MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
Grade 'A' Accredited by NAAC
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Curriculum for

M.Sc. Clinical Nutrition

Amended as per BOM -55/2018, Dated 27/11/2018

Amended History

1. Approved as per BOM - 29/2013, Resolution No. 13, Dated 15/06/2013
2. Amended as per BOM -55/2018 [Resolution No.4.13], Dated 27/11/2018.

M.Sc. Clinical Nutrition
Syllabus

Eligibility: Eligibility students with the following undergraduate degrees are eligible, B.Sc. Biochemistry or any Life Sciences & Home Science, MBBS, BHMS, BAMS.

Student should have obtained minimum 50% marks in the undergraduate degree or B grade from any recognized University.

Objective :

1. To impart knowledge and develop capacities of the students through higher education in the area of Clinical Nutrition and Dietetics and application in Medical Nutrition Management.
2. To develop students to become health care professionals for services in various fields of clinical nutrition and medical nutrition management and related areas such as hospitals academics, research, industry, clinical nutrition department, training, extension and community service.
3. To develop capacities and abilities and enable them to pursue higher education and research in Clinical Nutrition and Dietetics.

Prof. Z. G. Badade
Registrar,
MGM Institute of Health Sciences
Kamothe, Navi Mumbai-401209

M.Sc. Clinical Nutrition
(2 year Course)

Sr. No	Semester	Module	
1	Sem I- Basics of Nutrition	Module 1	Principles of Nutrition
		Module 2	Applied Biochemistry
		Module 3	Basic Human Physiology
		Module 4	Pathophysiology
2	Sem II- Applied Nutrition Biostatistics & Research Methodology	Module 1	Nutritional care in Health
		Module 2	Nutritional care for fitness
		Module 3	Biostatistics & Research Methodology
		Module 4	Community Nutrition
3	Sem III Advanced Nutrition	Module 1	Food Science
		Module 2	Functional foods & Nutraceuticals
		Module 3	Food Toxicology & Microbiology
		Module 4	Food analysis
4	Sem IV-Clinical Nutrition Management	Module 1	Nutrition Management I
		Module 2	Nutrition Management II
		Module 3	Nutrition in Critical Care
		Module 4	Pediatric and Geriatric Nutrition

M.Sc. Clinical Nutrition

(2 year Course)

Semester 1:- Basics of Nutrition

Module 1-Principles of Nutrition

Contents:

Topic No.	Topics and Details	No. of lectures
1	Basic Concepts: Micro & macronutrients, Food pyramid, Balanced diet, Nitrogen balance, Protein quality, SDA, BMR, Thermogenic effect of foods.	2
2	Body Composition Significance of body composition and changes through the life cycle Methods for assessing body composition (both classical and recent) and their applications.	1
3	Energy Components of energy requirements: BMR, thermic effect of feeding, physical activity. Factors affecting energy requirements, methods of measuring energy expenditure. Estimating energy requirements of individuals.	1
4	Carbohydrates Nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates and their implications Dietary fibre: Types, sources, role and mechanism of action Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiological significance Glycemic Index and glycemic load	2
5	Proteins Amino acids:Nutritional importance, essential , non essential aminoacids Therapeutic applications of specific amino acids Peptides of physiological significance.	1

6	Lipids Nutritional significance of fatty acids – SFA, MUFA, PUFA: functions and deficiency Role of n-3 and n-6 fatty acids Prostaglandins Trans Fatty Acids Conjugated linoleic acid Nutritional Requirements and dietary guidelines (International and National) for visible and invisible fats in diets.	2
7	Electrolytes Sodium, Potassium and Chloride	1
8	Vitamins: Historical background, Structure, Chemistry, Food sources, Requirement and Deficiency manifestations a)Water soluble Vitamins (B Complex and Vitamin C) b) Fat soluble Vitamins (Vitamin A,D,E,K)	5
Total		**15 lect.**

Practicals

Sr. No	Topic	No of Practical classes
1	Tests for Monosaccharides	1
2	Tests for Disaccharides	1
3	Tests for Polysaccharides	
4	Enzymatic Hydrolysis of Starch	1
5	Colour Reactions of Proteins	1
6	Precipitation Reactions of proteins	1
7	Qualitative Test for Vitamin A & C	1
Total		**6**

Module 2-Applied Biochemistry

Contents:

Topic No.	Topics and Details	No. of lectures
1	Membrane structure, composition and Transport of metabolites across membranes	1
2	Acid base balance and its regulation	1
3	Outline of Carbohydrate Metabolism Metabolism is to be discussed with reference to: Intestinal transport of carbohydrates Transport of glucose across various cells Cellular metabolism of carbohydrates(EM pathway, TCA cycle, and HMP pathway) Glycogen metabolism Regulation of carbohydrate metabolism at substrate level,enzyme level, hormonal level and organ level Disorders of Carbohydrate Metabolism	3
4	Outline of Metabolism of Lipids Metabolism is to be discussed with reference to: Intestinal transport of lipids Cellular uptake and metabolism of lipids (beta-oxidation, denovo synthesis of fatty acids, synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids and triacylglycerol) Lipoprotein metabolism VLDL and LDL ('Forward' Cholesterol transport) VLDL and LDL (Endogenous TAG transport) HDL('Reverse' Cholesterol transport) Regulation of lipid metabolism at substrate level, enzyme level, hormonal level and organ level. Disorders of Lipid Metabolism	2
5	Outline Protein Metabolism Metabolism is to be discussed with reference to: Metabolism of amino acids- biosynthesis and catabolism - energy, glucose and ketone bodies, protein amino acids, non-protein amino acids (including urea cycle, transamination, one-carbon metabolism), Creatine and creatinine Plasma proteins – Nature, properties and functions Biologically active peptides, polypeptides and transport proteins Inborn errors of Protein Metabolism	2

6	Intermediary Metabolism Intrigation of carbohydrate, lipid & protein metabolism Hormonal Regulation, starve-feed cycle.	1
7	Biological Oxidation Electron transport chain and oxidative phosphorylation.	1
8	Outline of Metabolism purine and pyrimidines Metabolism of purines Metabolism of pyrimidines Disorders of Purine Metabolism	1
9	Enzymes Classification of enzyme, Factors affecting enzyme activity. Enzyme specificity, regulation of enzyme activity and inhibition. Enzymes in clinical diagnosis	2
10	Detoxification in the body, metabolism of xenobiotics	1
11	Free radicals, ROS and oxidative damage	
Total		**15 lect.**

Practicals

Sr. No	Topic	No of Practical classes
1	Estimation of Blood Glucose	1
2	Demonstration on Glucose Tolerance Test	1
3	Demonstration on Lipid Profile	1
4	Demonstration on Total Protein & A/G Ratio	1
5	Estimation of Serum Uric Acid	1
6	Demonstration on AST, ALT & ALP	1
Total		6

Module 3- Basic Human Physiology

Contents:

Topic No	Topic and Details	No of Lectures
1	Circulatory system	2
2	Respiratory System	2
3	Renal System	2
4	Digestive system	3
5	Musculoskeletal system	2
6	Endocrine System	2
7	Hemotology	2
Total		**15 lect.**

Practicals

Sr. No	Topic	No. of Practical Classes
1	Clinical Examination of CVS	1
2	Blood Pressure, Pulse	1
3	Clinical Examination of RS	1
4	Clinical Examination of Alimentary System	1
5	Estimation of Hemoglobin	1
6	RBC,WBC &DC	1
Total		6

Module 4- Pathophysiology

Contents:

Topic No.	Topics and Details	No. of lectures
1	Cardio vascular diseases	3
2	Diseases of respiratory system	2
3	Diseases of Renal System	2
4	Diseases Digestive System	3
5	Diseases Musculoskeletal System	2
6	Diseases Endocrine System (Thyroid, PCOS, Addison's)	3
	Total	**15 lect.**

Practical

Sr. No	Topic	No. of Practical Classes
1	Urine Routine & Microscopy	1
2	Demonstration of GFR	1
3	Demonstration of Electrolytes Estimation	1
4	Demonstration of Thyroid function test	1
	Total	4

Semester II:- Applied Nutrition, Biostatistics & Research Methodology

Module 1-Nutritional Care In Health

Contents:

Topic No.	Topics and Details	No. of lectures
1	Nutritive value of common Indian Food items. Calori exchange for different food	2
2	Nutritional requirement in different Stages of life: Infant, child, adolescent adult male and female,preganancy and lactation. Calori calculation for each.	3
3	Nutritional requirement for various activities of life. Calori calculation for each.	2
4	Nutritional requirement in special conditions: Space,travel, High attitudes, High and low temperatures. Calori calculation for each.	2
5	Nutrition care process Screening & assessment- SGA, MUAC, NRS, NRI, PGSGA, MNA	3
6	Nutrional Diagnostics Nutrional assessment tools & methods Questionnare construction, Food frequencies, Diet recall	3
Total		15 lect.

Practical

Sr. No	Topic	No. of Practical Classes
1	Demonstration of Food groups	1
2	Sample meal plan	1
3	Calorie calculation for different activities	1
4	Calorie calculation for different stages of life	1
5	Calculation of BMR	1
6	Calculation of BMI, Body fat	1
Total		6

Module 2-Nutritional Care for Fitness

Contents:

Topic No.	Topics and Details	No. of lectures
1	Introduction to Fitness and Training Benefits of Exercise components of physical fitness. Assessment of nutritional status Holistic approach to management of health and fitness including diet and exercise(Aerobic and anaerobic).	1
2	Musculo-skeletal System Effect of anaerobic exercise on musculoskeletal system. Endurance , strength/ Power, Speed, Coordination, agility, balance etc	2
3	Cardio--respiratory System Assessm ent of Cardio-respiratory fitness using Maximum aerobic capacity (VO_{2max}). Assessment of coronary risk profile- RISKO factor Recognizing symptoms to stop any exercise. Emergency procedures.	2
4	Substrate for exercise, Utilization of lipid and carbohydrate in relation to exercise type, intensity and duration.	2
5	Water and Electrolyte Balance: Regime of hydration and dehydration. Symptoms and effect of dehydration. Sports Drink.	2
6	Effect of Specific Nutrients on Work Performance and Physical Fitness and Training Diets.	1
7	Formulating dietary guidelines for: Fitness and health	1
8	Sports Nutrition	1
9	Nutritional Supplements for fitness and sports Use of different food ingredients for development of health foods – artificial sweeteners, modified starches, fat replacers, increasing fibre content, functional ingredients, low sodium food adjuncts, protein concentrates, whey	3
Total		15 lect

Practical

Sr. No	Topic	No. of Practical Classes
1	Calculation of energy expenditure-Basal	1
2	Calculation of energy expenditure for exercises of different intensity & duration	2
3	Demonstration on calculation of lean body mass & Fat mass	2
Total		5

Module 3-Bio-Statistics & Research Methodology

Contents:

Topic No.	Topics and Details	No. of lectures
1	Introduction to statistics & Biostatistics & its application.	
2	Data condensation & graphical methods. - Raw data, Attributes & variables, Discrete & continuous variables, - Principles of classification - Construction of frequency distribution, discrete &continuous frequency distribution, relative frequency distribution, cumulative frequency distribution. - Graphical presentation of data using: Histogram, frequency polygon, frequency curve, ogive curves. - Diagrammatic presentation of data using :simple bar diagram, multiple bar diagram, subdivided bar diagram, pie- diagram	3
3	Measures of Central Tendency: - Need & features of good measure of central tendency. - Arithmatic mean, mode, median - Merits & demerits of mean, mode & median. - Graphical methods for mode & median. - Relation between mean, mode & median (Empirical Relation)	2
4	Measures of dispersion : - Need & characteristics of good measure of dispersion - Range, mean deviation, standard deviation, variance, C.V. - Merits & demerits of range, Mean deviation, Standard deviation, variance C.V.	2
5	Measures of skewness & kurtosis	

6	Hypothesis Testing - Sampling variability & Significance, Hypothesis testing - Normal distribution & its properties,Hypothesis, Types of hypothesis,Type I error, Type II error, level of significance, P-value, one-tailed test, two tailed test. - Significance of difference in Mean & proportion for large samples & small samples. - SEM (Standard Error of Mean) uses & its applications - SEDM (Standard Error of Differences in Means) - t-test –(paired t-test, unpaired t-test) - ANOVA - Chi-square test for association between attributes, chi-square test for goodness of fit Standard Error of Proportion (SEP) & Standard Error of Difference in Proportion (SEDP) & its uses and applications. - Non-Parametric tests	3
7	Vital Statistics	1
8	Research Design:-Correlational design, Experimental design, Internal & External validity, Threats to validity, components of research design, features of corrlational & experimental design Observational studies:- Exploratory studies, Descriptive studies, Explanatory studies, cohort studies, case-control studies, Evaluative studies, Monitoring studies, Historical studies, Panel studies.	2
9	Methods of data collection: Sample survey- Stages of sample survey - Methods of survey Sampling & Non sampling errors. Interviewing for Data Collection -Types of interviews -Art of asking questions. Questionnaire construction -Considerations of questionnaire construction -Features of questionnaire Pre-test Interviews & Pilot studies	2
Total		**15 lect**

Practical

Sr. No	Topic	No. of Practical Classes
1	Exercise on each of the above topic	6-8
Total		6-8

Module 4-Community Nutrition

Contents:

Topic No.	Topics and Details	No. of lectures
1	Epidemiological aspects of Food and Nutrition, Nutritional epidemiology	1
2	Nutritional Disorders of Public Health importance	1
3	Nutritional intake assessment, Nutritional Anthropometry	2
4	Protein energy malnutrition	1
5	Food borne diseases and food toxicants	2
6	Milk and Meat hygiene	1
7	Diet Standards and Diet Planning	2
8	Nutritional Surveillance	2
9	Social aspects of Nutrition	1
10	National Nutrition Programmes, National Nutrition Policy	1
11	ART, Diabetes education	1
Total		**15lect.**

Practical

Sr. No	Topic	No. of Practical Classes
1	Demonstration of PEM	1
2	Nutritional plan for PEM	1
3	Field work	4
Total		**6**

Semester III:- Advance Nutrition

Module 1-Food Science

Contents:

Topic No.	Topics and Details	No. of lectures
1	Introduction to sensory analysis and uses of sensory tests	1
2	Recognition tests for 4 basic tastes, odour and aroma Tests with other senses Threshold tests	1
3	Effect of cooking and processing techniques on carbohydrates of food: sugar, starch, cellulose, pectin and gums	2
4	Effect of cooking and processing techniques on proteins of food. Methods of assessing protein quality	2
5	Properties, uses, changes during heating and other processing and storage of fats and oils.	2
6	Classification, importance, composition of fruits and vegetables and effect of cooking and processing on their nutritive value	2
7	Classification and importance of beverages.	1
8	Food pigments; browning reaction	1
9	Definition, classification, uses and legal aspects of food additives; classification, nature and uses of leavening agents.	2
10	Food Labeling	1
	Total	**15 lect.**

Practical

Sr. No	Topic	No. of Practical Classes
1	Organoleptic evaluation of different foods	3
2	Effect of cooking	2
3	Demonstration of Nutrition facts	1
	Total	**6**

Module 2-Functional Foods and Nutraceuticals

Contents:

Topic No.	Topics and Details	No. of lectures
1	Introduction: Definition, history, classification – Type of classification	1
2	Probiotics Taxonomy and important features of probiotic micro- organisms. Health effects of probiotics including mechanism of action. Probiotics in various foods: fermented milk products, non-milk products etc. Quality Assurance of probiotics and safety.	2
3	Prebiotics Unit 1. Definition, chemistry, sources, metabolism and bioavail ability, effect of processing, physiological effects, effects on human he alth and potential applications in risk reduction of diseases, perspective for fo od applications for the following: - Non-digestible carbohydrates/oligosaccharides: - Dietary fibre - Resistant starch - Gums	3
4	Other Food Components with potential health benefits: Definition, chemistry, sources, metabolism and bioavailability, e ffect of processing, physiological effects, effects on human health and pote- ntial applications in risk reduction of diseases, perspective for food applications for the following: - Polyphenols: Flavonoids, catechins, isoflavones, tannins - Phytoesterogens - Phytosterols - Glucosinolates - Pigments : Lycopene, Curcumin etc - Organo sulphur compounds - Other components – Phytates, Protease inhibitors, saponins, Amylase inhibitors, haemagglutinins - Active biodynamic principles in spices, condiments and other plant materials	5

5	Non- nutrient effect of specific nutrients : Proteins, Peptides and nucleotides, Conjugated linoleic acid and n-3 fatty acids, Vitamins and Minerals.	4
Total		**15 lect**

Practical

Sr. No	Topic	No. of Practical Classes
1	Demonstration on commonly available pre and probiotics	1
2	Isolation of lycopene from tomatoes	1
3	Isolation of trypsin inhibitor from Methi seeds	1
4	Demonstration on nutraceuticals	1
Total		4

Module 3-Food Toxicology & Microbiology

Contents:

Topic No.	Topics and Details	No. of Lectures
1	**Food Toxicology** Introduction and significance of food toxicology. Food poisoning: types, causative factors, preventive measures.	1
2	natural food toxins, anti-nutritional factors, other food toxins, harmful effects, methods of removal.	1
3	Microbial toxins and food intoxications. Source of contamination, effect on health, preventive measures, methods of inactivation/destruction.	1
4	Chemical toxins: Pesticides, insecticides metallic and others, residual effects, preventive measures, methods of removal.	1
5	Food packaging material, potential contaminants from food packaging material.	1
6	Food laws and standards: FPO, ISI, AGMark, Codex Alimentarius, ISO, mark for vegetarian and non vegetarian foods, ecofriendly products and others in operation.	1
1	**Food Microbiology & Safety** Microbiology of food Occurrence an Growth of microorganisms in foods Food Hazards of Microbial Origin	1
2	Foods Spoilage	1
3	Hygiene and Sanitation in food service establishments	1
4	Food Contaminants	1
5	Food additives	1
6	Food Adulteration	1
7	Food Safety- Basic Concept Food safety in food service Establishment and other food areas	1
8	Food Packaging	1
9	Risk analysis	
10	Food regulations-standard & quality control	1
	Total	**15 Lect**

Practical

Sr. No	Topic	No. of Practical Classes
1	Demonstration on Food toxins	1
2	Demonstration on antinutritional factors	1
3	Demonstration on Chemical toxins	1
4	Demonstration on Food microbiology	1
5	Demonstration on Food Spoilage	1
6	Demonstration on Food packaging	1
Total		6

Module 4-Food Analysis

Contents:

Topic No.	Topics and Details	No. of lectures
1	Familiarization to terms and calculations used in preparation of various standard solutions	1.5
2	Principles, techniques and applications of colorimetr, spectrophotometer and atomic absorption spectrophotometer, fluorimeter, flame photometer	3
3	Electrophoresis: Principle different types and applications	3
4	Chromatography: Principle different types and applications	3
5	Introduction to animal assay.	1.5
6	Techniques in separation of biomolecules and tracer techniques in biology – radioactivity	3
Total		**15 lect**

Practical

Sr. No	Topic	No. of Practical Classes
1	Demonstration of colorimeter	1
2	Estimation of Iron	1
3	Demonstration of paper chromatography of sugars	1
4	Demonstration of paper electrophoresis	1
5	Demonstration of flame photometer	1
Total		**5**

Semester IV:- Clinical Nutrition Management

Module 1- Nutrition Management I

Contents:

Topic No.	Topics and Details	No. of lectures
1 & 2	**Medical Nutrition Theropy (MNT)** **Nutrition in Cardiovascular Diseases and Hypertension** Hypertension – classification (secondary and essential) Risk Factors for hypertension-CVA, MCA Dietary management-DASH approach Hyperlipidemia and Hyperlipoproteinemia Classifications Dietary management Cholesterol lowering agents Cholestreol lowering agents Atherosclerosis - Etiology and understanding the pathogenesis Coronary Heart Disease - Angina Pectoris and Myocardial Infarction (Terminology) - Dietary management Congestive Heart Failure - Pathogenesis - Pathogenesis of sodium and water retention Risk factors Clinical manifestation Cardiac Cachexia Treatment - Nutritional Care Cerebrovascular Disease and Peripheral Vascular Disease - In brief etiology and dietary care	5

3	**Diabetes -** Nutrition for Diabetes Mellitus and hypoglycemia Aetiology, classification, pathophysiology symptoms and diagnosis Management of DM (brief) Home blood glucose monitoring Glycosylated hemoglobin Urine testing Blood sugar lowering agents i) Oral hypoglycemic agents ii) Insulin Exercise Nutritional management Diet planning for Type1, Type2 For Special conditions Pregnancy Elderly Surgery Illness Physical activities Acute complications – pathophysiology, diagnosis, types, treatment Hypoglycemia Ketoacidosis Somogyi effect Dawn phenomenon Long term complication - pathophysiology, diagnosis, types, and treatment Macrovascular Microvascular	6
4	**Obesity –** Nutrition for weight management: Disorders of energy Balance, Psyco-social aspects. Components of body weight Adipose tissue- structure, regional distribution and storage Regulation of body weight Types of obesity Assessment of obesity Health risks Causes of obesity: neural, hormonal, and psychological Management of obesity - Dietary Modification : past and present approach - Surgical treatment effect on satiety and other factors - Maintenance of Reduced weight **Eating disorders**: Anorexia Nervosa and Bulimia Nervosa	4
	Total	**15 lect**

Practical

Sr. No	Topic
1	Ward Posting

Module 2- Nutrition Management II

Topic No	Topics and Details	No. of Lectures
1	**Nephrology -** MNT in Renal Diseases GlomeruloNephritis Etiology, characteristics Objectives, Principles of dietary treatment and management Nephrotic Syndrome Etiology, Objectives, Principles of dietary treatment and Management CKD-1 to 5 stages Uremic Renal Failure History, General importance of protein nutrition in renal failure and uremia Causes and Dietary management in Acute Renal Disease Causes and Dietary management in Chronic Renal Disease Dietary modification in chronic renal disease with complications Sodium and Potassium Exchange list Types of dialysis and their nutritional care – **Haemodialysis**, CAPD, Continuous Ambulatory peritoneal dialysis) **Renal Transplant and its nutritional care** **Nephrolithiases**- etiology, types of stones and nutritional care (acid & alkaline ash diet)	4
2	**Medical Nutrition therapy for Upper Gastrointestinal tract Diseases /Disorders** **Pathophysiology and Nutritional care and diet therapy in** Diseases of oesophagus; oesophagitis, Hiatus hernia Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers Management: associated with H. pylori infection, NSAIDS Dietary management: traditional approach and liberal approach **Gastric Surgery**: Nutritional care, dumping syndrome **Pre & Post surgery**	4

	Medical Nutrition therapy for Lower gastrointestinal tract Diseases/Disorders Common Symptoms of Intestinal dysfunction - Flatulence, constipation, haemorhoids, diarrhoea, steatorrhoea, Diseases of the large intestine: - Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease Malabsorption Syndrome/Diseases of Small intestine - Celiac (Gluten –induced) sprue, tropical sprue, intestinal brush border enzyme deficiencies, Lactose intolerance, protein- losing enteropathy Principles of dietary Care: Fibre, residue Modified fibre diets e) Intestinal surgery: Short bowel syndrome, Ileostomy, Colostomy, Rectal surgery Special Issues	
3	**M NT for Diseases of the Hepato - Biliary Tract** Nutritional care in liver disease in context with results of specific liver function tests - Dietary care and management in viral hepatitis(different types) , cirrhosis of liver, hepatic encephalopathy, Wilson's disease Dietary care and management in diseases of the gall bladder and pancreas i.e. billary dyskinesia, cholelithiasis, cholecystitis, cholecystectomy, pancreatitis, Zollinger-Ellison syndrome	2
4	**Delivery of Nutritional Support – Meeting nutritional needs** a)Enteral tube feeding b)Parenteral nutrition	1
5	**TB, HIV & Other Infectious Diseases** Nutrition in Fever and Infectious Diseases (Brief) Effect of fever and infection on Nutritional status Nutritional management: typhoid, tuberculosis and malaria, HIV Infection & AIDS	4
	Total	**15 lect**

Practical

Sr. No	Topic
1	Ward Posting

Module 3- Nutrition In Critical Care

Contents:

Topic No	Topic and Details	No. of Lectures
1	Nutritional screening and nutritional status assessment of the critically ill.	1
2	Nutritional support systems and other life – saving measures for the critically ill.	1
3	Enteral and parenteral nutrition support. Role of immuno enhancers, conditionally essential nutrients, immunosuppressants, and special diets in critical care.	2
4	Complications of Nutritional Support System including refeeding syndrome and rehabilitation diets.	1
5	Diet related ethical issues in the terminally ill.	1
6	Enteral Nutrition : Various sites for Enteral nutrition In brief, discussion on ryles tube and its care Types of feeds, advantages and disadvantage of home-based feeds, Commercial formula feeds. Incorporation of easily digestible foods. Requirements of nutrients according to problems eg. Renal, respiratory etc.	2
7.	Total Parental Nutrition The importance of TPN Long term effect of its use Site of TPN and its care Composition	2

8	Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like : CV complications, stroke and surgery Dialysis Respiratory failure-ARDS Multi organ failure Cancer Hepatic failure GI tract- surgery and its complications Neurosurgery Stress, trauma, sepsis and burns Ketoacidosis Nuromuscular Diseases-AIDP, CIDP, Myesthenia Gravis, MND	3
9	Drug-Nutrient Interaction	1
10	Immunonutrition	1
Total		**15 lect.**

Practical

Sr. No	Topic
1	Ward Posting

Module 4- Pediatric and Geriatric Nutrition

Sr. No	Topic and Details	No. of Lectures
1)	**Pediatric Nutrition**	
1	Pediatric Nutritional Assessment:-. Anthropometric measurements, (Ped-SGA) biochemical parameters, clinical and dietary data. Measuring, recording and plotting growth	1
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, fullterm infant, VLBW infants	1
3	Nutritional considerations for LBW children, and children with developmental disabilities, Sick neonat management(EN/PN)	1
4	Nutrition in childhood; Growth and development; nutrient needs Assessment of nutritional status of children Providing an adequate diet: - Factors affecting food intake. Feeding the preschool child, the school-aged child. Preventing chronic disease, PEM	2
5	Nutritional concerns: - Childhood Obesity; Underweight and Undernutrition- shortterm and longterm consequences in brief, Failure to thrive; Growth faltering and detection Mineral and vitamin deficiencies , Dental caries, Allergies Attention-deficit hyperactivity disorder	1
6	Gastrointestinal diseases and disorder i.e. diarrhea, gluten enteropathy, inflammatory bowel disease, constipation and fat absorption test diet. (calculation of fluids& electrolytes- both deficit and maintenance and management of caloric intake) HIV affected infants & children	2
7	Neurological disease in children i.e. epilepsy (ketogenic diets)	1
8	Pulmonary disease in children , cystic fibrosis	1
9	Renal disease and disorder in children i.e. nephritic syndrome, chronic renal failure and different types of dialysis (calculation of fluids& electrolytes- both deficit and maintenance and management of caloric intake)	1

2) 1	**Geriatric nutrition -** The ageing process- physiological, metabolic, body composition changes and impact on health and nutritional status Socio-psychological aspects of ageing-special problems of elderly women	1
2	Nutritional and health status of elderly. Factors influencing food and nutrient intake, health status including lifestyle pattern, medication, psychosocial aspects etc	1
3	Chronic degenerative diseases and nutritional problems of the elderly-their etiopathogenesis, management, prevention and control	1
4	Policies and programmes of the government and NGO sector pertaining to the elderly. Promoting fitness and well being-use of various modern and traditional approaches	1
Total		**15 lect**

Practical

Sr. No	Topic
1	Ward Posting
2	Dissertation

M.Sc. Medical Courses

M.Sc. Clinical Nutrition

1. **Theory**
   Didactic Lectures + Seminars should be **120 Hours**
2. **Practicals**
   Experimental Laboratory +Tutorial+ Demonstration should be **80 Hours**

Examination Pattern

1. There should be two papers in Each Semester.
2. Module 1 & 2 should be covered in Paper I. Module 3 & 4 should be covered in Paper II.
3. Paper pattern should be the same as what was decided in the last Board of Studies meeting. Which is as follows:-

Existing Scheme: (This gives equal weightage to sec B and Sec C)

Question		Mark distribution	Marks allotted per section	Marks
Sec:A	MCQ	10X 1 M =10	10	10
Sec:B	SAQ	3/ 4 x 5 M =15	15	25
	LAQ	1/ 2 x 10 M =10	10	
Sec : C	SAQ	3/ 4 x 5 M =15	15	25
	LAQ	1/ 2 x 10 M =10	10	
				Total= 60 M

4. **Theory Marks Distribution**

   A. Theory Marks -120 Marks

Paper I	60 Marks
Paper II	60 Marks
Total Marks	120 Marks

   B. Theory Internal Assessment Marks- 20 Marks

Attendance (T+P)	10 Marks
Prefinal or Midterm (T+P)	5 Marks
Seminar	5 Marks
Total Marks	20 Marks

- Total A (Theory Marks) +B (Theory Internal Assessment Marks) = 140 Marks

i.e. Internal Assessment of Theory should be added to total Theory Paper Marks.

21 Practical Marks Distribution

C. Practical Experiments- 35 Marks

Experiment No.1	20 Marks
Experiment No.2 or Station Excercise	20 Marks
Viva	10 Marks(5+5)
Total	50 Marks

D. Practical Internal Assessment-15 Marks

Journal	5 Marks
Prefinal or Midterm	5 Marks
Total	10 Marks

- Total C (Practical Marks) +D (Practical Internal Assessment Marks) = 60 Mark
  i.e. Internal Assessment of Practical should be added to total Practical Paper Marks.
- **Grand Total:** A (Theory Marks) +B (Theory Internal Assessment Marks)+C (Practical Marks)+D (Practical Internal Assessment Marks) =200 Marks
- **EACH CANDIDATE APPEARS FOR 200 MARKS IN EACH SEMESTER.**
- **Passing Criteria : As per MGMIHS Rule.**
- **Infrastructure required :**
  - **a) Staff room**
  - **b) Equipments :**

Sr. No	Equipments Name	Amount
1	Bioimpedence Analysis from Tannita Company	Rs. 3.0 lakh
2	Power lab	Rs. 7.0 lakh
3	Tread Mill	Rs. 0.7 lakh
4	Skin fold Calipers	Rs. 0.1 lakh
5	Height, Weight Scale	Rs. 0.1 lakh
6	Bone Densitometer	
Total approximately		12.0 lakhs

- **Teaching staff from following departments will be involved**
  -Dietician
  -Biochemistry
  -Physiology
  -PSM
  -Medicine
  -Surgery

- **Visiting faculty from Mumbai University Home Sciences College may be included.**

Resolution No. 4.13 of BOM-55/2018: Resolved as follows:-

(i) Slow learners must be re-designated as potential learners.

(ii) Students scoring less than 35% marks in a particular subjects/course in the 1st formative exam are to be listed as potential learners. These learners must be constantly encouraged to perform better with the help of various remedial measures.

(iii) Students scoring more than 75% marks in a particular subjects/course in the 1st formative exam are to be listed as advanced learners. These learners must be constantly encouraged to participate in various scholarly activities.

MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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