Syllabus in semester system of M.Sc in Clinical Nutrition and Dietetics

CBCS COURSE STRUCTURE

Semester I

Theory Papers

Paper No.	Paper Code	Title of Paper	Marks			Credits (10 LECTURES or Hrs. / CREDIT)
			ME	IA	Total	
I	CND 101	Nutritional Physiology including Metabolism in in Diseases	40	10	50	04
II	CND 102	Nutritional Biochemistry	40	10	50	04
III	CND 103	Research Methodology	40	10	50	04
IV	CND 104	Methods of Investigation including Nanotechnology	40	10	50	04

Practical Papers

Paper No.	Paper Code	Title of Paper	Marks			Credits (15 LECTURES or Hrs. / CREDIT)
			ME	IA	Total	
I	CND Pr 105	Nutritional Physiology and Biochemistry	50	-	50	04
II	CND Pr 106	Biometric assessment of Nutritional status	50	-	50	04
	Total Marks and Credits				**300**	**24**

COURSE STRUCTURE

Semester-II

Theory Papers						
Paper No.	**Paper Code**	**Title of Paper**	**Marks**			**Credits** (10 LECTURES / CREDIT)
			ME	**IA**	**Total**	
I	CND 201	Statistics and Computer application	40	10	50	04
II	CND 202	Functional foods and Nutraceutical including GM food & Nutritional education, Counseling and Entrepreneurial development	40	10	50	04
III	CND 203	Nutritional policy & Programme for public health including emergencies and disaster management	40	10	50	04
IV	CND 204	Optional	40	10	50	04
	OPTIONAL PAPER For other Dept. students	**Basics of Nutrition and Health**	40	10	50	04
Paper No.	**Paper Code**	**Title of Paper**	**Marks**			**Credits** (15 LECTURES / CREDIT)
			ME	**IA**	**Total**	
I	CND Pr 205	Statistics and Computer application	50	-	50	04
II	CND Pr 206	Public health and nutritional status assessment (Assignment programme) and Review work	50	-	50	04
Total Marks and Credits					**300**	**24**

COURSE STRUCTURE

Semester-III

Theory Papers						
Paper No.	**Paper Code**	**Title of Paper**	**Marks**			**Credits** (20 LECTURES / CREDIT)
			ME	**IA**	**Total**	
I	CND 301	Nutritional Genomics, Proteomics and Metabolomics and Drug-Nutrient interaction and Food service management	40	10	50	04
II	CND 302	Dietary management of diseases - Part I	40	10	50	04
III	CND 303	Dietary management of diseases Part II	40	10	50	04
IV	CND 304	OPTIONAL PAPER	40	10	50	04
	OPTIONAL PAPER for other Dept. students	**Food as medicine and prevention of diseases**	40	10	50	04
Paper No.	**Paper Code**	**Title of Paper**	**Marks**			**Credits** (20 LECTURES / CREDIT)
			ME	**IA**	**Total**	
I	CND Pr 305	Nutritional Proteomics, Genomics and Metalabo1ornics	50	-	50	04
II	CND Pr 306	Therapeutic diet chart preparation for diseases- Part-I & Part II	50	-	50	04
Total Marks and Credits					**300**	**24**

COURSE STRUCTURE

Semester-IV

Theory Papers						
Paper No.	**Paper Code**	**Title of Paper**	**Marks**			**Credits** (20 LECTURES / CREDIT)
			ME	**IA**	**Total**	
I	CND 401	Food microbiology and Food preservation	40	10	50	04
II	CND 402	Pediatric and Geriatric nutrition with nutrition in critical care	40	10	50	04
III	CND 403	Dietary management of diseases - Part III	40	10	50	04
IV	CND 404	Dietary management of diseases - Part IV	40	10	50	04
Paper No.	**Paper Code**	**Title of Paper**	**Marks**			**Credits** (20 LECTURES / CREDIT)
			ME	**IA**	**Total**	
I	CND Pr 405	Therapeutic diet chart preparation for diseasesPart-III & Part IV	50	-	50	04
II	CND Pr 406	Thesis work and hospital training (2 months)	50	-	50	04
Total Marks and Credits					**300**	**24**

Syllabus in semester system of M.Sc in Clinical Nutrition and Dietetics

1st Semester (Theoretical)

Nutritional Physiology including Metabolism in Diseases

Paper- CND 101

1. Growth and Development 1.1 General concept of Intra uterine growth & Infertile growth, Growth regulation1.2 Pubertal growth - Growth regulator1.3 Development of different phases of life cycle1.4 Growth chart & Growth monitoring, Growth markers.

2. Endocrine & Metabolism 2.1 Hormone receptor - Signal transduction, Nongenomic and genomic cAMP path, Tyrosine kinase, DAG, MAP kinase, IP3 2.2 Glycemic indices, Role of hormones2.3 Lipid Metabolism - Role of hormones2.4 Protein Metabolism - Role of hormones

3. Nutrients & Cardiovascular activities including Pathophysiology 3.1 Biogenesis of cardiovascular activities like TG, TC, HDL, LDL & VLDL 3.2 Atherosclerosis, Role of nutrients for its protection 3.3 Role of PUFA & MUFA on cardiovascular disease

4. Nutrients & Reproductive Events4.1 Stress on germ cell apoptosis : Role of Nutrients4.2 Pregnancy & its Nutritional demands4.3 Genoestrogen, its effects on reproduction

5. Nutrients as Immunomodulators5.1 General aspects of different types of immunity & their interrelationship5.2 Nutrients on cellular & hormonal immunity5.3 Immuno-Supression : Role of Nutrients

6. Nutrients on Endurance & Performance6.1 Bio-energetics & Metabolism in exercise6.2 Hormonal response & Exercise6.3 Ergogenic aids6.4 Body composition & Performance

7. Cancer7.1 Oncogene and Tumor suppressor gene interaction7.2 Apoptotic & Anti apoptotic factor7.3 Role of nutrients on its management

Nutritional Biochemistry

Paper- CND 102

1. Carbohydrate metabolism

1.1 Pathway of glycolysis & its regulation, Energetics & Role of hormone
1.2 Pathway ofTCA cycle & its regulation, Energetics & Role of hormone
1.3 Glycogen metabolism & its regulation, Energetics & Role of hormones
1.4 HMP Shunt pathway & its regulation
1.5 Protein sparing action of carbohydrate
1.6 Inborn error of carbohydrate metabolism (galactosemia)
1.7 Glycoprotein & Proteoglycan

2. Protein Metabolism 2.1 Deamination, Transamination & Transmethylation 2.2 Urea cycle 2.3 Protein structure 2.4 Inborn error of amino acid metabolism

3. Lipid Metabolism 3.1 Fatty acid synthesis
3.2 Lipoprotein synthesis 3.3 β-oxidation & ω-oxidation 3.4 Forward cholesterol transportation (LDL & VLDL), Reverse cholesterol transportation (HDL) 3.5 Disorders of lipid metabolism, Dyslipidemia & Lipid storage disease 3.6 Ketosis & Ketone body metabolism.

4. Nucleic acid Metabolism

4.1 Metabolism of Purine and Pyrimidine
4.2 Diseases due to abnormal nitrogen base metabolism
4.3 DNA replication, mutation, repair & recombination

5. Gene Expression

5.1 Gene expression in eukaryotes & its regulation (Normal)
5.2 Translation & post translational modification
5.3 Inhibitors of protein biology
5.4 Gene expression in mitochondria

6. Enzymes

6.1 Enzyme kinetics including inhibition in enzyme kinetics, Co-enzyme & Co-factors
6.2 Enzyme in clinical diagnosis

7. Free radical, ROS & Oxidation

8. Xenobiotics & its Metabolism

Research Methodology

Paper- CND 103

1. Types of research
1.1 Historical
1.2 Descriptive, Experimental
1.3 Case study
1.4 Social research
1.5 Participatory research

2. Definition & Identification of Research Problem
2.1 Selection of research problem
2.2 Jusstification
2.3 Theory
2.4 Hypothesis
2.5 Basic assumption

2.6 Limitation & delimitation of the problems
2.7 Types of variables

3. Theory of Probability

3.1 Probability
3.2 Sampling
3.3 Simple Random Systematic, Random Sampling
3.4 Two stages & multistage sampling
3.5 Non-probability sampling : purpose
3.6 Quota & Volunteer Sampling/Screwball sampling

4. Basic principle of research design

4.1 Purpose of research design/ fundamental
4.2 Applied & Action
4.3 Explanatory & descriptive
4.4 Experimental survey & case study
4.5 Longitudinal & Cross Sectional study
4.6 Co-relational study

5. Qualitative research in food and nutrition

5.1 Type of quality of research
5.2 Tools
5.3 Techniques and methodology
5.4 Rapid assessment procedure
5.5 Project reorientation and evaluation

6. Quantitative research method

6.1 Theory and design in quantitative research
6.2 Definition and quantitative research
6.3 Methods and techniques ofdata collection
6.4 Group discussion
6.5 Interviews: key information, in depth interview
7.1 Critical analysis of research
7.2 Writing a research proposal
7.3 Analysis of data and research report

8. Ethics in research

Methods of Investigation including Nanotechnology

Paper- CND 104

1. Theory of indicator & principles of measurement of pH
Physiochemical principle & methodology

1.1 Colorimetric
1.2 Photometric
1.3 Fluorometric
1.4 Flame photometry
1.5 Atomic absorptiometry

2. Cell study

2.1 Cell fractionation

2.2 Centrifugation

2.3 Marker enzyme assay

2.4 Microscopy & Microphotography

2.5 Cell shorting by cell fluorometry

3. Chromatography

3.1 Thin layer chromatography

3.2 Affinity chromatography

3.3 Partition chromatography

3.4 Column chromatography

3.5 Ion exchange chromatography

3.6 HPLC & FPLC

4. Electrophoresis

4.1 Paper Electrophoresis

4.2 Gel Electrophoresis

4.3 Immuno Electrophoresis

5. Bioassay

5.1 Evaluation of active ingredient from different plant

6. Use of Isotope

6.1 Radioactive elements and study of Isotope.

6.2 Structure elucidation-UV, JR, NMR, GC-MS and their applications

7. Immunological methods

7.1 RIA

7.2 ELISA

7.3 CLIA

7.4 Immunohistological technique and Immune fluorescence technique

8. Quantitative assay

8.1 DNA

8.2 RNA and Protein

8.3 Nucleic acid study- PCR

8.4 RT-PCR

8.5 DNA probes

8.6 Hybridization techniques and ISEL study

9. General concept ofNanotechnology

10. Examining of biological process relating to metabolism by Nanotechnology due to limitation of sampling tissue

11. Nutrition metabolism at atomic levels

12. Nanotechnology; a tool for the food science

13. Nanodevices for real time optical intercellular sensing

14. Nanoscience for gene and protein expression

15. Nanotecnology and sports supplement

16. Nano dietotherapeutics

17. Targeted delivery of Nutrients for optimization, role of Nanoscience

Practical

NUTRITIONAL PHYSIOLOGY AND BIOCHEMISTRY

Paper- CND 105

1. Determination of -

1.1 Body mass index
1.2 Arm circumference
1.3 Head circumference
1.4 Waist hip ratio
1.5 BMR, anthropometric analysis of under nutrition and obesity

2. Estimation of -

2.1 Plasma protein
2.2 Plasma lactate
2.3 Serum iron
2.4 Serum calcium assessment
2.5 Serum triglyceride
2.6 Cholesterol
2.7 Lipoprotein assessment

3. Dialysis of Protein

4. Estimation of -

4.1 Vitamin-A
4.2 Vitamin C
4.3 Vitamin- D
4.4 Vitamin-E
4.5 Vitamin-B l2 & B6 from food extract and from serum using spectroflurometer and spectrophotometer
5. Plasma glucose assessment by enzymatic method
6. Electrophoresis of protein.

BIOMETRIC ASSESSMENT OF NUTRITIONAL STATUS

Paper- CND 106

1. Weight for age, height for age, weight for height in Pre-adolescence group in different communities and its comparison with reference value.

2. BMI, Mid upper circumference, head circumference, chest circumference ofdifferent age groups and comments on result.
3. Body fat assessment in different zone, skin fold thickness in different age groups.
4. Resting energy expenditure from height, weight and others parameters.
5. Use of Laboratory data and its application on its nutritional status assessment.
6. BMR computation using primary and secondary data.
7. Nutritional status assessment of preschool going children using growth curve.

2nd Semester (Theoretical)

STATISTICS AND COMPUTER APPLICATION

Paper- CND 201

1.

1.1 Conceptual understanding of statistical measures
1.2 Classification and tabulation
1.3 Measurement of central tendency
1.4 Measurement of variation

2.

2.1 Frequency distribution
2.2 Histogram
2.3 Frequency polygon
2.4 Binomial distribution
2.5 Normal distribution-use of probability table

3.

3.1 Parametric and nonparametric tests
3.2 Testing of hypothesis- Type I and Type II errors
3.3 Chi-square test
3.4 Goodness of fit
3.5 Application of student 't' test for samples
3.6 Difference in proportion for mean and difference in means

4.

4.1 Correlation
4.2 Coefficient of correction and rank correlation 4.3 Regression and prediction
4.4 Analysis ofvariance-one way and two way classification

5.

5.1 Experimental design
5.2 Completely randomized design
5.3 Randomized block design
5.4 Latin square design,Factorial design, Trend analysis

6.

6.1 Basic computer architecture
6.2 Software's-use of MS word
6.3 MS EXCEL-Bar diagram
6.4 Pie diagram and line diagram
6.5 MS power point

7.

7.1 Application of statistica
7.2 Application of SPSS,Origin lab, Software
7.3 Use of software for food analysis

Functional foods and Nutraceuticals including GM food & Nutritional education, Counseling and Entrepreneurial development

Paper- CND 202

1.

1.1 Probiotics and Symbiotics concept, nutrient Vs. non nutrients
1.2 Important features of probiotic microorganisms
1.3 Health effects of probiotics including mechanism of action
1.4 Probiotics in fermented milk product and non milk products
1.5 Quality assurance of probiotics and safety

2.

2.1 Prebiotics Concept, chemistry sources, metabolism and bioavailability
2.2 Physiological effects ofprebiotics, effects on human health and application in risk reduction of diseases
2.3 Perspective for food applications for Dietary fiber, resistant starch, gums, oligosaccharides

3.

3.1 Nutraceuticals with potential health benefit definition, Chemistry, sources, metabolism and bio availability
3.2 Physiological effects of Nutraceuticals, effects on human health and application in risk reduction of diseases
3.3 Perspective for food applications for Polyphenols like flavonoids, chatchins, tannins
3.4 Phytoestrogens, phytosterols, pigments like lycopene, carcumin.
3.5 Phytatics ,Protease inhibitors,amalysae inhibitors,Heam agglutinins,Saponins
3.6 Non nutrient effect of PUFA and MUFA,Vitamins and Mineralas proteins,Peptides and Neucleotides

4.
4.1 GM food- concept,Deffination,available GM foods in India.
4.2 Fundamental techniques for GM food preparation
4.3 Food fortification through genetical modification
4.4 Steps adopted for acceptability of GM food.
5.

5.1 Importance and relevance of Information, Education and communication (IEC).
5.2 Concept, type, process and media of communication.
5.3 Interpersonal group and Mass communication.
5.4 Family education. Patient education and Patient health.

6.

6.1 Introduction of counseling, existing trends in counseling services in India.
6.2 Processes involved in counseling, supportive and behavioral Techniques in counseling

6.3 Cognitive and psychoanalytical techniques in counselling.
6.4 Practical issues involved counseling, family counselling covering family planning counseling, abortion counselling, counseling for children and adolescents, geriatric counselling with specific diseases like HIV/AIDS, Cancer and Diabetes.

7. Entrepreneurship

7.1 Defination,Characteristic,Meaning of entrepreneur, Importance of entrepreneur in economic devolopement
7.2 Steps, Quality of successful entrepreneur,Contents of training programme
7.3 Women entrepreneur,Problems measures,taken for the developement of women entrepreneur in India.
7.4 Concepts of small industries,Objectives,Problems,Measures taken for the promotion of SSI
7.5 Procedures to strat SSI-market survey,raw material collection,food production,Packing,labelling and marketing
7.6 Project formulation steps involves.

Nutritional policy & Programme for public health including emergencies and disaster management

Paper- CND 203

1

1.1 Nutritional problems of the community and implication in public health ,hazards of community health and nutritional status

1.2 Nutrition policy in India and plan of action,national food and nutrition policy plane of action and programme
2.
2.1 Population dynamics
2.2 Major nutritional problems and management
2.3 Primary health care of the community.approches and strategies for improving nutritional status and health
2.4 communicable and infectious disease control
2.5 Community water and waste management
2.6 Community food protection
2.7 Life style and community health
2.8 Immunization – schedule during pregnancy and childhood
2.9 Holistic approach to the management of fitness and health .Review of different energy system for endurance and power activity,nutrition in sports
2.10 Nutrition and health care programmes for mother and child,nutritional requirements of the elderly people and dietary management to meet their nutritional needs
3.
3.1 Emergencies and disaster management,general concepts,disaster cycle
3.2 Nutritional management of target group in disaster and emergencies situation-packet food and common kitchen in post disaster period
3.3 Ration system in disaster and different types of nutrition rehabilitation disaster management
3.4 Assessment process for nutritional rehabilitation at post disaster period

Practical

Statistics and Computer application

Paper- CND 205

1.

1.1 Mean,SD and SE computation using statistical software
1.2 Bar diagram
1.3 Pie diagram
1.4 Line diagram construction using MS Excel
2. Test of significance of the data using
2.1 SPSS statistical software
2.2 Origin statistical software
2.3 Co relation of co efficient and ANOVA using SPSS software
2.4 Food analysis and calorific value using then software

Public health and nutritional status assessment (Assignment programme) and Review work

Paper- CND 206

1. Assignment work on community nutrition awareness and public health any five assignments.

3rd Semester (Theoretical)

NUTRITIONAL GENOMICS, PROTEOMICS AND METABOLOMICS and Drug-Nutrient interaction and Food service management

Paper- CND 301

1. Fundamental expression of PCR, RTPCR and Q-PCR for gene expression.
2.

2.1 Nutrient and Gene expression with special reference to vitamin and other macronutrient,

2.2 Role of nutrient and dilatory component in regulation of genome structure expression and stability.

3.

3.1 Idea about nutrigenomics. Nutrition is only one player in the epigenetic repertoire,

3.2 Epigenetic effect of nutritional supplement to pregnant mother to regulate the undesirable gene expression of fetus like cancer, obesity and diabetes.

4. Influence of cholesterol and triglycerides levels of regulation of LDL receptors gene and apolipoprotein gene expression in liver and G.I tract .Bile acid mediated regulation of apo A1 gene.Nutrient control of lipoprotein lipase gene expression

5. Outline of proteomic.s protein quantification – gel based methods including differentional staining

6. Immuno flurocessence and Immunohistochemical detection of functional and structural proteins and tissue,stable isotopes labelling with amion acid in cellculture or SILAC.

7. Basic idea and field of metabolomics ,metabolome represent the ingredient of life

8. Techniques adopted in the study of metabolomics

9. Enzyme kinetic study and enzyme marking by Immunohistochemistry,Immunoenzymatic and Immune fluoroscence using tissue sample.

10.

10.1 Nutrient – drug interaction .The step of absorption ,metabolism,action,retention and / or excretion of nutrient as well as drug – influence of one on other.

10.2 Pharmacodynamic - influence of nutrients

10.3 Bioavailability of drug – influence of nutrients

10.4 Biotransformation, stability of the drug ,gastric empting –influence of nutrients

10.5 Pharmacokinetic – influence of nutrition .competition of absorption of drug and nutrients

10.6 Nutrients and nutritional status on drug efficacy

10.7 Isolation of Nutraceuticals from plant product-extract collection,fractionation and column separation

10.8 Detection and classification of compounds from different plant extract .

11.

11.1 Styles of food service – self service, tray service, waiter service, vending and mobile food service system

11.2 Sanitation and Hygiene in food service ,safe food handling practices,personal hygiene

11.3 Human resources management : Performing appraisal ,leadership,lows governing food service establishment .

11.4 Marketing – Definition, managerial function, marketing promotion in food service.

Dietary management of diseases - Part I
Paper- CND 302

1. Non communicable disease-
1.1 Diabetes (Type -I and Type- II)-
Epidemiology, pathophysiology, causes & dietary management
1.2 Hypertension –
Epidemiology, pathophysiology causes & dietary management
1.3 Hyperlipidemia-
Epidemiology, pathophysiology causes & dietary management
1.4 Atherosclerosis
Epidemiology, pathophysiology causes & dietary management
1.5 Nutritional anaemia
Epidemiology, pathophysiology causes & dietary management
1.6 Cancer
Epidemiology, pathophysiology causes & dietary management
1.7 Constipation
Epidemiology, pathophysiology causes & dietary management
1.8 Food allergy
Epidemiology, pathophysiology causes & dietary management.

Dietary management of diseases Part II
Paper- CND 303

1. Gastro Intestinal Diseases
1.1 Cholera
Epidemiology,Pathophysiology,Cause and dietery management
1.2 Diarrhoea
Epidemiology, Pathophysiology, Cause and dietery management

1.3 Dysentery
Epidemiology, Pathophysiology, Cause and dietery management
1.4 Flatulence
Epidemiology, Pathophysiology, Cause and dietery management
1.5 Junundice
Epidemiology, Pathophysiology, Cause and dietery management
1.6 Hepatitis
Epidemiology, Pathophysiology, Cause and dietery management
1.7 Gastritis
Epidemiology, Pathophysiology, Cause and dietery management
1.8 Ulcer
Epidemiology, Pathophysiology, Cause & dietary management
1.9 Irritable Bowel Syndrome
Epidemiology, Pathophysiology, Cause & dietary Management
1.10 Colitis Epidemiology, Pathophysiology, Cause & dietary management
2. Rheumatic diseases
2.1 Artharitis Epidemiology, Pathophysiology, Cause &dietary management
2.2 Osteoarthritis
Epidemiology, Pathophysiology, Cause & dietary management
2.3 Lupas arthritomatosis
Epidemiology, Pathophysiology, Cause &dietary management

Practical

Nutritional Proteomics, Genomics and Metalabo1ornics

Paper- CND 305

1.

1.1 Western Blot, SDS PAGE

1.2 DNA gel electrophoresis

1.3 Native gel electrophoresis

1.4 PCR for gene amplification and quantification

1.5 Immune fluorescence, Immunoenzymatic techniques for gene expression status assessment

1.6 Enzyme kinetics study in UV spectrophotometer

2. Any one Assignment program of nutrients genomics

2.1 Assignment program of Interactive Nutrition

2.2 Program on Nutrient-Drug interaction by chronic delivery of antibiotics in animal model through oral route and bio-availability/pharmacodynamics of micronutrients like Ca++, Fe, I, Vit-E, Vit-A, Vit-D, etc.

3. Assignment program of metabolomics on any of the following-

3.1 Fat enriched diet supplied to animal & assessment of glycolytic metabolic pathway by quantification of pyruvate, fumarate, α-ketoglutarate, lactic acid.

3.2 Carbohydrate enriched diet supplied to animal and assessment of LDL, HDL, VLDL, Triglyceride, Cholesterol, Ketone bodies.

3.3 Protein enriched diet supplied to animal and assessment of Uric acid, Urea, Ammonia, Purine & Creatinine.

3.4 Metabolomics analysis of body fluid from patient for disease diagnosis.

Therapeutic diet chart preparation for diseases-Part-I & Part II

Paper- CND 306

1. Non communicable disease-

1.1 Therapeutic diet chart preparation for Diabetes, case specific

1.2 Therapeutic diet chatt preparation for Hypertension, case specific

1.3 Therapeutic diet chart preparation for Hyperlipidemia case specific

1.4 Therapeutic diet chart preparation for Atherosclerosis, case specific

1.5 Therapeutic diet chart preparation for Nutritional anemia, case specific

1.6 Therapeutic diet chart preparation for Cancer, case specific

1.7 Therapeutic diet chart preparation for Constipation, case specific

1.8 Therapeutic diet chart preparation for Food allergy, case specific

2. Gastro Intestinal Diseases

2.1 Therapeutic diet chart preparation for Cholera, case specific

2.2 Therapeutic diet chart preparation for Diarrhoea, case specific

2.3 Therapeutic diet chart preparation for Dysentery,case specific

2.4 Therapeutic diet chart preparation for Flatulence,case specific

2.5 Therapeutic diet chart preparation for Jaundice,case specific
2.6 Therapeutic diet chart preparation for Hepatitis,case specific
2.7 Therapeutic diet chart preparation for Gastritis,case specific
2.8 Therapeutic diet chart preparation for Ulcer,case specific
2.9 Therapeutic diet chart preparation for Irritable Bowl Syndrome,case specific
2.10 Therapeutic diet chart preparation for Colitis,case specific

3. Rheumatic diseases

2.1 Therapeutic diet chart preparation for Arthritis,case specific
2.2 Therapeutic diet chart preparation for Osteoarthritis,case specific
2.3 Therapeutic diet chart preparation for Lupas arthritomatosis,case specific.

4th Semester (Theoretical)

Food microbiology and Food preservation

Paper- CND 401

1. Fundamentals of Microbiology

1.1 Introduction, Development of microbiology and food sanitation
1.2 Bacteria-morphology, reproduction, physiology, growth curve and biochemical changes in bacteria.
1.3 Yeast-morphology, methods of multiplication, process of hybridization, physiology, classification and importance of yeast.
1.4 Moulds-morphology, physiology and nutritional multiplication, significance of moulds and common household moulds.
1.5 Viruses-discovery, morphology, reproduction, bacteriophages, human viral disease, identification and control and viruses in relation to food science.

2. Denaturation of bacteria

Sterilization: physical agents-light, desication, electricity and heat and Chemical agents,

3. Microbiology of natural products

3.1 Water-sources, bacteriology of water supplies,
3.2 Bacteriological examination and purification of water

4. Microbiology of milk and milk products

4.1 Kinds of microorganisms in milk, sources of contamination, pathogens in milk, control ofmicroorganisms, quality & methods of study.
4.2 Microbiology of dairy products-fermented milk, butter & cheese.
5. Microbiology of fruits and Vegetables
5.1 Fruits and vegetables –external contamination,
5.2 Preservation
5.3 Spoilage & control of microorganism
6. Microbiology of cereals & cereal products
6.1 Cereal & cereal products- organism associated with grains
6.2 Classification & control of moulds in bread
7. Microbiology of Fleshy Foods
Flesh Foods- Microbiology of meat & meat products, poultry, fish & eggs
8. Role of sugar, spice & salt
8.1 Effect of salt on microorganism
8.2 Role of sugars in foods & Role of spices in food preservation
9. Principle of Food Spoilage
9.1 Food spoilage- microbiological, biochemical, biological, physical & chemical factors
9.2 Spoilage & examination of Canned Foods

9.3 Food Borne Diseases & their outbreak
10. Importance & Scope of Food Preservation
10.1 Principle & methods of food preservation
10.2 Selection & purchase of foods
11. Food Spoilage
11.1 Cause of spoilage, biological changes, action of enzyme, physical changes
11.2 Microorganisms responsible for spoilage in preserved foods
12. Preservation by Low & High Temperature
Principle, Methods, Commonly preserved foods by low & high temperature
13. Preservation by Drying & Dehydration
Principle, Methods, Dehydrated Foods
14. Preservation by Preservatives
Principles, Types of Preservatives, Action on Foods
15. Preservation by Osmotic Pressure
15.1 Preservation by high concentration of Sugar
15.2 Preservation by low concentration of Sugar
16. Preservation by Irradiation
Electromagnetic Irradiation & Ultra violet Rays.
17.
17.1 Food hygiene and quality control
17.2 Food laws and quality control measures
18. Food additives
18.1 Definition, their need, importance and safety evaluation, quality control and its importance. 18.2 Regulation of food additives. 19. Toxicants in food.

Paper- CND 402

Pediatric and Geriatric nutrition with nutrition in critical care

1. Pediatric nutrition
Pediatric nutrition assessment-
1.1 Anthropometric measurements
1.2 Biochemical parameters
1.3 clinical and dietary data
1.4 Measuring ,recording and plotting growth
2. Normal nutrition for infants – requirements , importance of breast feeding ,bottle feeding , commercial formulas,weaning foods ,other family foods ,physiology and care of the preterm infant.
3. Nutritional considerations for LBW children and children with development disabilities.
4.
4.1 Nutrition in childhood; Growth and development; nutrient needs
4.2 Assessment of nutritional status of children
4.3 Providing an adequate diet - Factors affecting food intake.
4.4 Feeding the preschool child, the school- aged child.
5. Nutritional concerns

5.1 Childhood obesity; Underweight and Undernutrition-shottern and long term consequences in brief, Failure to thrive;
5.2 Growth faltering and detection Mineral and vitamin deficiencies
5.3 Dental caries
5.4 Allergies
5.5 Attention-deficit hyperactivity disorder

6. Nurological disease in children i.e. epilepsy (ketogenic diets)

7. Pulmonary disease in children, cystic fibrosis

8. Geriatric Nutrition The ageing process-physiological, metabolic, body consumption changes and impact on health and nutritional status

9. Socio-psychological aspects of ageing-special problems of elderly women
10. Nutritional and health status of elderly. Factors influencing food and nutrient intake, health status including lifestyle pattern, medication, psychosocial aspect etc.
11. Chronic degenerative disease and nutritional problems of the elderly-their etiopathogenesis, management, prevention and control
12. Policies and programmes of the government and NGO sector pertaining of the elderly
13. Critical care
Nutritional screening and nutritional status assessment of the critically ill
14. Nutritional support system and other life - saving measures for the critically ill
15. Enteral and parenteral nutrition support. Role of immune enhancer, conditionally essential nutrients, Immune suppressants, and special diets in critical care
16. Complications of nutritional support system including re-feeding syndrome and rehabilitation diets
17. Enteral nutrition
17.1 Various sites for enteral nutrition
17.2 In brief, discussion on Ryles tube and its care
17.3 Types of feeds, advantages and disadvantages of home based feed
17.4 Commercial formula feed – incorporation of easily digestible food
17.5 Requirement of nutrients according to problems e.g. renal, respiratory etc.
18. Total parental nutrition
18.1 The importance of TPN
18.2 Long term effect of its use
18.3 Site of TPN and its care
18.4 Composition

Dietary management of diseases - Part III

Paper- CND 403

1. Renal disease-
1.1 Nephritis
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.2 Glomerulitis
Epidemiology, Pathophysiology, Cause and dietery management and critical care

1.3 Renal failure
Epidemiology, Pathophysiology, Cause and dietery management and critical care

1.3 Kidney stone
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.5 Nephrolithiasis
Epidemiology, Pathophysiology, Cause and dietery management and critical care

2 Respiratory disease-
2.1 Asthama
Epidemiology, Pathophysiology, Cause and dietery management and critical care

2.2 Chronic obstructive pulmonary disease
Epidemiology, Pathophysiology, Cause and dietery management and critical care
2.3 Respiratory failure
Epidemiology, Pathophysiology, Cause & dietary management and critical care
2.4 Tuberculosis
Epidemiology, Pathophysiology, Cause & dietary management and critical care

Dietary management of diseases - Part IV

Paper- CND 404

1.
1.1 Inborn error of metabolism-
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.2 HIV
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.3 Sepsis-
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.4 Trauma-
Epidemiology, Pathophysiology, Cause and dietery management and critical care

1.5 Burns-
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.6 Phenyl Ketonuria
Epidemiology, Pathophysiology, Cause and dietery management and critical care

1.7 Galactosemia
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.8 Glycogen storage disease
Epidemiology, Pathophysiology, Cause and dietery management and critical care
1.9 Maple syrup urine diseaseEpidemiology, Pathophysiology, Cause & dietary management and critical care.
2. Neural diseases
2.1 Parkinson disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
2.2 Alzeimer's disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
2.3 Angeleman disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
2.4 Corea athotosis disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
2.5 Lafora disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care

2.6 Huntington Corea disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care

Practical

Therapeutic diet chart preparation for diseases Part-III & Part IV

Paper- CND 405

1. Renal disease

1.1 Therapeutic diet chart preparation for Nephritis, case specific
1.2 Therapeutic diet chart preparation for Glomerulitis, case specific
1.3 Therapeutic diet chart preparation for Renal failure, case specific

1.4 Therapeutic diet chart preparation for Kidny stone , case specific
1.5Therapeutic diet chart preparation for Nephrolithiasis, case specific

2. Respiratory disease

2.1 Therapeutic diet chart preparation for Asthama, case specific
2.2 Therapeutic diet chart preparation for Chronic obstructive pulmonary disease, case specific
2.3 Therapeutic diet chart preparation for Respiratory failure, case specific
2.4 Therapeutic diet chart preparation for Tuberculosis, case specific
3.0
3.1 Therapeutic diet chart preparation for Inborn error of metabolism, case specific
3.2 Therapeutic diet chart preparation for HIV, case specific
3.3 Therapeutic diet chart preparation for Sepsis, case specific
3.4 Therapeutic diet chart preparation for Trauma, case specific
3.5 Therapeutic diet chart preparation for Bums, case specific
3.6 Therapeutic diet chart preparation for Phenyl ketonuria, case specific
3.7 Therapeutic diet chart preparation for Galactosemia, case specific
3.8 Therapeutic diet chart preparation for Glycogen storage disease, case specific
3.9 Therapeutic diet chart preparation for Maple syrup urine disease, case specific

Thesis work and hospital training (2 months)

Paper- CND 406

1. General outline about how to conduct research work on a particular topic and an idea about how to perform hospital training).

Semister-2

Optional paper-204

Basics of Nutrition and Health

1. Introduction to nutrition –
   Food as source of nutrients, functions of food, definition of nutrition and health, nutrients & energy, adequate, optimum & good nutrition, malnutrition. Basic five food groups How to use food guide (according to R.D.A.)

2. Nutrition and fitness.
3. Interrelationship between nutrition & health
4. Use of carbohydrate, protein and fat, minerals and vitamins from food sources and its significances.
5. Role of dietary fibres in human nutrition.
6. Effect of cooking on the nutritive value and Food sanitation in hygiene.

Semister-3

Optional paper-304

Food as medicine and prevention of diseases

1. Concept of disease- communicable and non-communicable disease, life style disorder. Very basic concept of medicine.
2. Culture of health and wellness and healthy food. Supplementary and fortified food.
3. Fast food and junk food culture and its related hazards.
4. Practice of healthy food habit from infancy
5. Food for common disorders-fever, gastritis, diarrhea, IBS, colitis.
6. Food for lifestyle disorder-stress and anxiety, obesity, diabetes, hypertension and cardiovascular disorders, renal disorders, asthma, COPD.