MALLAREDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED HEALTH CARE SCIENCES AND TECHNOLOGY

Suraram X Roads,
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Program

MASTERS IN NUTRITION AND DIETETICS

2025

MALLAREDDY 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)

- 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

MASTERS IN NUTRITION AND DIETETICS

COURSE STRUCTURE

I year I semester

S.NO	SUBJECT CODE	SUBJECT TITLE	L	T	P	C	INT	EXT	TOTAL MARKS
1		Principles of Human Nutrition	4	-	-	4	40	60	100
2		Nutritional Biochemistry	4	-	-	4	40	60	100
3		Food Science & Technology	4	-	-	4	40	60	100
4		Community Nutrition & Public Health	3	-	-	3	40	60	100
5		Research Methodology & Biostatistics	4	-	-	4	40	60	100
6		Practical: Nutritional Assessment & Diet Planning	-	-	2	2	40	60	100
	Total		**19**	**-**	**2**	**21**	**240**	**360**	**600**

I year II semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max.Marks		
							INT	EXT	TOTAL
1		Advances in Enteral and Parenteral Nutrition	3	-	1	4	40	60	100
2		Nutrition and Immunity	2	-	-	2	40	60	100
3		Innovation in Food Product Development	2	-	2	4	40	60	100
4		Preventive and Therapeutic diets	2	-	2	4	40	60	100
5		Scientific writing skills	3	-	-	3	40	60	100
6		Paediatric Nutrition (Elective)	4	-	-	4	40	60	100
7		Art of Being a better person (VAC)	1	-	-	1	100	-	100
TOTAL			**17**	**-**	**5**	**22**	**340**	**360**	**700**

MASTERS IN NUTRITION AND DIETETICS

II year III semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max.Marks		
							INT	EXT	TOTAL
1	MND 301	Intellectual Property Rights	2	-	-	2	40	60	100
2	MND 302	Precision Nutrition	4	-	-	4	40	60	100
3	MND 303	Food Service Management	2	-	2	4	40	60	100
4	MND 304	Advanced Communication Skills for Nutrition Practice	1	-	3	4	40	60	100
5	MND 305	Geriatric Nutrition (Elective)	4	-	-	4	40	60	100
6	MND 306	Internship	-	-	3	3	40	60	100
TOTAL			**13**	**-**	**8**	**28**	**240**	**360**	**600**

II year IVsemester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max.Marks		
							INT	EXT	TOTAL
4		Dissertation	-	-	20	20	40	60	100
TOTAL			**-**	**-**	**20**	**20**	**40**	**60**	**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

MASTERS IN NUTRITION AND DIETETICS

I year- 1st sem SYLLABUS

S.NO	SUBJECT CODE	SUBJECT TITLE	L	T	P	C	INT	EXT	TOTAL MARKS
1		Principles of Human Nutrition	4	-	-	4	40	60	100
2		Nutritional Biochemistry	4	-	-	4	40	60	100
3		Food Science & Technology	4	-	-	4	40	60	100
4		Community Nutrition & Public Health	3	-	-	3	40	60	100
5		Research Methodology & Biostatistics	4	-	-	4	40	60	100
6		Practical: Nutritional Assessment & Diet Planning	-	-	2	2	40	60	100
	Total		**19**	**-**	**2**	**21**	**240**	**360**	**600**

1. Principles of Human Nutrition

L-4/T/P/C-4

➢ **Course Outcomes (COs):**

- Explain the basic principles of human nutrition and nutrients.
- Identify nutritional requirements across different life stages.
- Apply nutrition knowledge for diet planning and health promotion.

➢ **Program Outcomes (POs):**

- Develop foundational knowledge in nutrition science.
- Promote healthy dietary practices in individuals and communities.
- Support disease prevention through proper nutrition.

➢ **Learning Objectives**

- Understand basic concepts of nutrition and nutrients
- Learn functions, sources, and requirements of nutrients
- Study balanced diet and nutritional needs across life stages

➢ **Learning Outcomes**

- Explain roles of macro and micronutrients
- Plan balanced diets for different age groups
- Identify nutritional deficiencies and their prevention

Unit 1: Introduction to Human Nutrition

(12 Hours)

- Definition and scope of nutrition
- Nutrients: classification and functions
- Nutritional requirements across life stages

Unit 2: Digestion, Absorption, and Metabolism

(12 Hours)

- Digestive system overview
- Absorption mechanisms of macronutrients and micronutrients
- Energy metabolism and balance

Unit 3: Macronutrients

(12 Hours)

- Carbohydrates: types, digestion, and metabolism
- Proteins: structure, digestion, and functions
- Fats: classification, digestion, and roles

Unit 4: Micronutrients

(12 Hours)

- Vitamins: types, functions, and deficiency disorders
- Minerals: essential macro and trace elements
- Water and electrolytes balance

Unit 5: Nutritional Assessment and Dietary Guidelines

(12 Hours)

- Methods of nutritional assessment
- Dietary guidelines and recommended dietary allowances (RDAs)
- Nutrition and health promotion

References:

1. *Human Nutrition* — Human Nutrition by Michael J. Gibney, Susan A. Lanham-New, Aedin Cassidy & Hester H. Vorster
2. *Modern Nutrition in Health and Disease* — Modern Nutrition in Health and Disease by Maurice E. Shils et al.
3. *Nutrition and Dietetics* — Nutrition and Dietetics by Davidson & Passmore
4. *Textbook of Human Nutrition* — Textbook of Human Nutrition by Mahtab S. Bamji, N. Prahlad Rao &Vinodini Reddy
5. *Advanced Nutrition and Human Metabolism* — Advanced Nutrition and Human Metabolism by Sareen S. Gropper & Jack L. Smith

2. Nutritional Biochemistry

L-4/T/P/C-4

➢ **Course Outcomes (COs):**

- Understand biochemical processes of nutrients in the body**.**
- Explainmetabolism of carbohydrates, proteins, and fats**.**
- Relate biochemical concepts tohealth and disease conditions**.**

➢ **Program Outcomes (POs):**

- Build strong scientific and analytical skills**.**
- Apply biochemical knowledge in clinical and nutrition practice**.**
- Interpret biochemical changes in disease management**.**

➢ **Learning Objectives**

- Understand biochemical processes related to nutrition
- Study metabolism of carbohydrates, proteins, and fats
- Learn role of enzymes, hormones, and vitamins

➢ **Learning Outcomes**

- Explain metabolic pathways and energy production
- Relate biochemical changes to diseases
- Interpret biochemical parameters in nutrition

Unit 1: Biochemical Basis of Nutrition

(12 Hours)

- Chemical composition of nutrients
- Metabolism overview: catabolism and anabolism
- Enzymes and coenzymes in nutrient metabolism

Unit 2: Carbohydrate Metabolism

(12 Hours)

- Glycolysis, gluconeogenesis, glycogen metabolism
- Citric acid cycle and electron transport chain
- Regulation of carbohydrate metabolism

Unit 3: Protein and Amino Acid Metabolism

(12 Hours)

- Amino acid structure and classification
- Protein synthesis and degradation
- Urea cycle and nitrogen balance

Unit 4: Lipid Metabolism

(12 Hours)

- Fatty acid oxidation and synthesis
- Ketogenesis and cholesterol metabolism
- Lipoproteins and lipid transport

Unit 5: Vitamins and Minerals in Metabolism

(12 Hours)

- Role of vitamins as cofactors
- Mineral function in enzymatic activities
- Metabolic disorders related to vitamin and mineral deficiencies

References

1. *Nutritional Biochemistry* — Nutritional Biochemistry by Tom Brody
2. *Biochemical, Physiological and Molecular Aspects of Human Nutrition* — Biochemical, Physiological and Molecular Aspects of Human Nutrition by Martha H. Stipanuk& Marie A. Caudill
3. *Lehninger Principles of Biochemistry* — Lehninger Principles of Biochemistry by Nelson & Cox
4. *Harper's Illustrated Biochemistry* — Harper's Illustrated Biochemistry by Robert K. Murray et al.
5. *Textbook of Biochemistry* — Textbook of Biochemistry by U. Satyanarayana & U. Chakrapani

3. Food Science & Technology

L-4/T/P/C-4

➢ **Course Outcomes (COs):**

- Understandfood composition and processing techniques**.**
- Explainfood preservation and safety principles**.**
- Apply knowledge infood quality evaluation and product development.

➢ **Program Outcomes (POs):**

- Ensure food safety and quality control practices**.**
- Support innovation in food processing and technology**.**
- Enhanceskills in food handling and storage systems**.**

➢ **Learning Objectives**

- Understand composition and properties of foods
- Learn food processing, preservation, and storage methods
- Study food safety and quality control

➢ **Learning Outcomes**

- Apply food processing and preservation techniques
- Ensure food safety and hygiene

- Evaluate food quality and nutritional value

Unit 1: Introduction to Food Science

(12 Hours)

- Definition and scope of food science and technology
- Composition of foods: carbohydrates, proteins, fats, water, minerals, vitamins
- Food classification and standards

Unit 2: Food Processing and Preservation

(12 Hours)

- Principles of food processing
- Thermal and non-thermal preservation methods
- Packaging and storage technologies

Unit 3: Food Additives and Safety

(12 Hours)

- Types and functions of food additives
- Food contaminants and adulterants
- Food safety standards and regulations

Unit 4: Food Quality and Sensory Evaluation

(12 Hours)

- Physical and chemical properties of foods
- Sensory evaluation techniques
- Factors affecting food quality

Unit 5: Emerging Technologies in Food Science

(12 Hours)

- Biotechnology and genetic engineering in food
- Novel food processing techniques
- Functional foods and nutraceuticals

References

1. *Food Science* — Food Science by B. Srilakshmi
2. *Principles of Food Science* — Principles of Food Science by George Borgstrom
3. *Food Chemistry* — Food Chemistry by Owen R. Fennema
4. *Food Processing and Preservation* — Food Processing and Preservation by B. Sivasankar
5. *Essentials of Food Science* — Essentials of Food Science by Norman N. Potter

4. Community Nutrition & Public Health

L-3/T/P/C-3

➢ **Course Outcomes (COs):**

- Understand nutrition issues at community level.
- Identify public health nutrition programs and policies.
- Plan nutrition interventions for community health improvement.

➢ **Program Outcomes (POs):**

- Promote public health and community nutrition awareness.
- Address malnutrition and health challenges in populations.
- Implement nutrition education and intervention programs.

➢ **Learning Objectives**

- Understand community nutrition concepts
- Study public health programs and policies
- Learn methods of nutritional assessment in communities

➢ **Learning Outcomes**

- Assess community nutritional problems
- Plan and implement nutrition programs
- Promote health and prevent malnutrition

Unit 1: Introduction to Community Nutrition

(9 Hours)

- Concepts and objectives of community nutrition
- Nutrition surveillance and assessment methods
- Role of community nutritionists

Unit 2: Nutritional Status and Deficiency Disorders

(9 Hours)

- Assessment of nutritional status in populations
- Common deficiency disorders: protein-energy malnutrition, vitamin A deficiency, anemia, iodine deficiency
- Prevention and control strategies

Unit 3: Public Health Nutrition Programs

(9 Hours)

- National and international nutrition programs (e.g., ICDS, Mid-day meal, WIC)
- Role of NGOs and government agencies
- Monitoring and evaluation of nutrition programs

Unit 4: Maternal and Child Nutrition

(9 Hours)

- Nutritional needs during pregnancy and lactation
- Infant and young child feeding practices
- Growth monitoring and promotion

Unit 5: Nutrition Education and Communication

(9 Hours)

- Principles and methods of nutrition education
- Designing nutrition education materials and campaigns
- Behavioral change communication strategies

References

1. *Community Nutrition* — Community Nutrition by B. Srilakshmi
2. *Public Health Nutrition* — Public Health Nutrition by Mann &Truswell
3. *Preventive and Social Medicine* — Preventive and Social Medicine by K. Park
4. *Nutrition in Public Health* — Nutrition in Public Health by Arlene Spark
5. *Community Nutrition in Action* — Community Nutrition in Action by Marie A. Boyle & David Holben

5. Research Methodology & Biostatistics

L-4/T/P/C-4

➢ **Course Outcomes (COs):**

- Understand research methods and study designs.
- Apply basic statistical tools for data analysis.
- Interpret research findings in nutrition studies.

➢ **Program Outcomes (POs):**

- Develop research and analytical skills.
- Support evidence-based nutrition practice.
- Enhance ability to critically evaluate scientific literature.

- **Learning Objectives**
- Understand research design and methods
- Learn basic statistical concepts and tools
- Study data collection and analysis techniques
- **Learning Outcomes**
- Design and conduct research studies
- Analyze and interpret data statistically
- Present research findings effectively

RESEARCH METHODOLOGY

(30 hours)

1. Introduction to research; Types of research; Defining a research question; Qualitative study designs; Quantitative study; Type I and type II bias; Study design: types
2. Case study, Case series, longitudinal cohort, Pre post design, Time series design, repeated measures design, Randomized control design.
3. Sampling design, calculating minimum sample size based on design
4. Measurement: Properties of measurement: reliability, validity, responsiveness, MCID. Outcome measures: Use of outcome measures in rehabilitation research
5. Research Methods: Designing methodology, Reporting results, Type I and Type II bias. Communicating research.
6. Evaluating published research: looking at the evidence Introduction to evidence-based practice, evaluating evidence Asking clinical questions
7. Translating of evidence into practice: strategies
8. Use of clinical practice guidelines, clinical pathways, prediction rules to inform practice.

BIOSTATISTICS

(30 hours)

1. Descriptive Statistics and measurement variability; Inferential
2. Statistics; Comparison of group means: T test; Analysis of variance; Multiple comparison tests
3. Parametric and non-parametric tests Correlations
4. Regression
5. Analysis of frequencies: Chi square Statistical measure of validity and reliability Factorial Design analysis
6. Power analysis – Determining sample size, Epidemio logical Measures–Rate, Ratio, Proportion, Incidence and prevalence, Relative risk, Risk ratio, Odds ratio
7. Application of various statistical software.

RECOMMENDED TEXT BOOKS

1. Statistical methods in Biology by Bailey, N.T.J
2. Statistical methods by Gupta, S.P
3. Research Methodology by Kumar, R

6. Practical I: Nutritional Assessment & Diet Planning

L/T/P-2/C-2

- **Course Outcomes (COs)**
- Perform nutritional assessment using standard methods.
- Plan balanced and therapeutic diets.
- Apply practical skills in real-life nutrition scenarios.
- **Program Outcomes (POs):**
- Develop hands-on clinical and diet planning skills.

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- Provide personalized nutrition care and counseling.
- Improve professional competence in dietetics practice.

➢ **Learning Objectives**

- Learn methods of nutritional assessment
- Understand diet planning principles
- Practice use of assessment tools

➢ **Learning Outcomes**

- Perform anthropometric and dietary assessments
- Plan balanced and therapeutic diets
- Apply practical skills in clinical and community settings

Unit 1: Anthropometric Assessment

(12 Hours)

- Measurement techniques: height, weight, BMI, skinfold thickness, circumferences
- Interpretation of anthropometric data

Unit 2: Biochemical and Clinical Assessment

(12 Hours)

- Collection and interpretation of biochemical data
- Clinical signs of nutritional deficiencies

Unit 3: Dietary Assessment Methods

(12 Hours)

- 24-hour recall, food frequency questionnaire, diet history
- Quantitative and qualitative diet analysis

Unit 4: Nutritional Status Interpretation

(12 Hours)

- Integration of anthropometric, biochemical, clinical, and dietary data
- Case study evaluations

Unit 5: Diet Planning and Prescription

(12 Hours)

- Principles of diet planning for healthy individuals and special groups
- Therapeutic diet modifications for common diseases
- Practical diet planning exercises and counseling practice.

References

1. *Diet Therapy* — Diet Therapy by B. Srilakshmi
2. *Normal and Therapeutic Nutrition* — Normal and Therapeutic Nutrition by Corinne H. Robinson
3. *Manual of Dietetic Practice* — Manual of Dietetic Practice
4. *Nutritional Assessment* — Nutritional Assessment by Robert D. Lee & David C. Nieman
5. *Oxford Handbook of Nutrition and Dietetics* — Oxford Handbook of Nutrition and Dietetics

MASTERS IN NUTRITION AND DIETETICS

I year- 2nd sem SYLLABUS

S. NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max.Marks		
							INT	EXT	TOTAL
1		Advances in Enteral and Parenteral Nutrition	3	-	1	4	40	60	100
2		Nutrition and Immunity	2	-	-	2	40	60	100
3		Innovation in Food Product Development	2	-	2	4	40	60	100
4		Preventive and Therapeutic diets	2	-	2	4	40	60	100
5		Scientific writing skills	3	-	-	3	40	60	100
6		Paediatric Nutrition (Elective)	4	-	-	4	40	60	100
7		Art of Being a better person (VAC)	1	-	-	1	100	-	100
TOTAL			**17**	**-**	**5**	**22**	**340**	**360**	**700**

1. ADVANCES IN ENTERAL AND PARENTERAL NUTRITION

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

➢ **Course Outcomes (COs)**

- Understand principles and indications of enteral and parenteral nutrition.
- Evaluate different feeding formulas and delivery systems.
- Plan and monitor nutritional support for critically ill patients.
- Identify complications and manage nutritional therapy safely.

➢ **Program Outcomes (POs)**

- Apply clinical nutrition knowledge in critical care settings.
- Demonstrate decision-making in advanced nutrition support.
- Ensure patient safety and ethical practice in nutrition therapy.
- Collaborate with healthcare teams in clinical management.

➢ **Learning Objectives**

- Understand nutrition support techniques
- Learn indications and methods of feeding
- Study complications and monitoring

➢ **Learning Outcomes**

- Plan enteral and parenteral nutrition
- Calculate nutrient requirements
- Monitor patients and manage complications

UNIT I: Foundations of Enteral Nutrition

(9 hours)

- Overview and importance of enteral nutrition
- Effects on:

  - Gut mucosa
  - Gut-associated lymphoid tissue (GALT)
  - Gut microbiota
- Clinical concerns:
  - Infections
  - General complications
- Refeeding Syndrome
- Drug–Enteral Nutrition Interactions

UNIT II: Therapeutic Role of Enteral Nutrition

(9 hours)

- Enteral nutrition in disease management:
  - Diabetes
  - Cancer
  - Gastrointestinal diseases (IBD)
  - Dementia
  - Paediatric critical care
  - Preterm infants

UNIT III: Specialized Enteral Nutrition Approaches

(9 hours)

- Enteral immunomodulatory diets:
  - Acute lung injury (ALI)
  - Acute respiratory distress syndrome (ARDS)
- Key nutrients:
  - Omega-3 fatty acids
  - γ-linolenic acid
  - Antioxidants
- Home-based enteral nutrition:
  - Blenderized tube feeding (BTF)

UNIT IV: Parenteral Nutrition – Complications and Clinical Use

(9 hours)

- Issues in parenteral nutrition:
  - Compounding
  - Vascular access device-related complications
  - Metabolic complications
  - Hepatobiliary complications
  - Metabolic bone disease
- Clinical applications:
  - Critical care
  - Neonates and premature infants
  - Bariatric surgery
  - Cancer

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

(9 hours)

- Safety considerations in parenteral nutrition
- Ethical issues in nutrition support
- Nutrition support in:
  - Long-term care
  - Home care settings

Practical (60 hours)

UNIT 1 **(30 hours)**

1. Planning tube-feeding diets for the following
i) Diabetes
ii) Cancer
iii) Gastrointestinal diseases – IBD,
iv) Dementia
v) Paediatric critical care
vi) Preterm infants

UNIT II **(30 hours)**

1. Parenteral nutrition support for the following-
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

2. 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

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- **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)

3. INNOVATION IN FOOD PRODUCT DEVELOPMENT

L-2/T/P-2/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

(6 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

(6 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

(6 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

(6 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

(6 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.

4. PREVENTIVE AND THERAPEUTIC DIETS

L-2/T/P-2/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

(6 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

(6 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

(6 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

(6 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

(6 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:

(90 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.

5. SCIENTIFIC WRITING SKILLS

L-3/T/P/C-3

➢ **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

(9 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

(9 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 **(9 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 **(9 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 **(9 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

6. PAEDIATRIC NUTRITION

L-4/T/P/C-4

- **Course Outcomes (COs)**
- Understand nutritional requirements across childhood stages.
- Assess growth and development using standard tools.
- Plan diets for infants, children, and adolescents.
- Manage nutritional disorders in children.
- **Program Outcomes (POs)**
- Provide specialized nutritional care for pediatric populations.
- Promote growth and development through appropriate nutrition.
- Address childhood malnutrition and related disorders.
- Support community and clinical pediatric nutrition programs.
- **Learning Objectives**
- Understand growth and development in children
- Learn nutritional requirements at different ages
- Study pediatric disorders and diet management
- **Learning Outcomes**
- Assess nutritional status of children
- Plan age-specific and therapeutic diets

UNIT I: Growth, Assessment and Nutritional Needs in Children

(12 Hours)

- Normal growth in children:
  - Formulae for average weight, height, head circumference (birth–12 years)
  - Factors affecting growth
  - Developmental milestones

- Nutritional assessment:
  - Physical examination (BP, respiratory rate, temperature, head-to-toe)
  - Anthropometry (weight, height, MUAC, head circumference)
- Interaction of nutrition and infection in children
- Nutritional requirements in children:
  - Energy, proteins, fats, carbohydrates
  - Vitamins, minerals
  - Water and electrolytes
  - Immunonutrients

UNIT II: Critical Care and Malnutrition Management

(12 Hours)

- Nutritional support in critically ill children:
  - Metabolic changes during critical illness
  - Goals of nutrition therapy
- Nutrition support methods:
  - Enteral nutrition (EN)
  - Total parenteral nutrition (TPN)
  - Dietary management
- Protein Energy Malnutrition (PEM) / Severe Acute Malnutrition (SAM):
  - Identification criteria
  - Causes
- Management of PEM:
  - Resuscitation
  - Restoration
  - Rehabilitation
  - Dietary management

UNIT III: Gastrointestinal, Liver and Renal Disorders

(12 Hours)

- Diarrhoeal diseases:
  - Adverse effects
  - Acute diarrhoea (ORT, fluid & electrolyte therapy, diet)
  - Persistent diarrhoea (pathogenesis & management)
- Other GI disorders:
  - Constipation (dietary management)
  - Inflammatory bowel disease (Crohn's disease, Ulcerative colitis)
- Liver disorders:
  - Hepatitis
  - Indian childhood cirrhosis
- Renal disorders:
  - Nephrotic syndrome
  - Acute renal failure
  - Chronic renal failure

UNIT IV: Metabolic, Cardiovascular and Infectious Diseases

(12 Hours)

- Cardiovascular disorders:
  - Congenital heart disease (etiology, growth issues, management)
  - Pediatric dyslipidemia
- Juvenile diabetes:
  - Metabolic changes

    - Diagnosis criteria
    - Medical Nutrition Therapy (MNT)
    - Insulin regimen and diet planning
    - Exercise and hypoglycemia
- Special considerations:
    - Infants, toddlers, school children, adolescents
- Complications:
    - Hypoglycemia
    - Diabetic ketoacidosis (DKA)
    - Somogyi effect
    - Dawn phenomenon
- HIV/AIDS:
    - Effect on nutrition
    - Nutritional requirements
    - ART and nutrition
    - Feeding practices (breastfeeding & replacement feeding)

UNIT V: Allergies, Genetic Disorders and Special Diets

(12 Hours)

- Food allergies and intolerance:
    - Types of hypersensitivity reactions (Type I–IV)
    - Common allergens (milk, egg, soy, fish, shellfish, peanuts)
    - Symptoms (skin, respiratory, GI)
    - Diagnosis and dietary management
- Inborn errors of metabolism:
    - Carbohydrate disorders:
        - Glycogen storage disease
        - Galactosemia
        - Fructosemia
    - Protein disorders:
        - PKU
        - MSUD
        - Alkaptonuria
        - Homocystinuria
        - Tyrosinemia
    - Mineral disorder:
        - Wilson's disease
- Nutrition for special conditions:
    - Ketogenic diet (epilepsy)
    - Neutropenic diet (bone marrow transplant)
    - Autism

References

1. Pediatric Nutrition (9th Edition) – American Academy of PediatricsEditors: Frank R. Greer & Steven A. AbramsA comprehensive evidence-based textbook covering infant, child, and adolescent nutrition, clinical nutrition, micronutrients, feeding practices, and public health nutrition.
2. Pediatric Nutrition for Dietitians – Praveen S. Goday& Cassandra WaliaUseful for undergraduate and postgraduate nutrition students. Covers nutritional assessment, intervention, disease-specific pediatric nutrition care, and ADIME approach.

3. Samour& King's Pediatric Nutrition in Clinical Care – Laura Elliott & Kathryn LMooreWidely used clinical reference focusing on nutrition management in pediatric diseases and hospital settings.
4. Clinical Paediatric Dietetics – Vanessa ShawStandard reference for pediatric dietetics and therapeutic nutrition, commonly used in clinical nutrition programs.
5. Nelson Textbook of Pediatrics – Robert M. Kliegman et al.Important medical reference with detailed sections on growth, development, infant feeding, and nutritional disorders.

7. ART OF BEING A BETTER PERSON

L-1/T/P/C-1

Program Outcomes (Pos)

- Demonstrate ethical behavior and positive attitude
- Communicate effectively and build healthy relationships
- Practice self-awareness and personal responsibility

Course Outcomes (Cos)

- Understand principles of personal growth and values
- Apply positive thinking and emotional control
- Improve interpersonal and life skills

Learning Objectives

- To develop self-awareness and confidence
- To promote empathy and ethical values
- To enhance communication and behavior

Learning Outcomes

- Exhibit improved self-discipline and attitude
- Demonstrate better communication and social skills
- Apply values in daily personal and professional life

Unit1

(2 Hours)

IntroductiontoBeingaGoodHuman

Defining"goodness"andethicalliving Overviewofmoralphilosophies:Utilitarianism,Deontology,VirtueEthics The role of self-awareness in personal growth

Activity:Reflectivejournalingonwhat"beinggood"meanstoyou.

Unit2

(1 Hour)

ThePowerof Empathy

Understandingempathyvs.sympathy Thesciencebehindempathyanditsbenefitsforsocialconnections Techniques for cultivating empathy in everyday life

Activity:Empathy-buildingexercisesanddiscussions.

Unit3

(1 Hour)

Emotional Intelligence (EQ)

WhatisEmotionalIntelligence?(Self-awareness,self-regulation,motivation,empathy,andsocialskills)

The role of EQ in personal and professional relationships
Strategiestoimproveemotionalintelligence
Activity:Self-assessmentofemotionalintelligenceandEQdevelopmentexercises.

Unit4 **(1 Hour)**

CompassionandKindness
Thescienceofkindness:How kindnessbenefits usand other
Practicingkindness insmall, everyday actions
Overcomingbarriers tokindness (e.g.,stress, biases, indifference)
Activity:"RandomActsofKindness"challenge.

Unit5 **(1 Hour)**

PersonalIntegrityandHonesty
Theimportanceofintegrityinpersonalandprofess
ionallife Consequences of dishonesty and lack
of integrity
Howtoalignactionswithvalues
Activity:Casestudydiscussiononethicaldilemmasanddecision-making.

Unit6 **(1 Hour)**

BuildingPositiveRelationships
Communication skills for
healthy
relationshipsSettingboundariesa
ndrespectingothers'boundaries
Conflict resolution and
forgiveness
Activity:Role-playingscenariostopracticehealthycommunication.

Unit7 **(1 Hour)**

Responsibilityand Accountability
The concept of personal
responsibility in life
Accountabilityinbothpersonalandcom
munitycontexts
Howtotakeownershipofmistakesandle
arnfromthem **Activity**: Reflect on
past mistakes and plan for growth.

Unit8 **(2 Hours)**

ContributingtotheCommunityandSociety
Theroleofindividualsinbuildingstrong
communities Volunteering, activism,
and social responsibility
Theimpactofsmall,positive actionsonalarger scale
Activity:Brainstormingsessiononpotentialwaystocontributetothelocalcommunity.

Unit9 **(1 Hour)**

PracticingGratitudeandContentment
Thepsychologicalandemotionalbenefi tsofgratitude Practicing contentment in a consumer-driven world Techniques for cultivating a mindset of abundance **Activity**: Gratitude journal and daily reflection.

Unit10 **(1 Hour)**

Livingwith Purpose and Meaning
Discoveringpersonalvaluesandpurpose The intersection of passion, skills, and service Creatingalifeplanthatalignswit hcorevalues
Activity:Createapersonalmissi onstatement.

Unit11 **(1 Hour)**

OvercomingNegativeTraits:Gre ed,Anger,andEnvy The psychology behind negative emotions and traits How greed, anger, and envy affect our well-being
Strategiesformanagingandtransformingnegativeemotions
Activity:Mindfulnessmeditationandreflection exercises.

Unit 12 **(2 Hours)**

Bringing It All Together: A Life of Goodness Review of key learnings from the courseCreatingavisionforcontinuou spersonalgrowth
Howtomaintainapositiveandethicallifeinachallengingworld
Activity:Finalreflectionpaperorpresentationonhowstudentswillapplythecourse'sprinciplestoth eir life.

ReferenceTextbook

1. HowtoWinFriendsandInfluencePeople"byDale Carnegie
2. TheSevenHabitsofHighly EffectivePeople"byStephenR. Covey

MASTERS IN NUTRITION AND DIETETICS

II year III semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max.Marks		
							INT	EXT	TOTAL
1	MND 301	Intellectual Property Rights	2	-	-	2	40	60	100
2	MND 302	Precision Nutrition	4	-	-	4	40	60	100
3	MND 303	Food Service Management	2	-	2	4	40	60	100
4	MND 304	Advanced Communication Skills for Nutrition Practice	1	-	3	4	40	60	100
5	MND 305	Geriatric Nutrition (Elective)	4	-	-	4	40	60	100
6	MND 306	Internship	-	-	10	10	40	60	100
TOTAL			**13**	**-**	**15**	**28**	**240**	**360**	**600**

1. 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.

2. PRECISE 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

3. FOOD SERVICE MANAGEMENT

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

MASTERS IN NUTRITION AND DIETETICS

- **Course Outcomes (COs)**
- Understand principles of food service systems and operations.
- Plan menus considering nutritional, economic, and cultural factors.
- Apply food safety and hygiene standards.
- Manage resources including staff, budget, and equipment.
- **Program Outcomes (POs)**
- Demonstrate managerial and organizational skills in food service settings.
- Ensure quality, safety, and efficiency in food operations.
- Apply leadership and teamwork in institutional management.
- Support large-scale food service and community nutrition programs.
- **Learning Objectives**
- Understand the principles of management and organization of food service establishments.
- Learn the planning of kitchen, equipment, food systems, and menu management.
- Gain knowledge of food standardization, regulations, and financial control in food services.
- **Learning Outcomes**
- Apply management principles to efficiently operate food service establishments.
- Plan and evaluate kitchen layout, menu, and food service systems effectively.
- Analyze and implement cost control, food safety, and regulatory practices in food services.

UNIT 1: Principles of Management in Food Service

(6 Hours)

- Functions of management: Planning, organizing, directing, coordinating, controlling, evaluating
- Tools of management: Tangible and intangible
- Management of resources: Natural and work environment
- Catering management: Basic principles and guidelines

UNIT 2: Types of Food Service Establishments

(6 Hours)

- Classification: Commercial and non-commercial
- Street food units and mobile food services
- Temporary food service establishments
- Vending machines and food courts
- High-risk food and safety considerations

UNIT 3: Planning of Space and Equipment

(6 Hours)

- Kitchen space: Types, size, and planning
- Work simplification and kitchen design features
- Storage space: Types and planning factors
- Service area: Location and layout
- Equipment: Classification, selection, installation, operation
- Purchasing, care, and maintenance of equipment

UNIT 4: Food and Menu Management

(6 Hours)

- Characteristics and quality of food (sensory and nutritional)
- Food purchasing: Importance and methods
- Receiving and storage of food (perishable and non-perishable)
- Menu planning: Importance and types (à la carte, table d'hôte, combination)

- Food service systems and styles (waiter, self-service, vending)

UNIT 5: Standardization, Regulations & Financial Management

(6 Hours)

- Recipe formulation and standardization (steps and significance)
- Patent laws and evolution of IPR in India
- Food product labeling: Purpose, types, and regulations
- Financial management: Cost concepts and behavior
- Break-even analysis and contribution
- Cost control: Importance, factors affecting losses
- Methods of controlling food and labor costs

PRACTICAL

(60 Hours)

1. Menu planning for quantity food production:
a. Packed meals in School canteens, Airline catering.
b. Restaurant
2. Principles of Menu planning and planning of meals for
a. Banquet s- 7 course meal
b. Outdoor Catering events like Weddings, Birthday parties etc.
3. Standardization of any 3 Recipes, Determination of standard serving size. Calculation of Food cost.
4. Calculate the Recipe conversion factor and Yield for the above standardized recipes. Calculation of nutritive value.
5. Preparation and Sale of a special meal for 50 people using the principles of yield and recipe conversion factor.
6. Evaluation of food service Units- –Conventional, Commissary
7. Visit to a food service unit.
8. Develop a HACCP Plan for an Indian Recipe. Identify Critical control points and corrective measures.

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)

4. 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 **to** create and analyze nutrition-related content across various media platforms**.**
- Understand the use **of** digital 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

5. GERIATRIC NUTRITION

L-4/T/P/C-4

- **Course Outcomes (COs)**
- Understand physiological changes and nutritional needs in aging.
- Assess nutritional status of elderly individuals.
- Plan diets for age-related diseases and conditions.
- Address issues like malnutrition, sarcopenia, and chronic illness.
- **Program Outcomes (POs)**
- Provide specialized care for elderly populations.
- Promote healthy aging through nutrition interventions.
- Manage geriatric health conditions with diet therapy.
- Support community and clinical geriatric programs.
- **Learning Objectives**
- Understand the biological, psychological, and social aspects of ageing.
- Learn the nutritional requirements and dietary management of the elderly.
- Gain knowledge of clinical conditions, challenges, and care systems in geriatric nutrition.

MASTERS IN NUTRITION AND DIETETICS

- **Learning Outcomes**

- Explain the ageing process and its impact on health and nutrition.
- Apply knowledge to plan appropriate diets and care for elderly individuals.
- Analyze clinical, social, and economic issues affecting the elderly and suggest interventions.

UNIT 1: Introduction to Ageing & Geriatric Care

(12 Hours)

- Concept of gerontology and geriatric care
- Biology of ageing
- Theories of ageing: disengagement, activity, selective, continuity
- Microscopic theories and ageing trends
- Interaction of biological, psychological, physiological, and social processes

UNIT 2: Nutrition & Dietetics in Ageing

(12 Hours)

- Drug–food–nutrient interactions
- Nutritional requirements in old age
- Food requirements and dietary modifications
- Demography, mortality, morbidity and implications for rehabilitation

UNIT 3: Issues, Challenges & Psychological Care

(12 Hours)

- Economic dependence, rural/urban issues
- Abuse, neglect, crime against elderly
- Sensory problems, falls, and common complaints
- Geriatric counseling and depression
- Exercise, yoga, meditation
- Therapies: REBT, horticultural, music, art, bibliotherapy

UNIT 4: Clinical Geriatric Nutrition

(12 Hours)

- Nutritional problems: osteoporosis, obesity, anemia, malnutrition, constipation
- Immunity and infections
- Degenerative disorders: dementia, Alzheimer's, Parkinson's
- Disorders of GIT, liver, biliary system, pancreas
- Respiratory infections and coronary heart disease

UNIT 5: Social Geriatrics & Geriatric Services

(12 Hours)

- Family systems and roles of elderly
- Loneliness, dependency, and generational issues
- Financial aspects and pensions
- Role of government and NGOs
- Geriatric services in India and abroad
- Institutional care: day care, long-term care, homes for aged
- Ethical issues and life-sustaining measures

Core Textbooks

1. Geriatric Nutrition: The Health Professional's Handbook – Geriatric Nutrition: TheHealth Professional's HandbookOne of the most widely used references for elderly nutrition, covering aging physiology, nutritional assessment, chronic diseases, therapeutic diets, and nutrition support in older adults.

2. Handbook of Clinical Nutrition and Aging – Handbook of Clinical Nutrition and Aging
   Comprehensive text discussing nutrition and aging, age-related diseases, micronutrients, sarcopenia, dementia, cardiovascular health, and evidence-based interventions.
3. Nutrition and Functional Foods for Healthy Aging – Nutrition and Functional Foodsfor Healthy AgingFocuses on functional foods, antioxidants, chronic disease prevention, and healthy aging nutrition strategies.
4. Geriatric Nutrition – Geriatric NutritionUseful reference on nutritional management of elderly patients, metabolic changes in aging, and disease prevention.
5. Geriatric Nutrition Handbook – Geriatric Nutrition HandbookPractical handbook dealing with nutritional requirements, assessment, diet therapy, and feeding concerns in older adults.

6. 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**
- Perform basic nutritional assessment and plan therapeutic diets.
- Demonstrate effective patient counseling and communication skills.
- Apply knowledge in clinical settings and hospital food service operations.

II Year IV Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max.Marks		
							INT	EXT	TOTAL
1	MND 401	Dissertation	-	-	20	20	40	60	100
TOTAL			**-**	**-**	**20**	**20**	**40**	**60**	**100**

Dissertation

L/T/P-40/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.