3	Supporting Courses	5
4	Seminar	2
5	Research	45
Total Credits 75		

Credit Layout for Ph. D. Programme

Semester	Course credits					
	Major	Minor	Supporting	Seminar	Total	NCCC
First	7	3	2	--	12	2
Second	6	5	-	--	11	2
Third	2	--	3	1	6	2
Fourth	--	--	--	1	1	--
Fifth	--	--	--			
Sixth						
Total	15	8	5	2	30	6

SEMESTERWISE DISTRIBUTION OF Ph. D. COURSES

Semester I

S.No	Course No.	Title of the Course	Credits
Major Courses: 7 Credits			
1	FN 601	Advances in Carbohydrates, Proteins And Lipids	4(3+1)
2	FN 604	Advances In Food Science And Technology	3(2+1)
Minor Courses: 3 Credits			
1	ESTN 603	Advances In Training Technology	3(2+1)
Supporting Courses: 2 Credits			
1	FN 609	Global Nutrition Problems	2(2+0)
Non-Credit Compulsory Courses: 2 Credits			
1	PGS 501	Library And Information Services	1((0+1)
2	PGS 504	Basic Concepts In Laboratory Techniques	1(1+0)
		Total Credits	**14(10+4)**

Semester II

S.No	Course No	Title of the Course	Credits
Major Courses: 6 Credits			
1	FN 603	Minerals In Human Nutrition	3(2+1)
2	FN 610	Maternal And Child Nutrition	3(2+1)
Minor Courses: 5 Credits			
1	AH 601	Advances in Quality Control of live Stock Product	2(2+0)
2	EXTN 604	Organizational Development	3(2+1)
Non-Credit Compulsory Courses: 2 Credits			
1	PGS 502	Technical Writing And Communication Skills	1(0+1)
2	PGS 503	Intellectual Property and Its Management In Agriculture	1(1+0)
		Total Credits	**13(8+5)**

Semester III

S.No	Course No	Title of the Course	Credits
Major Courses: 3 Credits			
1	FN 602	Advances in Vitamins and Hormones	2(2+0)
2	FN 691	Doctoral Seminar I	1(0+1)
Supporting Courses: 3 Credits			
1	FN 606	Nutrition and Agriculture Interface	3(3+0)
Non-Credit Compulsory Courses: 2 Credits			
1	PGS 506	Disaster Management	1(1+0)
2	PGS 505	Agricultural Research Ethics and Rural Development programme	1(1+0)
		Total Credits	**8(7+1)**

Semester IV

S.No	Course	Title of the Course	Credits
Major Courses			
1	FN 692	Doctoral Seminar-II	1(0+1)
2	FN 699	Doctoral Research	15(0+15)
		Total Credits	**16(0+16)**

Semester V &VI

S. No	Course No	Title of the Course	Credits
1	FN 699	Doctoral Research	30(0+30)

Syllabus for Ph. D. Foods & Nutrition

FN 601 ADVANCES IN CARBOHYDRATES, PROTEINS AND LIPIDS 4(3+1)

- **Theory**

- **UNIT I**

Carbohydrates, proteins and lipids-their digestion, absorption, metabolism. Inborn errors of metabolism.

- **UNIT II**

Metabolic disorders-diabetes, dental caries, obesity, atherosclerosis, hyperlipidemias and hypertension. Glucose homeostasis determined by insulin/glycogen ratio; carbohydrates free diet and its metabolic consequences; glycolic index; dietary fiber- its definition, composition, classification, functions and role in various physiological disorders.

- **UNIT III**

Classification of protein, new discoveries in protein and their functions such as protein in Immune system, as lubricants, biological buffers and carriers, evaluation of protein quality: in vitro and in vivo methods, animal and human bioassays: amino acid pool, protein turnover in man with special reference to body size, age and various nutrition and pathological conditions, regulation of proteins, requirements; novel food sources of protein. Effect of insulin, corticosteroids, thyroids, androgen and growth hormone on protein metabolism, inheritable disorders of amino acid metabolism of protein; effect of dietary protein on cardiovascular disease and cholesterol metabolism, adaptation of body to low intake of energy and protein.

- **UNIT IV**

Estimation of body fat; lipoproteins and hyper lipoproteinemia; hypolipidemic action of PUFA omega-3 fatty acids and oxidation products of cholesterol; lipids and cancer; fish oils in health and disease; oxidation products of cholesterol.Disturbance in lipid metabolism; role of reversal diet in cardiovascular disorders; high blood cholesterol – causes, prevention and treatment; hypolipidemic action of rice bran, oat, barley and legumes.

- **Practical**

Assessment of protein quality; project work related to metabolic disorders of proximate principles; blood analysis in relation to NCD and estimation of amylase and protease inhibitors in foods.

- **Suggested Readings**

Akoh CC & Min DB. 1998. Food Lipids - Chemistry, Nutrition and Biotechnology.
Marcel Dekker. Berdenier CD. 1976. Carbohydrate Metabolism - Regulation and Physiological Role. John Wiley.Bodwell CE. 1979. Evaluation of Protein for Human. AVI Publ. Dickens F. Carbohydrate Metabolism and its Disorder. Vol. II. Academic Press.
FAO. 1998. Carbohydrates in Human Nutrition. FAO.
FAO/WHO.1985. Energy and Protein Requirements. Technical Report Series 724.
Friedmen M.1975. Protein Nutritional Quality of Foods and Feeds. Part II.

Marcel Dekker. Lehninger Al. 1971. Bioenergetics. W.A. Benjamin. Munro HN & Attoson JB. (Eds.). Mammaliam Protein Metabolism. Vols. I-IV. Academic Press.
Waterlow JC, Garlick PJ & Millerand DJ. 1978. Protein Turnover in Mammalian Tissues and in the Whole Body. North Holland Publ. Co.

FN 602 ADVANCES IN VITAMINS AND HORMONES 2(2+0)

- **Theory**

- **UNIT I**

General definition and history of vitamins and hormones; cause of vitamin deficiencies in India. Chronology, chemistry, distribution, functions, absorption, transport, metabolism, deficiency manifestations,

- **UNIT II**

Nutritional requirements, methods of assay. Interaction with other nutrients, antagonists and analogues of vitamins

- **UNIT III**

Hypervitaminosis of water and fat soluble vitamins; vitamin fortification and supplementation; endocrine and exocrine secretion of hormonesorgans of secretion, metabolism, mechanism of action, regulation and sites of action, biological effects and interaction.

- **UNIT IV**

Assessments of vitamin status of population; antioxidants and their relationship with aging, cancer and other metabolic disorders.

- **Suggested Readings**

Basu TK & Dickerson JWT. 1996. Vitamins in Human Health and Disease. CABI.
Combs GF. 1992. The Vitamins, Fundamental Aspects in Nutrition and Health. Academic Press.
Kutsky RJ. 1981. Handbook of Vitamins and Minerals and Hormones. NRC.
Machlin LJ. 1991. Handbook of Vitamins. Marcel Dekker.

FN 603 MINERALS IN HUMAN NUTRITION 3(2+1)

- **Theory**
- **UNIT I**

General definition and history of minerals; causes of macro and micro mineral deficiencies in India. Chronology, chemistry, distribution, functions, absorption, transport, metabolism, deficiency manifestations.

- **UNIT II**

Nutritional requirements, methods of assay of all the minerals. Interactions of minerals with other nutrients, antagonists and analogues of minerals.

- **UNIT III**

Assessment of mineral status of population, mineral fortification and supplementation; major mineral pollutants- their harmful effect to health; mutagenicity, carcinogenicity, teratogencity, heavy metal toxicity. Use of mineral isotopes/ tracers in nutritional studies.

- **UNIT IV**

Metalonzymes; antioxidants and their relationship with aging, cancer and other metabolic disorders. Heavy metal toxicity; trace minerals, their chronology, chemistry, distribution, functions, absorption, metabolism, requirements, deficiency manifestation and interaction.

- **Practical**

Assessment of antioxidants in foods; Project to combat micro nutrient deficiencies- Vulnerable sections, Groups with special needs.

- **Suggested Readings**

Basu TK & Dickerson JWT. 1996. Vitamins in Human Health and Disease CABI. Boyd LO' Dell & Sunde RA. 1997. Handbook of Nutritionally Essential Mineral Elements. CRC Press.
Causing 2005. Annual Review of Nutrition. Vol. 25.
Comb GF. 1992. The Vitamins, Fundamental Aspects in Nutritional and Health. Academic Press.
Kutsky RJ. 1981. Handbook of Vitamins of Minerals and Hormones NRC. Machlin LJ.1991 Handbook of Vitamins. Marcel Dekker.
Monier Willam GW. 2008. Trace Elements in Foods. Agribios.
Taylor SL. 2007 Advances in Food and Nutrition Research. Vols. 1-52.Research Books & Pvt. Ltd.

FN 604 ADVANCES IN FOOD SCIENCE AND TECHNOLOGY 3(2+1)

- **Theory**

- **UNIT I**

Recent advances in the field of carbohydrates, lipids, proteins, vitamins and minerals in relation to human nutrition.

- **UNIT II**

Nutrogenomics, incorporating genetics into dietary guidance. Recent advances in the field of food analysis and food fortification.

- **UNIT III**

Foods of future; special nutrients. Food processing and product development; regulating food processing and preservation through TQM and HACCP.

- **UNIT IV**

GM foods and their health implications; functional foods and organic foods, impact of WTO in food regulation.

- **Practical**

Product development and shelf life of nutritionally fortified foods using advanced technologies, field study of food processing and preservation in relation to TQM and HACCP in an industry.

- **Suggested Readings**

Manay NS & Shadaksharaswamy 1997. Food Facts and Principles. New Age Publ.
Potter N & Hotchkiss JH. 1996. Food Scienc . 5th Ed. AVI Book Van.
Potty VH & Mulky MJ. 1993. Food Processing. Oxford & IBH.
Srilakshmi B. 2002. Nutrition Science. New Age Publ.
Swaminathan MS. 1993. Food Science and Experimental Foods. Ganesh & Co.

FN 606 NUTRITION AND AGRICULTURE INTERFACE 3(3+0)

- **Theory**

- **UNIT I**

Food situation in India and in the world, food production and consumption trends; food balance sheets. Role of nutrition in agricultural planning and national development.

- **UNIT II**

Linkages between agricultural practices; food production, food distribution and nutritional status; food crop failure and malnutrition; poverty and vicious cycle of low food production ; consumption indicators, nutritional status indicators and their role in agricultural planning.

- **UNIT III**

Agricultural development and its effect on food availability; effect of food production and economic policies on food availability; impact of physical resources, farming systems, cropping system, inputs and manipulation, agricultural marketing system, post harvest processing of foods on food and nutrition situation; food distribution systems .

- **UNIT IV**

Food and nutrition security at national and household level; nutrition policy implementation; nutritional impact of agricultural programmes, food price control and consumer subsidy; contribution of national and international organization for agricultural development.

- **Suggested Readings**

Bhatia MS. 1991. Agricultural Statistics at a Glance. Ministry of Agriculture, Govt. of India, New Delhi. Census 1981, 1991, 2001.India 2001. A Reference Annual. Publication Division, Ministry of Information about Broad casting, Govt. of India.UNICEF 1999. The State of World's Children. Oxford University Press.

FN 609 GLOBAL NUTRITIONAL PROBLEMS 2(2+0)

- **Theory**

- **UNIT I**

Food consumption pattern of developed and developing countries.

- **UNIT II**

An overview of world nutrition situation and assessment of problems of developing countries in light of prevalence, etiology, Indicators and preventive measures.

- **UNIT III**

An overview of world nutrition situation and assessment problems of developed countries in light of Prevalence, etiology, indicators and preventive measures.

- **UNIT IV**

Nutrition and health programmes to alleviate malnutrition; role of national and international organizations.

- **Suggested Readings**

Anderson L, Dibble MV, Turkki PR, Mitchell HE & Pynbergen HJ. 1982. Nutrition in Health and Disease. JB Lippincottt Co.
Jelliffee BD. 1966. The Assessment of the Nutritional Status of the Community. WHO.
Jolliffee N. 1962. Clinical Nutrition. Hoeber Medical Division.
Mclaren DS. 1983. Nutrition in the Community. John Wiley & Sons.
Park JE & Park K. 2000. Text Book of Preventive and Social Medicine. Barnasidas Bhanot Publ.
SCN News, United Nations. System Forum on Nutrition. WHO.
Shukla PK. 1982. Nutritional Problems of India. Prentice Hall of India.

FN 610 MATERNAL AND CHILD NUTRITION 3(2+1)

- **Theory**

- **UNIT I**

Current scenario of maternal and child nutrition; Nutritional aspect of embryogenesis; Factors affecting outcome of pregnancy; Physiological changes in body composition and mental development in relation to prenatal and postnatal nutrition .

- **UNIT II**

Effect of nutritional status of mother on quantity and quality of breast milk; recent guidelines in infant feeding and complementary feeding. Feeding of premature babies; HIV and breast feeding; drug abuse and breast feeding.

- **UNIT III**

Nutritional problems and requirements of preschool and school going children; growth and development of children; growth monitoring using growth charts.

- **UNIT IV**

Strategies to improve maternal and child health in India ; role of BPNI in promotion of breast feeding in India; importance of world breast feeding week.

- **Practical**

Preparation of a database on prevailing supplementary and weaning practices- planning, collecting data, analyzing data, writing report; preparation of low cost complementary foods. Analysis of weaning/complementary foods for its nutrient content.

- **Suggested Readings**

Bamji MS, Rao NP & Reddy V.1999. Text Book of Human Nutrition.Oxford & IBH. Falkner F & Tanner JM. 1978. Human Growth - Postnatal Growth and Neurobiology. Vol. II. Plenum Press. Falkner F & Tanner JM. 1986. Human Growth - A Comprehensive Treatise. Development Biology Press.

Falkner F & Tanner JM. 1986. Human Growth – Methodology, Ecological, Genetic and Nutritional Effects on Growth. Vol. III. Plenum Press.

Francis DEM. 1986. Nutrition in the Life Span. John Wiley & Sons.

Sachdeva HPS & Choudhary P. 1994. Nutrition in Children. Cambridge Press. Williams SR, Worthington RS, Sneholinka ED, Pipes P,

Ress JM & Mahal KL. 1988. Nurition Throughout the Life Cycle. Times Mirror/Mosby College Publ.

Ziegler EE & Filer LJ. 1996. Present Knowledge in Nutrition. International Life Science Institute, Washington, D.C.