

Item No.9

**MGM SCHOOL OF BIOMEDICAL SCIENCES,
NAVI MUMBAI**
(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)



M.Sc. Clinical Nutrition

((As per **CHOICE BASED CREDIT SYSTEM** With effect
From the Academic Year 2018–2019))

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

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 Nutrition Over 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	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • The basic concept of nutrition. • The importance of nutrients for the growth and maintenance of human body.
Learning Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Discuss the role of nutrients for human health and certain disorders. • Describe the different forms of nutrients and about the procurement and requirement of nutrients.

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 Significance of body composition and changes through the life cycle, Methods for assessing body composition (both classical and recent) and their applications.	6
3	Energy Components of energy requirements: BMR, thermic effect of feeding, physical activity. Factors affecting energy requirements, methods of measuring energy expenditure. Estimating energy requirements of individuals.	6
4	Carbohydrates Nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates and their implications Dietary fibre: Types, sources, role and mechanism of action	6
5	Proteins Amino acids: Nutritional importance, essential, non essential amino acids Therapeutic applications of specific amino acids Peptides of physiological significance.	6

6	<p>Lipids Nutritional significance of fatty acids – SFA, MUFA, PUFA: functions and deficiency Role of n-3 and n-6 fatty acids Prostaglandins Trans Fatty Acids Conjugated linoleic acid Nutritional Requirements and dietary guidelines (International and National) for visible and invisible fats in diets.</p>	9
7	<p>Electrolytes Sodium, Potassium and Chloride</p>	3
8	<p>Vitamins: Historical background, Structure, Chemistry, Food sources, Requirement and Deficiency manifestations a) Water soluble Vitamins (B Complex and Vitamin C) b) Fat soluble Vitamins (Vitamin A,D,E,K)</p>	6
9.	<p>Minerals (Macro Minerals): Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chloride Introduction, Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity .Interaction with other nutrients</p> <p>Minerals (Micro Minerals): Iron, Zinc, Copper, Selenium, Chromium, manganese, iodine and fluorine Introduction, Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity, Interaction with other nutrients</p>	6 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	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Understand the mechanisms adopted by the human body for regulation of metabolic pathways • Develop an insight into interrelationships between various metabolic pathways
Learning Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Understand integration of cellular level metabolic events to nutritional disorders and imbalances.

Contents:

TopicNo.	Topics and Details	No. of lectures
1	<p>Basic Concepts & Body Composition Micro & macronutrients, Food pyramid, Balanced diet, Nitrogen balance, Protein quality, SDA, BMR, Thermogenic effect of foods. Significance of body composition and changes through the life cycle Methods for assessing body composition (both classical and recent) and their applications</p>	01
2	<p>Energy Components of energy requirements: BMR, thermic effect of feeding, physical activity. Factors affecting energy requirements, methods of measuring energy expenditure. Estimating energy requirements of individuals.</p>	02
3	<p>Carbohydrates Nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates and their implications Dietary fibre: Types, sources, role and mechanism of action Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiological significance Glycemic Index and glycemic load</p>	03

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

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

18	Outline of Metabolism purine and pyrimidines Metabolism of purines Metabolism of pyrimidines Disorders of Purine Metabolism	02
19	Enzymes Classification of enzyme, Factors affecting enzyme activity. Enzyme specificity, regulation of enzyme activity and inhibition. Enzymes in clinical diagnosis	04
20	Detoxification in the body, metabolism of xenobiotics } Free radicals, ROS and oxidative damage }	02
14		
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. et al, 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: <ul style="list-style-type: none"> • The basic physiology of various system in human body. • The functions of various organs and their regulation.
Learning Outcomes	After the course accomplishment the student will be able to: <ul style="list-style-type: none"> • To discuss the physiology of the different organ system • To understand the functions of various organs of human body.

Sr. No	Topics	No. of Hrs.
1	Circulatory system <ol style="list-style-type: none"> 1. Basic structure and function of CVS 2. Structure and function of heart 3. Cardiac Impulse and cardiac cycle 4. Concept of Blood Pressure, Normal values, Regulation 	8
2	Respiratory System <ol style="list-style-type: none"> 1. Basic structure and function of RS 2. Mechanism of breathing 3. Transport of oxygen and carbon dioxide 4. Regulation of respiration 	6
3	Renal System <ol style="list-style-type: none"> 1. Basic structure and function of Renal System 2. Mechanism of urine formation GFR & Tubular functions. 3. Maintains of Osmolarity& Volume of ECF 4. Micturition & RFT 	4
4	Digestive system <ol style="list-style-type: none"> 1. Basic structure and function of GIT 2. Digestion & Absorption of food in various parts of GIT 	8
5	Musculoskeletal system <ol style="list-style-type: none"> 1. Basic structure and function of skeletal muscle 2. Neuromuscular Transmission and muscle contraction 3. Energetics of muscle contraction 	4

6	Endocrine System	1.Introcuotion to Endocrine system 2. Function, Regulation & Disorders of <ul style="list-style-type: none"> • Pituitary gland • Thyroid gland • Parathyroid gland • Adrenal gland • Endocrine Pancreas gland 	9
7	Hemotology	1.Composition & Functions of Blood 2.Normal Haemogram 3.Formation of blood cells-RBC, WBC, Platelets 4.Anemia 5. Blood coagulation 6. Blood groups	6
Total			45 hrs

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	Clinical Examination of CVS	2
12	Clinical Examination of RS	2
13	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	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • The pathophysiological changes in different organs, tissues and systems in different disease conditions across the lifespan • The metabolic changes occurring in disease conditions • The implications of functional interrelationships in a diseased body.
Learning Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • To know and interpret the various diagnostic indicators/parameters • 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, deficiency 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	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Understanding of basic concepts of medical nutrition therapy • Develop an insight about the etiology ,signs and symptoms, nutritional management of diseases and disorders
Learning Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • To explain about the basics of therapeutic diet • 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	<p>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.</p> <p>The Care Process - Setting goals and objectives short term and long term, Counselling and Patient Education, Dietary Prescription. Motivating Patients.</p> <p>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.</p>	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	<p>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</p> <p>Medical Nutrition therapy for Lower gastrointestinal tract Diseases/Disorders: Common Symptoms of Intestinal dysfunction – Flatulence, constipation, haemorrhoids, diarrhoea, steatorrhoea, typhoid</p> <p>Diseases of the large intestine: - Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease.</p> <p>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.</p>	10
12	<p>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.</p>	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	Advance Nutrition
Course Code	MCN 107 L

Teaching Objective	<p>To apprehend the candidate with</p> <ul style="list-style-type: none"> • Basics of nutrition • The nutritional requirement during the different stages of life cycle • The nutritional requirement during the specific conditions. • Awareness about the recent advances in nutrition
Learning Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • To explain about the basics of nutrition • To discuss about the nutritional requirement according to age, sex and physiological condition and how to apply them in practical dietetics.

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	<p>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 ,</p> <p>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</p> <p>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</p>	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, 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 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 expression epigenetics 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 Mifflin, 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, CRC Press, 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	<p>To apprehend the candidate with</p> <ul style="list-style-type: none"> • 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	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • To prevent the contamination and spoilage of food items by microorganism. • To control the contamination and maintain the hygienic condition during the handling of food items. • 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 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 poultry 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, spoilage 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, <i>Bacillus Cereus</i> poisoning, Botulism. Food borne infections: Salmonellosis, Hepatitis A, shellfish poisoning, <i>E.coli</i> diarrhea. Food borne toxic infections; cholera, <i>Clostridium Perfringens</i> gastroenteritis. Mycotoxins: Aflatoxicosis, Ergotism. 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. Frazier w. 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. Al. (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 and statistical models commonly used in medical and bio-medical sciences. The goal is to impart an intuitive understanding and working knowledge of research designs and statistical analysis. The strategy would be to simplify, analyse the treatment of statistical inference and to focus primarily on how to specify and interpret the outcome of research.
Learning Outcomes	Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of results 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	5

	Techniques, Possible sources of error in measurement, Tests of sound measurement	
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 transformation Important 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 Kruskal Walli'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.	3

	Frequencies, descriptive statistics, cross tabulations. Diagrammatic presentation include 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 001 P – 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

RULES AND REGULATION FOR EXAMINATION OF UNDER GRADUATE AND POST GRADUATE DEGREE COURSES UNDER SCHOOL OF BIOMEDICAL SCIENCES OFFERING CBCS PATTERN

1. Title of the courses offered :

M.Sc. Clinical Nutrition

2. Duration of the course:

Duration shall be for a period of two years for PG courses

3. Medium of instruction: The medium of instruction and examination shall be in English

4. LETTER GRADES AND GRADE POINTS:

MGMSBS has adopted the UGC recommended system of awarding grades and CGPA under Choice Based Credit Semester System for all the PG courses.

4.1 MGMSBS would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.

4.2 The UGC recommended 10-point grading system with the following letter grades will be followed:

Table 1: Grades and Grade Points:

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B (Good)	7
C (Above Average)	6
F (Fail)/ RA (Reappear)	0
Ab (Absent)	0
Not Completed (NC)	0
RC (<50% in attendance or in Internal Assessment)	

4.3 A student obtaining Grade RA shall be considered failed and will be required to reappear in the examination.

4.4 Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 75% in attendance or less than 35% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

5. CBCS Grading System - Marks Equivalence Table

5.1 Table 2: Grades and Grade Points

Letter Grade	Grade Point	% of Marks
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60 -69
B (Good)	7	55 -59
C (Above Average) – Pass for PGs	6	50- 54
F (Fail))/ RA (Reappear)	0	Less than 50
Ab (Absent)	0	-
NC- not completed	0	-
RC- Repeat the Course	0	0

5.2 Table 3: Cumulative Grades and Grade Points

Letter Grade	Grade Point	CGPA
O (Outstanding)	10	9.01 - 10.00
A+ (Excellent)	9	8.01 – 9.00
A (Very Good)	8	7.01 – 8.00
B (Good)	7	6.00 - 7.00
C (Above Average)	6	5.01 - 6.00

6. Assessment of a Course: Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CBCS to conduct continuous internal assessments (IA), followed by one end-semester university examination (ES) for each course.

6.1 For all category of courses offered (Theory, Practical, Discipline Specific Elective [DE]/ Lab [DL]; Generic Elective [GE] and Ability Enhancement Courses [AE]; Skills Enhancement Courses [SE] Theory or P (Practical) & RP(Research Project), assessment will comprise of Internal Assessment (IA) and the end–semester (ES) examination.

6.2 Courses in programs wherein Theory and Lab are assessed jointly (PG), the minimum passing head has to be 50% Grade in total including internal assessment. RA grade in any

one of the components will amount to reappearing in both components. i.e. theory and practical.

6.3 Evaluation for a course with clinical rotation or clinical training or internship will be done on a continuous basis.

7. Eligibility to appear for the end-semester examinations for a course includes:

7.1 Candidates having $\geq 75\%$ attendance and obtaining the minimum 35% in internal assessments in each course to qualify for appearing in the end-semester university examinations.

7.2 The students desirous of appearing for university examination shall submit the application form duly filled along with the prescribed examination fee.

7.3 Incomplete application forms or application forms submitted without prescribed fee or application form submitted after due date will be rejected and student shall not be allowed to appear for examination.

8. Passing Heads

8.1 Courses where theory and practical are involved, the minimum passing head shall be 50% in total including the internal assessment.

8.2 Elective subjects – the minimum prescribed marks for a pass in elective subject should be 50%. The marks obtained in an elective subjects should be communicated to the university before the commencement of the university examination.

9. Detention: A student not meeting any of the above criteria may be detained (NC) in that particular course for the semester. In the subsequent semester, such a candidate improve in all, including attendance and/or IA minimum to become eligible for the next end-semester examination.

The maximum duration for completing the course will be 4 years (minimum duration of course x 2) i.e. $(2 \times 2) = 4$ years for PG Courses, failing which his/her registration will be cancelled. Full fees of entire course of three or two years as the case may be liable to be paid by the students.

10. Carry over benefit:

10.1 First year examination: A candidate who fails in any two main subjects of first semester shall be permitted to carry over those subjects to second semester. However, the candidate has to clear all over subject before being allowed to appear for last semester examination.

10.2 A candidate shall not be allowed to appear in the final semester examination unless the candidate has cleared all the previous semester examinations.

11. University End-Semester Examination (PG Programs)

11.1 There will be one final university examination at the end of every semester.

11.2 A candidate must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each subject to be eligible for appearing the University examination.

11.3 The principal /dean/ director shall send to the university a certificate of completion of required attendance and other requirements of the applicant as prescribed by the university, two weeks before the date of commencement of the written examination.

11.4 A candidate shall be eligible to sit for the examination only, if she / he has secured minimum 35% in internal assessment of that subject. The internal examinations will be conducted at college/ department level.

11.5 Notwithstanding – anything in any examination, a deficiency of attendance at lectures or practical maximum to the extent of 10% - may be condoned by the principal / dean /director.

11.6 If a candidate fails either in theory or in practical, he/ she have to re-appear for both.

11.7 There shall be no provision of re- evaluation of answer sheets. Candidates may apply to the university following due procedure for recounting of theory marks in the presence of the subject experts.

11.8 Internal assessments shall be submitted by the Head of the Department to the university through the Director of MGMSBS at least two weeks before commencement of University theory examination.

12. Supplementary examination: There shall be no supplementary examination

13. Re-Verification

There shall be provision of retotaling of the answer sheets, candidate shall be permitted to apply for recounting/retotaling of theory papers within 8 days from the date of declaration of results.

14. Scheme of University Examination Theory for PG Program:

General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightages for PG programs of MGMSBS are given in the following tables

14.1 Marks scheme for the University exam:

Final theory marks will be **100 marks (80 marks University Theory exam + 20 Marks Internal assessment)**.

Question		Marks distribution	Marks allotted per section	Marks
Sec:A	MCQ	10 x 1 M = 10	10	10
Sec:B	SAQ	3/4x 5 M = 15	15	35
Sec:B	LAQ	2/3 x 10 M = 10	20	
Sec:C	SAQ	3/4x 5 M = 15	15	35
Sec:C	LAQ	2/3x 10 M = 10	20	
				Total = 80 M

14.2 Practical exam pattern: Total 40 marks with following breakup :

Exercise	Description	Marks
Q No 1	Practical exercise/Case study - 1	1 x20=20 M
Q No 2	Station exercise/Case study	2x5M=10 M
Q No 3	VIVA	5 M
QNo 4	Journal	5 M
		Total = 40 M

14.3 Practical to be conducted at respective departments and marks submitted jointly by the parent department to the university.

14.4 Breakup of theory IA calculation for 20 marks

Internal exam (at department)	15 marks
Seminar	5 marks
	Total = 20 M

Breakup of practical IA calculation:

Internal exam (at department)	10 marks
Viva	5 marks
Journal	5 marks
	Total = 20 M

Note –20 marks to be converted to 10 marks weightage for submission to the university.

14.5 ASSESSMENT OF SEMMINAR FOR PG COURSE (50 Marks)

Description	Marks
Submission of seminar report	25 M
Subject knowledge	5
Concept and Methodology	5
Presentation	5
VIVA	10 M
	Total = 50 M

14.6 Dissertation:-

17.6.1 PG student should submit a suitable dissertation topic forwarded by the guide to the School of Biomedical Sciences by September in III semester of the course. Following approval of ethics & scientific committee, work should be carried out.

17.6.2 Completed dissertation should be submitted in IV semester. (Dissertation submission date will be informed later)

15. Dissertation Evaluation Guidelines for PG courses:

The Dissertation allows the student to develop and display in-depth understanding of a theme in International Studies, as well as an in-depth understanding of the appropriate research tools, approaches and theories applicable to that theme. The dissertation should be based on a well-defined and clear research question of scholarly significance, and that the dissertation develops a theoretically and methodologically informed and evidence-based answer to that question.

Criteria for Evaluating a Dissertation:

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

Part I- III semester

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

Part-II- IV semester

- a. Continuous Internal Assessment, Novelty of work - 100 Marks
- b. Dissertation/Project work book: 50 Marks
- c. Viva-Voce: 50 Marks

16. Eligibility for award of degree

16.1 A candidate shall have passed in all the subjects of 1st & 2nd year to be eligible for award of Post Graduate degree.

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