# MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
**Grade 'A' Accredited by NAAC**
Sector-01, Kamothe, Navi Mumbai -410 209
Tel 022-27432471, 022-27432994, Fax 022 -27431094
E-mail: registrar@mgmuhs.com; Website :www.mgmuhs.com

CHOICE BASED CREDIT SYSTEM

**(CBCS)**

**(with effect from 2018-19 Batches)**

# Curriculum for

# M.Sc. Clinical Nutrition

Amended upto AC-42/2022, Dated 26/04/2022

## Amended History

1. Approved as per BOM -55/2018 [Resolution No.4.17], Dated 19/05/2018.
2. As amended in BOM-57/2019, [Resolution No.3.2.1.3], [Resolution No.3.1.4.2], [Resolution No.3.2.1.6.e], Dated 26/04/2019.
3. As Amended in BOM-63/2021[Resolution No.4.3.1.2], [Resolution No.4.3.1.3.], Dated 17/02/2021.
4. As Amended in AC-41/2021 [Resolution No. 3.5]; dated 27/08/2021.
5. As Amended in AC-42/2022 [Resolution No. 10.4.i], Dated 26/04/2022.

## OUTLINE OF COURSE CURRICULUM

### M.Sc. Clinical Nutrition

#### Semester I

| Code No. | Core Subjects | Credits/Week | | | | | Hrs/Semester | | | | | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation | Total Credits (C) | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation | Total hrs. | Internal Assessment | Semester Exam | Total |
| **Theory** | | | | | | | | | | | | | | |
| MCN 101 L | Principles of Nutrition | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 | **100** |
| MCN 102 L | Biochemistry & Applied Biochemistry | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 | **100** |
| MCN 103 L | Basic Human Physiology | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 | **100** |
| MCN 104 L | Pathophysiology | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 | **100** |
| MCN 105 CP | Nutrition Directed Clinical Education-I | - | - | - | 21 | **7** | - | - | - | 315 | **315** | 50 | - | **50** |
| **Practical** | | | | | | | | | | | | | | |
| MCN 102 P | Biochemistry & Applied Biochemistry | - | - | 2 | - | **1** | - | - | 30 | - | **30** | 10 | 40 | **50** |
| MCN 103 P | Basic Human Physiology | - | - | 2 | - | **1** | - | - | 30 | - | **30** | 10 | 40 | **50** |
| MCN 104 P | Pathophysiology | - | - | 2 | - | **1** | - | - | 30 | - | **30** | 10 | 40 | **50** |
| **Total** | | **14** | **0** | **6** | **21** | **24** | **210** | **0** | **90** | **315** | **615** | **160** | **440** | **600** |

## OUTLINE OF COURSE CURRICULUM

### M.Sc. Clinical Nutrition

#### Semester II

| Code No. | Core Subjects | Credits/Week | | | | | Hrs/Semester | | | | | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation | Total Credits (C) | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation | Total hrs. | Internal Assessment | Semester Exam | Total |
| **Theory** | | | | | | | | | | | | | | |
| MCN 106 L | Medical Nutrition Therapy I | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 | **100** |
| MCN 107 L | Advance Nutrition | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 | **100** |
| MCN 108 L | Food Microbiology and Safety | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 | **100** |
| MCN 109 CP | Nutrition Directed Clinical Education-II | - | - | - | 21 | **7** | - | - | - | - | **315** | 50 | - | **50** |
| CC 001 L | Research Methodology & Biostatistics ( Core Course) | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 | **100** |
| **Practical** | | | | | | | | | | | | | | |
| MCN 106 P | Medical Nutrition Therapy I | - | - | 4 | - | **2** | - | - | 60 | - | **60** | 10 | 40 | **50** |
| CC 001 P | Research Methodology & Biostatistics ( Core Course) | - | - | 4 | - | **2** | - | - | 60 | - | **60** | 10 | 40 | **50** |
| **Total** | | **14** | **0** | **8** | **21** | **25** | **210** | **0** | **120** | **0** | **645** | **150** | **400** | **550** |

## OUTLINE OF COURSE CURRICULUM

### M.Sc. Clinical Nutrition

#### Semester III

| Code No. | Core Subjects | Credits/Week | | | | | Hrs/Semester | | | | | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation | Total Credits (C) | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation | Total hrs. | Internal Assessment | Semester Exam | Total |
| **Theory** | | | | | | | | | | | | | | |
| MCN 110L | Medical Nutrition Therapy II | 4 | 0 | - | - | **4** | 60 | 0 | - | - | **60** | 20 | 80 | **100** |
| MCN111 L | Community Nutrition | 3 | 0 | - | - | **3** | 45 | 0 | - | - | **45** | 20 | 80 | **100** |
| MCN 112 L | Food Science and analysis | 3 | | - | | **3** | 45 | - | - | | **45** | 20 | 80 | **100** |
| MCN 113 L | Pediatric and geriatric Nutrition | 4 | | | | **4** | 60 | | | | **60** | 20 | 80 | **100** |
| MCN 114 | Nutrition Directed Clinical Education III | 4 | | - | 21 | **7** | | - | - | - | **315** | 50 | | **50** |
| **Practical** | | | | | | | | | | | | | | |
| MCN 107P | Medical Nutrition Therapy II | - | - | 4 | - | **2** | - | - | 60 | 60 | **60** | 10 | 40 | **50** |
| MCN 108P | Food Science and analysis | - | - | 4 | - | **2** | - | - | 60 | 60 | **60** | 10 | 40 | **50** |
| | | | | | | | | | | | | | | |
| **Total** | | **18** | **0** | **8** | **21** | **25** | **210** | **0** | **120** | **120** | **645** | **150** | **400** | **550** |

| Semester IV | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Syllabus Ref. No.** | **Subject** | **Credits** | **Teaching hours** | **Marks** | | |
| | **Theory** | | | | **Internal Assessment** | **Semester Exam** | **Total** |
| | | **General elective **** | 4 | 4 | 100 | - | 100 |
| | GE 001 T | Pursuit of Inner Self Excellence (POISE) | | | | | |
| | GE 002 T | Bioethics, Biosafety, IPR & Technology transfer ▲ (Multidisciplinary/ Interdisciplinary) | | | | | |
| | GE 003 T | Disaster management and mitigation resources | | | | | |
| | GE 004 T | Human rights | | | | | |
| | MCN 116 | Dissertation / Project* | 18 | 36 | - | 200 | 200 |
| | **Practical** | | | | | | |
| | MCN117 P | Educational Tour / Field Work* | 2 | 0 | 50 | - | 50 |
| | | **Total** | 24 | 40 | 150 | 200 | 350 |

**DIRECTOR'S MESSAGE**

Dear Students,

Greetings!!!!!

I take this opportunity to welcome you on behalf of MGM family to the Masters Degree at MGM School of Biomedical Sciences (MGM SBS).

MGM School of Biomedical Sciences (MGM SBS) established in the year 2007, the MGM School of Biomedical Sciences envisaged building a progressive learning community and is committed to pursuit of excellence in higher education, total development of personality and shaping the students into sensitive, self-reliant citizens of the country imbued with the ideals of secularism and a scientific aptitude. We set global standards to make our students scientifically as well as ethically stronger. The college adopts the national qualification frame work for the post-graduate programs which has adopted Credit Base Choice System (CBCS) so that, we construct a value based system of education that encourages critical thinking and creativity, a research platform as opposed to rote learning.

The P.G (M.Sc.) courses offered are; Medical Anatomy, Medical Physiology, Medical Biochemistry, Medical Microbiology, Medical Pharmacology, Biotechnology, Genetics, Molecular Biology, Masters in Hospital administration and Biostatistics, M.Sc. Cardiac Care Technology, M.Sc. Medical Radiology and Imaging Technology, M. Optometry, MPH & M.Sc. Clinical NutritionOver time, the program has evolved, to meet the challenges of the ever changing field of biomedical education system.

With Best Wishes,

Director
MGM School of Biomedical Sciences

# M.Sc. Clinical Nutrition
## Syllabus

**Eligibility**: Eligibility students with the following undergraduate degrees are eligible, B.Sc. Biochemistry or any Life Science & 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.

**Course outcome:**

After this course the students will be able to become health care professionals in the hospitals can perform teaching and research work in the institutions and the industries and can give nutrition education and create awareness among the society.

# FIRST YEAR

## M.Sc. Clinical Nutrition

### SEMESTER-I

| Code No. | Core Subjects |
|---|---|
| **Theory** | |
| MCN 101 L | Principles of Nutrition |
| MCN 102 L | Biochemistry &Applied Biochemistry |
| MCN 103 L | Basic Human Physiology |
| MCN 104 L | Pathophysiology |
| MCN 105 CP | Nutrition Directed Clinical Education-I |
| **Practical** | |
| MCN 102 P | Biochemistry &Applied Biochemistry |
| MCN 103 P | Basic Human Physiology |
| MCN104 P | Pathophysiology |

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Principles of Nutrition** |
| **Course Code** | **MCN 101 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• The basic concept of nutrition.<br>• The importance of nutrients for the growth and maintenance of human body. |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• Discuss the role of nutrients for human health and certain disorders.<br>• Describe the different forms of nutrients and about the procurement and requirement of nutrient**ts.** |

| Sr. No. | Topics | No. of Hrs. |
|---|---|---|
| 1 | **Basic Concepts**: Micro & macronutrients, Food pyramid,Balanced diet, Nitrogen balance, Protein quality, SDA, BMR, Thermogenic effect of foods. | 6 |
| 2 | **Body Composition**<br>Significance of body composition and changes through the life cycle,Methods for assessing body composition (bothclass ical and recent) and their applications. | 6 |
| 3 | **Energy**<br>Components of energy requirements: BMR, thermic effect of feeding, physical activity. Factors affecting energy requirements, methods of measuring energy expenditure.<br>Estimating energy requirements of individuals. | 6 |
| 4 | **Carbohydrates**<br>Nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates andtheir implications<br>Dietary fibre: Types, sources, role and mechanism of action | 6 |
| 5 | **Proteins**<br>Amino acids:Nutritional importance, essential , non essential aminoacids<br>Therapeutic applications of specific amino acids<br>Peptides of physiological significance. | 6 |

| | | |
|---|---|---|
| 6 | **Lipids**<br>Nutritional significance of fatty acids – SFA, MUFA,<br>PUFA: functions and deficiency<br>Role of n-3 and n-6 fatty acids<br>Prostaglandins<br>Trans Fatty Acids<br>Conjugated linoleic acid<br>Nutritional Requirements and dietary guidelines (International and National) for visible and invisible fats in diets. | 9 |
| 7 | **Electrolytes**<br>Sodium, Potassium and Chloride | 3 |
| 8 | **Vitamins:**<br>Historical background, Structure, Chemistry, Food sources, Requirement and Deficiency manifestations<br>a)Water soluble Vitamins (B Complex and Vitamin C)<br>b) Fat soluble Vitamins (Vitamin A,D,E,K) | 6 |
| 9. | **Minerals (Macro Minerals): Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chloride**<br>Introduction, Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity .Interaction with other nutrients<br>**Minerals (Micro Minerals): Iron, Zinc, Copper, Selenium, Chromium, manganese, iodine and fluorine**<br>Introduction, Physiological role, Bioavailability and requirements,<br>food sources, deficiency and toxicity, Interaction with other nutrients | 6<br>6 |
| **Total** | | **60 hrs** |

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Biochemistry & Applied Biochemistry** |
| **Course Code** | **MCN 102 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• Understand the mechanisms adopted by the human body for regulation of metabolic pathways<br>• Develop an insight into interrelationships between various metabolic pathways |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• Understand integration of cellular level metabolic events to nutritional disorders and imbalances. |

## Contents:

**Below is Currently Printed in Curriculum / Syllabus in AY 2018/19**

| TopicNo. | Topics and Details | No. of lectures |
|---|---|---|
| 1 | **Basic Concepts &Body Composition**<br>Micro & macronutrients, Food pyramid, Balanced diet, Nitrogen balance, Protein quality, SDA, BMR, Thermogenic effect of foods.<br>Significance of body composition and changes through the life cycle<br>Methods for assessing body composition (both classical and recent) and their applications | 01 |
| 2 | **Energy**<br>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. | 02 |
| 3 | **Carbohydrates**<br>Nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates andtheir implications<br>Dietary fibre: Types, sources, role and mechanism ofaction<br>Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiologicalsignificance<br>Glycemic Index and glycemic load | 03 |

| | | |
|---|---|---|
| 4 | **Proteins**<br>Amino acids:Nutritional importance, essential , non essential aminoacids<br>Therapeutic applications of specific amino acids<br>Peptides of physiological significance. | 03 |
| 5 | **Lipids**<br>Nutritional significance of fatty acids – SFA, MUFA,<br>PUFA: functions and deficiency<br>Role of n-3 and n-6 fatty acids<br>Prostaglandins<br>Trans Fatty Acids<br>Conjugated linoleic acid<br>Nutritional Requirements and dietary guidelines (International and National) for visible and invisible fats in diets. | 03 |
| 6 | **Vitamins:**<br>Historical background, Structure, Chemistry, Food sources, Requirement and Deficiency manifestations<br>a)Water soluble Vitamins (B Complex and Vitamin C)<br>b) Fat soluble Vitamins (Vitamin A,D,E,K) | 6 |
| 7. | **Minerals (Macro Minerals): Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chloride**<br>Introduction, Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity .Interaction with other nutrients<br>**Minerals (Micro Minerals): Iron, Zinc, Copper, Selenium, Chromium, manganese, iodine and fluorine**<br>Introduction, Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity, Interaction with other nutrients | 03<br>03 |
| 8 | **Cell Membrane**<br>structure, composition and Transport of metabolites across the across the membrane | 01 |
| 9 | **Acid base balance and its regulation** | 02 |
| 10 | **Water & Elctrolyte metabolism and disorders** | 02 |

| | | |
|---|---|---|
| 11 | **Outline of Carbohydrate Metabolism**<br>Metabolism is to be discussed with reference to:<br>Digestion and Absorption of carbohydrates<br>Cellular metabolism of carbohydrates(EM pathway, TCA cycle,Gluconeogenesis, HMP pathway, Glycogen metabolism)<br><br>Regulation of blood suagar,<br>Hypoglycemia and hyperglycemia<br>Glycogen storage conditions, Lactose intolerance and , Galactosemia, Diabetes Mellitus, Renal glycosuria, glycosuria, Gestational diabetes | 06 |
| 12 | **Outline of Metabolism of Lipids**<br>Metabolism is to be discussed with reference to:<br>Intestinal transport of lipids<br>Cellular uptake and metabolism of lipids<br>(beta-oxidation, denovo synthesis of fatty acids,<br>synthesis and breakdown of unsaturated fatty acids,<br>cholesterol, and triacylglycerol)<br>Lipoprotein metabolism<br>VLDL and LDL ('Forward' Cholesterol transport)<br>VLDL and LDL (Endogenous TAG transport)<br>HDL('Reverse' Cholesterol transport)<br><br>Atherosclerosis and risk of cardiac disorders | 05 |
| 13 | **Outline Protein Metabolism**<br>Metabolism is to be discussed with reference to:<br>Metabolism of amino acids and their disorders- (aromatic amino acids, Sulphur containing amino acids, Glycine, branched chain aminoacids)<br>urea cycle and its disoders<br>Plasma proteins – Nature, properties and functions<br>Biologically active peptides, polypeptides and | 05 |
| 14 | **Intermediary Metabolism**<br>Intrigation of carbohydrate, lipid & protein metabolism<br>Hormonal Regulation, | 01 |
| 15 | **Starvation metabolism** | 02 |
| 16 | **Hormone** | 02 |
| 17 | **Biological Oxidation**<br>Electron transport chain and oxidative<br>phosphorylation. | 02 |
| 18 | Outline of Metabolism purine and pyrimidines<br>Metabolism of purines<br>Metabolism of pyrimidines<br>Disorders of Purine Metabolism | 02 |

| | | |
|---|---|---|
| 19 | **Enzymes**<br>Classification of enzyme, Factors affecting enzyme activity.<br>Enzyme specificity, regulation of enzyme activity<br>and inhibition.<br>Enzymes in clinical diagnosis | 04 |
| 20 | **Detoxification in the body, metabolism of xenobiotics** | 02 |
| 14 | **Free radicals, ROS and oxidative damage** | |
| **Total** | | **60hrs** |

## Approved as per Resolution No. 3.2.1.6.c of BOM-57/2019 dated 20/06/2019

| TopicNo. | Topics and Details | No. of lectures |
|---|---|---|
| 1 | **Cell Membrane**<br>Structure, composition and Transport of metabolites across the across the membrane | 03 |
| 2 | **Acid base balance and its regulation** | 02 |
| 3 | **Water & Elctrolyte metabolism and disorders** | 02 |
| 4 | **Outline of Carbohydrate Metabolism**<br>Metabolism is to be discussed with reference to:<br>Digestion and Absorption of carbohydrates<br>Cellular metabolism of carbohydrates(EM pathway, TCA cycle,Gluconeogenesis, HMP pathway, Glycogen metabolism)<br><br>Regulation of blood suagar,<br>Hypoglycemia and hyperglycemia<br>Glycogen storage conditions, Lactose intolerance and , Galactosemia, Diabetes Mellitus, Renal glycosuria, glycosuria, Gestational diabetes | 10 |
| 5 | **Outline of Metabolism of Lipids**<br>Metabolism is to be discussed with reference to:<br>Intestinal transport of lipids<br>Cellular uptake and metabolism of lipids<br>(beta-oxidation, denovo synthesis of fatty acids,<br>synthesis and breakdown of unsaturated fatty acids,<br>cholesterol, and triacylglycerol)<br>Lipoprotein metabolism<br>VLDL and LDL ('Forward' Cholesterol transport)<br>VLDL and LDL (Endogenous TAG transport)<br>HDL('Reverse' Cholesterol transport)<br><br>Atherosclerosis and risk of cardiac disorders | 8 |

| | | |
|---|---|---|
| 6 | **Outline Protein Metabolism**<br>Metabolism is to be discussed with reference to:<br>Metabolism of amino acids and their disorders- (aromatic amino acids, Sulphur containing amino acids, Glycine, branched chain aminoacids)<br>urea cycle and its disoders<br>Plasma proteins – Nature, properties and functions<br>Biologically active peptides, polypeptides and | 10 |
| 7 | **Intermediary Metabolism**<br>Intrigation of carbohydrate, lipid & protein metabolism<br>Hormonal Regulation, | 3 |
| 8 | **Starvation metabolism** | 2 |
| 9 | **Hormone** | 2 |
| 10 | **Biological Oxidation**<br>Electron transport chain and oxidative phosphorylation. | 3 |
| 11 | Outline of Metabolism purine and pyrimidines<br>Metabolism of purines<br>Metabolism of pyrimidines<br>Disorders of Purine Metabolism | 4 |
| 12 | **Enzymes**<br>Classification of enzyme, Factors affecting enzyme activity.<br>Enzyme specificity, regulation of enzyme activity and inhibition.<br>Enzymes in clinical diagnosis | 6 |
| 13 | **Detoxification in the body, metabolism of xenobiotics** | 5 |
| 14 | **Free radicals, ROS and oxidative damage** | |
| **Total** | | **60hrs** |

# MCN 102 P- Biochemistry &Applied Biochemistry

| Sr. No | Topic | No of Practical classes |
|---|---|---|
| 1. | Tests for Monosaccharides | 2 |
| 2. | Test of disaccharide and polysaccharide | 2 |
| 3. | Enzymatic Hydrolysis of Starch | 2 |
| 4. | Colour Reactions of Proteins | 2 |
| 5. | Precipitation Reactions of proteins | 2 |
| 6. | Qualitative Test for Vitamin A & C | 2 |
| 7. | Estimation of Blood Glucose, glycosylated haemoglobin | 3 |
| 8. | Demonstration on Glucose Tolerance Test | 1 |
| 9. | Demonstration on Lipid Profile | 1 |
| 10. | Demonstration on Total Protein & A/G Ratio | 2 |
| 11. | Estimation of Serum Uric Acid | 2 |
| 12. | Demonstration on AST, ALT & ALP | 1 |
| 13. | Demonstration of Iron Studies | 3 |
| 14 | Demonstration of Vitamin B12 | 1 |
| 15 | Demonstration of Vitamin D | 1 |
| 16 | Demonstration of TFT | 3 |
| **Total** | | 30 |

**References:**


Dasgupta, S. K., Biochemistry Vol. I; N & Iii, Mc Milan Co. of India Ltd

Das, Debajyoti, Biochemistry 2nd Ed., 1980, Academic Publishers, India.

Harper, H. A. etal, A Review Of Physiological Chemistry, Los Altos,Lange Medical Publications, 1985.
Lehninger, A. L., Principles Of Biochemistry

Chaterjee. Textbook Of Medical Biochemistry

Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Basic Human Physiology** |
| **Course Code** | **MCN 103 L** |

| | |
|---|---|
| **Teaching Objective** | To apprehend the candidate with:<br>• The basic physiology of various system in human body.<br>• The functions of various organs and their regulation. |
| **Learning Outcomes** | After the course accomplishment the student will be able to:<br>• To discuss the physiology of the different organ system<br>• To understand the functions of various organs of human body. |

| **Sr. No** | **Topics** | | **No. of Hrs.** |
|---|---|---|---|
| 1 | Circulatory system | 1. Basic structure and function of CVS<br>2. Structure and function of heart<br>3. Cardiac Impulse and cardiac cycle<br>4. Concept of Blood Pressure, Normal values, Regulation<br>5. Normal ECG<br>6. Cardiac Output | 8 |
| 2 | Respiratory System | 1. Basic structure and function of RS<br>2. Mechanism of breathing<br>3. Transport of oxygen and carbon dioxide<br>4. Regulation of respiration | 6 |
| 3 | Renal System | 1. Basic structure and function of Renal System<br>2. Mechanism of urine formation GFR & Tubular functions.<br>3. Maintains of Osmolarity& Volume of ECF<br>4. Micturition & RFT | 4 |
| 4 | Digestive system | 1. Basic structure and function of GIT<br>2. Digestion & Absorption of food in various parts of GIT | 8 |
| 5 | Musculoskeletal system | 1.Basic structure and function of skeletal muscle<br>2. Neuromuscular Transmission and muscle contraction<br>3. Energetics of muscle contraction | 4 |

| | | | |
|---|---|---|---|
| 6 | Endocrine System | 1.Introcuction to Endocrine system<br>2. Function, Regulation & Disorders of<br>• Pituitary gland<br>• Thyroid gland<br>• Parathyroid gland<br>• Adrenal gland<br>• Endocrine Pancreas gland | 9 |
| 7 | Hemotology | 1.Composition & Functions of Blood<br>2.Normal Haemogram<br>3.Formation of blood cells-RBC, WBC, Platelets<br>4.Anemia<br>5. Blood coagulation<br>6. Blood groups | 6 |
| **Total** | | | **45hrs** |

# MCN 103 P- Basic Human Physiology

| Sr. No. | Topics | No. of Hrs. |
|---|---|---|
| 1 | Microscopy | 2 |
| 2 | Estimation of Hemoglobin | 2 |
| 3 | Estimation of WBC | 2 |
| 4 | Estimation of RBC | 2 |
| 5 | Estimation of DLC | 4 |
| 6 | Estimation of blood group | 2 |
| 7 | BT & CT | 2 |
| 8 | General Examinatoin, History taking | 2 |
| 9 | Clinical Examination of Pulse | 3 |
| 10 | Blood Pressure | 3 |
| 11 | Demonstration of Clinical Examination of CVS | 2 |
| 12 | Demonstration of Clinical Examination of RS | 2 |
| 13 | Demonstration of Clinical Examination of Alimentary System | 2 |
| **Total** | | **30 hrs** |

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Pathophysiology** |
| **Course Code** | **MCN 104 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• The pathophysiological changes in different organs, tissues and systems in different disease conditions across the lifespan<br>• The metabolic changes occurring in disease conditions<br>• The implications of functional interrelationships in a diseased body. |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• To know and interpret the various diagnostic indicators/parameters<br>• To apply this knowledge for planning nutritional care of individuals**.** |

| **Sr. No.** | **Topics** | | **No. of Hrs.** |
|---|---|---|---|
| 1 | Cardio vascular diseases | Atherosclerosis, Diet and Heart disease, Heart failure Hypertension- etiology, pathophysiology and diet, Rheumatic heart disease, Myocardial Infarction - etiology, pathophysiology and diet | 10 |
| 2 | Nutritional pathophysiology | Protein energy malnutrition, Kwashiorkar/ marasmus, Vitamins - absorption, deficeincy and role of diet, Rickets, Obesity - pathophysiology and diet | 05 |
| 3 | Respiratory system | Effect of smoking on lung, COPD, Pneumonia, Lung tumours - etiology, pathophysiology, Environment and lung diseases | 05 |
| 4 | Urinary system | Renal stones and diet, Urinary tract infections, Glomerulonephritis | 05 |
| 5 | Gastrointestinal system | Gastritis- pathophysiology and role of diet, Peptic versus duodenal ulcers, Tumours of GI system | 05 |
| 6 | Liver, Gall bladder, Pancreas | Liver disease and alcoholism, Hepatitis- etiology, pathophysiology and role of diet, Gall bladder stones and diet, Pancreatitis | 05 |
| 7 | Musculoskeletal system | Gout -etiology, pathophysiology and role of diet, Osteoporosis, Metabolic bone disease | 05 |
| 8 | Endocrine system | Thyroid, PCOS, Addison's disease, Diabetes mellitus - def, classification, pathophysiology and role of diet | 05 |
| **Total** | | | **45 hrs** |

# MCN 104 P: Pathophysiology

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| 1 | Urine Routine & Microscopy | 5 |
| 2 | Haemoglobin estimation | 5 |
| 3 | Anaemia charts | 10 |
| 4 | Hepatitis charts | 10 |
| **Total** | | **30 hrs** |

## Course code- MCN 105 CP: Nutrition Directed Clinical Education – I

Students will gain additional skills in this program to increase the role of nutrition in the practice of medicine, medical research, health promotion, and disease prevention by providing a unique combination of educational experiences to medical students. The students will be exposed to both clinical and academic aspects of nutrition..

## (Total-315 hrs)

# FIRST YEAR

## M.Sc. Clinical Nutrition

### SEMESTER-II

| Code No. | Core Subjects |
|---|---|
| **Theory** | |
| MCN 106 L | Medical Nutrition Therapy I |
| MCN 107 L | Advance Nutrition |
| MCN 108 L | Food Microbiology and Safety |
| MCN 109 CP | Nutrition Directed Clinical Education-II |
| CC 001 L | Research Methodology & Biostatistics ( Core Course) |
| **Practical** | |
| MCN 106 P | Medical Nutrition Therapy I |
| CC 001 P | Research Methodology & Biostatistics ( Core Course) |

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Medical Nutrition Therapy I** |
| **Course Code** | **MCN 106 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• Understanding of basic concepts of medical nutrition therapy<br>• Develop an insight about the etiology ,signs and symptoms, nutritional management of diseases and disorders |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• To explain about the basics of therapeutic diet<br>• To discuss about the medical nutrition management of various disease condition |

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| 1 | **Introduction to medical nutrition therapy :** Nutrition care process: nutrition assessment, nutrition diagnosis, nutrition intervention and nutrition monitoring, evaluation and documentation | 3 |
| 2 | **Nutrition Education and dietetic counseling:** Definition, characteristics and role of dietician in health care . Patient care and counselling Dietitian as part of the Medical Team and Outreach Services. Clinical Information - Medical History and Patient Profile Techniques of obtaining relevant information, Retrospective information, Dietary Diagnosis, Assessing food and nutrient intakes, Lifestyles, Physical activity, Stress, Nutritional Status. Correlating Relevant Information and identifying areas of need.<br>The Care Process - Setting goals and objectives short term and long term, Counselling and Patient Education, Dietary Prescription. Motivating Patients.<br>Working with - Hospitalized patients (adults, pediatric, elderly, and handicapped), adjusting and adopting to individual needs. Outpatients (adults, pediatric, elderly, handicapped), patients' education, techniques and modes, Follow up, Monitoring and Evaluation of outcome, Home visits . Maintaining records, Reporting findings, Applying findings, Resources and Aids for education and counselling. Education for individual patients, Use of regional language, linguistics in communication process, counselling and education. | 4 |
| 3 | **Introduction to therapeutic diets:** Type of dietary adaptations for therapeutic needs, routine hospital diets, mode of feeding: oral feeding, enteral feeding, peripheral vein feeding and total parenteral nutrition | 3 |

| | | |
|---|---|---|
| 4 | **Medical nutrition therapy in critical care :** Introduction and nutritional management during critically ill condition, nutritional support at that time: enteral and parenteral feeding | 4 |
| 5 | **Nutrition during stress :**The stress response, physiological response to surgery. Dietary management during surgery. Burns: classification of burns, complications, dietary management of burns, nutrition support. Trauma: physiological response to injury, metabolic and hormonal response, dietary management. Sepsis: metabolic and catabolic response, dietary management | 4 |
| 6 | **Nutritional management of infections and fevers :** Defense mechanism in body, metabolic changes during infection, type, etiology , signs and symptoms and nutritional management of different type of fever: typhoid, tuberculosis, HIV/AIDS | 4 |
| 7 | **Nutritional care in weight management :**Introduction, weight imbalance, calculation of Ideal Body Weight. Obesity: etiology, consequences, management of obesity; diet, lifestyle modification, psychotherapy and behavior modification, medication and surgery and preventive aspect. Underweight: etiology, dietary management and psychotherapy | 6 |
| 8 | **Nutritional management of coronary heart diseases:** Overview, coronary heart disease: prevalence, etiology, common coronary heart diseases and their management: dyslipidemia, atherosclerosis, hypertension, angina pectoris,myocardial infarction,congestive cardiac failure,rheumatic heart disease. | 10 |
| 9 | **Nutritional management of eating disorders:** Overview of eating disorder, anorexia nervosa,bulimia nervosa, binge eating disorder and not specified eating disorder, nutritional management of eating disorders. | 4 |
| 10 | **Nutritional management of food allergies and food intolerance:** Introduction, adverse food reactions: food allergy and food intolerance, diagnosis, treatment and management, preventions of adverse food reactions | 4 |

| | | |
|---|---|---|
| 11 | **Nutritional management of gastrointestinal diseases and disorders:** Medical Nutrition therapy for Upper Gastrointestinal tract Diseases /Disorders: Diagnostic Tests for the G.I. diseases, Signs and symptoms 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, Dietary management: traditional approach and liberal approach. Gastric Surgery: Nutritional care, dumping syndrome<br><br>Medical Nutrition therapy for Lower gastrointestinal tract Diseases/Disorders: Common Symptoms of Intestinal dysfunction – Flatulence, constipation, haemorhoids, diarrhoea, steatorrhoea, typhoid<br>Diseases of the large intestine: - Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease.<br>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, Intestinal surgery: Short bowel syndrome, Ileostomy, Colostomy, Rectal surgery. | 10 |
| 12 | **Nutrient and drug interaction:** Basic concept of nutrient drug interaction, effect of nutrition on drug, drugs effect on nutritional status, drug and drug interaction, clinical significance of drug nutrient interaction and guidelines to lower the risk. | 4 |
| **Total** | | **60 hrs** |

**References:**


1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
4. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.
5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing. 6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.

# MCN 106 P: Medical Nutrition Therapy I

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| 1 | Market survey of nutritional supplements available in market | 7 |
| 2 | Menu planning for normal adult male and female | 7 |
| 3 | Menu planning for weight reduction | 7 |
| 4 | Menu planning for weight gain | 7 |
| 5. | Nutrition management during stress | 7 |
| 6. | Nutrition management during acute and chronic fever | 7 |
| 7. | Nutrition management during coronary heart diseases | 9 |
| 8. | Nutritional management of gastrointestinal diseases and disorders | 9 |
| **Total** | | **60 hrs** |

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **AdvanceNutrition** |
| **Course Code** | **MCN 107 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with**<br>• Basics of nutrition<br>• The nutritional requirement during the different stages of life cycle<br>• The nutritional requirement during the specific conditions.<br>• Awareness about the recent advances in nutrition |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• To explain about the basics of nutrition<br>• To discuss about the nutritional requirement according to age, sex and physiological condition and how to apply them in practical diettics. |

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| 1 | **Understanding Nutrition:** Introduction ,Nutrition Science: Basic concepts ,History of Nutrition, Identification of food factors and discovery of water soluble vitamins, Discovery of other essential nutrients, Expanding frontiers of nutrition, The Indian Nutrition Scenario | 3 |
| 2 | **Nutritional Requirements :** Definition of concepts in relation to human nutritional requirements , Basic terminology in relation to nutritional requirements, Methods for studying the nutrition Requirements: Population survey of dietary intakes of nutrients , Growth studies, Depletion and repletion studies , Nutrient balance studies Use of isotopically labeled nutrients: Nutrient turnover, Obligatory losses of nutrients , National and international recommendations on Nutrient Requirements: Recommendations for Indian by the Indian council of Medical Research, FAO / WHO expert committee recommendations , Dietary references intakes of USA and Canada, Goals of National and international requirements estimates and RDAs , Dietary Guidelines. | 3 |
| 3 | Menu Planning : Introduction of Menu planning, Rationale for menu planning, Factors affecting food choice: Nutritional factors and Other factors, Exchange list vs food composition tables for menu planning , Steps in the development of exchange list, Recommended Dietary Allowances , Planning for adults: Some menu plans and dietary guidelines | 3 |

| | | |
|---|---|---|
| 4 | **Nutrient requirement during pregnancy and lactation:** Pregnancy and lactation – Critical stages in the lifecycle ,Physiological changes during pregnancy: Expansion in plasma volume and red cell mass, Hormonal profile in pregnancy, Organ functions Placental transfer of nutrients, Maternal weight gain, Nutritional needs during pregnancy , Maternal nutrition and foetal outcome, Pre pregnancy weight and foetal outcome, Pre pregnancy height and foetal outcome, Body mass index , Weight gain during pregnancy and foetal outcome, Maternal dietary intake and foetal outcome , Non-nutritional factors: Antenatal care, age, heavy physical work and intra uterine infections, Nutritional assessment and guidance in prenatal care, Common concerns during pregnancy : High risk pregnancies, Management of high risk pregnancies<br><br>**Lactation**: Physiology of lactation, Human milk composition and infant growth and development, Malnutrition – Effects of milk and effects on mothers, Maternal nutrition during lactation: Nutrient requirements during lactation, Dietary Management , Other concerns during breastfeeding | 5 |
| 5 | **Infants and preschool children** : Growth and development during infancy: Physiological changes , Growth monitoring , Health monitoring, Nutrient needs and recommended dietary allowances ,Diet and feeding patterns: Feeding 0-6 months infant, Feeding 6-12 months infant, Feeding preschoolers ,Problems of infants and preschoolers nutrition | 3 |
| 6 | **Older Children and adolescents :** Changes in physical development and body composition, Sexual maturity , Psycho-social change Nutrient needs and recommended dietary intakes , Diet and dietary patterns , Problems of older children and adolescent nutrition | 3 |
| 7 | **Geriatric population:** Definition of old age, Nutrition and ageing , Physiological changes associated with ageing, Changing body composition and techniques for measuring body composition , Changing body composition Techniques for measuring body composition, Nutritional requirements and dietary modifications in the diet of the elderly, Guidelines for planning balanced diets for elderly | 3 |
| 8 | **Sports Nutrition:** Evolution and growth of sports nutrition as a discipline, Anthropometric and physiological measurement Various techniques for measuring body composition, Work capacity, Physical fitness, Parameters of fitness, Fitness tests, Nutritional demands of sports and dietary recommendations | 3 |

| | | |
|---|---|---|
| 9 | **Nutritional requirements for Special conditions:** Calamity and emergency management: Information required for management of emergencies, Nutrient requirements during emergencies , Major nutritional deficiency diseases in emergencies , Monitoring assessment and surveillance of nutritional status and relief measures in emergencies,<br><br>**Nutritional requirements for extreme environments :** General adaptive mechanisms to environmental extremes and role of nutrition in successful acclimatization, Health Hazards associated with high altitude Nutritional requirements in high altitude, Nutritional requirements in cold and polar environment , Nutritional requirements in hot environments<br><br>Nutritional requirements for space missions, Nutritional considerations in brief for the following: 7.5.1 Military, naval personnel, Emergencies such as drought, famine, floods etc. | 5 |
| 10 | **Food components other than essential nutrients :** Functional foods Classification, Bioactive substances from plant food, Non-glycerides in edible oils,Probiotics and prebiotics: Definition and characteristics,Probiotics: Dietary sources and their mode of action / effects, Prebiotics: Dietary sources and their mode of action / health effects ,Polyphenols : Definition and classification, Bioavailability of polyphenols , Influence of polyphenols on macronutrients and minerals, Health benefits of polyphenols, Phytoestrogens: Dietary sources and chemical forms , Physiological effects Other dietary factors with anti nutritional effects : Protease inhibitors ,Saponins , Amylase inhibitors, Lectins or hemagglutinins , Phytates, Health benefits of other dietary factors with anti-nutritional effects | 5 |
| 11 | **Nutritional Regulation of Gene expressionepiegenetics and nutrigenetics& Nutrigenomics :** Gene Expression – An overview, Role of specific nutrients in controlling gene expression: Proteins, Lipids Minerals, Vitamins | 3 |
| 12 | **Immuno Nutrition:** Role of specific nutrients in immune suppression, Role of nutrients in Immune promotion | 3 |
| 13 | **Functional Foods and Nutraceuticals in Health & Disease:** History, Definition, Classification, Physiological effects, effects on human health and potential applications in risk reduction of diseases | 3 |
| **Total** | | **45 hrs** |

**Reference:**


1. Briggs, G. M. &Doirs K. Collaway: Bogery Nutrition And Physical Fitness (9th Ed.) Saunders, Philadelphia, 1979.
2. Chaney, M. S. Rose M.L. &Wischi J. C. Nutrition, Houghton Mifflim, Boston, 1979.
3. Guthrie H.: Introductory Nutrition (6th Ed.) Times Mirror/Mostry College Publishing, 1986.
4. Robinson, Lawler: Normal & Therapeutic Nutrition (17th Ed.) Macmillan Publishing Co. 1986.

5. Swaminathan S.: Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised _ Enlarged) Bapp Co. 1985.
6. Robinson. Basic Nutrition And Diet Therapy (8th Edition)
7. Shills And Young. Modern Nutrition In Health And Disease.
8. Krause' s Food and Nutrition Therapy 2010, 12th Edition
9. Whitney and Rolfes 2002 Understanding Nutrition • Chandra, R.K. (ed) (1992): Nutrition and Immunology. ARTS Biomedical. St. John's Newfoundland.
10. International Life Sciences Institute Present Knowledge in Nutrition – latest edition
11. Wildman, R.E.C. ed. (2000) Handbook of Nutraceuticals and Functional Foods, CRCPress, Boca Raton.
12. Gibson Principles of Nutrition Assessment Oxford Press
13. Baeurle, P.A. (ed) (1994) Inducible Gene Expression. Part I: Environmental Stresses and Nutrients. Boston: Birkhauser
14. Indian Council of Medical Research. Nutritive Value of Indian Foods – Latest Publication. • Indian Council of Medical Research. Recommended Dietary Intakes for Indians – Latest Recommendations.
15. World Reviews of Nutrition and Dietetics.
16. WHO Technical Report Series

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Food Microbiology and Safety** |
| **Course Code** | **MCN 108 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with**<br>• Knowledge in the area of food safety and microbiology related to food production,distribution and services, elementary food microbiology, food borne illness cause and control, quality control, rules and regulation etc. |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• To prevent the contamination and spoilage of food items by microorganism.<br>• To control the contamination and maintain the hygienic condition during the handling of food items.<br>• To assess the quality of food items available in market by seeing the packaging and labelling. |

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| 1 | **Microbiology of foods :** Food microbiology-basic concept, history of food microbiology, role of microbiology in biotechnology,role of microorganisms in fermented foods. | 3 |
| 2 | **Food safety**: Basic concepts : food safety and importance of safe food, factors affecting food safety: physical hazard, biological hazard, chemical hazards<br>**Microorganisms in food:**bacteria,fungi,yeasts,moulds,viruses, parasites, recent concerns of food safety | 3 |
| 3 | **Occurrence and growth of microorganisms in food :** Microbiology of air,water and soil, sources of foods contamination, factors affecting the growth of microorganisms: nutrition, oxygen,temperature,moisture requirement-the concept of water activity, osmotic pressure, hydrogen ion concentration, light. Control and destruction of microorganisms. | 3 |
| 4 | **Food Spoilage:** Factors responsible for food spoilage,chemical changes due to spoilage, spoilage of different foods: spoilage of meat, spoilage of pouitry and poultry products,spoilage of fish and other sea foods, spoilage of fruits and vegetables, spoilage of cereals and cereals products, spoilage of milk and milk products, spolage of soft drinks, fruit juices, fruit preserves and other | 3 |

| | | |
|---|---|---|
| 5 | **Food Hazards of Microbial Origin:** Types of food borne diseases. Food borne intoxicants; staphylococcal poisoning, *Bacillus Cereus* poisoning, Botulism. Food borne infections: Salmonellosis, Hepatitis A, shellfish poisoning, *E.coli* diarrhea. Food borne toxic infections; cholera,*Clostridium Perfringens* gastroenteritis. Mycotoxins: Aflatoxicosis, Ergotism.<br><br>Food borne diseases due to naturally occurring toxicants: lathyrism | 4 |
| 6 | **Food Contaminants:** Food contamination. naturally occurring toxicants: toxicants in animal and plant foods, antinutritional factors in foods. Environmental contaminants: biological contaminants, pesticide residues, veterinary drug residues, heavy metals, miscellaneous contaminants. | 3 |
| 7 | **Food Additives:** Definition of food additives, classification of food additives. Functional role of different additives: antioxidants, preservatives, food colours, flavouring agents, emulsifying and stabilizing agents, anti-caking agents, sequestrants, buffering agents, anti foaming agents, sweetening agents and others. Safety issues | 3 |
| 8 | **Food adulteration:** Definition, foods commonly adulterated, common adulterants. Harmful effects of adulterants. Methods for detection of some adulterants | 3 |
| 9 | **Food safety in food service establishments and other food areas:** Food safety and food service establishment. Food safety measures in a food service establishment. Street food safety measures. Temporary food service. Food safety on wheels,wings and waves | 3 |
| 10 | **Hygiene and sanitation in food service establishments:** Hygiene requirements for licensing and safe health status of food handlers, personal hygiene and facilities to employees. | 3 |
| 11 | **Food packaging:** Introduction to Packaging : Concepts, Significance and Functions , Classification of Packaging Materials, Packaging Methods, Interactions between Packaging and Food – Toxicity Hazards , Labeling Requirements and Bar Coding, Nutrition Labeling and Nutrition Claims, Coding of Food Product , Packaging Laws and Regulation | 4 |
| 12 | **Risk analysis:** Overview of risk analysis. Risk assessment of chemical agents and biological hazards. Risk management: elements of risk management, principles of risk management. Risk communication | 3 |
| 13 | **HACCP-a Food safety assurance system:** Introduction, need for HACCP,principles of HACCP, guidelines for application of HACCP principles. HACCP status in India. | 3 |

| | | |
|---|---|---|
| 14 | **Food Standard and quality control :**Food standard and regulation in India. The prevention of food adulteration act, 1954-formulation and administration. Compulsory national legislations- Essential commodities act,1955,Standard weight and measures act,1976, Export act 1963. Voluntary based product certification (BIS, AGMARK and Consumer protection act). Regulation related to genetically modified foods. International Organization and Agreements in the area of food standardization and quality control | 4 |
| **Total** | | **45 hrs** |

**References:**


1. Frazierw. C. and Westhoff D. C. Food Microbiology, 4th ed., 1988 New York.
2. Pelezar, M. (1988) Microbiolqgy V ed., McGraw Hill, N. Y.
3. James, M. Jay. Modern Food Microbiology 4th ed., CBS Publishers, New Delhi.
4. Frobisher M. et. AI. (1974) Fundamentals of Microbiology -9th ed., W. Savenders Co.

Baanwart,G.J.(1987) Basic Food Microbiology CBS Publishers, New Delhi

## Course code- MCN 109 CP: Nutrition Directed Clinical Education – II

Students will gain additional skills in this program to increase the role of nutrition in the practice of medicine, medical research, health promotion, and disease prevention by providing a unique combination of educational experiences to medical students. The students will be exposed to both clinical and academic aspects of nutrition.

## (Total-315 hrs)

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Research Methodology & Biostatistics (Core Course)** |
| **Course Code** | **CC 001 L** |

| | |
|---|---|
| **Teaching Objective** | The course is intended to give an overview of research andstatistical models commonly used in medical and bio-medical sciences. Thegoal is to impart an intuitive understanding and working knowledge ofresearch designs and statistical analysis. The strategy would be tosimplify, analyse the treatment of statistical inference and to focus primarily onhow to specify and interpret the outcome of research. |
| **Learning Outcomes** | Student will be able to understand develop statistical models, researchdesigns with the understating of background theory of various commonly usedstatistical techniques as well as analysis interpretation & reporting ofresults and use of statistical software. |

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| **A** | **Research Methodology:** | |
| 1 | Scientific Methods of Research: Definition of Research, Assumptions, Operations and Aims of Scientific Research. Research Process, Significance and Criteria of Good Research , Research Methods versus Methodology, Different Steps in Writing Report, Technique of Interpretation, Precaution in interpretation, Significance of Report Writing, Layout of the Research Report | 5 |
| 2 | Research Designs: Observational Studies: Descriptive, explanatory, and exploratory, Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, Cohort Studies, Case Control Studies, Cross sectional studies, Intervention studies, Panel Studies. | 5 |
| 3 | Sampling Designs: Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs (Probability sampling and non probability sampling), How to Select a Random Sample?, Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sampling with probability proportional to size, Sequential sampling. | 5 |

| | | |
|---|---|---|
| 4 | Measurement in research: Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques, Scale Construction Techniques, Possible sources of error in measurement, Tests of sound measurement | 5 |
| 5 | Methods of Data Collection: Types of data, Collection of Primary Data, Observation Method, Interview Method, Collection of Primary Data | 5 |
| 6 | Sampling Fundamentals : Need and importance for Sampling, Central Limit Theorem, Sampling Theory, Concept of Standard Error, Estimation, Estimating the Population Mean Estimating Population Proportion, Sample Size and its Determination, Determination of Sample Size through the Approach Based on Precision Rate and Confidence Level. | 5 |
| **B** | **Biostatistics** | |
| 7 | Data Presentation: Types of numerical data: Nominal, Ordinal, Ranked, Discrete and continuous. Tables: Frequency distributions, Relative frequency, Graph: Bar charts, Histograms, Frequency polygons, one way scatter plots, Box plots, two way scatter plots, line graphs | 3 |
| 8 | Measures of Central Tendency and Dispersion: Mean, Median, Mode Range, Inter quartile range, variance and Standard Deviation, Coefficient of variation, grouped mean and grouped standard deviation (including merits and demerits). | 3 |
| 9 | Testing of Hypotheses: Definition, Basic Concepts, Procedure for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Normal distribution, data transformationImportant Parametric Tests, Hypothesis Testing of Means, Hypothesis Testing for Differences between Means, Hypothesis Testing for Comparing Two Related Samples, Hypothesis Testing of Proportions, Hypothesis Testing for Difference between Proportions, Hypothesis Testing for Comparing a Variance to Some Hypothesized Population Variance, Testing the Equality of Variances of Two Normal Populations. | 6 |
| 10 | Chi-square Test: Chi-square as a Non-parametric Test, Conditions for the Application Chi-square test, Steps Involved in Applying Chi-square Test, Alternative Formula, Yates' Correction, and Coefficient by Contingency. | 2 |
| 11 | Measures of Relationship: Need and meaning, Correlation and Simple Regression Analysis | 2 |
| 12 | Analysis of Variance and Covariance: Analysis of Variance (ANOVA):Concept and technique of ANOVA, One-way ANOVA, Two-way ANOVA, ANOVA in Latin-Square Design Analysis of Co-variance (ANOCOVA), ANOCOVA Technique. | 4 |
| 13 | Nonparametric or Distribution-free Tests: Important Nonparametric or Distribution-free Test Sign test, Wilcoxon signed-Rank Test, Wilcoxon Rank Sum Test: Mann-Whitney U test KruskalWalli's test, Friedman's test, and Spearman Correlation test. | 3 |
| 14 | Vital Health Statistics: Measurement of Population: rate, crude rate, specific rate, Measurement of fertility: specific fertility rate, Total fertility rate, Reproduction rate, Gross Reproduction Rate, Net Reproduction Rate, Measures related to mortality: Crude Death Rate (CDR), Age-specific death Rate, Infant and child mortality rate, Measures related to morbidity. | 4 |
| 15 | Computer Application Use of Computer in data analysis and research, Use of Software and Statistical package. Introduction to SPSS. Importing data from excel, access, tab and comma separated files. Entering data, labeling a variable, coding and recoding a categorical and continuous variable. Converting data from string to numeric variables, sorting & filtering, merging, appending data sets.<br>Frequencies, descriptive statistics, cross tabulations. Diagrammatic presentation include | 3 |

| | | |
|---|---|---|
| | histogram, bar chart, pie chart, scatter diagram, box plot, line chart. Parametric test of hypothesis-one sample, Independent and paired sample t test, one way ANOVA& post HOC test. Testing for normality,Chi-square test with measures of association. Pearson correlation. Non parametric test. | |
| **Total** | | **60 hrs** |

## CC 001P –Research Methodology & Biostatistics

| Sr. No. | Topics | No. of Hrs |
|---|---|---|
| **A** | **Research Methodology** | |
| 1 | Sampling Designs | 4 |
| 2 | Measurement in research | 5 |
| 3 | Methods of Data Collection | 3 |
| 4 | Sampling Fundamentals | 3 |
| **B** | **Biostatistics** | |
| 5 | Data Presentation | 4 |
| 6 | Measures of Central Tendency and Dispersion | 4 |
| 7 | Testing of Hypotheses | 12 |
| 8 | Chi-square Test | 2 |
| 9 | Measures of Relationship | 3 |
| 10 | Analysis of Variance and Covariance | 4 |
| 11 | Nonparametric or Distribution-free Tests | 4 |
| 12 | Vital Health Statistics: Measurement of Population | 6 |
| 13 | Computer Application Using Statistical Software | 6 |
| **Total0** | | **60 hrs** |

# SECOND YEAR

## M.Sc. Clinical Nutrition

### Semester III

| Code No. | Core Subjects |
|---|---|
| **Theory** | |
| MCN 110 L | Medical Nutrition Therapy II |
| MCN 111 L | Community Nutrition |
| MCN 112 L | Food Science and analysis |
| MCN 113 L | Pediatric and Geriatric Nutrition |
| MCN114 CP | Nutrition Directed Clinical Education |
| **Practical** | |
| MCN 107 P | Medical Nutrition Therapy II |
| MCN 108 P | Food science and analysis |

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Medical Nutrition Therapy II** |
| **Course Code** | **MCN 110 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• Understanding of basic concepts of medical nutrition therapy<br>• Develop an insight about the etiology ,signs and symptoms, nutritional management of diseases and disorders |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• To explain about the basics of therapeutic diet<br>• To discuss about the medical nutrition management of various disease condition |

| Sr. No. | Topics | No. of Hrs. |
|---|---|---|
| 1 | MNT during diabetes:<br>Aetiology, classification, symptoms, diagnosis, prevention and treatment oral medication, insulin therapy, dietary management, lifestyle modifications, complications: acute complications hypoglycemia, hyperglycemia, ketoacidosis, long term complications macrovascular and microvascular | 10 |
| 2 | MNT in renal diseases:<br>Etiology, characteristics, dietary management of renal diseases :Glomerulonephritis, nephrotic syndrome, renal calculi, acute and chronic renal failure, type of dialysis and nutritional care, renal transplant and nutritional care | 10 |
| 3 | MNT for diseases of hepato biliary tract:<br>Aetiology, signs and symptoms, complications and dietary management of liver diseases; hepatitis, cirrhosis, hepatic encephalopathy and Wilson's disease<br>Dietary care and management in gall bladder and pancreas i.e. biliary dyskinesia, cholelithiasis, cholecystitis, cholecystectomy, pancreatitis, zollinger Ellison syndrome | 6 |
| 4 | Medical Nutrition Therapy for Thyroid and other endocrinal Disorders: Thyroid Physiology; Assessment of Thyroid Disorders; Hypothyroidism, Polycystic Ovary Syndrome; Hyperthyroidism; Other Endocrine System Disorders | 6 |
| | Nutrition and Cancer<br>Carcinogenesis and Mutagenesis- Carcinogens in Food<br>Epidemiology Investigations of Diet-Cancer relationship<br>Development of cancer | 10 |

| | | |
|---|---|---|
| | Types of cancer and effect on metabolism and nutritional status<br>Nutrients and their relationship with cancer<br>Recent developments in nutrition and cancer. | |
| 6 | Medical Nutrition Therapy in Diseases of the Pulmonary System: Asthma, Cystic Fibrosis, COPD<br>Medical Nutrition Therapy in Diseases of the Musculo-Skeletal System and Bone Diseases: Rheumatic Diseases, Arthritis, Gout, Osteoporosis<br>Medical Nutrition Therapy in Neurological Disorders and Psychiatric Conditions | 8 |
| | **Total** | **60 hrs** |

**MCN 107 P: Medical Nutrition Therapy II**

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| 1 | Menu planning for diabetics | 7 |
| 2 | Menu planning for renal diseases | 9 |
| 3 | Menu planning for hepatitis | 7 |
| 4 | Menu planning for cirrhosis | 7 |
| 5. | Nutrition management for cancer patient | 9 |
| 6. | Menu planning for thyroid disorders | 7 |
| 7. | Nutritional management for gout and osteoporosis patient | 7 |
| 8. | Nutritional management of diseases of pulmonary system | 7 |
| **Total** | | **60 hrs** |

**References:**

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
4. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.
5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing. 6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Community Nutrition** |
| **Course Code** | **MCN 111L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• Basics of community nutrition<br>• Understanding of nutrition related problems and nutrition interventions. |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• Discuss about the nutrition related problems prevalent in community. |

| Sr. No. | Topics | No. of Hrs. |
|---|---|---|
| 1 | Concept and Scope of Community Nutrition<br>Nutritional Status: Determinants and Indicators of Nutritional Status; Assessment of Nutritional Status of an Individual and Community<br>Food and Nutrition Security: Food Production, Access, Distribution, Availability, Losses, Consumption. Factors Affecting Food Availability and Intake; Food Security and Adequacy of Diets; Socio-cultural aspects and Dietary Patterns and their implications on Nutrition and Health<br>**a.** National Food, Nutrition and Health Policy of India and Plan of Actio | 15 |
| 2 | Prevalence of Malnutrition in India: Common Nutritional Problems: Their Prevalence, Morbidity and Mortality Rate; HUNGAMA Report; Ecology of Malnutrition; Nutrition and Infection; Nutritional Disorders: Nutritional Deficiency Anaemia(Vitamin $B_{12}$,iron); Vitamin A Deficiency, Iodine Deficiency Disorder, Fluorosis, PEM - Etiology, Prevalence, Symptoms and Preventive Measures<br>Strategies to Overcome Malnutrition: Measures to Overcome Malnutrition in India; Need for an Integrated Approach to Solve the Problems of Malnutrition; Nutrition Education; Nutrition Intervention Programmes; Agriculture Planning, Role of Food Technology; Environmental Sanitation and Health | 15 |

| | | |
|---|---|---|
| 3 | Nutrition Intervention Programmes: Objectives and Operation of Nutrition Intervention Programmes: SLP, SNP, ANP and Other Programmes Organized By Governmental and Non-Governmental Agencies for the Vulnerable Sections of the Population<br>Role of National and International Organizations to Combat Malnutrition<br>Aims, Objectives, Activities and Programmes Conducted:<br>National Organizations Concerned with Food and Nutrition: ICDS, ICMR, ICARM, CHEB, CSWB and SSWB.<br>International Organizations Concerned with Food and Nutrition: FAO, WHO, UNICEF, CARE, AFPRO, CWS, World Bank and Others | 10 |
| 4 | Nutrition Education: Meaning, Nature and Importance of Nutrition Education to the Community; Principles of Planning, Executing and Evaluating Nutrition Education Programmes; Educational Aids; Problems of Nutrition Education Programmes | 5 |
| **Total** | | **45 hrs** |

**References:**


Gopalan, T. and Sheshadri, S. (1987): Nutrition – Monitoring and Assessment Oxford University Press. N. Delhi

• Gibson,R.S.1990. Principles of Nutritional Assessment. Oxford University Press.New Delhi

• Gopalan, C. and Kaur, S.(Eds) (1993): Towards Better Nutrition, Problems and Policies, Nutrition Foundation of India.

• National Nutrition Policy (1993): Dept. of WCD, Govt. of India.

• National Policy of Action on Nutrition (1995): Food & Nutrition Board, Dept. of WCD, Govt. of india.

• Beaton, G.H. and Bengoa, J.M. (Eds) (1996): Nutrition in Preventive Medicine, WHO.

• Bamji, M.S., Rao, P.N., Reddy, V. (Eds) (1996): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi

• Jelliffe. D.B. (1996), The assessment of nutritional status on the community – WHO Monograph Series – No.53. Geneva

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Food Science And Food Analysis** |
| **Course Code** | **MCN 112 L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• Basics of all the food groups<br>• Principles and techniques of food analysis. |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• Conserve the nutrient composition of food by applying their knowledge.<br>• Familiar with the principles of food analysis. |

| **Sr. No.** | **Topics** | **No. of Hrs.** |
|---|---|---|
| 1 | Importance , composition of different food groups, effect of cooking and processing on nutritive value<br><br>Cereals and millets, pulses and legumes, milk and milk products, egg, meat, fish and poultry, fruits and vegetables,fats and oils and sugar, nuts and oilseeds, spices and condiments and beverages | 15 |
| 2 | Introduction to sensory analysis and uses of sensory tests and objective test | 10 |
| 3 | Principles,techniques and applications of colorimeter,spectrophotometer and atomic absorption spectrophotometer,fluorimeter, flame photometer | 10 |
| 4 | Electrophoresis: different types and applications, chromatography principle different types and applications | 10 |
| Total | | 45 |

**MCN 108 P: Food Science And Analysis**

| Sr. No | Topic | No. of Hrs. |
|---|---|---|
| **1** | Effect of cooking of different food stuffs | **12** |
| 1 | Organoleptic evaluation of food | 12 |
| 2 | Demonstration of colorimeter | 9 |
| 3 | Demonstration of spectrophotometer | 9 |
| 4 | Demonstration of different types of chromatography | 9 |
| 5 | Demonstration of Electrophoresis | 9 |
| **Total** | | **60** |

**References :**


Srilakshmi B. (2006) : Food Science, New Age International (P) Ltd. Publishers, New Delhi.

15.Potter, N. and Hotchkiss, J.H. (2007) : Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi.

16.N. ShakuntalaManay; M. ShadaksharaSwamy (2008) : Foods, Facts and Principles. Third Edition Tata McGraw – Hill Publishing Co. Ltd., New Delhi.


**Website, e-learning resources:**

www.fao.org – Food and agricultural organization

www.wfp.org - world food programme

| | |
|---|---|
| **Name of the Programme** | **M.Sc. Clinical Nutrition** |
| **Name of the Course** | **Pediatric and Geriatric Nutrition** |
| **Course Code** | **MCN 113L** |

| | |
|---|---|
| **Teaching Objective** | **To apprehend the candidate with:**<br>• The methods of assessment of pediatric and geriatric population<br>• The nutritional management for child and elderly person |
| **Learning Outcomes** | **After the course accomplishment the student will be able to:**<br>• Assess the nutritional status of the child and elderly person<br>• Plan nutritional management for child and elder person |

| Sr. No. | Topics | No. of Hrs. |
|---|---|---|
| 1 | Pediatric Nutritional Assessment: Anthropometric measurements, (Ped-SGA) biochemical parameters,clinical and dietary data<br>measuring, recording and ploting growth | 5 |
| 2 | Nutrition in first 1000 days of life- from conception to childhood, breast feeding,bottle feeding, complementry feeding, Nutritional care of the preterm infant,fullterm infant, LBW andVLBW infants, supplimentation of micronutrients for expectant mother and baby. | 5 |
| 3 | Nutrition in childhood; growth and development, nutrient needs<br>Assessment of nutritional status of children, factors affecting food intake, feeding the preschool and school aged child, preventing chronic diseases PEM. Management of severe and acute malnutrition(SAM) | 5 |
| 4 | Nutritional concerns: childhood obesity,underweight and undernutrition, failure to thrive, growth faltering and detection, mineral andvitamin deficiencies, dental caries, allergies, attention –deficit hyperactvity disorder.<br>Nutritional requirements for Inborn Errors of Metabolism -<br>PKU, Maple syrup urine disease, Homocystinemia, Tyrosinemia,<br>Galactosemia, Glycogen storage disorder | 5 |
| 5 | Gastrointestinal diseases and disorder i.e. diarrhea,gluten enteropathy,inflammatory bowel disease,constipation, Nutrition in acute and persistent diarrhea, diarrhea as a nutritional diasease, HIV affected infants and children. | 10 |

| | | |
|---|---|---|
| 6 | Neurological disease in children i.e. epilepsy(ketogenic diets)<br>Pulmonary disease in children, cystic fibrosis | 5 |
| 7 | Renal disorders in children i.e. AGN,nephrotic syndrome and chronic renal failure.<br>Calculation of fluids and electrolytes- both deficit and maintenance and management of caloric intake | 5 |
| 8 | Geriatric nutrition<br>Ageing process- physiological, metabolic, body composition changes and impact on health and nutritional status socio-psychological aspects of ageing- special problems of elderly women | 5 |
| 9 | Nutritional and health status of elderly, factors influencing food and nutrient intake, health status including lifestyle pattern,medication,psychosocial aspects etc. | 5 |
| 10 | Chronic degenerative diseases and nutritional problems of the elderly their etiology, management,prevention and control | 5 |
| 11 | Policies and programmes of the government and NGO sector pertaining to the elderly.<br>Promoting fitness and well being and traditional approaches | 5 |
| **Total** | | 60 |

**References:**

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.

2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.

3. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing. 6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.

**Course Code – MCN 114 CP : Nutritional Directed Clinical Education -III**

**S**tudents will gain additional skills in this program to increase the role of nutrition in the practice of medicine, medical research, health promotion and disease prevention by providing a unique combination of educational experiences to medical students. The students will exposed to both clinical and academic aspects of nutrition

**(Total – 315 Hours)**

**M.Sc. CLINICAL NUTRITION**

**SEMESTER IV**

| SEMESTER IV | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Syllabus Ref. No.** | **Subject** | **Credits** | **Teaching hours** | **Marks** | | |
| | **Theory** | | | | **Internal Assessment** | **Semester Exam** | **Total** |
| | | **General elective **** | 4 | 4 | 100 | - | 100 |
| | GE 001 T | Pursuit of Inner Self Excellence (POISE) | | | | | |
| | GE 002 T | Bioethics, Biosafety, IPR & Technology transfer ▲ (Multidisciplinary/ Interdisciplinary) | | | | | |
| | GE 003 T | Disaster management and mitigation resources | | | | | |
| | GE 004 T | Human rights | | | | | |
| | MCN 116 | Dissertation / Project* | 18 | 36 | - | 200 | 200 |
| | **Practical** | | | | | | |
| | MCN117 P | Educational Tour / Field Work* | 2 | 0 | 50 | - | 50 |
| | | **Total** | 24 | 40 | 150 | 200 | 350 |

**ACADEMIC SYLLABUS FOR SEMESTER - IV**

| | |
|---|---|
| Name of the Programme | **M.Sc. CLINICAL NUTRITION** |
| Course Code | **MCN 115** |
| Name of the Course | **SEMINAR** |

For seminar/presentation there will be a maximum of 50marks. Seminar / presentations will be evaluated by the teachers of the dept. The marks obtained in the same will be kept confidentially with the Head of the Dept. and will be submitted along with the internal assessment marks.

**ACADEMIC SYLLABUS FOR SEMESTER - IV**

**ELECTIVE COURSE**

| | |
|---|---|
| Name of the Programme | **M. SC CLINICAL NUTRITION** |
| Course Code | **GE 001 T** |
| Name of the Course | **PURSUIT OF INNER SELF EXCELLENCE (POISE)** |

| | |
|---|---|
| **Course objective** | 1. To inculcate moral values in students – Self-Discipline , Time Management, Develop attitude of Service with humility, Empathy, Compassion, brotherhood, Respect for teachers, colleagues & society members.<br>2. Develop Effective means of communication & presentation skills in students<br>3. To develop wisdom in students for deciding their career based on their areas of interest and inner skills.<br>4. Introduce techniques for Relaxation, Meditation & Connecting with innerself.<br>5. Rejuvenation Techniques which can be used by students to distress themselves<br>6. To improve performance of students during various assignments, projects, elocutions, events, quiz, interviews. |
| **Course outcomes** | 1. Students will become self dependent, more decisive and develop intuitive ability for their study and career related matter.<br>2. Students ability to present their ideas will be developed.<br>3. Enhanced communication skills, public speaking & improved Presentation ability.<br>4. Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused.<br>5. Students will observe significant reduction in stress level.<br>6. With the development of personal attributes like Empathy, Compassion, Service, Love &brotherhood , students will serve the society and industry in better way with teamwork and thus grow professionally. |

| Unit no. | Topics | Hours allotted 60hrs |
|---|---|---|
| 1 | **Spiritual Values for human excellence :** The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti , Patanjali'sAshtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddism, etc.; Why spirituality? Concept – significance ; Thought culture | **15 hrs** |
| 2 | **Ways and Means :** Correlation between the values and the subjects ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master | **15 hrs** |
| 3 | **Integrating spiritual values and life:** Relevance of VBSE (Value Based Spiritual Education) in contemporary life ; Significant spiritual values ; Spiritual destiny ; Principles of Self-management; Designing destiny | **15 hrs** |
| 4 | **Experiencing through the heart for self-transformation (Heartfulness Meditation):** Who am I? ; Introduction to Relaxation; Why, what and how HFN Meditation?; Journal writing for Self-Observation ; Why, what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFN connect to Self (Prayer)?; Pursuit of inner self excellence ; Collective Consciousness-concept of *egregore effect;* | **15 hrs** |

**Reference Books:**


1. www.pdfdrive.net
2. www.khanacademy.org
3. www.acadeicearths.org
4. www.edx.org
5. www.open2study.com
6. www.academicjournals.org

| | |
|---|---|
| Name of the Programme | **M. SC CLINICAL NUTRITION** |
| Course Code | **GE 002 T** |
| Name of the Course | **BIOETHICS, BIOSAFETY, IPR & TECHNOLOGY TRANSFER** |

| | |
|---|---|
| **Course objective** | The students will gain structural knowledge on:<br>1. To list the routes of exposure for a pathogen to a human being .<br>2. To demonstrate and assess the proper use of PPE, best practices,biological containment, and be prepared to safely conduct research<br>3. To identify the role of the Biosafety Professional inBiomedical Research Laboratories<br>4. To appreciate the importance of assertion in interpersonal communication and beintroduced to some key assertion strategies<br>5. To understand the interpersonal nature of giving feedback, receiving criticism and resolving conflicts.<br>6. To establish attentive listening as an assertion strategy |
| **Course outcomes** | Students will learn to:<br>1. Effectively manage the health and safety aspects of a biological laboratory.<br>2. Give reliable, professional and informed advice and information to colleagues and managers.<br>3. Help to ensure that their institution complies with relevant legislation, liaise effectively with enforcing authorities and be aware of the penalties for failing to comply.<br>4. Build a context of understanding through communication.<br>5. Mediate between other conflicting parties.<br>6. Exhibit de-escalatory behaviors in situations of conflict.<br>7. Demonstrate acknowledgment and validation of the feelings, opinions, andcontributions of others. |

| Unit no. | Topics | Hours allotted 60hrs |
|---|---|---|
| 1 | **Ethics***:* Benefits of Ethics, ELSI of Bioscience, recombinant therapeutic products for human health care, genetic modifications and food consumption, release of genetically engineered organisms, applications of human genetic rDNA research, human embryonic stem cell research. | **15 hrs** |
| 2 | **Patenting:** Patent and Trademark, Bioscience products and processes, Intellectual property rights, Plant breeders rights, trademarks, industrial designs, copyright biotechnology in developing countries. Biosafety and its implementation, Quality *control in* Biotechnology. | **15 hrs** |
| | **Introduction to quality assurance, accreditation & SOP writing :**Concept of ISO standards and certification , National regulatory body for accreditation, Quality parameters, GMP & GLP, Standard operating procedures, Application of QA in field of genetics, Data management of clinical and testing laboratory | **15 hrs** |
| 3 | **Funding of biotech business** (Financing alternatives, funding, funding for Bioscience/ Medical Health Sector in India, Exit strategy, licensing strategies, valuation), support mechanisms for entrepreneurship (Bio-entrepreneurship efforts in India, difficulties in India experienced, organizations supporting growth, areas of scope, funding agencies in India, policy initiatives), Role of knowledge centers and R&D (knowledge centers like universities and research institutions, role of technology and up gradation) | **15 hrs** |

**Reference Books:**


1. www.pdfdrive.net
2. www.khanacademy.org
3. www.acadeicearths.org
4. www.edx.org
5. www.open2study.com
6. www.academicjournals.org

| | |
|---|---|
| Name of the Programme | **M. SC CLINICAL NUTRITION** |
| Course Code | **GE 003 T** |
| Name of the Course | **DISASTER MANAGEMENT AND MITIGATION RESOURCES** |

| | |
|---|---|
| **Course objective** | The course will uplift about:<br>1. Understand and appreciate the specific contributions of the Red Cross/Red Crescent movement to the practice and conceptual understanding of disaster management and humanitarian response and their significance in the current context.<br>2. Recognize issues, debates and challenges arising from the nexus between paradigm of development and disasters.<br>3. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.<br>4. Respond to disaster risk reduction initiatives and disasters in an effective, humane and sustainable manner. |
| **Course outcomes** | At the successful completion of course the student will gain:<br>1. knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.<br>2. Knowledge and understanding of the International Strategy for Disaster Reduction (UN-ISDR) and to increase skills and abilities for implementing the Disaster Risk Reduction (DRR) Strategy.<br>3. Ensure skills and abilities to analyse potential effects of disasters and of the strategies and methods to deliver public health response to avert these effects. |

| Unit no. | Topics | Hours allotted 60hrs |
|---|---|---|
| 1 | **Introduction:** Definition of Disaster, hazard, global and Indian scenario, general perspective, importance of study in human life, Direct and indirect effects of disasters, long term effects of disasters. Introduction to global warming and climate change. | **08 hrs** |
| 2 | **Natural Disaster and Manmade disasters:**Natural Disaster: Meaning and nature of natural disaster, Flood, Flash flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion Manmade Disasters: Chemical, Industrial, Nuclear and Fire Hazards. Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters. | **15 hrs** |
| 3 | **Disaster Management, Policy and Administration:**Disaster management: meaning, concept, importance, objective of disaster management policy, disaster risks in India, Paradigm shift in disaster management.<br>Policy and administration: Importance and principles of disaster management policies, command and co-ordination of in disaster management, rescue operations-how to start with and how to proceed in due course of time, study of flowchart showing the entire process. | **12 hrs** |
| 4 | **Financing Relief Measures:**Ways to raise finance for relief expenditure, role of government agencies and NGO's in this process, Legal aspects related to finance raising as well as overall management of disasters. Various NGO's and the works they have carried out in the past on the occurrence of various disasters, Ways to approach these teams. International relief aid agencies and their role in extreme events. | **13 hrs** |
| 5 | **Preventive and Mitigation Measures:**Pre-disaster, during disaster and post-disaster measures in some events in general structural mapping: Risk mapping, assessment and analysis, sea walls and embankments, Bio shield, shelters, early warning and communication Non Structural Mitigation: Community based disaster preparedness, risk transfer and risk financing, capacity development and training, awareness and education, contingency plans. Do's and don'ts in case of disasters and effective implementation of relief aids. | **12 hrs** |

**Reference Books:**


1. ShailendraK.Singh : Safety & Risk Management, Mittal Publishers
2. J.H.Diwan : Safety, Security & Risk Management,APH
3. Stephen Ayers &Garmvik: Text Book of Critical Care, Holbook and Shoemaker
4. www.pdfdrive.net
5. www.khanacademy.org
6. www.acadeicearths.org
7. www.edx.org
8. www.open2study.com
9. www.academicjournals.org

| | |
|---|---|
| Name of the Programme | **M. Sc. CLINICAL NUTRITION** |
| Course Code | **GE 004 T** |
| Name of the Course | **HUMAN RIGHTS** |

| | |
|---|---|
| **Course objective** | Students will comprehend on:<br>1. A branch of public international law, and relevant juridical mechanisms at global as well as regional levels,<br>2. Human rights as an object of study in history, philosophy and the social sciences, as well as a practical reality in national and international politics.<br>3. Different forms of promoting and implementing human rights, domestically as well as on the international level.<br>4. The role of human rights in contemporary issues relating to terrorism, religion, ethnicity, gender and development.<br>5. Cholarly values such as transparency, impartiality, clarity, reliance and the importance of sound reasoning and empirical inference. |
| **Course outcomes** | Student will be able to virtue:<br>1. identify, contextualise and use information about the human rights situation in a given country<br>2. critically appraise source material, including cases from human rights committees and tribunals and reports and summary records from treaty bodies<br>3. analyse a country's situation or an international situation in terms of human rights and formulate human rights-based initiatives and policies<br>4. Promote human rights through legal as well as non-legal means.<br>5. Participate in legal, political and other debates involving human rights in a knowledgeable and constructive way |

| Unit no. | Topics | Hours allotted 60hrs |
|---|---|---|
| 1 | *Background*: Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights | **08 hrs** |
| 2 | *Human rights at various level* : Human Rights at Global Level UNO, Human Rights – UDHR 1948 – UN Conventions on Human Rights: International Covenant on civil and Political Rights 1966, International Convent on Economic, Social and Cultural Right, Racial Discrimination -1966 International, Instruments: U.N. Commission for Human Rights, European Convention on Human Rights. | **15 hrs** |
| 3 | *Human rights in India* : Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman | **12 hrs** |
| 4 | *Human Rights Violations*: Human Rights Violations against Women, Human Rights Violations against Children, 35 Human Rights Violations against Minorities SC/ST and Trans-genders, Preventive Measures. | **13 hrs** |
| 5 | *Political issues*: Political Economic and Health Issues, Poverty, Unemployment, Corruption and Human Rights, Terrorism and Human Rights, Environment and Human Rights, Health and Human Rights | **12 hrs** |

**Reference Books:**


1. JagannathMohanty Teaching of Human sRights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
2. Ram Ahuja: Violence Against Women Rawat Publications JewaharNager Jaipur.1998.
3. SivagamiParmasivam Human Rights Salem 2008
4. Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

| Name of the Programme | **M. SC CLINICAL NUTRITION** |
|---|---|
| Course Code | **MCN 116** |
| Name of the Course | **DISSERTATION / PROJECT WORK** |

1. Dissertation/Project work should be carried out as an individual Dissertation and actual bench work.

2. The students will carry independent project work under the supervision of the staff of Department on an advanced topic assigned to him/her. Inhouse projects are encouraged. Students may be allowed to carry out the project work in other Departmental laboratories /Research institutes /Industries as per the availability of Infrastructure.

3. Co guides from the other institutions may be allowed.

4. The Dissertation/Project work will begin from 3rd Semester, and will continue through the 4th Semester.

5. The Dissertation/Project report (also work book shall be presented at the time of presentation and viva voce) will be submitted at the end of the 4th Semester and evaluated.

6. Five copies of the project report shall be submitted to the Director, SBS.

7. For the conduct of the End Semester Examination and evaluation of Dissertation/Project work the University will appoint External Examiners.

8. Since the dissertation is by research, Dissertation/Project work carries a total of 250 marks and evaluation will be carried out by both internal and external evaluators.

9. The student has to defend his/her Dissertation/Project Work in a seminar which will be evaluated by a internal and external experts appointed by the University.

10. The assignment of marks for Project/Dissertation is as follows:

    Part I-

    Topic Selection, Review of Literature, Novelty of works-50 marks

    Part-II-

    a. Continuous Internal Assessment, Novelty, Overall Lab Work Culture - 100 Marks

    b. Dissertation/Project work book: 50 Marks

    c. Viva-Voce: 50 Marks

d. However, a student in 4th semester will have to opt for general elective course from other related disciplines in addition to his Dissertation/Project work in the parent department.

| | |
|---|---|
| Name of the Programme | **M. SC CLINICAL NUTRITIOIN** |
| Course Code | **MCN 117 P** |
| Name of the Course | **EDUCATIONAL TOUR/FIELD WORK/HOSPITAL VISIT/ INDUSTRIAL VISIT** |

## MONITORING LEARNING PROGRESS

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Model Checklists are attached

The learning out comes to be assessed should include:

i) **Journal Review Meeting (Journal Club):** The ability to do literature search, in depth study, presentation skills, and use of audio- visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist (see Model Checklist – I)

ii) **Seminars / Symposia**: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio- visual aids are to be assessed using a checklist (see Model Checklist-II )

iii) **Teaching skills**: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist III,)

iv) **Work diary / Log Book**- Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal, reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of experiments or laboratory procedures, if any conducted by the candidate.

v) **Records**: Records, log books and marks obtained in tests will be maintained by the Head of the Department.

**Checklist - I**

**Model Checklist for Evaluation of Journal Review Presentations**

Name of the student:_____ Date:_____

Name of the Faculty/ Observer:_____

| S No. | Items for observation during presentation | | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Article chosen was | | | | | |
| 2 | Extent of understanding of scope & objectives of the paper by the candidate | | | | | |
| 3 | Whether cross- references have been consulted | | | | | |
| 4 | Whether other relevant references have been Consulted | | | | | |
| 5 | Ability to respond to questions on the paper /subject | | | | | |
| 6 | Audio-visuals aids used | | | | | |
| 7 | Ability to defend the paper | | | | | |
| 8 | Clarity of presentation | | | | | |
| 9 | Any other observation | | | | | |
| | **Total score** | | | | | |

**Checklist - II**

**Model Checklist for Evaluation of the Seminar Presentations**

Name of the student:_____ Date:_____

Name of the Faculty/ Observer:_____

| S No. | Items for observation during presentation | | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Article chosen was | | | | | |
| 2 | Extent of understanding of scope & objectives of the paper by the candidate | | | | | |
| 3 | Whether cross- references have been consulted | | | | | |
| 4 | Whether other relevant references have been Consulted | | | | | |
| 5 | Ability to respond to questions on the paper /subject | | | | | |
| 6 | Audio-visuals aids used | | | | | |
| 7 | Ability to defend the paper | | | | | |
| 8 | Clarity of presentation | | | | | |
| 9 | Any other observation | | | | | |
| | **Total score** | | | | | |

## Checklist - III
## Model Checklist for Evaluation of Teaching Skill

Name of the student: _____ Date: _____

Name of the Faculty/ Observer: _____

| S. No. | | Strong Point | Weak point |
|---|---|---|---|
| 1 | Communication of the purpose of the talk | | |
| 2 | Evokes audience interest in the subject | | |
| 3 | The introduction | | |
| 4 | The sequence of ideas | | |
| 5 | The use of practical examples and /or illustrations | | |
| 6 | Speaking style (enjoyable, monotonous, etc., specify) | | |
| 7 | Summary of the main points at the end | | |
| 8 | Ask questions | | |
| 9 | Answer questions asked by the audience | | |
| 10 | Rapport of speaker with his audience | | |
| 11 | Effectiveness of the talk | | |
| 12 | Uses of AV aids appropriately | | |

**Checklist - IV**
**Model Check list for Dissertation / Project Work Presentations**
**Name of the student:_____ Date:_____**
**Name of the faculty/ Observer:_____**

| S No. | Points to be covered | | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Interest shown in selecting topic | | | | | |
| 2 | Appropriate review | | | | | |
| 3 | Discussion with guide and other faculty | | | | | |
| 4 | Quality of protocol | | | | | |
| 5 | Preparation of proforma | | | | | |
| | **Total score** | | | | | |

## Checklist - V

## Continuous Evaluation of dissertation / project work by Guide/Co-Guide

**Name of the student:_____ Date:_____**

**Name of the faculty/ Observer:_____**

| S No. | Points to be covered | | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Interest shown in selecting topic | | | | | |
| 2 | Appropriate review | | | | | |
| 3 | Discussion with guide and other faculty | | | | | |
| 4 | Quality of protocol | | | | | |
| 5 | Preparation of proforma | | | | | |
| | **Total score** | | | | | |

----------xxxxxxx----------

**Resolution No. 3.1.4.2 of BOM-57/2019:**

i. Resolved to include "Gender Sensitization" into UG (from new batch 2019-2020) and PG (from existing batches) curricula. **[Annexure-21]**

ii. Resolved to align the module of "Gender Sensitization" with MCI CBME pattern for MBBS students.

iii. Resolved that Dr. Swati Shiradkar, Prof., Dept. of OBGY., MGM Medical College, Aurangabad will coordinate this activity at both campuses.

# Annexure - 21

**Gender sensitization for UG (2nd , 3rd , 8th semesters) and PG (3 hours)**

## INCLUSION OF " GENDER SENSATIZATION" IN CURRICULUM

### Introduction :

The health care provider should have a healthy gender attitude, so that discrimination, stigmatization, bias while providing health care will be avoided. The health care provider should also be aware of certain medico legal issues related with sex & gender.

Society particularly youth & adolescents need medically accurate, culturally & agewise appropriate knowledge about sex, gender & sexuality. So we can train the trainers for the same. It is need of the hour to prevent sexual harassment & abuse .

To fulfill these objectives, some suggestions are there for approval of BOS.

### Outline

1)For undergraduates :- Three sessions of two hours each, one in 2nd term, one in 3rd term & one in 8th term.

2)For Faculties and postgraduates :- One session of two hrs .

3)For those want to be trainers or interested for their ownself, value added course, which is optional about sex, gender, sexuality & related issues.

**Responsibility**

ICC of MGM, MCHA , with necessary support from IQAC & respective departments.

**Details of undergraduate sessions**

**1)First session in 2nd term**

**Aim –** To make Students aware about the concept of sexuality & gender**.**

To check accuracy of knowledge they have,

To make them comfortable with their own gender identify & related issues.

To make them aware about ICC & it is functioning.

**Mode** – Brain storming , Interactive power point presentation experience sharing.

**Duration** – Around two hours

**Evaluation** – Feedback from participants.

**2)Second session in 3rd / 4th term**

**Aim** – To ensure healthy gender attitude in these students as now they start interacting with patients.

To ensure that the maintain dignity privacy while interacting with patients and relatives, particularly gender related.

To make them aware about importance of confidentiality related with gender issues.

To encourage them to note gender related issues affecting health care & seek solutions.

Mode – focused group discussions on case studies, Role plays & discussion.



Duration – Around two hours.

Evaluation – Feedback from participants.

Third session in 8$^{th}$ term.

**Aim** – To understand effect of gender attitudes on health care in various subjects.

To develop healthy gender attitude while dealing with these issues.

**Mode** – Suggested PBL by departments individually. ( In collaboration with ICC till faculty sensitization is complete)

**Evaluation** – Feedback

****

**FOR POSTGRADUATES**

Session of 2-3 hrs preferably in induction program.

**Aim** – To introduce medically accurate concept of gender, sex, gender role & sex role.

To ensure healthy gender attitude at workplace.

To understand gender associated concepts on health related issues & avoid such bias wile providing health care.

To make them aware about ICC & it's functioning.

**Mode** – Interactive PPT

Role plays & discussion

**Duration** – 2 to 3 hrs

**Evaluation** – Feedback.

**FOR FACULTIES**

Session of 2 hours may be during combined activities.

**Aim** – To ensure clarity of concept abut gender & sex.

To discuss effect of these concept on health related issues.

To identify such gender & sex related issues in indivual subject specialties.

To discuss methodology like PBL for under graduate students when whey are in $7^{th}$-$8^{th}$ semester.

**Mode** – Role play

Focused group discussion

Case studies

**Evaluation** – Feed back.

******

M.Sc. Clinical Nutrition

**Resolution No. 3.2.1.6.e of BOM-57/2019:** Resolved to approve the List of books (PG) for M.Sc. Clinical Nutrition and List of books (UG & PG) for Optometry program. **[Annexure-27 & 28]**

**Annexure–27**

# M.Sc. Clinical Nutrition

# List of Books & Journals

## List of Books


1. Mahan and Stump. Krause's Food and the Nutrition Care Process. 14th edition. Elsevier
2. Robinson & Lawler. Normal and Therapeutic Nutrition. Revised 17th ed. Prentice-Hall
3. Williams' Essentials of Nutrition & Diet Therapy, Eleanor Schlenker PhD RD and Sara Long Roth PhD RD LD
4. Srilakshmi B. : Food Science, New Age International Private Ltd., New Delhi.
5. Srilakshmi B. Dietetics, New Age International Private Ltd., New Delhi.
6. Textbook of nutrition and dietetics, By kumud khanna
7. Maurice E. Shils, Moshe Shike, A.Catharine Ross, Benjamin Caballero, Robert J. Cousins Modern Nutrition in Health and disease, twelfth edition
8. Swaminathan M, Food Science, Chemistry and Experimental Foods, Bappco Publisher.
9. Manay S.M and Shadaksharaswamy, (1987): Food, Facts and Principles, Wiley Eastern Ltd
10. Norman N. Potter, Food Science, CBS Publishers
11. Frazier William C., Westhoff Dennis C. Food Microbiology, 4th Edition. Tata Mc-Graw Hill
12. Bamji. Textbook of human nutrition 2009
13. Public health nutrition in developing countries, by Sheils chander vir, 2011, Woodhead publication Indian PVT. Ltd.
14. Garrow. Human nutrition and Dietetics
15. Helen Andrew Guthrie, Introductory nutrition, Mosby publication

## List of journals

1 .American journal of clinical nutrition

2. Clinical Nutrition

3. Asian journal of clinical nutrition

4. Journal of clinical nutrition and dietetics

5. International journal of advanced nutritional and health science

6. Asia pacific Journal of Clinical Nutrition

7. Indian journal of nutrition

**Resolution No. 4.3.1.2 of BOM-63/2021:** Resolved to include topics related to COVID 19 in UG {B.Sc. AT & OT (BOTAT 108L), B.Sc. MLT( BMLT 108 L), B.Sc. MRIT (BMRIT 108L), B.Sc. MDT-(BMDT 108L), B.Sc. CCT (BCCT 108L), B.Sc.PT (BPT 108L), B.Optometry (BOPTOM 108L) Programs for Batch AY 2020-21 (Semester II)} & B.Sc. Medical Laboratory Technology SEMESTER-VI in subject of Medical Microbiology-II (BMLT 125 L) & Medical Microbiology-II (BMLT 125 P) for Batch AY 2020-21. **[Annexure-7]**
Further Dr. N.N. Kadam, Hon'ble Pro Vice Chancellor suggested to add topics under "Newer Infectious Diseases" as the main topic.

## Annexure-07 of BOM-63/2021 dt 17.02.2021

To include Covid-19 topics in health professional curriculum as per the BOM Resolution No. 3.7 of BOM-62/2020

a) M.Sc. ( PG Program), (M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Biostatistics, M.Sc. Molecular Biology, M.Sc. MRIT, M.Sc. CCT, M.Sc. Clinical Nutrition, M.Sc. Clinical Embryology, Master in Hospital Administration, Master of Public Health, and M.Optometry)

| Approved syllabus | Name of the subject | Existing content | Proposed changes |
|---|---|---|---|
| **Common Syllabus for Semester IV – 2 year M.Sc. programs** (M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Biostatistics, M.Sc. Molecular Biology, M.Sc. MRIT, M.Sc. CCT, M.Sc. Clinical Nutrition, M.Sc. Clinical Embryology, Master in Hospital Administration, Master of Public Health, and M.Optometry) | **BIOETHICS, BIOSAFETY, IPR & TECHNOLOGY TRANSFER**<br><br>**GE 002 L** | **Sr. no. 2**<br>Introduction to quality assurance, accreditation & SOP writing :Concept of ISO standards and certification , National regulatory body for accreditation, Quality parameters, GMP & GLP, Standard operating procedures, Application of QA in field of genetics, Data management of clinical and testing laboratory | **Sr. no. 2**<br>Introduction to quality assurance, accreditation & SOP writing :Concept of ISO standards and certification , National regulatory body for accreditation, Quality parameters, GMP & GLP, Standard operating procedures, Application of QA in field of genetics, Data management of clinical and testing laboratory, **WHO & CDC, ICMR guidelines for Biosafety and Vaccines with regards COVID 19** |

**Resolution No. 4.3.1.3 of BOM-63/2021:** Accorded post facto approval for changes in the index of UG (B.Sc. AT & OT, B.Sc. MLT, B.Sc. MRIT, B.Sc. MDT, B.Sc. CCT, B.Sc.PT, B. Optometry) and PG 2 year (M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Biostatistics, M.Sc. Molecular Biology, M.Sc. MRIT, M.Sc. CCT, M.Sc. Clinical Nutrition, M.Sc. Clinical Embryology, Master in Hospital Administration, Master of Public Health, and M.Optometry). **[Annexure-8A, 8B]**

# OUTLINE OF COURSE CURRICULUM

## M.Sc. Clinical Nutrition

### Semester I

| Code No. | Core Subjects | Credits/Week | | | | | Hrs/Semester | | | | | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation (CP) | Total Credits (C) | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation (CP) | Total (hrs.) | Internal Assement (IA) | University semester Exam (UEX)/ Internal Semester Exam (INT) | Total |
| **Theory** | | | | | | | | | | | | | | |
| MCN 101 L | Principles of Nutrition | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 (UEX) | **100** |
| MCN 102 L | Biochemistry & Applied Biochemistry | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 (UEX) | **100** |
| MCN 103 L | Basic Human Physiology | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 (UEX) | **100** |
| MCN 104 L | Pathophysiology | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 (UEX) | **100** |
| MCN 105 CP | Nutrition Directed Clinical Education-I | - | - | - | 21 | **7** | - | - | - | 315 | **315** | - | 50 (INT) | **50** |
| **Practical** | | | | | | | | | | | | | | |
| MCN 102 P | Biochemistry & Applied Biochemistry | - | - | 2 | - | **1** | - | - | 30 | - | **30** | 10 | 40 (UEX) | **50** |
| MCN 103 P | Basic Human Physiology | - | - | 2 | - | **1** | - | - | 30 | - | **30** | 10 | 40 (UEX) | **50** |
| MCN 104 P | Pathophysiology | - | - | 2 | - | **1** | - | - | 30 | - | **30** | 10 | 40 (UEX) | **50** |
| **Total** | | **14** | **0** | **6** | **21** | **24** | **210** | **0** | **90** | **315** | **615** | **110** | **490** | **600** |

# OUTLINE OF COURSE CURRICULUM

## M.Sc. Clinical Nutrition

### Semester II

| Code No. | Core Subjects | Credits/Week | | | | | Hrs/Semester | | | | | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation (CP) | Total Credits (C) | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation (CP) | Total (hrs.) | Internal Assement (IA) | University semester Exam (UEX)/ Internal Semester Exam (INT) | Total |
| **Theory** | | | | | | | | | | | | | | |
| MCN 106 L | Medical Nutrition Therapy I | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 (UEX) | **100** |
| MCN 107 L | Advance Nutrition | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 (UEX) | **100** |
| MCN 108 L | Food Microbiology and Safety | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 (UEX) | **100** |
| MCN 109 CP | Nutrition Directed Clinical Education-II | - | - | - | 21 | **7** | - | - | - | - | **315** | - | 50 (INT) | **50** |
| CC 001 L | Research Methodology & Biostatistics ( Core Course) | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 (UEX) | **100** |
| **Practical** | | | | | | | | | | | | | | |
| MCN 106 P | Medical Nutrition Therapy I | - | - | 4 | - | **2** | - | - | 60 | - | **60** | 10 | 40 (UEX) | **50** |
| CC 001 P | Research Methodology & Biostatistics ( Core Course) | - | - | 4 | - | **2** | - | - | 60 | - | **60** | 10 | 40 (UEX) | **50** |
| **Total** | | **14** | **0** | **8** | **21** | **25** | **210** | **0** | **120** | **0** | **645** | **100** | **450** | **550** |

## OUTLINE OF COURSE CURRICULUM

### M.Sc. Clinical Nutrition

#### Semester III

| Code No. | Core Subjects | Credits/Week | | | | | Hrs/Semester | | | | | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation (CP) | Total Credits (C) | Lecture (L) | Tutorial (T) | Practical (P) | Clinical Posing/ Rotation (CP) | Total (hrs.) | Internal Assement (IA) | University semester Exam (UEX)/ Internal Semester Exam (INT) | Total |
| **Theory** | | | | | | | | | | | | | | |
| MCN 110 L | Medical Nutrition Therapy II | 4 | - | - | - | **4** | 60 | - | - | - | **60** | 20 | 80 (UEX) | **100** |
| MCN 111 L | Community Nutrition | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 (UEX) | **100** |
| MCN 112 L | Food Science and analysis | 3 | - | - | - | **3** | 45 | - | - | - | **45** | 20 | 80 (UEX) | **100** |
| MCN 113 L | Pediatric and Geriatric Nutrition | 4 | - | - | 21 | **4** | 60 | - | - | - | **60** | 20 | 80 (UEX) | **100** |
| MCN114 CP | Nutrition Directed Clinical Education | 4 | - | - | - | **7** | | - | - | - | **315** | - | 50 (INT) | **50** |
| **Practical** | | | | | | | | | | | | | | |
| MCN 106 P | Medical Nutrition Therapy II | - | - | 4 | - | **2** | - | - | 60 | 60 | **60** | 10 | 40 (UEX) | **50** |
| CC 001 P | Food Science and Analysis | - | - | 4 | - | **2** | - | - | 60 | 60 | **60** | 10 | 40 (UEX) | **50** |
| **Total** | | **18** | **0** | **8** | **21** | **25** | **210** | **0** | **120** | **120** | **645** | **100** | **450** | **550** |

## OUTLINE OF COURSE CURRICULUM

### M.Sc.Clinical Nutrition

#### Semester IV

| Code No. | Core Subjects | Credits/Week | | Marks | | |
|---|---|---|---|---|---|---|
| | | Credits ( C) | Teaching (Hrs.) | Internal Assement (IA) | University semester Exam (UEX)/ Internal Semester Exam (INT) | Total |
| **Theory (General Elective**)** | | | | | | |
| GE 001 L | Pursuit of Inner self Excellence (POISE) | 4 | 4 | - | 100 (INT) | **100** |
| GE 002 L | Bioethics, Biosafety, IPR and Technology Transfer | | | | | |
| GE 003 L | Disaster Management and Mitigation Resources | | | | | |
| GE 004 L | Human Rights | | | | | |
| MCN 116 | Dissertation / Project* | 18 | 36 | - | 200 (UEX) | **200** |
| **Practical** | | | | | | |
| MCCT 117 P | Educational Tour / Field Work/IV/Hospital Visit | 2 | 0 | - | 50 (INT) | **50** |
| **Total** | | **24** | **40** | **0** | **350** | **350** |

| | |
|---|---|
| 12.1 : Minutes of CBCS meeting held on 3.02.2021<br><br>I. Courses titled as elective, seminar, clinical posting etc. will be evaluated at university level, only: | **Decision taken by CBCS Committee:**<br>Members agreed that all courses (core, elective, seminar, clinical posting etc) in all programs with CBCS curriculum under MGM School of Biomedical Sciences (MGMSBS-UG & PG), MSc Medical Programme under MGM Medical College and MGM School of Physiotherapy (MGMSOP) (BPT & MPT) will be evaluated at the level of the University at the end during semester examination. (Detailed included as 1, 2,3,4 points) |
| 1. Courses which were evaluated at constituent units titled as elective, seminar, clinical posting etc. will be evaluated at university level for UG & PG of MGMSBS, Navi Mumbai: | MGM School of Biomedical Sciences (MGMSBS-UG) :First year B.Sc. (Semester I & Semester II) (core-1.1 & 1.2) and (elective-1.3) common for all seven programs **(B.Sc. DT, B.Sc. AT & OT, B.Sc. CCT, B.Optometry, B.Sc. PT, B.Sc. MRIT, B.Sc. MLT)** which were having 100 marks previously will be changed to 50 marks (40 marks university Semester End Exam-(SEE) and 10 marks Internal Assessment – (IA) as per below format - 1.4) w.e.f AY 20-21. (**Annexure 1**)<br>Clinical Directed posting allotted 50 marks will be assessed as university end semester exam w.e.f AY 20-21. **(Annexure 1.1)**<br>**(request to add**<br>**a) evaluation pattern of seminar - 50 marks– BSc Dialysis- sem IV**<br>**b) Boptometrysem III – course : geometrical optics and visual optics I/II**<br>**sem IV – optometric instrumentation**<br>**10 IA + 40 SEE – format submitted )** |
| | **2.1** Courses which were evaluated at constituent units titled as elective, seminar, clinical posting etc. will be evaluated at university level.<br>Members agreed that all courses (core, elective, seminar, clinical posting etc) in all programs with CBCS curriculum under MGM School of Biomedical Sciences (MGMSBS- PG), will be evaluated at the level of the University end semester examination w.e.f. AY 2020-21.<br>***** For PG program (M.Sc. 2 year including allied program, MHA, MPH) having courses like seminar/education tour & Industrial visit which were allotted **50 marks** will be assessed as university end semester exam.<br>a. Amended 10 marks in seminar **(Annexure-2.1A)**<br>b. Amended 20 marks for Educational Tour/Field Work/Hospital Visit/ Industrial Visit **(Annexure-2.1B)**<br>c. 50 marks for Clinical Directed Posting (no change) **(Annexure-2.1C)**<br>**(request to add the evaluation pattern for MPH – sem I,II, III )**<br>**MOptometry – Sem I – evaluation pattern to be added)**<br><br>**2.2** PG Courses which were evaluated at constituent units titled as elective carrying 100 marks as only similar to that of core courses, will be evaluated at university level. Similar pattern which is being followed for core Subjects (IA - 20 Marks + university exam - 80 marks) will be followed.**(Annexure-2.2)** |

**Resolution No. 10.4 of Academic Council (AC-42/2022):**

**i)** "Resolved to accept "50% eligibility in internal assessment" pattern for all the CBCS programs (UG & PG) running under the constituent units of MGMIHS.(MGM School of Biomedical Sciences, MGM School of Physiotherapy, MGM Medical College (M.Sc. Medical 3 year courses).

This will be applicable to all existing batches (for remaining regular examinations) and forthcoming batches from June 2022 onwards"

# MGM INSTITUTE OF HEALTH SCIENCES

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

**Grade 'A' Accredited by NAAC**

**Sector-01, Kamothe, Navi Mumbai - 410209**

**Tel 022-27432471, 022-27432994, Fax 022-27431094**

**E-mail- registrar@mgmuhs.com Website : www.mgmuhs.com**