Mahatma Gandhi University

Of

Medical Sciences & Technology, Jaipur

Syllabus

M.Sc. Clinical Nutrition & Dietetics

(2 Years Degree Course + 6 months Internship)

Notice

1. Amendments made by the University in Rules / Regulations of the Courses shall automatically apply.

2. The University reserves the right to make changes in the syllabus/books/ guidelines, fee structure or any other information at any time without prior notice. The decision of the University shall be binding on all.

3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

M.Sc. Clinical Nutrition & Dietetics ( )

(2 Years Degree Course + 6 months Internship)

Rules & Regulations

1. **TITLE OF THE COURSE**

The title of the course shall be **"**M.Sc. Clinical Nutrition & Dietetics".

2. **DURATION OF COURSE/TRAINING**

The course shall be of two years duration and 6 months internship from the date of commencement of academic session.

3. **MEDIUM OF INSTRUCTION**

English shall be the medium of instruction

4. **ELIGIBILITY FOR ADMISSION**:

Candidate should have passed the Bachelor's Degree in Science with Clinical Nutrition/ Dietetics.

5. **CRITERIA FOR ADMISSION**

Selection shall be done by an Admission Board of the University strictly on merit. It will consist of two-step process –Written Entrance Examination followed by Counseling/Personal Interview (PI).

6. **RESERVATION POLICY**

Reservation shall be applicable as per policy of the State Government.

7. **ENROLMENT**

Every candidate who is admitted to M.Sc. Course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology after paying the prescribed eligibility and enrolment fees.

A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, through the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within two months of his/her admission or up to November 30 of the year of admission whichever is later, he/she will have to pay late fee prescribed by the University

8. **MIGRATION RULES**

No student, once admitted to the course and enrolled by the University, will be permitted to migrate to any other Course/ University.

No student will be admitted to the Course on migration from any other Course/ University.

9. ATTENDANCE

Minimum 75% attendance in each year, both for theory and practical classes separately. Student with deficient attendance will not be permitted to appear in University examination.

10. TRAINING:

1. The period of training for M.Sc. shall be of two years from the date of admission.
2. Part – I and Part – II of the course shall be of one-year duration each.
3. The candidate will undertake the post graduate training as a full time post graduate in the department concerned.
4. The students will be required to complete the prescribed period of study and fulfill the requirement of attendance before they are allowed to appear in the University examination.

11. EXAMINATION AND ASSESSMENT

1. The examination of Part I shall consists of three theory papers and internal assessment and practical & viva-voce examination.
2. The examination of Part II shall consist of three theory papers & internal assessment and practical in the opted specialization.
3. A candidate shall be permitted a maximum of 4 years from the year of admission to complete the course and pass the examination failing which, the candidate will have to leave the course.
4. Only those candidates will be allowed to appear at Part II examination, who have passed Part –I examination completely.
5. Degree of M.Sc. Clinical Nutrition & Dietetics will be awarded to a candidate only after his successful completion of 6 months compulsory internship.

12. CONDUCTION OF THE UNIVERSITY EXAMINATION:

University examination shall be conducted twice in a year; that is Main and Supplementary Examination. Supplementary examination shall be conducted after 4 - 6 months of the main examination.

13. SCHEME OF EXAMINATION

The Examination in Part I shall consist of:

Paper	**Marks**
Theory	
Paper I - Biostatistics & research methodology	100 Marks
Paper II - Applied Nutrition & Food safety	100 Marks
Paper III - Molecular Nutrition	100 Marks
Internal Assessment	100 Marks
Practical & Viva Voce Examination	200 Marks
Total Marks	**600 Marks**

Notes:

1. Each theory paper shall be of 3 hours duration.
2. Each paper will be set by the External Examiner of the subject concerned and will be assessed by the internal examiner of the subject concerned.

Pattern of questions to be set and answered shall be as follows:

Paper	No. of questions to be set	No. of questions to be answered
Paper I	4	4
Paper II	4	4
Paper III	4	4

3. In order to pass the University Examination, the candidate must secure a minimum of 50% marks in each theory paper including internal assessment and 50% marks in practical and viva-voce examination separately.
4. A candidate who has failed in one or more theory paper of Part-I Examination must appear in that theory paper in supplementary examination which will be conducted by university within 4 – 6 months.

The Examination in of Part II shall consist of:

Paper	**Marks**
Theory	
Paper I – Therapeutic Nutrition	100 Marks
Paper II – Advanced Nutrition	100 Marks
Internal Assessment	100 Marks
Practical & Viva Voce Examination	200 Marks
Dissertation	200 Marks
Total Marks	700 Marks

Notes:

1. Each theory paper shall be of 3 hours duration.
2. All papers shall be set by the External Examiners.
3. Disseration will be assessed by the External Examiner and Paper I will be assessed by the Internal Examiner viz. Head of the Department of subject concerned. Paper II will be assessed by Professor / Associate professor / Assistant professor

Pattern of questions to be set and answered shall be as follows:

Paper	No. of questions to be set	No. of questions to be answered
Paper I	4	4
Paper II	4	4

4. Practical examination shall be conducted by one Internal, one External Examiner which will be appointed by the university.
5. In order to pass the examination the candidate must secure a minimum of 50% marks in Theory papers including internal assessment and 50% marks in practical and viva-voce examination separately.
6. In case a student passes either in Theory or in Practical only, the student shall be considered to fail in the whole examination and he will have to appear in both the Theory and Practical in the subsequent examination.
7. To successfully complete the course and pass the examination, a candidate shall be permitted a Maximum of four years from the date of his/her admission in the course, failing which he/she will have to leave the course.

14. APPOINTMENT OF EXAMINER AND PAPER SETTERS

a. All the examiners, paper setters, theory examination answer books evaluators, Internal and External Examiners for Practical examinations shall be appointed by the President of the University.

b. Qualification of the Paper setter / Examiner: Assistant Professor and above.

c. Paper setter can be an examiner

15. GRACE MARKS

No grace marks will be provided in M.Sc. Examination

16. REVALUATION / SCRUTINY

No Revaluation of answer books shall be permitted in M.Sc. Examination. However, the candidate can apply for scrutiny of marks as per University Rules.

Curriculum Outline

Distribution of Teaching hours

1ST Year Master of Clinical Nutrition & Dietetics

Course Title	Hours
Biostatistics & research methodology	300
Applied Nutrition & Food safety	300
Molecular Nutrition	200
Total Theory Hours	**800**
Practical	400
Total Hours :	**1200**

2nd Year Master of Clinical Nutrition & Dietetics

Course Title	Hours
Therapeutic Nutrition	200
Advanced Nutrtion	200
Total Theory Hours	**400**
Practical	**400**
Dissertation	**400**
Total Hours :	**1200**

SYLLABUS

M.Sc. Clinical Nutrition & Dietetics ( )

(2 Years Degree Course + 6 months Internship)

Learning Objectives:

At the completion of this course, the student should be –

1. Recognize “Health for all” as a national goal & right of all citizens and by undergoing training, student will be able to fulfil his/ her social obligations towards realization of this goal
2. Learn various aspects of National policies on health & devote him/ her to its practical implementation
3. Develop scietific approach, acquire educational experience for proficiency in profession and promote healthy living
4. Student will be able to learn different aspects of Nutrition applicable to daily living & how quality of life can be provided by preventing & curing diseases
5. He/ she will be able to idetify clinical needs of patients & design diet regime for them

Expectation from the future graduate in the providing patient care

1. Students will be aware & develop an attitude for health & fitnessDevelop a sense of adequate nutrient intake by self & by society
2. Will develop promotive, preventive, curative & rehabilitative aspects of common nutritional & therapeutic problems
3. They will develop skill of planning menu in an artistic & scientific manner to fulfil patient's & community's physical nutrient needs & psychological satisfaction as well

Assessment:

The examination to the first/second year shall be open to a student who:

Has remained on the rolls of the course concerned for full on academic year preceding the examination and having attended not less than 75% of the full course of lectures and 75% practical separately held for the purpose in each year.

CURRICULUM

M.Sc. Clinical Nutrition & Dietetics

(2 Years M.Sc. Degree Course + 6 months Internship)

1. COURSE OF STUDY : M.Sc. Clinical Nutrition & Dietetics

1.1 PART-I

a) Theory

Paper I: Biostatistics & research methodology

1. Meaning & scope of statistics
2. Presentaion of data – tabulation, graphic & diagramatic presention by graphs, bars, charts etc.
3. Measures of central tendency – mean, mode, median
4. Measures of dispersion – mean deviation, standard deviation, variance, range, skewness, kwctosis
5. Corelation & regression interpretation
6. Ideas of probability
7. Hypothesis – null hypothesis – level of significance
8. Sampling techniques
9. Student's t test – its application, significance, confidence interval in normal population for mean when variance is known & unknown
10. Design of experiments – Analysis of variance, completely randomized & random block designs
11. Non parametric inference: Sign, Median, Run test & X test, (as goodness of fit & independence of attributes in 2x2 & r x c contingency tables).
12. Research design – Experimental & Descriptive, definition & identification of Research problem, selection of problem, basic assumption & limitation of problem.
13. Data gathering instruments – Questionaires, interviews, measurements & scales, relaibility & validity of measuring instruments
14. Methods of collecting information – Census & sampling, various sampling schemes, Methods of estimating population means, & its standard error in simple random sampling & stratified random sampling
15. planning, executing & analysis of large scale surveyswith special emphasis on surveys in Nutrition. Presenation & preparation of report for publication

PAPER II. Applied Nutrition & Food safety

1. Assessment of nutritional status of different age groups
   - Infants, preschoolers, children, adolescents, adults & elderly
   - Pregnant & lactating females
2. Planning diet for different age groups as per their nutrient requirements & factors affecting their nutritional needs
   - Infants, preschoolers, children, adolescents, adults & elderly
   - Pregnant & lactating females
3. Major nutrition related community health problems – PEM, anemia, iodine deficieny, vitamin A

deficiency, scurvy, beri beri, pellagra, fluorosis etc.

4. Inborn errors of metabolism in brief
5. Management of diet in different types of institutional settings
6. Quality Control - National & International food safety regulating agencies & organizations
   - FSSAI & its rules & regulations to maintain food quality & holistic wellness
   - Safe food practices as per FSSAI, nutrition labelling & carbon foot prints of food
7. Quality evaluation & Techniques -
   - Sensory evaluation – Colour, texture, flavour & taste, different tests & methods of sensory evaluation of foods
   - Bacteriological & nutritional quality evaluation for food products
   - Statistical methods used in quality control
   - Food adulteration & food toxicities including food borne illness
8. Food safety & contamination : Naturally occuring toxins & antinutritional factors (lathyrism, Epidemic dropsy), contamination of food (Chemical, heavy metal & pesticide residue) fungal aflatoxic hepatitis, enteroergotism & mycotoxicosis.
9. Carbon foot prints of food

PAPER III Molecular Nutrition

1. The molecular nutrition paradigm
2. Nutritional physiology and biochemistry
3. Nutriepigenomics & metabolomics
4. Dietetics & molecular gastronomy
5. Molecular nutrients targeting with diet
6. Dietary supplements & nutraceuticals
7. Survey of target molecules
8. Survey of nutrient molecules
9. Targeting Foodome – Metabolome Interaction: a combined Modeling Approach
10. Metabolic syndrome in relation to different diseases
11. Solutions to implement Molecular Nutrition

B. PRACTICAL

PAPER I HAS NO PRACTICAL

PAPER II. Applied Nutrition & Food safety

1. Assessment of nutritional status of different age group
2. - Infants, preschoolers, children, adolescents, adults & elderly
3. - Pregnant & lactating females
4. a. Learning anthropometric techniques – Recording & interpretation of height, weight, BMI, Fat percentage, waist hip ration, bone mineral density, skin fold thickness, chest, head & mid upper arm circumference, infant weight & length
5. b. Measurement of blood pressure, temperature, blood glucose, biochemical assessment to identify deficiency diseases namely PEM, anemia etc.
6. c. Clinical assessment – Identifyingclinical menifestations (signs & symptoms) of various

nutrition related problems

7. d. Dietary survey – Use of different thechniques to assess dietary intake of a given population
8. Planning diet for different age groups as per their nutrient requirements
2. - Infants, preschoolers, children, adolescents, adults & elderly, pregnant & lactating females
3. Market survey report with powerpoint presentation for RTE/ RTC foods
4. Food labeling – regulating agency, nutritional facts, Identify food colours, preservatives
5. Study of permitted range of various compounds – emulsifiers, acidity regulators, stabilizers
6. Food service facility visit
7. Product development – experimental preparation of foods, recipe formulation, product development & evaluation

Practical learning of sensory evaluation of foods using different methods

PAPER III Molecular Nutrition (Practical)

1. Identification of vitamin & mineral deficiencies in patients
2. Nutraceuticals survey & comparison
3. Product development as per different physiologic conditions & different disease states
4. Preparation of project on any topic of molecular nutrition

1.2 PART-II

a) Theory

Paper I: Therapeutic Nutrition

1. Factors in patient care, counselling and co-ordinated nutritional services for the patient, feeding the patient, psychological aspects & assessment of patient's needs – Different nutritional assessment tools for patients (MUST, SGA, MNA etc)
2. RDAs & Dietary guidelines for Indians
3. Physiological changes & diet for different types of infections (Fevers)
4. Physiological changes & diet for GI disorders
5. Physiological changes & diet for Cardiac disorders
6. Physiological changes & diet for pulmonary disorders
7. Physiological changes & diet for kidney disorders
8. Physiological changes & diet for liver disorders
9. Physiological changes & diet for neurological disorders
10. Physiological changes & diet for different types of cancers, burn
11. Nutritional care in pre & post surgey patients including bariatrics
12. Physiological changes & diet for different types of autoimmune disorders
13. Special feeding methods - Enteral & parentral feeding
14. Drug nutrient interaction
15. Standard guidelines for clinical nutrition (ASPEN/ ESPEN/ IAP/ KDQOI etc.)

Paper II Advanced Nutrtion

1. Sports nutrition
2. Weight management (Different types of diets in fashion)
3. Nutrition in stress

4. Nutritional needs in extreme environmental conditions
5. Disaster management (famine, drought, war)
6. Space nutrition
7. Fermented food products
8. Antioxidants, Functional foods & Organic foods
9. Nutregenomics
10. Prebiotics, probiotics & symbiotics, FODMAP

B. PRACTICAL

Paper I Therapeutic Nutrition

1. Assessment of nutritional status of patients using different tools (MUST, MNA, SGA etc)
2. Planning & preparation of Medical nutrition therapy for different types of diseases -
   - Different types of infections (Fevers)
   - GI disorders
   - Cardiac disorders
   - Pulmonary disorders
   - kidney disorders
   - liver disorders
   - neurological disorders
   - cancers, burn
   - pre & post surgey patients including bariatrics
   - autoimmune disorders
   - Enteral & parentral feeding
3. Make a project on drugs on different types of disease – their usage, side effects & drug nutrient interaction

Paper II Advanced Nutrition

1. Planning diet for different conditions studied in theory like -
   - Different Sports
   - Weight management programmes
   - Planning diet for stress condition
   - Disaster diet management plan
   - Space nutrition diet plan
2. Presentations based on traditional & modern developments in
   - Fermented foods
   - Antioxidants
   - Functional foods
   - Organic foods
   - Nutregenomics
   - Prebiotics, probiotics & symbiotics

2. DISSERTATION / PROJECT WORK

The Dissertation / Project work shall be conducted under the supervision of an allotted guide of the opted subject. The work shall relate to the lab investigations/ nutrition status/ nutritional intervention and quality management of the specialisation area.

The candidate shall submit the Dissertation / Project work as a printed copy to the Head of Department at least one month before commencement of University Theory paper examination otherwise permission to appear in the University examination shall not be granted. The same shall be presented and assessed at the time of Examination.

3. REFERENCE BOOKS

1. Simpson & Kafka: Basic Statistics (Oxford & I.B.H. Publishers)
2. Gupta S.P.: Statistical Methods (Sultan Chand & Co.)
3. Goon, Gupta, Das: Fundamentls of statistics, Vol I and II. Gupta
4. Phillip B.S. : Social research, strategy & techtics.
5. Devdas R.P.: Hand book of Research Methodology. Kulandaivel (Sri RamKrishna Mission Vidyalaya 1971)
6. Food Science- B. Srilakshmi.
7. Norman P.N. Food Science, The AVI Publishing Co. 1962.
8. Charley H. Food Science John Wiley & Sons, 1982.
9. Text book of Human Nutrition. Bamji, Rao & Reddy
10. Therapeutic nutrition. B.Srilakshmi
11. Nutrition & Dietetics & Nutrition. Antia F.P. & Abraham P.
12. Human Nutrition & Meal Planning. Sheel Sharma
13. Nutritional problems of India : Shukla P.K.
14. Catering Management – Mohini Shetty & Surjeet Malhan
15. Normal & Therapeutic nutrition. Robinson CH, Lawler MR, Chenoweth WL and Garwick AW (1986) 17th Ed. Macmillan Publihing Company, Newyork,, Collier Macmillan Canada, Inc. Toronto, Collier Macmillan publishers, London.
16. Textbook of biochemistry by E.S. West, W.R. Todd, H.S. Nelson, T.T. Van Brugger, Oxford I.B.H. Publishing Co., New Delhi, Bombay, Calcutta.
17. Lehninger, A.L. Biochemistry, Worth Publishing Inc. N.Y.
18. Texbook of biochemistry for Medical Students by A.V.S. Rama Rao, L.K. & S. Publishers, Tanaku
19. Molecular Nutrition – The Practical Guide. Jeffrey I, Mechanick MD, Michael A., Via MD and Shan Zhao, Endocrine Press, 2018.
20. Nutrition care & therapeutic nutrition. Krause.
21. Normal & Therapeutic nutrition. Robinson CH, Lawler MR, Chenoweth WL and Garwick AW (1986) 17th Ed. Macmillan Publihing Company, Newyork,, Collier Macmillan Canada, Inc. Toronto, Collier Macmillan publishers, London.
22. Modern nutrition in health & disease. Shils M.E. And Young V.R. Bombay K.M. Verghese Company (vi edition 1988)
23. Nutrition & Dietetics& nutrition, Antia F.P. Oxford University Press (III edition) 1989
24. Clinical Dietetics Manual – indian Dietetic Association

MODEL PAPER

M.Sc. CND.– I **Short Name**

M.Sc. CLINICAL NUTRITION & DIETETICS Part-I (Main) Examination
month year

Paper I
Biostatistics & research methodology

Time: Three Hours
Maximum Marks:
100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Essay Type - What are the measures of central tendency?	25
Q.2	Essay Type - Define different sampling techniques	25
Q.3	Long answers Type	
	a) What is probability ?	12½
	b) Explain different Tests of variance	12½
Q.4	Short Notes	5x5=25

a) ANOVA

b) Random sampling

c) What is biostatistics

d) What is RCTs?

e) Methods to present & interpretation of data

MODEL PAPER

M.Sc. CND.– I **Short Name**

M.Sc. CLINICAL NUTRITION & DIETETICS Part-I (Main) Examination
month year

Paper-II
Applied Nutrition & Food Safety

Time: Three Hours
Maximum Marks:
100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Essay Type - What is FSSAI & describe about other food quality regulating agencies	25
Q.2	Essay Type - Define PEM	25
Q.3	Long answers Type	
	a) Explain factors affecting BMR	12½
	b) Which are permissible food colours & preservatives	12½
Q.4	Short Notes	5x5=25

a) What is phenylketone urea?

b) Dietary survey methods

c) Explain about different types of food toxins

d) Factors affecting energy requirements of infants.

e) What common adulterant is found in turmeric ?

MODEL PAPER

M.Sc. CND.– I **Short Name**

M.Sc. CLINICAL NUTRITION & DIETETICS

Part-I (Main) Examination month year

Paper-III

Molecular Nutrition

Time: Three Hours Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Essay Type – Explain mitochondrial energetics	25
Q.2	Essay Type - Explain calcium hemostatis	25
Q.3	Long answers Type	
	a) Sodium potassium pump	12½
	b) Define different types of nutraceuticals	12½
Q.4	Short Notes	5x5=25

a) Write food sources of vitamin B2/ riboflavin

b) Symptoms of zinc deficiency

c) What is molecular gastronomy?

d) What are endocrine disruptors?

e) Explain Metabolic syndrome.

MODEL PAPER

M.Sc. CND.– II **Short Name**

M.Sc. CLINICAL NUTRITION & DIETETICS

Part-II (Main) Examination month year

Paper I Therapeutic Nutrition

Time: Three Hours Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1 Essay Type – Plan Medical nutrition therapy for cancer of buccle mucosa patient whose height is 175 cm & weight is 58 Kg, and undergoing chemotherapy & radiation therapy. Also mention the common problems faced by these patients 25

Q.2 Essay Type - What are nutritional assessment tools for patients 25

Q.3 Long answers Type

a) Medical nutritional therapy for liver cirrhosis patients 12½

b) Define nutrition care process. 12½

Q.4 Short Notes 5x5=25

a) Role of nutritionist.

b) Write foods to be avoided for CKD patients

c) Define dietary advice for infections/ fevers

d) What is GI index & glycemic load.

e) What is IBD & IBS ?

MODEL PAPER

M.Sc. CND.– II **Short Name**

M.Sc. CLINICAL NUTRITION & DIETETICS

Part-II (Main) Examination month year

Paper-II

Advanced Nutrition

Time: Three Hours
Maximum Marks:
100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1 Essay Type – Write factors affecting diet plan for stress condition. 25

Q.2 Essay Type - How will you manage your food resources during a disaster that can fulfil maxium needs of affected population in minimum resources? 25

Q.3 Long answers Type

a) Explain different types of fad diets. 12½

b) Explain space nutrition. 12½

Q.4 Short Notes 5x5=25

a) What are antioxidants?

b) Define Probiotics

c) What is nutrigenomics?

d) Plan a diet for famine condition

e) Write factors affecting nutrient needs for weight management.