MALLAREDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED HEALTH CARE SCIENCES AND TECHNOLOGY

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Program

MASTERS IN NUTRITION AND DIETETICS

2026

MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED HEALTH CARE SCIENCES AND TECHNOLOGY

MASTERS IN NUTRITION AND DIETETICS

Vision

To produce skilled dietitians who improve health through proper nutrition and research.

Mission

Provide advanced knowledge, clinical training, research skills, and promote ethical practice to solve health and nutrition problems.

Program Educational Objectives (PEOs)

Graduates will:

- Apply nutrition knowledge in practice
- Provide diet therapy for diseases
- Conduct research
- Work ethically and professionally
- Improve public health through nutrition

Program Outcomes (POs)

Students will:

- Understand advanced nutrition concepts
- Assess nutritional status
- Plan therapeutic diets
- Analyze clinical data
- Conduct research
- Communicate effectively

- Follow ethics
- Use modern tools
- Address community health issues
- Continue lifelong learning

Program Specific Outcomes (PSOs)

Students can:

- Assess and diagnose nutritional problems
- Plan personalized diets
- Manage hospital nutrition care
- Conduct nutrition education programs
- Do clinical and community research

Course Outcomes (COs)

Students will:

- Understand clinical nutrition concepts
- Assess nutritional status
- Plan diets for diseases
- Interpret lab data
- Apply food safety
- Develop practical and counseling skills

CURRICULUM

I YEAR FIRST SEMESTER

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 101	Advanced Human Nutrition and Metabolism	4	-	4	40	60	100
2	MND 102	Advanced Pathophysiology and Clinical Biochemistry	4	-	4	40	60	100
3	MND 103	Preventive & Therapeutic Dietetics	3	1	4	40	60	100
4	MND 104	Research Methodology for Dietetics and Public Health	4	-	4	40	60	100
5	MND 105	Biostatistics	2	2	4	40	60	100
6		Research work	-	4	4	-	-	-
TOTAL			**17**	**7**	**24**	**200**	**300**	**500**

I Year Second Semester

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 201	Nutrition Assessment Methods & Applications for Dietitians	2	2	4	40	60	100
2	MND 202	Advances in Enteral and Parenteral Nutrition	2	2	4	40	60	100
3	MND 203	Advances in Public Health Nutrition	3	1	4	40	60	100
4	MND 204	Nutrition and Immunity	2	-	2	40	60	100
5	MND 205	Innovation in Food Product Development	1	3	4	40	60	100
6	MND 206	Scientific Writing Skills	2	-	2	40	60	100
7		Research work	-	2	2	-	-	-
TOTAL			**12**	**10**	**22**	**240**	**360**	**600**

MASTERS IN NUTRIITION AND DIETETICS

II Year Third Semester

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 301	Intellectual Property Rights	2	-	2	40	60	100
2	MND 302	Precision Nutrition	4	-	4	40	60	100
3	MND 303	Institutional Food Service Management and Quantity Cookery	1	5	6	40	60	100
4	MND 304	Advanced Communication Skills for Nutrition Practice	1	3	4	40	60	100
5	MND 305	Internship	-	10	10	40	60	100
TOTAL			**8**	**18**	**26**	**200**	**300**	**500**

II Year Fourth Semester

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 401	Dissertation	-	20	20	100	-	100
TOTAL			-	**20**	**20**	**100**	-	**100**

MASTER'S IN NUTRITION AND DIETETICS

1. Eligibility for Admission

- Bachelor's degree in Nutrition and Dietetics (Honours) or equivalent
- Degree must be from a recognised university
- Minimum CGPA required: 5.5

2. Duration of the Course

- Total duration: 2 years
- Structured as 4 semesters
- Total instructional hours: 1725 hours

3. Medium of Instruction

- English shall be the medium of instruction for:
  - All subjects of study
  - All examinations

4. Attendance Requirements

A candidate must secure minimum attendance to be eligible for final examination:

- Theoretical classes: 75% attendance
- Skills training / Practical / Clinical: 80% attendance

I YEAR FIRST SEMESTER

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 101	Advanced Human Nutrition and Metabolism	4	-	4	40	60	100
2	MND 102	Advanced Pathophysiology and Clinical Biochemistry	4	-	4	40	60	100
3	MND 103	Preventive & Therapeutic Dietetics	3	1	4	40	60	100
4	MND 104	Research Methodology for Dietetics and Public Health	4	-	4	40	60	100
5	MND 105	Biostatistics	2	2	4	40	60	100
6		Research work	-	4	4	-	-	-
TOTAL			**17**	**7**	**24**	**200**	**300**	**500**

MND 101 ADVANCED HUMAN NUTRITION AND METABOLISM

L-4/T/P/C-4

Course Outcomes

- Understand the metabolism and functions of macro and micronutrients.
- Analyze metabolic pathways involved in human nutrition.
- Apply advanced nutrition concepts in health and disease management.

Program Outcomes

- Apply nutritional science principles in healthcare practice.
- Assess nutritional needs in various physiological conditions.
- Promote evidence-based nutrition interventions.

Learning Objectives

- To study digestion, absorption and metabolism of nutrients.

- To understand energy balance and metabolic regulation.
- To explore the role of nutrition in health promotion.

Learning Outcomes

- Explain nutrient metabolism and physiological functions.
- Describe the role of nutrients in disease prevention.
- Relate nutrition concepts to clinical practice.

Unit I – Carbohydrates

12 Hours

Structural features, types, functions, sources, requirements, of carbohydrates; chemistry and characteristics of dietary and functional fibers, role of dietary fibre; resistant starch and fructo-oligosaccharides in various physiological disorders; Glycemic response to carbohydrates; digestion, absorption, transport, and distribution of carbohydrates.

Unit II – Fats

12 Hours

Structure and biological importance; digestion absorption, transport and storage; lipids, lipoproteins, and cardiovascular disease risk; integrated metabolism in tissues; regulation of lipid metabolism; brown fat thermogenesis; deficiency disorders of lipids and essential fatty acids; role of omega-3 and omega 6 fatty acids in physiological disorders.

Unit III – Proteins

12 Hours

Functional categories; protein structure and organization; digestion and absorption; amino acid metabolism; protein turnover; synthesis and catabolism of tissue proteins; evaluation of protein quality; protein deficiency/ malnutrition; body composition, energy balance.

Unit IV – Vitamins

10 Hours

Functions, absorption, requirement, sources, deficiency, toxicity, metabolism and excretion of fat-soluble vitamins - A, D, E and K and water-soluble vitamins- thiamine, riboflavin, niacin, pyridoxine, folate, B12, ascorbic acid, pantothenic acid and biotin.

Unit V – Minerals, Water and Electrolyte Balance

14 Hours

Functions and mechanisms of action, digestion, absorption, transport, excretion, adequate intake, requirements, deficiency, toxicity of macro minerals - calcium and phosphorus and micro minerals – iron, zinc, sodium, copper, cobalt, selenium and chromium; water and electrolyte balance - functions and distribution of water in body; electrolyte composition of body fluids and electrolyte balance.

Reference Books

- Advanced Human NutritionWildman, R. E. C., & Medeiros, D. M. (2000). *Advanced Human Nutrition*. CRC Press, Boca Raton, Florida.
- Textbookof Human NutritionBamji, M. S., Rao, N. P., & Reddy, V. (2003). *Textbook of Human Nutrition* (2nd ed.). Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
- Advanced Nutrition: Macronutrients, Micronutrients and MetabolismBerdanier, C. D., & Zempleni, J. (2009). *Advanced Nutrition: Macronutrients, Micronutrients and Metabolism*. CRC Press, New York.
- Advanced Nutrition and Human MetabolismGroff, J. L., & Gropper, S. (2012). *Advanced Nutrition and Human Metabolism* (7th ed.). New York.
- Modern Nutrition in Health and DiseaseRoss, A. C., Caballero, B., Cousins, R. J., Tucker, K. L., & Ziegler, T. R. (2012). *Modern Nutrition in Health and Disease* (11th ed.). LWW, Philadelphia.

- Biochemical, Physiological and Molecular Aspects of Human NutritionStipanuk, M. H., & Caudill, M. A. (2013). *Biochemical, Physiological and Molecular Aspects of Human Nutrition* (3rd ed.). Elsevier.

Webliography

- Nutrition International
- World Health Organization (WHO)
- Harvard T.H. Chan School – Nutrition Source
- National Institute of Nutrition (NIN)

MND 102 ADVANCED PATHOPHYSIOLOGY AND CLINICAL BIOCHEMISTRY

L-4/T/P/C-4

Course Outcomes

- Explain the pathophysiology of major diseases.
- Interpret biochemical changes associated with disorders.
- Apply clinical biochemistry knowledge in nutrition care.

Program Outcomes

- Integrate clinical biochemistry with dietetics practice.
- Interpret laboratory investigations accurately.
- Support disease management through nutrition therapy.

Learning Objectives

- To understand mechanisms of diseases and disorders.
- To study biochemical alterations in pathological conditions.
- To learn interpretation of diagnostic investigations.

Learning Outcomes

- Describe disease pathogenesis and clinical manifestations.

- Interpret biochemical and laboratory reports.
- Apply nutrition interventions based on clinical findings.

Unit I – Disorders of the Cardiovascular System

12 Hours

Disorders of rhythm --- Brady arrhythmias – Dysfunction of the SA and AV nodes --- Tachyarrhythmias.

Disorders of the heart --- Congestive heart failure --- Ischemic Heart disease (MI, Angina, Sudden cardiac death).--- Valvular heart disease –Rheumatic Heart Diseases -- Myocardial heart disease, Primary (essential) and secondary hypertension --- pathogenesis and risk factors --- effects of Hypertension on the heart, kidney, and brain.

Introduction to other heart diseases: cardiomyopathies and congenital HD.

Atherosclerosis and other forms of Arteriosclerosis --- pathogenesis and risk factors.

Disorders of lipoprotein metabolism.

Cardiac Function tests.

Unit II – Disorders of the Respiratory System and Neoplasia

12 Hours

General characteristics of respiratory disorders.

Classification of respiratory disorders.

Upper and lower respiratory tract infections: common cold, influenza, pneumonia.

Obstructive respiratory disorders: Bronchial asthma, bronchitis, emphysema.

Restrictive respiratory disorders: Pneumothorax, Atelectasis.

COPD, ARDS.

Respiratory failure.

Bronchiectasis --- Cystic Fibrosis --- Disorders of the pleura and the diaphragm.

Pulmonary Function Tests.

Neoplasia: Definition --- Tumors --- Benign and Malignant --- Characteristics.

Molecular basis of Cancers --- Oncogenes --- Activation --- Tumor Suppressor Genes.

Chemical carcinogenesis – stages.

Radiation carcinogenesis.

Viral carcinogenesis.

Clinical features of cancers.

Host cell defenses.

Grading of tumors.

Diagnosis of cancers -- histologic and molecular methods -- Tumor markers.

Unit III – Disorders of the Kidney and the Urinary Tract & Disorders of the GI Tract

12 Hours

Clinical Manifestations of renal diseases (overview).

Types, pathogenesis and clinical manifestations of Glomerular diseases: glomerulonephritis, nephrosis, nephritic syndrome.

Diseases affecting the tubules and interstitium ---Pyelonephritis.

Diseases of the blood vessels --- Nephrosclerosis.

Urolithiasis.

Acute and chronic renal failure.

Voiding dysfunction, Incontinence, fluid-electrolyte balance.

Renal function test.

Disorders of the GI tract:

Pathogenesis and clinical manifestations of GERD and bile reflux- H. hernia.

Esophagitis.

Gastritis- peptic ulcer.

Vascular disease- Ischemic Bowel disease, haemorrhoids.

Enterocolitis- diarrhoea, dysentery.

Constipation.

Malabsorption syndromes-celiac sprue, Bacterial overgrowth syndrome and IIBD.

Colonic diverticulosis.

Gastric Function tests.

Unit IV – Liver Disorders

12 Hours

Jaundice- abnormalities of bilirubin metabolism.

Morphology and patterns of hepatic Injury- Necrosis, degeneration and Inflammation, regeneration and fibrosis.

Inflammatory disease- viral hepatitis.

Cirrhosis- etiology, alcohol and organ damage, Portal hypertension, ascites, splenomegaly, Hepatic failure.

Hepatic encephalopathy.

Pathogenesis and features.

Cholelithiasis- pathogenesis and manifestations of cholesterol and pigment stones.

Cholestasis- Cholecystitis.

Pancreatitis- chronic and acute.

Liver function tests.

Unit V – Disorders of the Endocrine and Reproductive System

12 Hours

Diseases of the thyroid ---hypo and hyperthyroidism --diagnostic tests.

Diabetes Mellitus- types, pathogenesis- metabolic derangements and metabolic alterations.

Complications of DM- Micro and macroangiopathy, neuropathy, nephropathy, retinopathy, diabetic foot.

Diagnostic tests.

Disorders of Reproductive system:

Etiology, Pathogenesis, clinical manifestations, diagnosis and treatment of – Endometriosis, PCOS and STDs.

Reference Books

1. Baynes, J., and Dominiczak. M. (2002). Medical Biochemistry. London : Mosby

2. Thabrew, I. and Ayling. R.M. (2001). Biochemistry for Clinical Medicine. New Delhi: Replika Press Pvt Ltd.

3. Guyton, A.C., and Hall. J.E. (1996). Textbook of Medical Physiology (9thed.). Bangalore: Prism Books Pvt. Ltd.

4. Cotran, R.S., Kumar, V., Robbins, S.L., and Schoen.F.J. (Ed.). (1994). Robbins Pathologic Basis of Disease (5thed.). Bangalore: Prism Books Pvt Ltd.

5. Devlin, T.M. (2002). (Ed.). Textbook of Biochemistry with Clinical Correlations.(5thed.). New York: Wiley-Liss.

MND 103 PREVENTIVE AND THERAPEUTIC DIETETICS

L-3/T/P-1/C-4

➢ Course Outcomes (COs)

- Understand dietary modifications for various diseases.
- Plan therapeutic diets for conditions like diabetes, CVD, renal disorders.
- Apply principles of preventive nutrition.
- Evaluate patient dietary needs and counseling strategies.

➢ Program Outcomes (POs)

- Deliver effective diet therapy for disease management.
- Promote preventive healthcare through nutrition education.
- Apply clinical judgment in diet planning.
- Improve patient outcomes through personalized nutrition care.

➢ Learning Objectives

- Understand principles of diet therapy
- Study diet modification for diseases
- Learn patient counseling techniques

➢ Learning Outcomes

- Plan preventive and therapeutic diets
- Customize diets based on disease conditions

- Apply diet counseling in clinical practice

UNIT I: Fundamentals of Therapeutic Nutrition

(9 Hours)

- Role of nutrients in therapeutic conditions:

a. Carbohydrates

  - Types
  - Mode of action
  - Preventive and therapeutic use in diseases

b. Proteins

  - Types
  - Role of specific amino acids
  - Therapeutic applications

c. Lipids

  - Types (regular & structured)
  - Mode of action
  - Disease-specific applications

d. Vitamins and Minerals

  - Role in disease conditions

e. Dietary Fiber and Water

  - Importance and applications in diseases

UNIT II: Immune, Metabolic and Critical Care Nutrition

(9 Hours)

- Immune and inflammatory system:
  - Introduction to immune system
  - Nutrients affecting immunity
  - Role of cytokines in therapy
- Chrono nutrition:
  - Food timing
  - Circadian rhythm
  - Role in chronic diseases
- Fundamentals of nutrition therapy:
  - Feeding techniques
  - Types of therapeutic diets
  - Guidelines:
    - Hypometabolic (starved) patients
    - Hypermetabolic (stressed) patients
- Critical care nutrition:
  - Definition of critical illness
  - Conditions requiring ICU care
  - Goals of nutrition support
- Brief introduction to enteral nutrition

UNIT III: Metabolic Disorders and Special Conditions

(9 Hours)

- Diabetes:
  - Type 1, Type 2, Gestational
  - Complications (including nephropathy)
- Obesity:
  - Different grades
  - Across age groups

- Inborn errors of metabolism:
  - Phenylketonuria (PKU)
  - Glycogen storage diseases
  - Galactosemia

UNIT IV: Gastrointestinal, Hepatic and Cardiovascular Disorders

(9 Hours)

- Gastrointestinal disorders:
  - Gastritis
  - GERD
  - Diverticular diseases
  - Gastric surgeries
- Liver and biliary disorders:
  - Cirrhosis
  - Hepatic encephalopathy
  - Liver transplant
  - Gall bladder diseases
  - Pancreatitis (acute & chronic)
  - NAFLD
  - Hemochromatosis
- Cardiovascular disorders:
  - Heart diseases
  - Hypertension (primary & secondary)

UNIT V: Renal, Respiratory and Critical Clinical Nutrition

(9 Hours)

- Renal disorders:
  - Acute renal failure
  - Nephrotic syndrome
  - Chronic kidney disease (CKD)

  - Renal replacement therapy
  - Renal transplant
- Respiratory disorders:
  - Overview of normal respiration
  - Types of ventilation
  - MNT goals and principles
  - Acute exacerbation nutrition
  - Chronic condition nutrition
  - Immunonutrition
- Burns:
  - Definition and types
  - Degree of burns
  - Burn surface area assessment
  - Systemic response to burns

Practical:

(30 Hours)

1. Estimation of nutrient requirements- Energy, Carbohydrates, Protein etc. ,
2. Disease specific dietary planning & interpretation of case studies
   - Cardiovascular Disease
   - Diabetes
   - Obesity
   - Inborn Errors Of Metabolism
3. Standardizing general high calorie high protein recipes.
4. Standardizing general low calorie recipes
5. Standardizing recipes based on different nutrient needs
6. Counseling Techniques and mock sessions
7. Estimation of nutrient requirements Critical Care Burns (different Types & Degrees) Cancer (dietary guidelines for different cancers & therapies) Surgery (associated to different disease states)
8. Disease-specific dietary planning & interpretation of case studies and presentations in

Gastrointestinal diseases

9. Disease-specific dietary planning & interpretation of case studies and presentations in Liver disorders
10. Disease-specific dietary planning & interpretation of case studies and presentations in Renal Disorders
11. Disease-specific dietary planning & interpretation of case studies and presentations in Pulmonary Disease
12. Review& Case study presentations for therapeutic conditions
13. Review of nutrient drug interactions
14. Classes for small sample case study presentations by student.

Reference Books

- Links between the Circadian Rhythm, Obesity and the MicrobiomeRacz, B., Duskova, M., Starka, L., Hainer, V., & Kunesova, M. (2018). *Links between the circadian rhythm, obesity and the microbiome*. *Physiological Research*, 67, S409–S420.
- Maternal Health: Time for a Radical ReappraisalCeschia, A., & Horton, R. (2016). *Maternal health: time for a radical reappraisal*. *The Lancet*, 388(10056), 2064–2066.
- Preventive Nutrition – The Comprehensive Guide for Health ProfessionalsBendich, A., & Deckelbaum, R. J. (Eds.). (2005). *Preventive Nutrition – The Comprehensive Guide for Health Professionals* (3rd ed.). Human Press Inc., New Jersey.
- Nutrition Support for the Critically Ill Patient – A Guide to PracticeCresci, G. (Ed.). (2005). *Nutrition Support for the Critically Ill Patient – A Guide to Practice*. Taylor & Francis/CRC Press, USA.
- Dietary Fiber in Human NutritionSpiller, G. A. (Ed.). (2001). *Dietary Fiber in Human Nutrition* (3rd ed.). CRC Press, USA.
- Handbook of Nutrition and FoodBerdanier, C. D. (Ed.). (2002). *Handbook of Nutrition and Food*. CRC Press, USA.

MND 104 Research Methodology for Dietetics and Public Health

L-4/T/P/C-4

Course Outcomes

- Understand principles and methods of research.
- Design research studies in nutrition and public health.
- Interpret and present research findings scientifically.

Program Outcomes

- Conduct scientific research in nutrition and dietetics.
- Apply evidence-based practices in healthcare.
- Demonstrate ethical conduct in research activities.

Learning Objectives

- To understand the basics of research methodology.
- To learn data collection and analysis methods.
- To study ethical issues in research.

Learning Outcomes

- Formulate research problems and hypotheses.
- Analyze and interpret research data.
- Prepare scientific reports and presentations.

Unit I

12 Hours

Introduction to Research Methodology : Definition and importance of research methodology, Research process: problem formulation, hypothesis development, data collection, data analysis, and interpretation, Overview of research designs: descriptive, analytical, and experimental.

Unit II

12 Hours

Epidemiological Studies and Research Design: Types of research designs: cross-sectional, longitudinal, quasi-experimental, randomized controlled trials, Factors to consider when selecting a research design, Case studies: examples of different research designs in dietetics and public health.

Unit III

12 Hours

Data Collection Methods : Surveys: types, advantages, and limitations, Interviews: types, advantages, and limitations Observational studies: types, advantages, and limitations Case studies: examples of different data collection methods in dietetics and public health.

Unit IV

12 Hours

Statistical analysis: descriptive statistics, inferential statistics.

Data analysis software: examples of commonly used software (e.g., SPSS), Data visualization techniques: charts, graphs, tables.

Unit V

12 Hours

Ethical considerations in research: informed consent, confidentiality, deception, Reporting research results: introduction, methods, results, discussion, conclusions.

Case studies: examples of ethical dilemmas in dietetics and public health research.

Reference Books

- ResearchMethods for Public HealthMcClean, S. (2019). *Research Methods for Public Health*. Sage Publications.

- Nutrition Research MethodologiesLovegrove, J. A., Hodson, L., Sharma, S., & Lanham-New, S. A. (2015). *Nutrition Research Methodologies (The Nutrition Society Textbook)*. Wiley-Blackwell.
- Introduction to Epidemiologic Research Methods in Public Health PracticeSusan, B., & Deepa, H. (2012). *Introduction to Epidemiologic Research Methods in Public Health Practice*. Jones & Bartlett.
- Statistics in Nutrition and DieteticsNelson, M. (2020). *Statistics in Nutrition and Dietetics*. Wiley-Blackwell.
- Research Ethics and PlagiarismSreelatha, N. T., & Sreelatha, K. (2021). *Research Ethics and Plagiarism*. Ess Ess Publications.

MND 105 BIOSTATISTICS

L-2/T/P-2/C-4

Course Outcomes

- Understand concepts and applications of biostatistics.
- Apply statistical methods in nutrition research.
- Interpret quantitative research data accurately.

Program Outcomes

- Apply statistical reasoning in healthcare research.
- Support evidence-based decision making.
- Demonstrate analytical and problem-solving skills.

Learning Objectives

- To understand statistical concepts and terminology.
- To study methods of data analysis and interpretation.
- To learn hypothesis testing and statistical inference.

Learning Outcomes

- Calculate and interpret statistical measures.
- Perform basic statistical tests.
- Present and interpret research findings scientifically.

Unit I

3 Hours

Overview of concepts and definition in biostatistics, Various measurements and types of variables- indicators, Types of data – nominal, ordinal, interval, and ratio.

Unit II

3 Hours

Measures of central tendency and deviation: mean, median, mode, standard deviation, Z-score, Concepts of reliability and validity, Interpretation of research data.

Unit III

8 Hours

Hypothesis and sampling: Types of hypothesis and examples for nutritional research, Sample size calculation- statistical procedures, Errors in sampling- type 1 and type 2 errors, Consideration for sampling for statistical tests sample size, sample grouping.

Unit IV

8 Hours

Statistical test: Concept of bivariate and multivariate, Comparison of data set –examples for nutritional research, T-test, paired t-test, Karl Pearson, correlation coefficient test, and others, Chi-square test and other various types of test.

Unit V

8 Hours

Statistical tests for multiple variables; F-test (ANOVA).

Concept of regression analysis, line of regression, regression test.

Conducting statistical analysis and interpretation of data.

PRACTICALS - Computer programs for data analysis

60 Hours

1. Use of software in statistical analysis: Excel, SPSS, JASP, JAMOVI R, Any other software
2. Qualitative data analysis: ATLAS.T1, N-VIVO 20
3. Integrating quantitative and quantitative data
4. Various ways of presenting data: tables, figures graphs, and flow charts

Reference Books

- Introduction to Statistical ReasoningSmith, G. (1998). *Introduction to Statistical Reasoning*.
- Biostatistics: A Foundation for Analysis in the Health SciencesDaniel, W. W. (1978). *Biostatistics: A Foundation for Analysis in the Health Sciences* (Vol. 129). Wiley.
- Research MethodologyKothari, C. R. (2004). *Research Methodology*.
- Research Methods and Measurements in Behavioural and Social SciencesBhatnagar, O. P. (1990). *Research Methods and Measurements in Behavioural and Social Sciences*. Agricole Publishing Academy.

I Year Second Semester

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 201	Nutrition Assessment Methods & Applications for Dietitians	2	2	4	40	60	100
2	MND 202	Advances in Enteral and Parenteral Nutrition	2	2	4	40	60	100
3	MND 203	Advances in Public Health Nutrition	3	1	4	40	60	100
4	MND 204	Nutrition and Immunity	2	-	2	40	60	100
5	MND 205	Innovation in Food Product Development	1	3	4	40	60	100
6	MND 206	Scientific Writing Skills	2	-	2	40	60	100
7		Research work	-	2	2	-	-	-
TOTAL			**12**	**10**	**22**	**240**	**360**	**600**

MND 201 NUTRITION ASSESSMENT METHODS & APPLICATIONS FOR DIETITIANS

L-2/T/P-2/C-4

Course Outcomes

- Apply various nutritional assessment methods in clinical and community settings
- Interpret anthropometric, biochemical, clinical, and dietary assessment data
- Evaluate nutritional status and identify nutrition-related risks
- Utilize nutritional screening tools for patient assessment and intervention

MASTERS IN NUTRIITION AND DIETETICS

Program Outcomes

- Develop competency in evidence-based nutrition assessment practices
- Enhance clinical decision-making and diet planning skills
- Strengthen research and analytical abilities in nutrition sciences
- Promote professional ethics and communication in dietetic practice

Learning Objectives

- To understand the principles and methods of nutritional assessment
- To familiarize students with nutritional screening and assessment tools
- To develop skills in interpretation of nutritional data
- To apply assessment methods in dietetic practice

Learning Outcomes

- Demonstrate proficiency in nutritional assessment techniques
- Analyze nutritional data for planning interventions
- Assess malnutrition and nutritional deficiencies effectively
- Perform nutrition assessment in diverse population groups

Syllabus

Unit I: Fundamentals of Nutritional Assessment in Clinical Practice

3 Hours

- Introduction to nutritional assessment
- Importance and relevance of nutritional assessment in clinical practice
- Objectives and applications of nutritional assessment
- Role of nutritional assessment in disease prevention and management

Unit II: Body Composition and Biomarkers of Nutritional Status

12 Hours

- Body composition and cellular basis of growth

- Significance of body composition in nutrition assessment
- Methods used for measurement of body composition
- Common biomarkers of nutritional status
- Biomarkers of inflammation and their significance

Unit III: Nutritional Screening and Assessment Tools

4 Hours

- Malnutrition Universal Screening Tool (MUST)
- Nutritional Risk Screening 2002 (NRS-2002)
- Mini Nutritional Assessment® (MNA)
- Short Nutritional Assessment Questionnaire© (SNAQ)
- Malnutrition Screening Tool (MST)
- Subjective Global Assessment (SGA)

Unit IV: Information Sources for Nutritional Assessment

3 Hours

- Screening or referral forms
- Interview of patient or key social support
- Medical or health records
- Community- or organization-based surveys and focus groups
- Health surveillance data, reports, and research studies

Unit V: Dietary Intake Assessment and Digital Tools

8 Hours

- Comparison of food and nutrient intake assessment methods
- Advantages and limitations of dietary assessment methods
- Websites for tracking nutritional intake
- Mobile applications for monitoring nutritional intake and physical activity data
- Use of digital tools in nutrition assessment and counseling

Practical

1. Using nutrition assessment tools to measure nutritional status in patients in hospital: MUST, MNA. SGA, WHO Steps for assessment of NCDs

15 Hours

2. Assessment of Nutritional risk factor of elderly Using Mini Nutritional Assessment Cumulative Illness Rating Scale for Geriatrics

5 Hours

3. Designing a nutritional assessment system for a group of patients in a hospital setting

- The assessment system used
- Type and number of measurements selected
- Indices and indicators derived from these measurements
- Interpretation and application of the indicators 20 268 "Curriculum of Nutrition and Dietetics (Intellectual Property of the National Commission for Allied and Healthcare Professions, Ministry of Health and Family Welfare)."

20 Hours

4. Case Studies to assess the nutritional status of patients in hospital using various tools Simplified nutritional appetite questionnaire (SNAQ) patient-generated subjective global assessment (PGSGA) nutrition risk screening (NRS) malnutrition screening tool (MST) Nutritional Risk Index(NRI) Biomarkers

i) Cancer

ii) Chronic liver Disease

iii) Diabetes

iv) Cardiovascular/ CHD

20 Hours

Reference Books

- Krause's Food and the Nutrition Care ProcessMahan, L. K., & Escott-Stump, S. (2021). *Krause's Food and the Nutrition Care Process* (16th ed.). Elsevier Pvt. Ltd. ISBN: 032381025X.
- Public Health Nutrition in Developing CountriesVir, S. C. (2011). *Public Health Nutrition in Developing Countries* (Parts 1 & 2). Woodhead Publishing India Pvt. Ltd.

- Textbook of Community NutritionSehgal, S., & Raghuvanshi, R. S. (2007). *Textbook of Community Nutrition*. Directorate of Information and Publication of Agriculture, ICAR, New Delhi.
- Textbook of Human NutritionBamji, M. S., Krishnaswamy, K., & Brahmam, G. N. V. (2009). *Textbook of Human Nutrition* (3rd ed.). Oxford & IBH Publishing Co. Pvt. Ltd.
- The Assessment of Nutritional Status of the CommunityJelliffe, D. S. (1966). *The Assessment of Nutritional Status of the Community*. WHO, Geneva.
- Nutritional Monitoring and AssessmentGopaldas, T., & Sheshadri, S. (1987). *Nutritional Monitoring and Assessment*. Oxford University Press, New Delhi.
- Principles of Nutritional AssessmentGibson, R. S. (2005). *Principles of Nutritional Assessment* (3rd ed.). Oxford University Press.

Webliography

- Nutrition Screening Tools for Hospitalized Patients
- The Utility of Body Composition Assessment in Nutrition and Clinical Practice

MND 202 ADVANCES IN ENTERAL AND PARENTERAL NUTRITION

L-2/T/P-2/C-4

Course Outcomes

- Explain the principles and advancements in enteral and parenteral nutrition
- Assess indications and complications associated with nutrition support
- Plan nutrition support for critically ill and special patient groups
- Evaluate ethical and safety issues related to nutrition support therapy

Program Outcomes

- Strengthen clinical nutrition support competencies
- Enhance critical thinking in patient nutrition management
- Improve interdisciplinary healthcare collaboration skills
- Promote safe and evidence-based nutrition support practices

Learning Objectives

- To understand enteral and parenteral nutrition support systems
- To study recent advances in nutrition support therapy
- To identify complications and monitoring methods in nutrition support
- To apply nutrition support strategies in clinical practice

Learning Outcomes

- Differentiate between enteral and parenteral nutrition therapies
- Formulate nutrition support plans for various disease conditions
- Monitor and manage complications of nutrition support
- Demonstrate knowledge of home-based nutrition support care

Syllabus

Unit I: Fundamentals and Clinical Applications of Enteral Nutrition

5 Hours

- Important issues in enteral nutrition
- Effect on gut mucosa and gut-associated lymphoid tissue (GALT)
- Gut microbiota, infections, and complications
- Refeeding syndrome
- Drug–enteral nutrition interactions

Unit II: Therapeutic Role of Enteral Nutrition

6 Hours

- Role of enteral nutrition in diabetes and cancer
- Enteral nutrition in gastrointestinal diseases – Inflammatory Bowel Disease (IBD)
- Enteral nutrition in dementia
- Enteral nutrition in paediatric critical care
- Enteral nutrition in preterm infants

Unit III: Specialized and Home-Based Enteral Nutrition

5 Hours

- Enteral immunomodulatory diet for acute lung injury and acute respiratory distress syndrome (ARDS)
- Omega-3 fatty acid, γ-linolenic acid, and antioxidant supplementation
- Home-based enteral nutrition
- Blenderized tube feeding

Unit IV: Parenteral Nutrition – Complications and Clinical Applications

9 Hours

- Issues in parenteral nutrition: compounding and vascular access device-related complications
- Metabolic complications and hepatobiliary complications
- Metabolic bone disease associated with parenteral nutrition
- Role of parenteral nutrition in critical care
- Parenteral nutrition in neonates, premature infants, bariatric surgery, and cancer

Unit V: Safety, Ethics, and Long-Term Nutrition Support

5 Hours

- Safety issues in parenteral nutrition
- Ethical issues in parenteral nutrition
- Nutrition support in long-term care
- Home care nutrition support
- Monitoring and management of nutrition support therapies

Practical

1. Planning tube-feeding diets for the following

36 Hours

i) Diabetes

ii) Cancer

iii) Gastrointestinal diseases – IBD,

iv) Dementia

v) Paediatric critical care

vi) Preterm infants

2. Parenteral nutrition support for the following-

24 Hours

i) Critical care

ii) Neonates and premature infants

iii) Bariatric surgery

iv) Cancer

Reference Books

- ASPEN Parenteral Nutrition HandbookAyers, P., Bobo, E. S., Hurt, R. T., Mays, A. A., & Worthington, P. H. (Eds.). (2020). *ASPEN Parenteral Nutrition Handbook* (3rd ed.). American Society for Parenteral and Enteral Nutrition. ISBN: 1889622419.
- Krause's Food and the Nutrition Care ProcessMahan, L. K., & Escott-Stump, S. (2021). *Krause's Food and the Nutrition Care Process* (16th ed.). Elsevier Pvt. Ltd. ISBN: 032381025X.
- Textbook of Critical Care NutritionDixit, S. B., Kulkarni, A. P., & Zirpe, K. G. (Eds.). (2023). *Textbook of Critical Care Nutrition (ISPEN)*. Jaypee Brothers Medical Publishers Pvt. Ltd. ISBN: 9356963150.
- Nutrition Guidance After Mini Gastric Bypass Bariatric SurgeryNambiar, V. S., & Zaveri, D. (2024). *Nutrition Guidance After Mini Gastric Bypass Bariatric Surgery*. Adhyayan Publishers and Distributors. ISBN-10: 8119681169.
- Nutrition Guidelines for Roux-en-Y Gastric Bypass Bariatric SurgeryNambiar, V. S., & Zaveri, D. (2024). *Nutrition Guidelines for Roux-en-Y Gastric Bypass Bariatric Surgery*. Adhyayan Publishers and Distributors. ISBN-10: 8119681215.

Webliography

- Nutrients 2014 Article on Clinical Nutrition

MND 203 ADVANCES IN PUBLIC HEALTH NUTRITION

L-3/T/P-1/C-4

Course Outcomes

- Analyze public health nutrition problems at local and global levels
- Evaluate national and international nutrition programs and policies
- Assess determinants of malnutrition and food insecurity
- Apply public health approaches for nutrition intervention and advocacy

Program Outcomes

- Develop leadership skills in public health nutrition
- Promote community-based nutrition intervention strategies
- Enhance policy analysis and program evaluation skills
- Strengthen advocacy and communication for nutrition promotion

Learning Objectives

- To understand concepts and scope of public health nutrition
- To study nutrition policies, programs, and food security systems
- To examine global nutrition challenges and interventions
- To develop skills in nutrition advocacy and program planning

Learning Outcomes

- Assess public health nutrition issues and determinants
- Interpret indicators related to nutrition and development
- Evaluate the effectiveness of nutrition programs and policies
- Plan nutrition education and advocacy activities

Unit I: Global Nutrition and Food Security

9 Hours

- Overview of The Lancet Global Health and Global Nutrition Report
- Positive health, universal health coverage, and nutritional status
- Malnutrition: undernutrition, overweight, obesity, micronutrient malnutrition, and hidden hunger
- Nutrition interventions, food and nutrient supplements, food substitutes, and nutrition education
- Food and nutrition security: overview, challenges, and solutions at local, national, and state levels

Unit II: Poverty, Hunger, and Sustainable Food Systems

9 Hours

- Poverty, hunger, and Human Development Index (HDI): components and indicators
- Comparison of global, national, and state HDI
- Calculation and interpretation of Global Hunger Index (GHI) and HDI
- Food systems approach to sustainable healthy diets
- Knowledge, leadership, capacity, coordination, and governance in food systems

Unit III: National Food Security Initiatives and Global Support Systems

9 Hours

- Steps taken by India Government: Green Revolution, White Revolution, GMOs, and bio-fortified crops
- Food Corporation of India and buffer stock management
- Public Distribution System (PDS): strengths and weaknesses
- Role of World Food Programme in food and nutrition security
- International support systems for food security and nutrition

Unit IV: Nutrition in Maternal and Child Health Programs

9 Hours

- Concept of nutrition in child survival, national health, and development programs
- Maternal health during the perinatal and postpartum periods
- Determinants of maternal health and maternal mortality transition
- Vulnerabilities and reparative strategies during pregnancy, childbirth, and postpartum period
- Best practices and case studies from National Health Mission and POSHAN 2.0
- Need for revision and regular upgrading of nutrition programs and policies

Unit V: Nutrition Advocacy and Mainstreaming

9 Hours

- Mainstreaming nutrition at national and international levels
- Concepts and practices of nutrition advocacy
- Steps for successful nutrition advocacy programs
- Eat Right India Movement and other new initiatives for nutrition advocacy
- Role of Food and Agriculture Organization, World Health Organization, NGOs, and United Nations in advocacy and program implementation
- Operationalizing national and state nutrition policies and targets at field level

Practical

1. To compare nutritional surveillance data sets: nutritional profile, determinants of nutritional status and gender differences, health data of MCH and other populations (at regional national and global level) and calculate trend lines of past 5 years and write a critique for way forward

10 Hours

2. • Nutrition and Health Program Planning at Sub-National Level

   • Understanding the sub-national level: local, district or regional level situation through the use of available data sets; understanding the local nutrition health delivery systems for Essential Nutrition Actions (ENA), decentralization & governance

- Survey to understand the health systems of India – at primordial, primary, secondary and tertiary care- issues, concerns and best practices and way forward.
- Engage in understanding field level Bottom-up, inter-sectoral, multi-stakeholder collaboration at the sub-national level for any program or policy (Management, Leadership & Partnership for District Health)- - issues, concerns and best practices and way forward.

10 Hours

3. To conduct a coverage evaluation survey Using quantitative & qualitative methods) for delivery of key nutrition health interventions in a community,

- collect data
- analyse,
- interpret,
- report &
- suggest recommendations for improving coverage & delivery of services

10 Hours

Reference Books

- Textbook of Community Medicine Preventive and Social MedicineLal, S. (2018). *Textbook of Community Medicine Preventive and Social Medicine with Recent Update*. CBS Publishers & Distributors Pvt. Ltd.
- Public Health Nutrition in Developing CountriesVir, S. C. (Ed.). (2011). *Public Health Nutrition in Developing Countries*. Woodhead Publishing India Pvt. Ltd.

Webliography

- UNICEF
- World Health Organization (WHO)
- World Food Programme (WFP)
- WHO – United Nations Decade of Action on Nutrition
- Mother, Infant and Young Child Nutrition and Malnutrition
- WHO – Double Burden of Malnutrition
- United Nations Development Programme – Sustainable Development Goals

- WHO – Global Nutrition Targets 2025
- UNICEF – Breastfeeding and Complementary Feeding Practices
- National Guidelines on Infant and Young Child Feeding
- WHO Health Statistics and Global Health Estimates
- WHO – Non-Communicable Diseases and Risk Factors
- CDC – Overview of Non-Communicable Diseases and Related Risk Factors

MND 204 NUTRITION AND IMMUNITY

L-2/T/P/C-2

➢ Course Outcomes (COs)

- Explain the relationship between nutrition and immune function.
- Identify nutrients influencing immunity (vitamins, minerals, antioxidants).
- Assess dietary strategies for immune support.
- Evaluate the role of nutrition in infectious and chronic diseases.

➢ Program Outcomes (POs)

- Integrate nutrition science in disease prevention and management.
- Promote immune health through evidence-based dietary practices.
- Analyze the impact of malnutrition on immune response.
- Develop public health strategies for improving immunity.

➢ Learning Objectives

- Understand immune system basics
- Study role of nutrients in immunity
- Learn diet-disease relationships

➢ Learning Outcomes

- Explain nutrition–immunity interactions
- Plan diets to enhance immune function

- Manage nutrition in infections and immune disorders

UNIT I: Basics of Immunity and Nutritional Influence

(6 hours)

- Concept of immunity
- Role of nutrition in immunity
- Role of nutrition in infection
- Effect of nutritional status on immune function
- Types of immunity:
    - Innate immunity
    - Adaptive immunity
- Overview of immune response:
    - Humoral immunity
    - Cell-mediated immunity

UNIT II: Immune System Components and Micronutrient Role

(6 hours)

Cells of the immune system

- Structure and functions of immunoglobulins:
    - IgG, IgM, IgA, IgD, IgE
- Immune alterations:
    - Immune changes in malnutrition
    - Autoimmunity
    - Hypersensitivity
- Micronutrients and immunity:
    - Immunologic effects and mechanisms
    - Clinical relevance of micronutrients

UNIT III: Nutrition–Immunity–Infection Interactions

(6 hours)

- Host defense mechanisms
- Nutrients essential for immune system development
- Effects of infection:
  - Impact of infections on nutritional status
- Nutritional imbalance:
  - Nutrient deficiencies affecting immunity
  - Nutrient excess and immunocompetence
- Immunomodulatory nutrients:
  - Arginine
  - Glutamine
  - Omega-3 fatty acids
  - Sulphur-containing amino acids
  - Nucleotides
  - Ornithine
  - Alpha-ketoglutarate
  - Taurine
- Functional foods:
  - Prebiotics
  - Probiotics
  - Synbiotics

UNIT IV: Nutritional Immunology and Gene Expression

(6 hours)

- Role of nutrition in disease prevention and management
- Nutrition in autoimmune disorders
- Designing foods for immune-related disorders
- Genetics and nutrition:
  - Fundamentals of gene structure

  - Principles of gene expression
  - Transcription (mechanism & regulation)
  - Translation (mechanism & regulation)
- Nutrigenomics:
  - Effects of nutrients on gene expression
  - Thrifty genotype–phenotype hypothesis

UNIT V: Immunization and Research in Nutrition & Immunity

(6 hours)

- Immunization programs:
  - National programs
  - International programs
  - Milestones in immunization
- Advances:
  - New initiatives in vaccines
  - Role of immunization in child health
- Research:

Review and analysis of research papers on nutrition and immunity

Reference Books

Devereux,G., 9780851995830.0001, CABI, doi:10.1079/9780851995830.0001, (1–20), CABIPublishing, The immune system: an overview., (2002)

MND 205 INNOVATION IN FOOD PRODUCT &DEVELOPMENT

L-1/T/P-3/C-4

➢ **Course Outcomes (COs)**

- Understand principles of food product development and innovation.
- Design and develop nutritionally enhanced food products.
- Apply sensory evaluation and quality control techniques.

- Analyze market trends and consumer preferences.

➢ **Program Outcomes (POs)**

- Foster creativity and innovation in food and nutrition sector.
- Apply scientific knowledge to develop functional foods.
- Ensure food safety, quality, and regulatory compliance.
- Support entrepreneurship and product commercialization.

➢ **Learning Objectives**

- Understand principles of food product development
- Learn formulation and processing techniques
- Study sensory evaluation and quality control

➢ **Learning Outcomes**

- Develop new food products with nutritional value
- Evaluate products using sensory and scientific methods
- Ensure quality, safety, and shelf-life of products

UNIT I: Fundamentals of Food Product Development

(3 Hours)

- Basic principles of food product development
- Sensory properties of food and their role in product development
- Food evaluation methods:
  - Objective methods
  - Subjective methods
- Sensory evaluation process:
  - Selection of judges
  - Training of judges
  - Development of scorecards
  - Analysis of sensory data

UNIT II: Concept and Process of New Food Product Development

(3 Hours)

- Concept of new food product development
- General classes of new food products
- Need for new products:
    - Reasons for new food product development
- Product development process:
    - Stages of new product development
    - New product life cycle

UNIT III: Idea Generation and Product Design

(3 Hours)

- Consumer surveys and market insights
- Idea generation:
    - Sources of ideas
    - Idea screening
- Product creation:
    - Translation of idea into product prototype
    - Product testing
- Consumer research:
    - Development of schedules/questionnaires
    - Data analysis

UNIT IV: Commercialization and Product Applications

(3 Hours)

- Market testing
- Pre-commercialization processes
- Product launch strategies
- Product formulation:

  - Development for general use
  - Therapeutic food products
- Specialized products:
  - Functional foods
  - Nutraceuticals

UNIT V: Packaging, Safety, and Quality Regulations

(3 Hours)

- Packaging materials and their role in product development
- Food labeling
- Food safety and quality control:
  - Quality control measures
  - HACCP (Hazard Analysis Critical Control Point)
- Regulatory aspects:
  - Food quality regulations
  - Standards in food product development

Practical:

(90 Hours)

1. Sensory evaluation: Selection and Training of judges- Determination of Sensitivity Thresholds. Methods: Difference Test- Paired comparison- Duo-trio, Triangle test – preparation of score card and conduction of test. Numerical scoring, Composite scoring and Dilution tests- preparation of score card and conduction of test. Hedonic rating and Flavor Profile test - preparation of score card and conduction of test. Methods of Quantitative Descriptive Analysis - preparation of score card and conduction of test. Objective evaluation of Food – Physical, chemical and microbiological parameter analysis
2. Selection of Product categories, Idea generation and selection of Ingredients, Preparation of flow chart and ingredient preparation.
   a. Innovative Product formulation and standardization – High Protein products
   b. Innovative Product formulation and standardization – Low calorie Products.

c. Innovative Product formulation and standardization – Bakery products with high fibre and low glycemic index.
d. Innovative Product formulation and standardization – Food products with hypocholesterolemic property.
e. Innovative Product formulation and standardization – Food products with antioxidant property.
f. Innovative Product formulation and standardization – Food Product with HDL for Heart health.
g. Innovative Product formulation and standardization – Food products with immunity boosting ingredients.
h. Innovative Product formulation and standardization – Food products with low sodium.
i. Innovative Product formulation and standardization – Food products with nutraceuticals
j. Food products for diabetics and obese.
k. Packaging and sale of products, presentation of developed food products, Video shooting of product preparation.

Reference Books

1. Altschul A., M. (1993). Low calorie foods. Marcel Dekker.

2. Goldberg, I. (1994). Functional foods: Designer foods, Pharma Foods, Neutraceuticals. Springer.

3. Matz, S.A. (2004). Formulating and processing of dietetic foods. CHIPS Publ.

4. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi. 281 “Curriculum of Nutrition and Dietetics (Intellectual Property of the National Commission for Allied and Healthcare Professions, Ministry of Health and Family Welfare).”

5. Srilakshmi, B. (2010). Food science (Fifth ed.) New Age International Pvt. Limited, Pub., New Delhi.

6. Gordon, W.F. (2011). New food product development: From concept to market place (third edition). CPR, Press

MND 206 SCIENTIFIC WRITING SKILLS

L-2/T/P/C-2

➢ Course Outcomes (COs)

- Understand structure and components of scientific writing.
- Develop skills in writing research papers, reports, and reviews.
- Apply referencing styles and avoid plagiarism.
- Interpret and present scientific data effectively.

➢ Program Outcomes (POs)

- Communicate scientific information clearly and professionally.
- Engage in research and academic writing.
- Demonstrate critical thinking and analytical skills.
- Contribute to scientific literature and evidence-based practice.

➢ Learning Objectives

- Understand research methodology basics
- Learn scientific writing formats
- Study referencing and ethics

➢ Learning Outcomes

- Write research papers, reports, and theses
- Present scientific data effectively
- Apply ethical standards and avoid plagiarism

UNIT I: Introduction to Scientific Writing

(6 Hours)

- Importance of scientific writing in food and nutrition
- Role in:

  - Research
  - Industry
  - Public health communication
- Types of scientific documents:
  - Research papers
  - Review articles
  - Reports

UNIT II: Writing Process and Planning

(6 Hours)

- The writing process:
  - Planning scientific papers
  - Organizing content logically
- Understanding communication:
  - Identifying target audience
  - Purpose of scientific writing
- Basics of structuring ideas before writing

UNIT III: Structure of Scientific Papers

(6 Hours)

- Components of a research paper:
  - Title
  - Abstract
  - Introduction
  - Methods
  - Results
  - Discussion
  - References
- Writing key sections:
  - Crafting a strong introduction

- Literature review:
  - Searching sources
  - Summarizing
  - Synthesizing research

UNIT IV: Data Presentation and Interpretation

(6 Hours)

- Writing methodology:
  - Clear and detailed methods
  - Reproducibility and transparency
- Presenting results:
  - Tables, figures, graphs
  - Statistical analysis and interpretation
- Discussion and conclusion:
  - Interpreting findings
  - Significance and limitations
  - Future directions
- Abstract writing:
  - Concise summary of study

UNIT V: Ethics, Publication and Scientific Communication

(6 Hours)

- Ethics in scientific writing:
  - Plagiarism
  - Authorship
  - Conflicts of interest
  - Ethical data handling
- Peer review and publication:
  - Process of peer review
  - Responding to reviewer comments

  - Manuscript revision
- Specialized communication:
  - Writing research proposals and grants
  - Grant writing strategies
  - Writing for lay audiences
  - Science communication through media and public platforms

Reference Books

- Scientific Writing and CommunicationHofmann, A. H. (2019). *Scientific Writing and Communication: Papers, Proposals, and Presentations* (4th ed.). Oxford University Press.
- Writing for Science and EngineeringSilyn-Roberts, H. (2012). *Writing for Science and Engineering: Papers, Presentations and Reports* (2nd ed.). Butterworth-Heinemann.
- The Craft of Scientific WritingAlley, M. (2018). *The Craft of Scientific Writing* (4th ed.). Springer.
- Scientific Writing: Easy When You Know HowPeat, J., Elliott, E., Baur, L., & Keena, V. (2013). *Scientific Writing: Easy When You Know How* (2nd ed.). BMJ Books.
- How to Write and Publish a Scientific PaperDay, R. A., & Gastel, B. (2016). *How to Write and Publish a Scientific Paper* (8th ed.). Cambridge University Press.
- From Research to ManuscriptKatz, M. J. (2009). *From Research to Manuscript: A Guide to Scientific Writing* (2nd ed.). Springer.

Webliography

- Writing & Publishing Nutrition Research
- Elsevier Researcher Academy
- NIH – Introduction to Grant Writing
- Nature – Scientific Writing and Publishing
- Purdue OWL APA Formatting Guide
- UC Berkeley – Evaluating Resources
- UNC Writing Center – Scientific Writing.

MASTERS IN NUTRIITION AND DIETETICS

II Year Third Semester

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 301	Intellectual Property Rights	2	-	2	40	60	100
2	MND 302	Precision Nutrition	4	-	4	40	60	100
3	MND 303	Institutional Food Service Management and Quantity Cookery	1	5	6	40	60	100
4	MND 304	Advanced Communication Skills for Nutrition Practice	1	3	4	40	60	100
5	MND 305	Internship	-	10	10	40	60	100
TOTAL			**8**	**18**	**26**	**200**	**300**	**500**

MND 301 INTELLECTUAL PROPERTY RIGHTS

L-2/T/P/C-2

- **Course Outcomes (COs)**

- Understand concepts and types of intellectual property (patents, copyrights, trademarks).
- Explain legal frameworks and protection mechanisms.
- Analyze IPR issues in food, nutrition, and research fields.
- Apply ethical practices in use and protection of intellectual property.

Program Outcomes (POs)

- Demonstrate awareness of legal and ethical standards in professional practice.
- Protect innovations and research outputs effectively.
- Promote originality and prevent plagiarism.
- Apply IPR knowledge in entrepreneurship and research.

Learning Objectives

- Understand the **fundamental concepts and types of Intellectual Property Rights**.
- Learn the **legal frameworks and protection mechanisms** for copyrights, patents, trademarks, and designs.
- Develop knowledge of **IPR enforcement, infringement, and protection procedures**.

Learning Outcomes

- Identify and explain **different forms of IPR and their legal protections**.
- Apply basic knowledge to **protect intellectual property and recognize infringement**.
- Analyze the role of IPR in **innovation, business, and society**.

UNIT 1: Basics of Intellectual Property Rights & Copyright

(6 Hours)

- Meaning and concept of Intellectual Property Rights (IPR)
- Copyright: Definition and meaning
- Rights covered under copyright
- Duration of copyright
- Copyright protection

UNIT 2: Related Rights & Geographical Indications

(6 Hours)

- Related Rights: Meaning
- Distinction between copyright and related rights
- Geographical Indications (GI): Meaning and concept
- Protection of Geographical Indications
- Reasons for protecting GI

UNIT 3: Patents

(6 Hours)

- Meaning of patents
- Kinds of inventions protected by patents
- Patent document
- How to protect your inventions
- Granting of patents
- Rights of a patent holder
- Extent of patent protection

UNIT 4: Patent Procedures & Industrial Designs

(6 Hours)

- Drafting and filing of a patent
- Industrial Designs: Meaning and concept
- Protection of industrial designs
- Rights provided by industrial design protection
- Duration of protection
- Importance of protecting industrial designs

UNIT 5: Trademarks, Trade Secrets & Enforcement

(6 Hours)

- Trademarks: Meaning and types of signs used
- Rights of trademark owners
- Trademark protection and registration
- Duration of trademark protection
- Trade secrets and know-how agreements
- Infringement of IPR
- Enforcement measures of IPR

Text Books and References

1. T. M. Murray, M. J. Mehlman. Encyclopedia of Ethical, Legal and Policy Issues in Biotechnology, Vol 2, John Wiley & Sons, 2010.

2. P. N. Cheremisinoff, R. P. Ouellette, R. M. Bartholomew, Biotechnology Applications and Research, Technomic Publishing Co., Inc. 1985.

3. D. Balasubramaniam, C. F. A. Bryce, K. Dharmalingam, J. Green, K. Jayaraman, Concepts in Biotechnology, 3/e University Press. 2004.

4. B. David, T. R. Jewell, R. G. Buiser, Biotechnology: Demystifying the Concepts1/e., Wesley Longman, USA, 2000.

5. Parulekar, S. D'Souza, Indian Patents Law – Legal & Business Implications, Macmillan India ltd. 2006. 289 "Curriculum of Nutrition and Dietetics (Intellectual Property of the National Commission for Allied and Healthcare Professions, Ministry of Health and Family Welfare)."

6. L. Wadehra. Law Relating to Patents, Trademarks, Copyright, Designs & Geographical Indications, Universal law Publishing Pvt. Ltd., 2000.

7. P. Narayanan, Law of Copyright and Industrial Designs, 4/e., Eastern law House, Delhi. 2010.

MND 302 PRECISION NUTRITION

L-4/T/P/C-4

➢ Course Outcomes (COs)

- Understand the concept of personalized/precision nutrition.
- Explain the role of genetics, lifestyle, and environment in nutrition.
- Interpret nutrigenomics and nutrigenetics data.
- Develop individualized diet plans based on patient variability.

➢ Program Outcomes (POs)

- Apply personalized nutrition approaches in clinical practice.
- Integrate emerging technologies in nutrition assessment.
- Improve patient outcomes through tailored interventions.
- Promote advanced, evidence-based nutrition care.

➢ Learning Objectives

- Understand the **principles of precision nutrition and nutritional genomics**.

- Learn the **interaction between genes, diet, and environmental factors** in health and disease.
- Gain knowledge of **modern tools like omics technologies, microbiome analysis, and AI in nutrition**.

➢ **Learning Outcomes**

- Explain **gene–diet interactions and their role in disease prevention and management**.
- Apply knowledge of **genetic and microbiome factors in personalized nutrition planning**.
- Analyze the impact of **advanced technologies in improving nutritional health outcomes**.

UNIT 1: Foundations of Precision Nutrition & Genomics

(12 Hours)

- Introduction to Precision Nutrition and Personalized Nutrition
- Human Genome and Nutritional Genomics
- Key terms: Nutrigenomics, Nutrigenetics, Exposome, Epigenetics
- Genotype vs Phenotype
- Gene variations: SNPs, mutations, CNVs (differences)
- Epigenetics vs Epigenomics
- Genome of rare and complex diseases

UNIT 2: Precision Medicine & Gene–Nutrient Interactions

(12 Hours)

- Precision medicine: Role of genetics and environment
- Gene–nutrient interaction
- Missing heritability concept
- Interaction concepts in complex diseases
- Precision Nutrition vs Community Nutrition
- Experimental designs in Precision Nutrition

- Current basis of nutritional research

UNIT 3: Omics Technologies & Nutrition-Related Genetics

(12 Hours)

- Omics technologies: Genomics, Proteomics, Metabolomics, Metagenomics, Epigenomics
- Functional genomics and biomarkers
- SNPs associated with nutrition-related diseases
- Cardiovascular health, oxidative stress (eNOS, SOD), ApoE
- Metabolic health: Obesity, Type 2 Diabetes
- Liver health and methylation detoxification

UNIT 4: Chronobiology, Genotype & Lifestyle Factors

(12 Hours)

- Circadian rhythm and genes (chronobiology)
- Central and peripheral clocks
- Hormonal regulation: Leptin and Ghrelin
- Appetite and satiety control
- Exercise genotype (adrenergic genotype)
- Food-specific genotypes: Caffeine, lactose, gluten

UNIT 5: Microbiome, Systems Biology & Advanced Applications

(12 Hours)

- SNPs and genetic risk scores (GRS, polygenic risk score)
- Diet-gene interactions in diseases (diabetes, hypertension, cancer, etc.)
- Allergies vs intolerances
- Microbiota: composition, enterotypes, and diet
- Gut-brain axis and role in diseases (obesity, CVD, neuro disorders)
- Microbiome in diagnosis and prognosis
- Diet-modulated microRNAs
- Nutrition systems biology and personalized nutrition

- Role of AI in precision nutrition and health

Reference Books

- Ericksen, P. J. (2008). *Conceptualizing food systems for global environmental change research*. Global Environmental Change, 18(1), 234–245.
- HLPE. (2017). *Nutrition and Food Systems*. High Level Panel of Experts on Food Security and Nutrition, FAO, Rome.
- Burlingame, B., & Dernini, S. (2012). *Sustainable Diets and Biodiversity: Directions and Solutions for Policy, Research and Action*. FAO & Bioversity International.
- Vir, S. C. (2011). *Public Health Nutrition in Developing Countries*. Woodhead Publishing India.
- FAO. (2018). *Sustainable Food Systems: Concept and Framework*. Food and Agriculture Organization, Rome.

Webliography

- FAO – Sustainable Food Systems
- UN Sustainable Development Goals
- World Food Programme
- Food and Nutrition Security – WHO
- Climate Smart Agriculture – World Bank

MND 303 Institutional Food Service Management and Quantity Cookery

L-1/T/P-5/C-6

Course Outcomes

- Explain principles and functions of institutional food service management
- Plan and standardize menus for quantity food production
- Apply food safety, sanitation, and cost-control measures in food service operations

MASTERS IN NUTRIITION AND DIETETICS

Program Outcomes

- Develop managerial and organizational skills in food service systems
- Enhance practical competencies in quantity cookery and catering
- Promote efficient and safe food service practices in institutions

Learning Objectives

- To understand institutional food service systems and management principles
- To develop skills in quantity food production and menu planning
- To familiarize students with hygiene, sanitation, and food safety regulations

Learning Outcomes

- Organize and manage institutional food service operations
- Prepare and standardize recipes for large-scale cooking
- Demonstrate safe food handling and service techniques

Unit I: Introduction to Institutional Food Service Management

3 Hours

- Definition, scope, and objectives of institutional food service
- Types of food service establishments: commercial and non-commercial
- Organization and functions of food service departments
- Principles and functions of management
- Tools and approaches of management

Unit II: Menu Planning and Quantity Food Production

3 Hours

- Principles and factors affecting menu planning
- Types of menus
- Standardization of recipes
- Portion control and recipe adjustment

- Quantity food production techniques

Unit III: Food Purchase, Storage, and Cost Control

3 Hours

- Food purchasing methods and receiving procedures
- Food storage principles and inventory management
- Cost concepts and budgeting
- Cost control measures in food service institutions
- Utilization of leftovers and waste management

Unit IV: Food Service, Hygiene, and Safety

3 Hours

- Types and styles of food service
- Table setting and service techniques
- Food hygiene and sanitation
- Personal hygiene and safety measures
- Food safety regulations: FSSAI, HACCP, BIS, AGMARK

Unit V: Planning and Layout of Food Service Units

3 Hours

- Planning of kitchen, storage, and service areas
- Types of kitchen layouts and workflow
- Selection and maintenance of equipment
- Space planning and work simplification
- Personnel management in food service establishments

Practicals

1. **Standardization of quantity recipes**

50 Hours

- Calculation of nutritive value, yield, and cost per serving
- Preparation of South Indian, North Indian, and Western menus for large groups

- Portion control and bulk food production
- Planning and preparation of therapeutic diets in institutional settings

2. Food Service Operations

50 Hours

- Table setting and service styles
- Folding of napkins and arrangement of covers
- Use and care of cutlery, crockery, and equipment
- Organizing and serving special meals for large groups
- Menu planning for hospitals, hostels, canteens, and industrial food services

3. Institutional Visits and Field Training

50 Hours

- Visits to hospitals, hotels, hostels, industrial canteens, and transport catering units
- Observation of kitchen layout, workflow, sanitation, and management practices
- Internship/field exposure in institutional food service units
- Preparation of reports on food service operations

Text Books

- Sethi, M., & Malhan, S. (2017). Catering Management: An Integrated Approach. New Age International Publishers.
- Mohini Sethi. (2019). Institutional Food Management. New Age International Publishers.
- West, B. B., Wood, L., & Harger, V. F. (2012). Food Service in Institutions (9th ed.). Wiley India.
- Philip E. Thangam. (2016). Modern Cookery for Teaching and the Trade (Vol. I & II). Orient BlackSwan.
- Krishna Arora. (2018). Theory of Cookery. Frank Brothers & Company.

Reference Books

- Sudhir Andrews. (2013). Food and Beverage Service Training Manual. Tata McGraw Hill.
- June Payne-Palacio & Monica Theis. (2016). Foodservice Management: Principles and Practices (13th ed.). Pearson Education.
- Marian C. Spears & Vaden C. Spears. (2017). Foodservice Organizations: A Managerial and Systems Approach. Pearson.
- Lillicrap, D., Cousins, J., & Weekes, S. (2014). Food and Beverage Service (9th ed.). Hodder Education.
- Gisslen, W. (2018). Professional Cooking (9th ed.). Wiley.

Webliography

- Food Safety and Standards Authority of India (FSSAI)
- National Institute of Nutrition (NIN)
- Hospitality Institute of Technology and Management Resources
- Institute of Hotel Management (IHM)

MND 304 ADVANCED COMMUNICATION SKILLS FOR NUTRITION PRACTICE

L-1/T/P-3/C-4

➢ Course Outcomes (COs)

- Develop effective verbal and non-verbal communication skills.
- Apply counseling techniques in nutrition practice.
- Enhance interpersonal and patient interaction skills.
- Use digital tools for professional communication.

➢ Program Outcomes (POs)

- Communicate effectively with patients, families, and healthcare teams.
- Deliver patient-centered counseling and education.
- Build professional relationships and teamwork.
- Promote health awareness through communication strategies.

- **Learning Objectives**

- Develop effectivecommunication and counseling skillsfor nutrition practice.
- Learn tocreate and analyze nutrition-related content across various media platforms**.**
- Understand the use ofdigital tools and social media for health promotion and marketing**.**

- **Learning Outcomes**

- Demonstrate effective patient counseling and professional communication skills**.**
- Design and develop engaging nutrition education content for different media platforms**.**
- Apply knowledge of social media strategies and analytics to enhance outreach and impact**.**

UNIT 1: Communication Skills & Patient Counseling

(3 Hours)

- Communication strategies in nutrition practice
- Principles of patient counseling
- Communication skills for marketing in nutrition services

UNIT 2: Media Analysis & Content Planning

(3 Hours)

- Concepts of media communication (print, visual, social media)
- Audience engagement and communication strategies
- Planning content calendars

UNIT 3: Digital Content Creation & Design

(3 Hours)

- Principles of design and communication materials
- Basics of digital and print content development

UNIT 4: Audio-Visual Communication

(3 Hours)

- Basics of audio-visual communication
- Storytelling techniques in nutrition education
- Concepts of interactive learning tools

UNIT 5: Social Media Management & Analytics

(3 Hours)

- Introduction to social media platforms for professional use
- Basics of social media algorithms and analytics
- Strategies for digital marketing and engagement

Practical

90 Hours

1. Role play and simulation for effective patient counseling
2. Activities to develop interpersonal and communication skills
3. Role play and simulation for effective patient counseling
4. Activities to develop interpersonal and communication skills
5. Designing logos, business cards, and pamphlets
6. Creating content for digital, print, and social media
7. Developing awareness content for special health days
8. Creating public service announcements and podcasts
9. Developing short educational videos (story format)
10. Designing interactive quizzes or mini-games
11. Managing Instagram for engagement and LinkedIn for professional networking
12. Analyzing performance (views, likes, followers)
13. Developing strategies to improve reach and audience interaction

References

1. Philipose Pamela. Media‘s Shifting Terrain: Five Years that Transformed the Way India

Communicates,(2019) Orient Blackswan, New Delhi.ISBN 9352875346

2. Narula Uma, Mass Communication-Theory and Practice (2019) Har-Anand Publications, New Delhi ISBN 9388409361

3. Narula Uma. Communication Models (2023); Atlantic Publishers and Distributors (P) Ltd ISBN 8126906766

MND 305 INTERNSHIP

L/T/P-10/C-10

300 Hours

Number of Practical Credits 10 =20 hours x 15= 300 hours, Duration 3 months

➢ Course Outcomes (COs)

- Apply theoretical knowledge in real-world clinical/community settings.
- Develop practical skills in diet planning, assessment, and counseling.
- Gain experience in hospital and food service operations.
- Demonstrate professional behavior and teamwork.

➢ Program Outcomes (POs)

- Enhance employability and professional competence.
- Integrate theory with practice effectively.
- Demonstrate problem-solving in real-life situations.
- Adapt to multidisciplinary healthcare environments.

Learning Objectives

- Understand clinical nutrition practices and hospital diet planning.
- Develop skills in patient assessment and dietary counseling.
- Learn food service management and interdisciplinary coordination.

➢ Learning Outcomes

- Performbasic nutritional assessment and plan therapeutic diets**.**
- Demonstrateeffective patient counseling and communication skills**.**

- Apply knowledge inclinical settings and hospital food service operations.

II Year IV Semester

SI. No.	Course Code	Course Title	Theory Credits	Practical Credits	Total Credits	MAX MARKS		Total
						INT	EXT	
1	MND 401	Dissertation	0	20	20	100	0	100
TOTAL			**0**	**20**	**20**	**100**	**0**	**100**

MND 401 Dissertation

L/T/P-20/C-20

(600 Hours)

➢ **Course Outcomes (COs)**

- Formulate a research problem and design a scientific study in the field of clinical nutrition and dietetics.
- Collect, analyze, and interpret data using appropriate research and statistical methods.
- Prepare and present a structured dissertation following scientific writing standards.
- Apply critical thinking to discuss findings and draw meaningful conclusions.

➢ **Program Outcomes (POs)**

- Demonstrate research competence and evidence-based practice in nutrition and dietetics.
- Integrate theoretical knowledge with practical research application.
- Exhibit analytical, problem-solving, and critical thinking skills.
- Communicate scientific findings effectively through written and oral presentation.

➢ **Learning Objectives**

- Develop understanding of **research methodology and data collection techniques** in clinical nutrition.
- Learn to **analyze nutrition-related health problems using scientific approaches**.

- Enhance skills in **report writing and presentation of research findings**.

➢ **Learning Outcomes**

- Conduct a **basic research study in clinical nutrition and dietetics**.
- Analyze and interpret **data to draw meaningful conclusions**.
- Present findings in a **structured scientific report and oral presentation**.