सत्यमेव जयते

National Commission for Allied and Healthcare Professions

COMPETENCY BASED CURRICULUM

for

"NUTRITION AND DIETETICS"

As per the NCAHP Act -2021

APPROVED SYLLABUS
2025

Ministry of Health & Family Welfare

4.2 Masters in Nutrition and Dietetics

Eligibility for admission:

Bachelor of Nutrition and Dietetics in Honours or equivalent from a recognised university with a minimum 5.5 CGPA

Duration of the course

The Masters in Nutrition and Dietetics is of two years duration.

Duration of the course**:** 2 years or 4 semesters.

Total hours –**1725 Hours**

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and examination.

Attendance:

A candidate has to secure a minimum

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

Credit details:

1 hour lecture per week - 1 credit

2 hours of tutorials per week - 1 credit

2 hours of clinics per week - 1 credit

Curriculum Outline

Masters in Nutrition and Dietetics

[2 years program]

Proposed Scheme

Year	Semester	Hours
1	1	345
1	2	420
2	3	660
2	4	300
Total		1725

Credit details:

One credit implies one hour of lecture per week two hours of laboratory/practical per week or two hours of

clinics per week or two hours of Research projects per week

A semester is considered to have 15 weeks. For example,

1 credit course = 15 hours of lectures per semester

3 credits course = 45 hours of lectures per semester

0.5 credit course = 15 hours of practical/laboratory.

CL	CP	L	P
1	1	15	60

CL: Credit for Lecture

CP: Credit for Practical

L: Hours for Lecture

P: Hours for Practical

Curriculum Outline

First Semester

SI.no.	Course Titles	Credits			Hours /Semester (15 weeks)		
		Theory	Practical	Total	Theory	Practical	Total
MND 101	Advanced Human Nutrition and Metabolism	4	0	4	60	0	60
MND 102	Advanced Pathophysiology and Clinical Biochemistry	4	0	4	60	0	60
MND 103	Preventive & Therapeutic Dietetics	3	1	4	45	30	75
MND 104	Research Methodology for Dietetics and Public Health	4	0	4	60	0	60
MND 105	Biostatistics	2	2	4	30	60	90
TOTAL		**17**	**3**	**20**	**255**	**90**	**345**

Second Semester

SI.no.	Course Titles	Credits			Hours /Semester (15 weeks)		
		Theory	Practical	Total	Theory	Practical	Total
MND 201	Nutrition Assessment Methods & Applications for Dietitians	2	2	4	30	60	90
MND 202	Advances in Enteral and Parenteral Nutrition	2	2	4	30	60	90
MND 203	Advances in Public Health Nutrition	3	1	4	45	30	75
MND 204	Nutrition and Immunity	2	0	2	30	0	30
MND 205	Innovation in Food product development	1	3	4	15	90	105
MND 206	Scientific writing skills	2	0	2	30	0	30
TOTAL		**12**	**8**	**20**	**180**	**240**	**420**

Third Semester

SI.no.	Course Titles	Credits			Hours /Semester (15 weeks)		
		Theory	Practical	Total	Theory	Practical	Total
MND 301	Intellectual Property Rights	2	0	4	30	0	30
MND 302	Precision Nutrition	4	0	4	60	0	60
MND 303	Institutional Food Service Management and Quantity Cookery	1	5	6	15	150	165
MND 304	Advanced Communication Skills for Nutrition Practice	1	3	4	15	90	105
MND 305	Internship	0	10	10	0	300	300
TOTAL		**08**	**18**	**20**	**120**	**540**	**660**

Fourth Semester

SI.no.	Course Titles	Credits			Hours /Semester (15 weeks)		
		Theory	Practical	Total	Theory	Practical	Total
MND 401	Dissertation	0	20	20	0	600	600
TOTAL		**0**	**10**	**10**	**0**	**600**	**600**

First Semester

MND 101 Advanced Human Nutrition and Metabolism

CL	CP	L	P
4	0	60	0

Semester	I
Course Name	**MND 101 Advanced Human Nutrition and Metabolism**
Course Description	Proper nutrition is the crux of human health along with safe water, sanitation, immunization etc. Adequate knowledge about this core course on macro and micronutrients in totality will enable the students to handle a population's nutrition situations and how to apply the knowledge for sustainable handling to induce better health and productivity.
Objectives	To provide in-depth understanding related to macro and micronutrients
	To impart knowledge about specific requirements of these nutrients as per age, sex, and physiological conditions for meaningful handling of normal and disease situations.
	To gain detailed knowledge of the digestion, absorption and metabolism of carbohydrates, protein, fat, vitamins and minerals, as well as energy balance and metabolism.
Reference Books	1. Wildman REC and Medeiros DM (2000) *Advanced Human Nutrition*. CRC Press, Boca Raton, Florida. 2. Bamji MS, Rao NP and Reddy V (2003) *Textbook of Human Nutrition.* 2nd Edition, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi. 3. Eastwood MA (1997) *Principles of Human Nutrition*. London ; Chapman & Hall.

4. FAO (2004) *Human Energy Requirements -Report of a Joint FAO/WHO/UNU Expert Consultation.* Technical Report Series 1. Food and Agriculture Organization, Geneva.
5. FAO (2007) *Protein and Amino Acid Requirements - Report of a Joint FAO/WHO/UNU Expert Consultation.* Technical Report Series 1. Food and Agriculture Organization, Rome.
6. Berdanier, CD and Zempleni, J (2009) *Advanced Nutrition: Macronutrients, Micronutrients and Metabolism.* CRC Press, New York.
7. Groff J L and Gropper S (2012) *Advanced Nutrition and Human Metabolism.* 7th Edition, Yolanda Cossio, New York.
8. Summathi S (2017) *Food Chemistry and Nutrition.* BS Publication, Hyderabad.
9. Ross A C, Caballero B, Cousins RJ, Tucker KL and Ziegler TR (2012) *Modern Nutrition in Health and Disease.* 11thEdition, LWW, Philadelphia.
10. Whitney EN &Rolfels CR (2019) *Understanding Nutrition.* 15th Ed., West Publishing Company, USA.
11. Stipanuk MH and Caudill MA (2013) *Biochemical, Physiological and Molecular Aspects of Human Nutrition.* 3rd Edition, Elsevier Pub.
12. https://www.nutritionintl.org
13. https://www.who.int
14. https://www.hsph.harvard.edu/nutritionsource
15. http://www.nin.res.in

Prerequisites: Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan		
Unit	**Practical topics**	**Credit hours**
1.	Carbohydrates 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.	**13**
2.	Fats 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.	**13**
3.	Proteins 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.	**14**

4.	Regulatory nutrients and water 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, B_{12}, ascorbic acid, pantothenic acid and biotin; 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.	**20**

MND 102 Advanced Pathophysiology and Clinical Biochemistry

CL	CP	L	P
4	0	60	0

Semester	1
Course Name	**MND 102 Advanced Pathophysiology and Clinical Biochemistry**
Course Description	It is a course that integrates the advanced concepts of the pathophysiology of disease with clinical biochemistry.
Objectives	1. To comprehend Normal Biochemistry, Disease Pathogenesis, Etiology, Clinical Signs & Symptoms, Diagnostic Tests, and Complications of the healthy & diseased conditions. 2. To identify and understand the importance and use of diagnostic tests in the prognosis of disease processes.
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.
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan	
THEORY	**Hours**
UNIT ONE Disorders of the Cardiovascular system: 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 Disorders of the respiratory system: 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	**30**

Radiation carcinogenesis Viral carcinogenesis Clinical features of cancers Host cell defenses Grading of tumors Diagnosis of cancers -- histologic and molecular methods -- Tumor markers	
UNIT TWO Disorders of the Kidney and the urinary tract 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 Liver disorders: Jaundice- abnormalities of bilirubin metabolism Morphology and patterns of hepatic Injury- Necrosis, degeneration and Inflammation, regeneration and fibrosis	**30**

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. F). Disorders of the Endocrine system: 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 G) . Disorders of Reproductive system: Etiology, Pathogenesis, clinical manifestations, diagnosis and treatment of – Endometriosis, PCOS and STDs	

MND 103 Preventive and Therapeutic Dietetics

CL	CP	L	P
3	1	45	30

Semester	**I**
Course Name	**MND 103 Preventive and Therapeutic Dietetics (Theory and Practical)**
Course Description	It is a course that details the application of preventive and therapeutic Dietetics .
Objectives	1. Relate the physiologic role of specific nutrient & non nutrient components of food in relation to various organ systems. 2. Explain the mechanisms of disease management process and correlate it with the principles of medical nutrition therapy 3. Interpret therapeutic principles in clinical settings to develop dietary interventions.
Reference Books	1. Racz B., Duskova M., Starka L., Hainer V., Kunesova M. Links between the circadian rhythm, obesity and the microbiome. *Physiol. Res.* 2018;67:S409–S420. 2. Ceschia A, Horton R. Maternal health: time for a radical reappraisal. *The Lancet.* 2016;388(10056):2064–6. 3. Wei M, Ho E, Hegde P. Wei M, et al. An overview of percutaneous endoscopic gastrostomy tube placement in the intensive care unit. J Thorac Dis. 2021 Aug;13(8):5277-5296. 4. Preventive Nutrition – The Comprehensive Guide for Health Professionals (2005) ;3rd Edition; Edited by Andrianne Bendich, Richard J. Deckelbaum Human Press Inc., New Jersey.

	5. Nutrition Support for the critically ill patient – A Guide to Practice (2005);Edited by GAIL CRESCI Taylor and Francis London, CRC press, USA. 6. Dietary Fiber in Human Nutrition (2001);3rd Edition ; Edited by Gene A. Spiller CRC press, USA. 7. Handbook of Nutrition and Food (2002); Edited by Carolyn D. Berdanier, CRC press, USA
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan

THEORY	**Hours**
UNIT ONE Role of macronutrients and micronutrients in therapeutic conditions Carbohydrates: Types, Mode of Action & preventive use and therapeutic use in specific disease, Proteins: Types &Role of specific amino acids- preventive and therapeutic uses in various disease states, Lipids: Types(regular/structured), Mode of action preventive and therapeutic and use in specific disease. Vitamins and Minerals: Its application in various disease conditions. Dietary fiber and Water, Its application in various disease conditions. The Immune & Inflammatory System, Introduction to the immune system. Nutrients that affect immune function & their assessment. Role of cytokines in therapeutic conditions Chrono nutrition and chronic diseases: Introduction to Chrono nutrition, Food timings, circadian rhythm and Chrono nutrition Fundamentals of nutrition therapy : - Feeding techniques, types of therapeutic diets Guidelines for nutrition therapy- hypometabolic starved patient & hypermetabolic stressed patient. Critical Care Illness & Conditions requiring intensive care: Definition- Critical Illness & Conditions requiring intensive care, Goals of Nutrition Support in critically ill.Brief about Enteral Nutrition Support	**20**

Burns: Definition: Burns, Types of Burns, Degree of Burns, Assessment of Burn Surface Area, Systemic Response to Burns on different organ system.

Diabetes (Type 1, Type 2, Gestational, Nephropathy and other complications.)

Obesity in different grades and age groups

Inborn Errors Of Metabolism

Phenylketonuria, glycogen storage disease, Galactosemia.

UNIT TWO

25

Respiratory (Pulmonary) Disorders:

Normal respiration mechanism: a brief overview of different types of ventilation

MNT Goals & Principles, Acute Exacerbation MNT,Chronic condition MNT

Immunonutrition

Gastrointestinal disorders:Gastritis, GERD, diverticular diseases, gastric surgeries.

Liver disorders: Cirrhosis of the liver, hepatic encephalopathy, Liver transplant, Gall bladder disease, Pancreatitis (acute, chronic). Metabolic liver diseases-NAFLD, hemochromatosis. Disorders of the heart, Primary (essential) and secondary hypertension

Cardiovascular disorders: Disorders of the heart , Primary (essential) and secondary hypertension

Renal Disorders: Acute renal failure, Nephrotic syndrome, Chronic kidney disease, renal replacement therapy, renal transplant

Metabolic: Diabetes (Type 1, Type 2, Gestational, Nephropathy and other complications.)

Obesity in different grades and age groups

Diabetes (Type 1, Type 2, Gestational, Nephropathy and other complications.)

Obesity in different grades and age groups

Inborn Errors Of Metabolism, Phenylketonuria, glycogen storage disease, Galactosemia.

PRACTICAL A) Estimation of nutrient requirements- Energy, Carbohydrates, Protein etc. , Disease specific dietary planning & interpretation of case studies • Cardiovascular Disease- • Diabetes • Obesity • Inborn Errors Of Metabolism B) I. Standardizing general high calorie high protein recipes. 2. Standardizing general low calorie recipes 3. Standardizing recipes based on different nutrient needs 4. Counseling Techniques and mock sessions C) Estimation of nutrient requirements- Critical Care Burns (different Types & Degrees) Cancer (dietary guidelines for different cancers & therapies) Surgery (associated to different disease states) D) 1. Disease-specific dietary planning & interpretation of case studies and presentations in Gastrointestinal diseases- 2. Disease-specific dietary planning & interpretation of case studies and presentations in Liver disorders 3. Disease-specific dietary planning & interpretation of case studies and presentations in Renal Disorders 4. Disease-specific dietary planning & interpretation of case studies and presentations in Pulmonary Disease E) 1. Review& Case study presentations for therapeutic conditions 2. Review of nutrient drug interactions 3. classes for small sample case study presentations by students	**30**

MND 104 Research Methodology for Dietetics and Public Health

CL	CP	L	P
4	0	60	0

Semester	**II**
Course Name	MND 104 Research Methodology for Dietetics and Public Health
Course Description	This course provides students with a comprehensive understanding of research methodology in dietetics and public health with hands-on practical aspects in epidemiology, study design, statistics, body composition, physical activity assessment and dietary intake measurements as well as experience in scientific writing and detailed reviews of peer reviewed scientific papers in dietetics and public health. This course covers various aspects of research methodology, including research design, data collection, data analysis, and interpretation as well as ethical issues in conducting research. This course will enable students to design, conduct, and evaluate research studies.

Objectives	1. To understand the principles of research methodology in dietetics and public health
	2. To identify the types of research questions and designs appropriate for studies and to provide an understanding of the term epidemiological studies
	3. To introduce the important scientific concepts in study design, research protocol development and ethical issues in research
	4. To introduce different strategies and interpretation of research studies and provide an understanding of key statistical issues including sampling, study size and statistical power.
Reference Books	• McClean S. (2019) Research Methods for Public Health. Sage Publications. • Lovegrove JA., Hodson L., Sharma S. and Lanham-New SA. (2015). Nutrition Research Methodologies (The Nutrition Society Textbook). Wiley-Blackwell; 1st edition. • Susan B and Deepa H. (2012) Introduction To Epidemiologic Research Methods In Public Health Practice. Jones & Bartlett • Nelson M. (2020). Statistics in Nutrition and Dietetics. Wiley-Blackwell • Sreelatha k NT. and Sreelatha K. (2021)Research ethics and plagiarism. Ess Ess Pubns.
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan		
Unit	**Practical**	**Credit Hours**
1.	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	**. 15**
2.	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	**15**
3.	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	**15**
4.	Statistical analysis: descriptive statistics, inferential statistics Data analysis software: examples of commonly used software (e.g., SPSS), Data visualization techniques: charts, graphs, tables	**15**
5	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	**15**

MND 105 Biostatistics

CL	CP	L	P
2	2	30	60

Semester	**VI**
Course Name	**MND 105 Biostatistics**
Course Description	Biostatistics applies statistical methods to biological and health research. The course covers data collection, analysis, and interpretation, focusing on study design, probability, hypothesis testing, regression, and survival analysis. Students learn to use statistical software, analyze real-world datasets, and apply findings to public health and clinical decision-making.
Objectives	• To understand fundamental statistical concepts and biological and health research methodologies. • To develop skills in designing and conducting epidemiological and clinical studies. • To master data collection, management, and analysis techniques using statistical software. • To learn to apply probability and hypothesis testing to real-world biological data. • To analyze and interpret results from regression models and survival analysis. • To communicate statistical findings effectively to inform public health and clinical decisions.

Reference Books	• Smith, G. (1998). Introduction to statistical reasoning. *(No Title)*. • Daniel, W. W. (1978). *Biostatistics: a foundation for analysis in the health sciences* (Vol. 129). Wiley. • Kothari, C. R. (2004). Research methodology. • Bhatnagar, O. P. (1990). *Research Methods and Measurements in Behavioural and Social Sciences*. Agricole Publishing Academy.

Instructor in charge

M.Sc. and / Ph.D. in Foods and Nutrition or equivalent

Course Plan		
Unit	**Topic**	**Hours**
1.	Overview of concepts and definition in biostatistics, Various measurements and types of variables- indicators, Types of data – nominal, ordinal, interval, and ratio, Measures of central tendency and deviation: mean, median, mode, standard deviation, Z-score, Concepts of reliability and validity , Interpretation of research data	**6**
2.	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	**8**
3.	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	**8**
4.	Statistical tests for multiple variables; F-test (ANOVA) Concept of regression analysis, line of regression, regression test Conducting statistical analysis and interpretation of data	**8**
	PRACTICALS - Computer programs for data analysis	
1.	Use of software in statistical analysis: Excel, SPSS, JASP, JAMOVI R, Any other software	**20**
2.	Qualitative data analysis: ATLAS.T1, N-VIVO	**20**
3.	Integrating quantitative and quantitative data	**5**
4.	Various ways of presenting data: tables, figures graphs, and flow charts	**15**

Second Semester

MND 201 Nutrition Assessment Methods & Applications for Dietitians

CL	CP	L	P
2	2	30	60

Course Description	The course shall enable the student to learn about the various methods of nutritional assessment and the skills to measure and interpret them.
Objectives	This course will enable the students to 1. Understand the nutritional assessment of patients 2. Learn the skills to measure and interpret the various indicators and indices of nutritional assessment. 3. Learn to design a nutritional assessment plan for subjects.
References	1. Mahan, L.K. and Escott-Stump, S. (2021): Krause's Food Nutrition and Nutrition Care Process, 16th Edition, Elsevier Pvt. Ltd.ISBN 032381025X 2. Vir SC. Public Health Nutrition in Developing Countries Pt 1 and 2.(2011) Wood head publishing India PVT LTD, New Delhi. Cambridge, Oxford, Philadelphia. 3. Sehgal S and Raghuvanshi Rita S Textbook of Community Nutrition. (2007) Indian Council of Agricultural Research, Published by: Directorate of Information and Publication of Agriculture, Indian Council of Agriculture Research, Krishi Anusandhan Bhavan, Pusa, New Delhi-110012 4. Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd. ISBN 9788120417427

	5. Jeliffe DS.The Assessment of Nutritional status of the community, (1966) WHO Geneva 6. Gopaldas T and Sheshadri S. Nutritional Monitoring and Assessment. (1987) Oxford University Press, New Delhi. 7. Gibson R.S. Principles of Nutritional Assessment (2005) - 3rd edition. Oxford University Press
Webliography	1. Nutrition Screening Tools for Hospitalized Patients, Patricia S. Anthony MS, RD 2008, https://doi.org/10.1177/0884533608321130 2. Holmes CJ, Racette SB. The Utility of Body Composition Assessment in Nutrition and Clinical Practice: An Overview of Current Methodology. *Nutrients*. 2021; 13(8):2493. https://doi.org/10.3390/nu13082493
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan

Theory

Unit	Topic	Hours
1.	Nutritional Assessment in Clinical Practice – Introduction, relevance	**3**
2.	Body composition and cellular basis of growth, Significance, and methods used for measurement of body composition in nutrition. Common Biomarkers of Nutritional Status and Inflammation	**12**
3.	,Malnutrition Universal Screening Tool, Nutritional Risk Screening 2002, Mini Nutritional Assessment®, Short Nutritional Assessment Questionnaire©, Malnutrition Screening Tool, and the Subjective Global Assessment.	**4**

4.	Information Sources: Screening or referral form, Interview of patient or key social support, Medical or health records , Community- or organization-based surveys and focus groups, Health surveillance data, reports, research studies	**3**
5.	Comparison of Food and Nutrient Intake Assessment Methods	**4**
6.	Websites and Apps for Tracking Nutritional Intake and Physical Activity Data	**4**

Practical		
Unit	**Topic**	**Hours**
1.	Using nutrition assessment tools to measure nutritional status in patients in hospital: MUST, MNA. SGA, WHO Steps for assessment of NCDs	**15**
2.	Assessment of Nutritional risk factor of elderly Using Mini Nutritional Assessment Cumulative Illness Rating Scale for Geriatrics	**5**
3.	Designing a nutritional assessment system for a group of patients in a hospital setting ● The assessment system used ● Type and number of measure-ments selected ● Indices and indicators derived from these measure-ments ● Interpretation and application of the indicators	**20**

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**

MND 202 Advances in enteral and parenteral nutrition

CL	CP	L	P
2	2	30	60

Instructor in charge

M.Sc. and / Ph.D. in Foods and Nutrition or equivalent

Course Description

The course shall enable the student to learn about the role of enteral and parenteral nutrition in various disease and their complications.

Objectives

This course will enable the students to understand:

References	1. Ayers P, Bobo ES, Hurt RT, Mays AA, Worthington PH, eds.(2020) ASPEN Parenteral Nutrition Handbook, Third Edition. Silver Spring, MD: American Society for Parenteral and Enteral Nutrition; .ISBN **1889622419** 2. Mahan, L.K. and Escott-Stump, S. (2021): Krause's Food Nutrition and Nutrition Care Process, 16th Edition, Elsevier Pvt. Ltd.ISBN 032381025X 3. Subhal Bhalchandra Dixit (Author), Atul Prabhakar Kulkarni Kapil Gangadhar Zirpe (Editor) **Textbook of Critical Care Nutrition (ISPEN) (2023)** Jaypee Brothers Medical publishers (Pvt) Ltd .ISBN **9356963150** 4. Nambiar VS and Zaveri D (2024). Nutrition Guidance After Mini Gastric Bypass Bariatric Surgery. Adhyayan Publishers and Distributors. ISBN-10 : 8119681169. 5. Nambiar VS and Zaveri D (2024).Nutrition Guidelines for Roux-en-Y Gastric Bypass Bariatric Surgery. Adhyayan Publishers and Distributors. ISBN-10 : 8119681215.

Webliography	nutrients-06-05142.pdf Nutrients 2014, 6, 5142-5152; doi:10.3390/nu6115142
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program) and knowledge of medical nutrition therapy and advanced nutrition

Course Plan		
Theory		
Unit	**Topic**	**Hours**
1.	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 Interaction	**5**
	Role of Enteral Nutrition in the following: - Diabetes, Cancer Gastrointestinal diseases – IBD, Dementia, Paediatric critical care, Preterm infants	**6**
2.	Enteral immunomodulatory diet for acute lung injury and acute respiratory distress syndrome, omega-3 fatty acid, γ-linolenic acid, and antioxidant supplementation	**2**
3.	Home-based enteral nutrition – Blenderized tube feeding,	**2**
UNIT II **4.**	Issues in Parenteral Nutrition: Compounding, Vascular access device-related complications, Metabolic Complications, Hepato biliary Complications, Metabolic Bone Disease	**5**
5.	Role of Parenteral Nutrition in the following: Critical care, Neonates and premature infants, Bariatric surgery, Cancer	**4**
6.	Examining safety and ethical issues in parenteral nutrition	**2**
7.	Nutrition support in long-term and home care	**2**

Practical		
Unit	**Topic**	**Hours**
1.	Planning tube-feeding diets for the following Diabetes Cancer Gastrointestinal diseases – IBD, Dementia Paediatric critical care Preterm infants	**36**
2.	Parenteral nutrition support for the following- Critical care Neonates and premature infants Bariatric surgery Cancer	**24**

MND 203 Advances in Public Health Nutrition

CL	CP	L	P
2	2	30	60

Semester	**II**
Course Name	MND 203 Advances in Public Health Nutrition
Course Description	The course aims to focus on the advances in Public Health Nutrition at National level and Global level
Objectives	1. To understand and define the advanced concepts in Public Health Nutrition (PHN)
	2. To understand the global importance of nutrition across the life cycle and its role in achieving Sustainable Development Goals (SDGs).
	3. To assess the impact of public policies on community nutrition and global health targets.
	4. To explore nutritional surveillance systems, for monitoring and evaluating public health nutrition programs.
	5. To analyze epidemiological data to understand the relationship between diet and community health.
	6. To emphasize the need for Health Promotion in diverse population.

Reference Book	1. Lal, S. (2018). Textbook Of Community Medicine Preventive And Social Medicine With Recent Update. CBS Publishers & Distributors Private Limited.
	2. Public Health Nutrition in Developing Countries. (2011) Edited by Sheila Vir. Woodhead Publishing India PVT. LTD.
Webliography	1. UNICEF. https://www.unicef.org/ 2. WHO. http://www.who.int/ 3. World Food Programme. http://www.wfp.org/content/about-wfp- 4. WHO. United Nations Decade of Action on Nutrition. http://www.who.int/nutrition/decade-of-action/en/ 5. Mother, Infant and Young Child Nutrition and Malnutrition. http://motherchildnutrition.org/india/overview-india.html 6. Double burden of malnutrition. http://www.who.int/nutrition/double-burden-malnutrition/en/ 7. United Nations Development Programme. Sustainable Development Goals. http://www.undp.org/content/undp/en/home/sustainable-development-goals.html 8. Global targets 2025 http://www.who.int/nutrition/global-target-2025 9. Improving breastfeeding, complementary foods and feeding practices. www.unicef.org/nutrition/index_breastfeeding.html 10. National Guidelines on Infant and Young Child Feeding. www.wcd.nic.in 11. WHO Health Statistics and Information Systems. Global Health Estimates. http://www.who.int/healthinfo/global_burden_disease/en/ 12. WHO Non-communicable diseases and risk factors. http://www.who.int/ncds/en/ 13. Overview of Non-Communicable Diseases and Related Risk Factors. https://www.cdc.gov/globalhealth/healthprotection/fetp/

Course Plan		
Unit	**Topic**	**Hours**
I	The Lancet Global Health Overview Global Nutrition Report and its relation with positive health, universal health coverage, malnutrition (under-nutrition, overweight, obesity, micronutrient malnutrition), Hidden Hunger, nutritional status, nutrition intervention, food and nutrient supplements, food substitute, nutrition education Food and nutrition security –overview, challenges and solutions (local, national, state) Poverty, hunger, HDI -components and indicators, comparison of global HDI with national and state HDI, calculations for GHI and HDI	**6**
2	Food Systems Approach to Sustainable Healthy Diets Knowledge, Leadership, Capacity, Coordination & Governance Steps taken by GoI such as Green Revolution, White Revolution, GMOs and bio-fortified crops Food Corporation of India - Buffer stock Public Distribution System – Strength and Weaknesses Role of World Food Programme in ensuring Food and Nutrition Security	**8**

3	Concept of nutrition in all child survival programs and national health and development programs Maternal health in the perinatal period and beyond A global analysis of the determinants of maternal health and transitions in maternal mortality Vulnerabilities and reparative strategies during pregnancy, childbirth, and the postpartum period: moving from rhetoric to action Best Practices – Recent National and International Examples and Case Studies from NHM and Poshan 2.0 Need for revision in nutrition programs and policies: Critique on gaps & need for regular upgrading	**8**
4	Mainstreaming and Nutrition at National and International Level Concepts of nutrition advocacy Concepts and practices in nutrition advocacy– steps for success; some examples from successful nutrition advocacy programs Eat right India Movement Other New Initiatives for Nutrition Advocacy Role of FAO, WHO, NGO's & United Nations in Global /National advocacy & program implementation support to Government Operationalizing national/state policies and targets – steps for advocacy and mainstreaming of nutrition at field levels in various programs	**8**

	PRACTICAL	**60**
. 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**
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.	**25**
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	**25**

MND 204 NUTRITION AND IMMUNITY

CL	CP	L	P
2	0	30	0

Semester	**II**
Course Name	**MND 204 NUTRITION AND IMMUNITY**
Course Description	Introduction to basics of immunology, the role of various nutrients in modulating immune responses, and the impact on immune health.
Objectives	To gain knowledge on the immunological aspects To gain importance of nutrition immunity interactions.
Text Books	Nutrition, Immunity, and Infection by Philip C. Calder, Anil D. Kulkarni, Anil Digambar Kulkarni, CRC Press, Taylor & Francis Group, 2018 Nutrition and Immune Function by P. C. Calder, C. J. Field, H. S. Gill
Reference Books	Devereux,G., 9780851995830.0001, CABI, doi:10.1079/9780851995830.0001, (1–20), CABI Publishing, The immune system: an overview., (2002)
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan		
Unit	**Topic**	**Hours**
1.	Role of Nutrition in Immunity Concept of immunity, Role of nutrition in infection, Effect of nutritional status on immunity. Immunity - Types of immunity, cells of the immune system, structure of immunoglobulins- – IgG, IgM, IgA, IgD, IgE, Immune response - humoral immunity, cell mediated immunity, immune changes in malnutrition, Immunologic effect and mechanism of different micronutrients, Clinical relevance of micronutrients., autoimmunity and hypersensitivity.	**8**
2.	Interactions of Nutrition, Immunity and Infection Defense mechanisms in the host cell and nutrients essential in the development of the immune system, Effect of infections on the nutritional status of an individual, Nutrient deficiencies and excesses affecting the immuno-competence and to infections. Nutrients with immuno-modulati properties - Arginine, Glutamine, Omega 3 fatty acids, sulphur containing amino acids, nucleotides, ornithine, alpha ketoglutarate and taurine; Supplementation, beneficiary effects-Prebiotics, Probiotics and symbiotics	**8**
3.	Nutritional Immunology in Disease Prevention and Gene Expression Role of nutrition in managing diseases, Auto Immune disorders, Designing foods for immune related disorders Fundamentals of gene structure- Principles of gene expressions, Transcription mechanism and regulation, Translation mechanism and regulation, Effects of nutrients on gene expression, Thrifty genotype – phenotype hypothesis	**8**

4.	Programmes on Immunization National and International, New Initiatives in Vaccines, Milestones in the Immunization program, Immunization and Child Health. Review of Research papers on Nutrition and Immunity	**6**

MND 205 Innovation in Food Product & Development

CL	CP	L	P
1	3	15	45

Semester	**II**
Course Name	**MND 205 Innovation in Food Product & Development**
Course Description	It is a first basic course giving an insight into various aspects of Innovation, Food Ingredients and Food Formulation.
Objectives	1. To make a student understand concepts of Product Development – converting an Idea into a product and a plan to commercialize it
	2. To make a student understand concepts of Product Development , Quality control and Marketing the new product
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.

	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
Prerequisites	Bachelor of Nutrition and Dietetics (Honors) (4-year program)

Course Plan

Unit	Topic	Hours
1.	A) Basic principles of food product development: Sensory properties of food and their role in product development. Evaluation of food: Objective and subjective methods, selection and training of judges, Development of score cards and analysis of data. B) Concept of New Food Product Development – General classes of New Food Products, Reasons for new food product, Stages of new product development and New Food product life cycle	**5**

2.	A) Consumer Surveys, Idea Generation, Sources, Screening, Translation of idea to product prototype, Product testing, Consumer research evaluation: development of schedule and data analysis. B) Market testing, Pre Commercialization, and Product launch	**5**
3.	A) Packaging materials and labeling Food safety and quality control issues in product development, food quality regulations and standards, quality control and HACCP B) Product formulation and development for general and therapeutic use, functional foods and Nutraceuticals	**5**

Innovation in Food Product & Development (Practical-45; 90hr)

1. Sensory evaluation: Selection and Training of judges- Determination of Sensitivity Thresholds

2. Methods: Difference Test- Paired comparison- Duo-trio, Triangle test – preparation of score card and conduction of test

3. Numerical scoring, Composite scoring and Dilution tests- preparation of score card and conduction of test

4. Hedonic rating and Flavor Profile test - preparation of score card and conduction of test

5. Methods of Quantitative Descriptive Analysis - preparation of score card and conduction of test

6-10. Objective evaluation of Food – Physical, chemical and microbiological parameter analysis

10-15. Selection of Product categories, Idea generation and selection of Ingredients, Preparation of flow chart and ingredient preparation.

16-17. Innovative Product formulation and standardization – High Protein products

18-19. Innovative Product formulation and standardization – Low calorie Products

20-22. Innovative Product formulation and standardization – Bakery products with high fibre and low glycemic index

23-26. Innovative Product formulation and standardization – Food products with hypocholesterolemic property

27-30. Innovative Product formulation and standardization – Food products with antioxidant property

31-34. Innovative Product formulation and standardization – Food Product with HDL for Heart health

35-37. Innovative Product formulation and standardization – Food products with immunity boosting ingredients

38-40. Innovative Product formulation and standardization – Food products with low sodium

41-43. Innovative Product formulation and standardization – Food products with nutraceuticals- Food products for diabetics and obese

44-45. Packaging and sale of products, presentation of developed food products, Video shooting of product preparation

MDN 206 Scientific Writing Skills

CL	CP	L	P
2	0	30	0

Semester	**II**
Course Name	**MDN 206 Scientific Writing Skills**
Course Description	This course aims to develop students' ability to write scientific papers, reports, and other professional documents. The focus will be on the principles of clear and concise scientific writing, understanding the structure of scientific papers, and developing skills for effective communication in the field of food and nutrition.
Objectives	1 To understand the structure and elements of scientific papers.
	2 To develop skills for writing clear and concise scientific texts.
	3 To learn effective methods for presenting data and research findings.
	4 To understand ethical considerations in scientific writing.
	5 To practice writing different types of scientific documents
Reference Books	1. Hofmann, A. H. (2019) Scientific writing and communication: Papers, proposals, and presentations (4th ed.). Oxford University Press. 2. Silyn-Roberts, H. (2012) Writing for science and engineering: Papers, presentations and reports(2nd ed.) Butterworth-Heinemann. 3. Alley, M. (2018). The craft of scientific writing* (4th ed.). Springer. 4. Peat, J., Elliott, E., Baur, L., & Keena, V. (2013). Scientific writing: Easy when you know how (2nd ed.). BMJ Books.

	5. Day, R. A., & Gastel, B. (2016)How to write and publish a scientific paper (8th ed.). Cambridge University Press. 6. Gopen, G. D., & Swan, J. A. (1990)The science of scientific writing. American Scientist, 78(6), 550-558. 7. Katz, M. J. (2009). From research to manuscript: A guide to scientific writing (2nd ed.). Springer. 8. https://nutrition.org/writing-publishing-nutrition-research/ 9. https://www.researcheracademy.elsevier.com/ 10. https://www.nih.gov/grants-funding/introduction-grant-writing 11. https://www.nature.com/scitable/ebooks/scientific-writing-and-publishing-14053993/ 12. https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html 13. https://guides.lib.berkeley.edu/evaluating-resources 14. https://writingcenter.unc.edu/tips-and-tools/scientific-writing/
Prerequisites	1. Basic understanding of food and nutrition science 2. Proficiency in written and spoken English 3. Basic research skills including familiarity with conducting literature reviews, using academic databases, and understanding primary vs. secondary sources. 4 Basic computer skills, including proficiency in word processing software (e.g., Microsoft Word, Google Docs) and familiarity with referencing software (e.g., EndNote, Mendeley, Zotero), are essential for preparing assignments and papers.

Course Plan		
Unit	**Topic**	**Credit Hours**
1.	Scientific Writing : Importance of Scientific Writing in Food and Nutrition; Role of scientific writing in research, industry, and public health communication, different types of scientific documents (research papers, review articles, reports, etc.); The Writing Process - Planning and organizing scientific papers. - Understanding the target audience and the purpose of scientific communication	**6**
2.	Structure and components of scientific papers :Overview of research paper structure - key components: title, abstract, introduction, methods, results, discussion, and references; writing the introduction and literature review - crafting a compelling introduction; conducting a literature review: finding, summarizing, and synthesizing relevant research.	**6**
3.	Methods, results, discussion and conclusion: Describing research methods - writing clear and detailed methodology sections. - importance of reproducibility and transparency; presenting results - effective use of tables, figures, and graphs; describing statistical analyses and interpreting data; crafting the discussion section - interpreting and discussing research findings; Discussing the significance, limitations, and future directions of the study; writing the conclusion and abstract - summarizing the main findings and contributions of the study. - crafting an abstract that succinctly summarizes the study's purpose, methods, results, and conclusions.	**6**

4.	Ethics and integrity in scientific writing: Ethical considerations - understanding plagiarism, authorship, and conflicts of interest; ethical data handling and reporting; peer review and publication process - the role of peer review in scientific publishing - how to respond to reviewer comments and revise manuscripts.	**6**
5.	Specialized writing and communication : Writing research proposals and grant applications - key elements of research proposals and grants; strategies for successful grant writing; writing for lay audiences and media - adapting scientific information for non-expert audiences. - communicating science through media and public platforms.	**6**

Third Semester

MND 301 INTELLECTUAL PROPERTY RIGHTS

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: Lawyer or Faculty with experience in medical law or practice

COURSE DESCRIPTION: The course is designed to introduce fundamental aspects of Intellectual Property Rights to learners who are going to play a major role in development and management of innovative process. The course is designed for increasing among a multidisciplinary audience.

OBJECTIVES:

At the end of the semester, the student should be able to:

1. Analyse various aspects of copyrights and geographical indications
2. Analyse various aspects of patents and Infer aspects of industrial designs
3. Examine various aspects of trademark, and apply the knowledge about the enforcement of intellectual property rights

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.

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.

PREREQUISITES: Medical law and Ethics.

COURSE PLAN		
UNIT	**TOPIC**	**HOURS**
1	Copyright: Definition, meaning of copyright, duration of copyright copyright protection, Related Rights : meaning, distinction between related rights and copyright, Rights covered by copyright Geographical Indications: geographical indication, geographical indication protection and its reasons.	10
2	Patents: Patents and kinds of inventions protected by a patent, patent document, and how to protect your inventions. Granting of patent, Rights of a patent, How extensive is patent protection? Drafting and Filing of a patent. Industrial Designs: Industrial design, industrial designs protection W protection provided by industrial design, duration of protection last, why to protect industrial designs	10
3	Trademarks: meaning, rights of trademark, of signs can be used as trademarks, trademark protection, trademark registration, length of trademark protection, Trade secrets, and know-how agreements. Enforcement Of Intellectual Property Rights: Infringement of intellectual property rights, Enforcement Measures	10

MND 302 Precision Nutrition

CL	CP	L	P
4	0	60	0

Semester	**III**
Course Name	**MND 302 Precision Nutrition**
Course Description	It is a course which covers the advanced concepts of application of principles of precision nutrition in health and disease.
Objectives	1. Integrate the concept of DNA, microbiome & metabolic responses to specific foods or dietary patterns, to determine personalized eating plan for wellness and illness. 2. Describe the principles of precision nutrition & medicine, focusing on the interaction between nutrients and human/microbial genes. 3. Identify genetic backgrounds contributing to individual differences in macro- and micronutrient metabolism 4. Comprehend the biochemical, physiological and molecular aspects of energy metabolism and inflammatory pathways that play a crucial role in the pathogenesis of metabolic diseases, including roles of diet and dietary components 5. Apply the concept of nutrigenetics for designing clinical nutrition therapies and diet plans for disease management.

Reference Books	1. Arshad, Z., Bains, V.K., Jhingran, R., Madan, R., & Srivastava, R. (2017). Nutrigenomics: An Overview. Asian Journal of Oral Health & Allied Sciences, 7(2), 52. 2. Ayesha Nasir, Mir. M. Hassan Bullo, Zaheer Ahmed, Aysha Imtiaz, Eesha Yaqoob, Mahpara Safdar, Hajra Ahmed, Asma Afreen &Sanabil Yaqoob. (2020). Nutrigenomics: Epigenetics and cancer prevention: A comprehensive review. Critical Reviews in Food Science and Nutrition, 60(8), 1375-1387. doi:10.1080/10408398.2019.1571480 3. Berná G, Oliveras-López MJ, Jurado-Ruíz E, Tejedo J, Bedoya F, Soria B, Martín F. (2014).Nutrigenetics and nutrigenomics insights into diabetes etiopathogenesis. Nutrients, 6(11), 5338-5369. doi:10.3390/nu6115338 4. Fenech M, El-Sohemy A, Cahill L, Ferguson LR, French TA, Tai ES, Milner J, Koh WP, Xie L, Zucker M, Buckley M, Cosgrove L, Lockett T, Fung KY, Head R. (2011). Nutrigenetics and nutrigenomics: viewpoints on the current status and applications in nutrition research and practice. J Nutrigenet Nutrigenomics, 4(2), 69-89. doi:10.1159/000327772 5. Ganesh S.B. & Sugumar, K. (2020). Nutrigenomics: A new direction in periodontics. International Journal of Applied Dental Sciences, 6(1), 146-149. 6. Harvard T.H. Chan School of Public Health. (2022). Precision Nutrition. The Nutrition Source.Retrieved from https://www.hsph.harvard.edu/nutritionsource/precision-nutrition/ 7. Helland MH, Nordbotten GL. (2021). Dietary Changes, Motivators, and Barriers Affecting Diet and Physical Activity among Overweight and Obese: A Mixed Methods Approach. Int J Environ Res Public Health, 18(20), 10582. doi:10.3390/ijerph182010582 8. Himanshu D, Ali W, Wamique M. (2020). Type 2 diabetes mellitus: pathogenesis and genetic diagnosis. J Diabetes MetabDisord, 19(2), 1959-1966. doi:10.1007/s40200-020-00641-x 9. Manoharan, S., & Kareem, N. (2020). Nutrigenomics In Periodontics - A Review. International Journal of Pharmaceutical Research, 12(1), 1983-1986.

	10. Meiliana, A., & Wijaya, A. (2020). Nutrigenetics, Nutrigenomics, and Precision Nutrition. Indones Biomed J, 12(3), 189-200. 11. Sushrut Jangi, Katie Hsia, Naisi Zhao, Carol A Kumamoto, Sonia Friedman, Siddharth Singh, Dominique S Michaud.Dynamics of the Gut Mycobiome in Patients With Ulcerative Colitis.. Clin Gastroenterol Hepatol, 2023 Oct 5:S1542-3565(23)00762-0. doi: 10.1016/j.cgh.2023.09.023 12. Guojun Wu, Naisi Zhao, Liping Zhao.Microbial-host isozyme: A novel target in "drug the bug" strategies for diabetes. Cell Metab, 2023 Oct 3;35(10):1677-1679. doi: 10.1016/j.cmet.2023.09.008. 13. Haslberger, Alexander G. (ed.) : Advances in precision nutrition, personalization, and healthy aging [ ] Cham. Springer, 2022. 978-3-031-10152-6
Prerequisites	BSc Nutrition and Dietetics - 4 years Program

Course Plan	
UNIT ONE Introduction to Precision Nutrition and Nutritional Genomics : The Human Genome, Introduction, Study, SNP, Definition of various terms- Precision Nutrition, Personalized Nutrition, Nutrigenomics, Nutrigenetics, Exposome, Epigenetics, Gene variations, mutations, Epigenetics vs Epigenomics, Genotype & Phenotype, Differences between SNPs, Mutations and CNVs, The Genome of Rare and Complex Diseases, Genotype and Phenotype Precision Medicine : Influence of Genetics and Environmental Factors in Complex Diseases, Gene- Nutrient Interaction, Need for Precision: The problem of Missing Heritability Concept of Interaction Precision Nutrition vs. Community Nutrition, Current Basis of Nutritional Research Experimental Designs in Precision Nutrition, Omics Technologies and their Biomarkers, Epigenomics, Proteomics, Metabolomics, Metagenomics, Functional Genomics, Nutrigenetics, SNPs Associated with Nutrition-Related Diseases (Diet-Dependent), Vascular health, Cardiovascular diseases, Oxidative stress (eNOS SOD) ApoE Metabolic Health, Obesity (Snacking), Diabetes Type 2, Methylation Detoxification : Liver health Circadian Rhythm and gene : Chronobiology, Appetite and Satiety, Central Clock Peripheral Clocks, Circadian Rhythm Hormones, Intake Control (Leptin and Ghrelin) Exercise Genotype: Adrenergic genotype, Food Specific Genotype : Caffeine, Lactose Gluten	**Hours** **30**

UNIT TWO SNPs Predisposing to Complex Nutrition-Related Diseases - Genetic Risk Scores (GRS). Diet-gene interaction: polygenic risk score: Type II Diabetes, Hypertension Arteriosclerosis, Hyperlipidemia, Cancer SNP vs. Allergies vs. Intolerances Role of Bioactive Components of Diet on Gene Expression The Effect of Micro and Macro Nutrients on Gene Expression Human Microbiota Composition Enterotypes and Diet, Microbiota and Metabolic Syndrome, Microbiota and Cardiovascular Diseases Effect of the Oral and Intestinal Microbiota, Gut-brain Axis, Microbiota and Neurodegenerative Diseases Microbiota and Neuropsychiatric Diseases, Schizophrenia, Anxiety, Depression, Autism, Microbiota and Obesity Gut microbiome and disease diagnosis and prognosis Diet-Modulated MicroRNAs Nutrition Systems Biology: Integrated approach toward personalized nutrition Role of AI in Nutrition System and Precision Health	**30**

MND 304 Advanced Communication Skills for Nutrition Practice

CL	CP	L	P
1	3	15	45

Instructor in charge

M.Sc. and / Ph.D. in Foods and Nutrition or equivalent

Course Description	The course shall enable the student to have good communication skills
Objectives	1. Learn about the various types of communication 2. Learn effective communication skills
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
Prerequisites	First and Second Semester of M. Sc. Nutrition and Dietetics

Unit	Topic	Hours
1.	Relevance of communication skills for nutrition practice Five Cs of communication	**2**
2.	Types of Communication Written communication, Creative writing, content creation Oral communication. Non-verbal and visual communication, Design and visual communication Contextual communication. Active Listening	**8**
2.	Effective Communication Skills active listening observation skills Body language Focus and attention Empathy	**5**

Practical		
Unit	**Topic**	**Hours**
1.	Role play and simulation for effective patient counseling.	**3**
2.	Critical analysis of nutrition and health related messages on print, visual and social media	**2**
3.	Create an interactive digital media project such as an interactive quiz or mini-game.	**3**
4.	Designing a logo, business card and pamphlets for clients	**2**
5.	Content creation for topical days like obesity day, osteoporosis day etc.	**4**
6.	Content calendar planner for activities	**4**
7.	Audio creation for public service announcement, podcasts	**4**
8.	Content creation for digital media, print media and social media platforms for disseminating content. Analysis of algorithms of views, likes and followers.	**8**
9.	Create short videos with specific nutrition education message in a story format.	**8**
10.	Communication skills for Marketing	**8**
11.	Use of Instagram account for engagement, LinkedIn for business	

MND 305 Internship - MSc Nutrition and Dietetics

Name of the program	Masters in Nutrition and Dietetics
Course Title	Internship
Academic year	Second Year
Semester	03
Number of Practical Credits	10 =20 hours x 15= 300 hours
Duration	3 months
Course Prerequisite	Students should develop critical skills like evaluation of patients, designing meal plans, interaction with other health professionals and evaluating information received.
Course Synopsis	This module provides students with an opportunity to integrate and apply acquired knowledge and technical skills in actual clinical settings.

Course Outcomes

- Select the right practice from the acquired skills as a clinical nutritionist and Dietitian Demonstrate an attitude of professionalism when working with colleagues and other health professional staff of the hospitalUtilize skills in record keeping, organizing material, presentation of case studies and effective communication.
- Analyse and develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains.
- Design, evaluate and implement new methods or protocols in different cases.
- Evaluate the relationship between nutrition data and pathologic processes, and how nutrition data relates to health and disease
- Develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains.

Content	Competencies
Orientation	Define the role of dietitian in hospitals Outline the functioning of the Dietetics Services in a hospital and learn about its working schedules and plans. List and summarize the knowledge about the maintenance of the patient's case file and how the details are entered/registered in it.
Food Service Area	Interpret the therapeutic and normal diet settings in the kitchen Interpret acquiring skills in food procurement quality maintenance and patient food service. Acquire skills in Menu system, Personnel Management, Food supply, procurement and control, Food production,

Medicine **(2 cases)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions. Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation.
Nephrology and Urology **(1 case)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation.
Cardiology **(1 case)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions in disease condition of the patients. Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which Enteral and Parenteral nutrition is provided, its administration and formulation.

Gastroenterology **(1 case)**	Illustrate the assessment of nutritional status among patients.Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which Enteral and Parenteral nutrition is provided, its administration and formulation.
Oncology **(1 case)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions in the disease condition of the patients. Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which Enteral and Parenteral nutrition is provided, its administration and formulation.
Obstetrics Gynaecology **(1 case)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions. Explain and develop the dietary counseling given to the patients. Illustrate and relate the condition in which Enteral and Parenteral nutrition is provided, its administration, and formulation.
Pediatrics **(2 cases)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions in the disease condition of the patients. Explain and develop the dietary counseling given to the patients. Illustrate and relate the condition in which Enteral and Parenteral nutrition is provided, its administration, and formulation.

Surgery **(1 Case)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions. Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which Enteral and Parenteral nutrition is provided, its administration, and formulation.
Intensive care unit **(2 Cases)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions. Explain and develop the dietary counseling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided, as well as its administration and formulation.
Psychiatry/ Rehabilitation **(1 Case)**	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions. Explain and develop the dietary counseling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided, as well as its administration and formulation.
Mini Project	Provide interns with practical experience in their field of study or interest, allowing them to apply the knowledge and skills they have gained in a real-world setting
Standardization	Enforce a level of consistency or uniformity while giving MNT or any other operations within the selected environment.

Learning Strategies: Small group discussion (SGD), Problem-Based Learning (PBL), Case Based Learning (CBL), Clinics, Seminars.

Formative Assessment: Quiz, Viva, Clinical assessment (OSCE, OSPE, WBPA), Clinical Log BookThe internship completion certificate will be issued from the Dean's office, only after · Successfully clearing all four assessment exams and Obtaining a satisfactory completion certificate from the head/ In-charge of the department at the end of the internship.

MND 401 Dissertation (3 months)

Course Objectives The Dissertation aims to develop skills in conducting a research study/ working in a project and learn the process of writing a dissertation/ project report

Course Learning Outcomes: Students will be able to

1. Know the practical aspects of, collecting data/ project work

2. Evaluate, select, and use appropriate strategies for the reduction, analysis, and presentation of data collected during the research process/ project work

3. Suitably illustrate data/ insights using various graphical and other methods.

4. Prepare a dissertation

The research will be an original work with plagiarism check and ethical clearance. document/ project report based on research process/ project work done. The student will be guided and supervised by a member of the teaching faculty of the Institute. However, the dissertation in which the research culminates should reflect the student's own work. The students will undertake an independent piece of research work on an issue of contemporary concern that contributes to the advancement of knowledge in the field of Dietetics of Clinical Nutrition.

Assessment:

Distribution of marks for Internal and External assessments will be based on the credit distribution of the theory and practical for the courses. For eg. If a course has 3 credits for Lectures and 0.5 credits for Practicals, 25 marks for theory and 5 marks for practicals will be considered for internal assessments out of the 30 marks. Similar ratios will be followed for External assessments. For Practical examinations, an internal and external examiner will assess the candidates.

Research Project:

An internal and external examiner will assess the candidates for the final evaluation. Clinical Dieticians with PhD (Preferably in the relevant disciplines of Nutrition and Dietetics) should be the examiner for the assessment of research projects.

4.3. PhD Guidelines

Minimum Standards and Procedure for Award of Ph.D. Degree:

Every University established or incorporated by or under a Central Act, a Provincial Act, or a State Act, and every Institution Deemed to be a University under Section 3 of the UGC Act, 1956, and every degree-granting autonomous College and every affiliated college allowed offering Ph.D. programs. Candidates for admission to the Ph.D. program shall have completed:

A 2-year/4-semester Master's degree program, (after 4 years of undergraduate degree) with at least 55% marks in aggregate or its equivalent grade 'B' (or an equivalent grade in a point scale wherever grading system is followed) or an equivalent degree from a foreign an educational institution accredited by an Assessment and accreditation Agency which is approved, recognized, or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure the quality and standards of educational institutions. A candidate seeking admission after a 5-year/10-semester Bachelor's degree in Research should have a minimum CGPA of 7.0/10.

A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-abled, Economically Weaker Section (EWS) and other categories of candidates as per the Commission's Decision from time to time.

Note: The eligibility marks of 55% (or an equivalent grade on a point scale wherever The grading system is followed) and the relaxation of 5% to the categories mentioned above are permissible based only on the qualifying marks without including the grace mark procedures, if any. A relaxation of 0.5 score in CGPA or an equivalent relaxation of grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.

Ph.D. program shall be for a minimum duration of two years excluding course work or a minimum of 3 years including course work, and a maximum of six years.

Extension beyond the above limits will be governed by the relevant clauses as stipulated in the Statute/Ordinance of the individual Institution concerned, but not beyond more than two years or 3 years as mentioned above.

All Universities shall admit Ph.D. Scholars through a National Eligibility Test (NET) or National Entrance Test or an Entrance test/exit exam conducted by NCAHP.

Eligibility criteria to be a Research Supervisor, Co-Supervisor, Number of Ph.D. scholars permissible per Supervisor, etc.

Any regular Professor/Associate Professor of the University/ College, with at least five research publications in peer-reviewed or refereed journals after obtaining PhD and any regular Assistant Professor of the university/ college with a minimum of five years of teaching/research experience with a Ph.D. degree and at least three research publications in peer-reviewed or refereed journals may be recognized as Research

Supervisor. Provided that in areas/disciplines where there is no or only a limited number of peer-reviewed or refereed journals, the Institution may relax the above condition for recognition of a person as Research Supervisor with reasons recorded in writing.Only a full-time regular teacher of the University/ College concerned can act as a Research Supervisor. Adjunct faculties are not permitted to be Research Supervisors except being Co-supervisor. However, Co-Supervisors from within the same department or other departments of the same institution or sister institutions may be permitted with the approval of the Research Advisory Committee. In specific cases of a formal institutional collaboration based on the MoUs, the Universities/Colleges concerned may approve a faculty member as Research Supervisor/Co-Supervisor for a Ph.D. candidate from the collaborating institution. In the case of topics which are inter-disciplinary and where the Department concerned feels that the expertise in the Department has to be supplemented from outside, the Department may appoint a Research Supervisor from the Department itself, who shall be known as the Research Supervisor, and a Co-Supervisor from outside the Department/Faculty/College/University on such terms and conditions as may be specified and agreed upon by the consenting Institutions.

The allocation of a Research Supervisor for a selected research scholar shall be decided by the Department concerned depending on the number of scholars per Research Supervisor, the available specialization among the Supervisors, and the research interests of the scholars as indicated by them at the time of interview/viva voce.

A Research Supervisor/Co-Supervisor who is a Professor cannot guide more than eight (8) Ph.D. scholars at any given point of time. An Associate Professor as Research Supervisor can guide up to a maximum of six (6) Ph.D. scholars (including co-supervision) and an Assistant Professor as Research Supervisor can guide up to a maximum of four (4) Ph.D. scholars. One additional research scholar can be allotted to each supervisor over and above the allotted number provided the Research Supervisor is implementing a major sponsored research project. Further, each Research Supervisor/Co-Supervisor can guide two international students on a supernumerary basis. At any point of time the total number of candidates under a research supervisor shall not exceed the number as prescribed above including the candidates under co-supervision.

Note: The Research Supervisor should declare the number of Ph.D. scholars registered With him/her periodically to the University/College. He/she cannot increase the number by using recognition from multiple universities/colleges. University teachers after superannuation, if they are re-appointed in the parent University As contract or honorary or distinguished or emeritus professors, may continue as Research Supervisors till the age of 70. The university/college, after considering the research track record and fitness of such superannuated teachers to supervise scholars, may decide on his/her continuation as a Research Supervisor with or without financial commitment. The minimum number of credit requirement for the Ph.D. programme should be at least 12 credits and a maximum of 16 credits.

The coursework shall be treated as a prerequisite for Ph.D. preparation. A minimum of four credits shall be assigned to one or more courses on Research Methodology which could cover areas such as quantitative methods, qualitative methods, computer applications, research ethics, and review of published research in the relevant field,fieldwork, etc. Students who register for a Ph.D. directly from four-year undergraduate with research will have to undertake 6-8 credit courses (at Ph.D. level) about relevant skills/research techniques/domain-specific subjects offered by the University.

All Ph.D., entrants irrespective of discipline, shall be required to take credit-based courses in teaching/education/pedagogy/writing related to their chosen Ph.D. subject during their doctoral training period. Other courses shall be advanced-level courses preparing the students for the Ph.D. degree. Lifelong learners/ accomplished researchers as evinced from their original contributions in terms of patents granted or new relevant knowledge or/and artistic practices desirous to get a research degree the Research Advisory Committee may provide choices in selecting the courses/ credits that facilitate the entrepreneur in the monetization of IP thus generated. Credits earned for completed coursework are transferable from one institution to another institution through the Academic Bank of Credits. All fresh Ph.D. entrants, irrespective of discipline, will be required to take credit-based courses in teaching/education/pedagogy/writing related to their chosen Ph.D subject during their doctoral training period. Ph.D. scholars may also have 3-4 hours per week of actual teaching experience gathered through teaching assistantships or other forms of knowledge dissemination that are not repetitive. All dissemination activities including External presentations and posters, popular articles conveying scientific information (or scientific articles) to the general public, production of books, commissioned research and Internal presentations must be approved by the departmental level Research Committee. Teaching for the Department, supervision of fellow students/technical staff, and dissemination tasks can also be credited as knowledge dissemination and as a work commitment. The Department where the scholar pursues his/her research shall prescribe the course(s) to him/her based on the recommendations of the Research Advisory Committee (RAC) of the research scholar. All candidates admitted to the Ph.D. programs shall be required to complete the coursework prescribed by the Department during the initial one or two semesters.

Grades in the course work, including research methodology courses shall be finalized after a combined assessment by the Research Advisory Committee and the Department and the final grades shall be communicated to the Institution/College. A Ph.D. scholar has to obtain a minimum of 55% of marks or its equivalent grade in the UGC10-point scale (or an equivalent grade/CGPA in a point scale wherever the grading system is followed) in the course work in order to be eligible to continue in the programme and submit the thesis.

There shall be a Research Advisory Committee, or an equivalent body for a similar purpose as defined in the Statutes/Ordinances of the Institution concerned, for each Ph.D. scholar. The Research Supervisor of the scholar shall be the Convener of this Committee. This Committee shall have the following responsibilities:

- To review the research proposal and finalize the topic of research;
- To guide the research scholar to develop the study design and methodology of research and identify the course(s) that he/she may have to do.
- To periodically review and assist in the progress of the research work of the research scholar.

  A research scholar shall appear before the Research Advisory Committee once in six months to make a presentation of the progress of his/her work for evaluation and further guidance. The six-monthly progress reports shall be submitted by the Research Advisory Committee to the Institution with a copy to the research scholar. In case the progress of the research scholar is unsatisfactory, the Research Advisory Committee shall record the reasons for the same and suggest corrective measures. If the research scholar fails (even after 3 failures or 3 attempts) to implement these corrective measures, the Research Advisory Committee may recommend the cancellation of registration from the program. Upon satisfactory completion of course work and obtaining the marks/grade, the Ph.D. scholar shall be required to undertake research work and produce a draft dissertation/thesis within a reasonable time, as stipulated by the Institution concerned based on these Regulations. Before the submission of the thesis, the scholar shall make a presentation in the Department before the Research Advisory Committee of the Institution concerned which shall also be open to all faculty members and other research scholars. The feedback and comments obtained from them may be suitably incorporated into the draft thesis in consultation with the Research Advisory Committee.

- It is desirable that the research work of Ph.D. scholars is published in peer-reviewed or refereed journals and presented in conferences/seminars. At least 2 publications in peer reviewed Scopus/Science Index journals are mandatory (It can be 1 publication and 1 conference presentation also). The quality assessment of Ph.D. degrees should be the responsibility of the Institutions. The institutions are free to evolve guidelines in this regard, if needed.

- The thesis shall be submitted together with an originality report produced by an anti-plagiarism software application. The supervisor (and co-supervisor, if there is any) shall receive an originality report on the whole text of the thesis and shall take this report into account in the evaluation of the submission.

Note: An originality report is not to be considered as sufficient proof that the submitted thesis does not contain plagiarized text. Avoiding plagiarism and other forms of academic misconduct in the authorship of the thesis remains the sole responsibility of the researcher. If the Research Supervisor (or Co-Supervisor) suspects plagiarism, he or she may ask for an investigation.

The Ph.D. thesis submitted by a research scholar shall be evaluated by his/her Research Supervisor and at least two external examiners, who are experts in the field and not in employment of the Institution. Examiner(s) should be academics with a good record of scholarly publications in the field. Out of the two external examiners, one must be from out of the state in which the institution is located. Where possible, one of the external examiners may preferably be chosen as a distinguished academician, not below the rank of Professor or equivalent, from outside India. The viva-voce examination based, among other things, on the critiques given in the evaluation report, shall be conducted by the Research Supervisor and at least one of the two external examiners and shall be open attended by Members of the Research Advisory Committee, all faculty members of the Department, other research scholars and other interested experts/researchers.

o If the research results of the thesis constitute new possible things for the protection of intellectual property rights (IPRs), the Ph.D. candidate and Supervisor shall inform the University or the Research Advisory Committee about the matter. In this case, the Ph.D. candidate, with the consent of the Supervisor, may request that the submitted dissertation be treated discreetly before the thesis is submitted for assessment, until the defense/viva voce. The IPR Cell or the competent body of the university designated for the purpose shall conduct the procedure for legal and commercial protection of research results, by the relevant regulations. In this case, the public defense can be extended, in agreement with the Ph.D. candidate, at the latest for a year, starting on the day of the procedure of evaluation of the dissertation. Request for extension of defense/viva voce must accompany the Certificate of the Technology Transfer from the competent authority. The viva voce of the research scholar to defend the thesis shall be conducted only if the evaluation report(s) of the examiner(s) on the thesis recommends acceptance.

If one of the evaluation reports of the examiner in case of a Ph.D. thesis, recommends rejection, the Institution shall send the thesis to an alternate examiner out of the approved panel of examiners and the viva-voce examination shall be held only if the report of the alternate examiner is satisfactory. If the report of the alternate examiner is also unsatisfactory, the thesis shall be rejected, and the research scholar shall be declared ineligible for the award of the degree.

The Institutions shall develop appropriate methods so as to complete the entire process of evaluation of the Ph.D. thesis within three months from the date of submission of the thesis.

Academic, research, administrative, and infrastructure requirements to be fulfilled by Post-Graduate Colleges for getting recognition for offering Ph.D. programs:

Post Graduate Departments of Universities/Colleges may be considered eligible to offer Ph.D. programs only if they satisfy the availability of eligible Research Supervisors, required

infrastructure, and supporting administrative and research promotion facilities as per these Regulations. Post Graduate Departments of such Colleges, Research laboratories of the Government of India/State Government with at least two Ph.D. qualified teachers/scientists/other academic staff in the Department concerned along with required infrastructure, supporting administrative and research promotion facilities as per these Regulations, stipulated below, shall be considered eligible to offer Ph.D. programs. Post Graduate College should additionally have the necessary recognition by the Institution under which they operate to offer a Ph.D. program. Colleges with adequate facilities for research as mentioned below alone shall offer Ph.D. programs:

Exclusive research laboratories with sophisticated equipment as specified by the Institution concerned with the provision for adequate space per research scholar along with computer facilities and essential software, and uninterrupted power and water supply; Earmarked library resources including the latest books, Indian and International journals, e-journals,

extended working hours for all disciplines, adequate space for research scholars in the Department/ library for reading, writing, and storing the study and research materials;

Colleges may also access the required facilities of the neighbouring Institutions/Colleges, or of those Institutions/Colleges/R&D laboratories/Organizations which have the required facilities.

All requirements for the Ph.D. degree of such candidates must be duly fulfilled. It is the joint responsibility of the affiliated Colleges, University departments/ Universities.

Notwithstanding anything contained in these Regulations or any other Rule or Regulation, for the time being in force, no University/College shall conduct Ph.D. programs through distance education

mode/online mode. Candidates in service shall be allowed to do a Ph.D., provided all the eligibility conditions mentioned in the extant Ph.D. Regulations are met.

Following the successful completion of the evaluation process and before the announcement of the award of the Ph.D. degree(s), the Institution concerned shall submit an electronic copy of the Ph.D. thesis to the INFLIBNET/Institutional Electronic Archive, for hosting the same to make it accessible to all Institutions. Shodhganga theses repository/registration is also mandatory. The guidelines on matters such as full-time and part-time enrolment, roles and responsibilities within departmental research committees, admissions procedures, supervision arrangements including co-supervisors, regulations concerning leave and vacation entitlements, funding protocols, fee structures, registration processes, duration of study, coursework requirements, qualifying examination procedures, criteria for publication, guidelines for the submission of final theses, and appointment of external examiners, etc., are subject to alignment or modification under the regulations stipulated by the National Commission for Academic and Health Professions (NCAHP) as amended periodically.

Chapter 5

Competency Standards for Entry Level into the Profession of Dietician in India

Newly qualified dietitian-nutritionists should have the necessary knowledge, skills, and attitudes to perform their role when they begin to practice.

Competency-based education uses both educational (classroom/theory) and clinical outcomes (practice); work-based assessments rely heavily on the observations and judgments of suitably trained supervisors or preceptors with frequent, effective direct observations, coaching, and feedback.

Structured Clinical Examinations (OSCE), especially if the direct observations of students with real patients or clients are difficult. The very nature of the competency standards suggests that multiple pieces of assessment evidence would be required to make a judgment on a trainee's achievement of competence.

The minimum level of education of a dietitian-nutritionist is:

A bachelor's degree in nutrition and dietetics and

A period of supervised professional practice of at least 500 hours and Meets the international competency standards. The Standards should be used as a key reference for a variety of interested people/groups or organizations (stakeholders) and purposes.

• For higher education institutions when designing and developing new programs of dietitian-nutritionist education, or when revising existing programs.

• For internal and external evaluation, providing a plan to support control of quality and improvements, such as academic review, as well as for making judgments about minimum standards being met.

• For employers to understand the competencies, qualities, and capabilities that should be demonstrated by the dietitian-nutritionist.

• For students to understand the competencies, qualities, and capabilities being developed during their education and training.

• For patients, clients, other health professionals, the government, and other stakeholders to understand the roles of the dietetics profession,

• For the dietetics workforce to improve the profile and image of the dietetics workforce.

• For the dietetics workforce to help assist with the exchange of professionals between countries.

Definitions used in this document

In any learning process there are two key players - the learner and the 'supervisor' or teacher. There is some confusion in the use of terms to define competence. The definitions provided here are to help distinguish the different roles of the most relevant players in the learning dynamic

Term	Definition
Competence (-s)	Professional competence is the regular and skillful use of "communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection" and "the bringing together of different components to perform, do something successfully or manage complex situations" Competence defines WHAT a person can do well, effectively, and following professional standards. Competence refers to a person's ability or the skills and knowledge that the person possesses. Competence can only be demonstrated. Competence is an outcome: it describes what someone can do. It does not describe the learning process that the individual has taken Competence represents the whole combination of knowledge, understanding, skills, and abilities and the capacity for applying them. In order to reliably measure someone's ability to do something, there must be clearly defined and widely accessible standards through which performance is measured and accredited; Competence is a measure of what someone can do at a particular point in time.

Competency(-ies)	Competency is a skill whereas competence is the sign of a person's practice in the workplace context. Competency is defined as "an observable ability… integrating …. knowledge, skills, values and attitudes". The focus of competency is concentrated on the learners and their actions rather than upon already agreed-upon products, or it can mean active participation through learning. Learning programs (in Higher Education or elsewhere) are therefore competency-based programs.
Learning Outcomes	Learning outcomes are statements of what a learner is expected to know, understand and/or be able to demonstrate or do after the completion of learning. They can refer to a single subject, course, unit, or module or they can refer to a time period of study, for example, a first or a second cycle program (Europe) or a program year. Learning outcomes specify the requirements for award of academic credit. Learning outcomes are developed by academic staff, who have professional knowledge of actual practice requirements and expectations.
Behavioural Objective	A behavioural objective has three parts: a) a defined behavioural verb, b) described conditions that allow the behaviour described by the verb, c) a description of the minimum level of acceptable performance (criteria). An example of a behavioural objective is: by the end of the period of training (the condition), the student will be able to perform a physical nutrition assessment (the behaviour) with 90% accuracy (the minimum level of performance) In this document, higher order behavourial descriptors5 such as "synthesizes", "evaluates", "creates", "characterizes" and similar are not included as these standards are designed as minimum to enter the profession. This does not preclude the

	use of higher order objectives in practice as these are examples only. The actual level or quality of performance needed to meet the behavioural objectives is not outlined in this document, as it is expected that local contexts and expectations will lead to a variety of performance measures.
Client	The term "client" is used to include; individual patients – whether in the hospital or the community, a group such as a community group seeking nutrition services, stakeholders or organisations who may be purchasing or funding programs or services, or any other people who are receiving nutrition services. Learning outcomes specify the requirements for award of academic credit. Learning outcomes are developed by academic staff, who have professional knowledge of actual practice requirements and expectations

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- Anderson LW, Krathwohl DR, Bloom BS A Taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives, New York, Longman 2001.

1.0 Dietetic Process and Professional Reasoning			
	Competency	Behavioural objectives or learning outcomes	Examples of Behaviour
1.1	Applies the nutrition care process based on the expectations and priorities of individuals, group, communities or population	a) Can identify, assess, and develop goals for nutrition related problems with individuals, groups, communities, populations and regulator b) Develops and implements intervention plans, and monitors and evaluates the outcomes, and reports on it	Clinical Practice Writes nutrition care plan sheets for simulated and/or real cases Makes reasoned case reports or provides case portfolio Gives case presentations Public Health/Community Nutrition Writes report for group education / community projects demonstrating needs assessment, plans and implementation Foodservice Management Assesses the accurate delivery of appropriate meals consistent with the nutrition plan Any Practice Setting • Writes report on implementation of plan and outcomes

			• Presents evidence of interaction with individuals/groups/populations demonstrating improvement of planned nutrition interventions (simulated cases or real 'cases')
1.2	Engages in collaborative (shared) practice in providing high-quality, cost efficient services to achieve positive health outcomes	a) Establishes collaborative (shared) partnerships, consults with and advises clients, caregivers, team members and other stakeholders to improve care b) Undertakes basic cost-benefit analysis of intervention	Any Practice Setting • Documents evidence of inter professional involvement in partnership activities to improve care or service • Finds evidence for (and of) quality assurance of dietetic services • Reports on the effective and timely completion of independent work Clinical Practice • Provides a case portfolio or case(s) connecting activity and impact resulting in improved care Any Practice Setting • Find ways to use time and resources more cost-effectively Foodservice Management

			• Writes a report of food service management project(s) with cost-benefit evidence
1.3	Reflects and reviews own dietetic practice	a) Utilizes the process of reflection7 to take action on critical incidents8 (either positive or negative) that reflects professional benefit b) Develops plans for own dietetic practice improvement	Any Practice Setting • Writes and presents critical incident reflection Any Practice Setting • Shows how systematic evaluation of practice provides opportunities for Lifelong learning and on-going assessment of competence • Uses feed-back from peers, supervisors and colleagues to write on the value of supervised interaction with colleagues and clients
1.4	Works independently and in partnership to integrate nutrition and dietetics into overall professional care/service	Accepts personal responsibility and is answerable to others for actions and decisions	Any Practice Setting • Describes the ethics of communication, including social media • Shows agreement with and acts on policies, procedures, and professional ethics through nutrition care notes or other documentation.

		a) Maintains a critical knowledge of current best practice guidelines and policy statements b) Contributes to team decision-making	• Uses reports and feedback by supervisors to show professional role in a multidisciplinary team Clinical Practice • Reports examples where limitations of own knowledge and skills required individual clients to be referred to other competent professionals. Any Practice Setting • Demonstrates the use of best practice guidelines and policy statements for a safe and professional service Any Practice Setting • Works according to the principles of a non-discriminatory client centred practice • Reports on assessment approaches that utilise principles of community development Clinical Practice • Presents a case portfolio(s) showing client centred intervention(s)

1.5	Respects the unique emotional, social, cultural, religious, ecological needs of individuals, groups, communities or populations	a) Recognises social, cultural, regional and religious influences on food selection and the provision of nutrition interventions. b) Uses client-centred intervention and community development approaches	Any Practice Setting • Takes into account diverse sociocultural situations, ability and resources of clients when planning nutrition care or services Public Health/Community Nutrition or Foodservice Management • Demonstrates cultural competency and how diverse socio-cultural groups and diversity within socioeconomic status guides community projects. Any Practice Setting • Works according to the principles of a non-discriminatory client centred practice • Reports on assessment approaches that utilise principles of community development Clinical Practice • Presents a case portfolio(s) showing client centred intervention(s)

2.0 Evidence Based Practice and Application of Research			
	Competency	Behavioural objectives or learning outcomes	Examples of Behaviour
2.1	Systematically search, judge, interpret and apply findings from food, nutrition, dietetic, social, behavioural and education sciences into practice	a) Can demonstrate skills in independent searching of scientific literature and other relevant information b) Interprets, analyses, synthesises and critically appraises research findings and their applicability to practice	Any Practice Setting • Writes an evidence based report to justify a nutritional intervention Any Practice Setting • Works showing a logical, reasoned approach to dietetic practice Clinical Practice • Presents case studies showing an evidenced based approach with reasoned conclusions • Shows through care plans that problem solving skills have been used to provide a justified approach to practice

2.2	Identify, design and participate in research and audit to enhance the practice of dietetics	a) Participates in research or evaluation or audit projects within the field of nutrition and dietetics b) Uses principles of research design, data management, analyses and interpretation in dietetic practice c) Shows how results from audit/research activities can be used to enhance own practice	Any Practice Setting • Reports on how dietetic practice was audited against standards and proposes future actions • Writes a research, or audit project report in the field of dietetics and nutrition Any Practice Setting • Develops and uses systems to manage data and information which is shown to enhance dietetic practice Any Practice Setting • Keeps a reflective portfolio to show how systematic monitoring and use of evidence have informed and changed own practice • Uses reports from supervisors and peers to show how own practice has changed due to audit outcome

2.3	Apply food and nutrition science to solve problems	a) Collects and analyses relevant information related to an identified issue and proposes a solution b) Provides evidence based rationale to resolve the identified issue c) Discusses ways dietitian-nutritionists can contribute to the research process.	Any Practice Setting • Develops and presents a protocol for a research project Public Health/Community Nutrition • Writes a project report demonstrating information gathering from and for communities/groups and prioritising issues Clinical Practice • Shows in nutrition care process notes how issues have been resolved and solutions implemented Any Practice Setting • Leads a discussion on how dietitian-nutritionists have contributed to a research outcome • Participates in research as part of the team

2.4	Adopts an evidence based approach to dietetics practice. Adopts an evidence based approach to dietetics practice	a) Judges the evidence to answer practical dietetic questions b) Uses contextual factors and stakeholder perspectives to justify decisions	Any Practice Setting • A case portfolio shows justified evidence-based practice • Demonstrates professional judgement in the use of evidence Clinical Practice • Case notes and care plans clearly show how evidence has been used to guide decisions
2.5	Shares evidence based dietetics and nutrition with colleagues and key stakeholders	a) Summarizes and communicates research information appropriate to the 'audience'. b) Shares own knowledge, skills and experiences with others	Any Practice Setting • Writes a summary of evidence based dietetics or nutrition in response to questions Any Practice Setting • Makes an oral or poster presentation of thesis, dissertation, research projects or case studies

3.0 Quality Assurance of Dietetics Practice			
	Competency	Behavioural objectives or learning outcomes	Examples of Behaviour
3.1	Improve practice through continuous and systematic evaluation maintaining clear and concise records of all activities	a) Uses dietetics and other standards to systematically evaluate practice and participate in audit procedures b) Collects data and revises plans to achieve continuous quality improvement across the dietetics service in partnership with others c) Uses current technology in practice to provide evidence for quality assurance purpose	Any Practice Setting • Locates and summarises dietetic and other standards which are applied for quality assurance Foodservice Management • Produces an audit cycle Any Practice Setting • Produces documentation which can be audited successfully Clinical Practice • Always uses a standardised system for collecting patient records Foodservice Management • Develops a plan for quality improvement involving stakeholders • Discusses the ways a service can be evaluated

3.2	Maintain competence to practice through lifelong learning (LL)	a) Demonstrates regular review of own practice and competence b) Implements a plan for professional development.	Any Practice Setting • Routinely seeks feedback on performance as a dietitian nutritionist from peers, colleagues, clients and others • Identifies own competences and compares to published professional competences • Produces a Lifelong Learning (LLL) plan Any Practice Setting Sets themselves continuous improvement tasks • Discusses choice of activities to show how they meet LLL plan • Actively shows how professional development activities meet the LLL plan

3.3	Assumes leadership, educational and mentoring roles	a) Participates in supervision, teaching and mentoring in processes with peers, students and colleagues b) Demonstrates leadership skills in a variety of formal and informal roles	Any Practice Setting • Maintains professional boundaries, roles and responsibilities when working with others • Engages in a formal or informal learning partnership with clear agreed outcomes • Uses a range of techniques to encourage others to reflect on their professional progress Any Practice Setting • Demonstrates commitment to achieving a successful outcome for the project and the team • Encourages others to value each other's abilities and contribution

3.4	Use current technologies, to collect and manage data responsibly and professionally for information and reporting purpose	a) Develops, plans and gathers valid, reliable and comprehensive information using current technology b) Assesses the relevance, importance and validity of data gathered both electronically and by other means	Clinical Practice • Shows how use of electronic health records or health management systems in patient care can be assessed for relevance Public Health/Community Nutrition • Produces evidence of how digital literacy has been successfully used in IT related projects Foodservice Management • Leads a discussion on the validity of results from nutrition software used to analyse nutrient composition of diets

3.5	Accepts responsibility for ensuring practice meets legislative requirements	a) Complies with current legislation that applies to the professional context in which dietitians-nutritionists work b) Establishes safe environments for practice which minimises risks including human rights, hazard and infection control	Any Practice Setting • Adopts an approach to their work and role which shows concern for human rights Foodservice Management • Takes appropriate and correct action to infection control when working with people, food or in other areas • Shows awareness of what and how a safe environment can be established

4.0 Professional relationships, communication and partnerships			
	Competency	Behavioural objectives or learning outcomes	Examples of Behaviour
4.1	Communicate effectively and responsibly using multiple means	a) Uses a communication style to meet the needs of stakeholder b) Writes and speaks clearly, concisely and professionally using professional terminology	Any Practice Setting • Adapts communication style to meet the needs and level of understanding of the individual or group • Uses encouraging and active listening techniques to maintain rapport • Explains how the use of nonverbal communications can be used to evaluate effective communication • Develops and explains the uses of teaching materials for users of differing abilities • Develops (in writing,visually or verbally) and evaluates a client resource information package

			Any Practice Setting • Seeks feedback on type and style of communication from peers, supervisors and colleagues • Presents and discusses an audit of communication styles and language of printed or other media Foodservice Management • When working and communicating with teams always checks for team members' understanding
4.2	Demonstrate interpersonal skills, professional autonomy and accountability	a) Establishes trust and rapport with stakeholders	Any Practice Setting • Takes corrective action during one on one conversations to restore rapport and understanding • Accepts accountability and responsibility for own actions Clinical Practice

			• Seeks views of supervisors/teachers on the establishment of trust and rapport during interviews • Writes a reflective log about an encounter where professional autonomy was challenged.
4.3	Build partnerships, networks and promote the dietetics profession	a)Shows how opportunities for partnerships and networks can be used effectively b) aise the profile of the profession through professionalization and networking.	Any practice Setting • Records how a professional encounter was used to promote/introduce the expertise of dietitian nutritionists Any Practice Setting • Works and behaves as a professional dietitiannutritionist using the professional code of conduct

			• Writes an article for a professional dietetics newsletter or other media source • Serves on a committee and promotes the role of the dietitian-nutritionist
4.4	Seek, support and promote opportunities for learning among peers, and others	a) Identifies and uses learning episodes to support team members, peers and others b) Engages in the development and use of appropriate learning materials to support professional development c)) Seeks, responds to, and provides, effective feedback	Any Practice Setting • Encourages others to recognise learning opportunities in daily life to advance practice • Writes a reflective log about a learning opportunity in which team members advanced their understanding of dietetics Any Practice Setting • Sets-up or actively participates in a literature review and discussion or a Journal Club • Develops a learning episode and evaluates its effectiveness Any Practice Setting • Monitors and reports on learning undertaken by a peer

			• Pro-actively takes a critical approach to own learning and sets goals and targets for lifelong learning
4.5	Advocate for the contribution that nutrition and dietetics can make to improve health	Identifies opportunities to change factors affecting health Advocates on behalf of stakeholders to improve health	Any Practice Setting • Undertakes a project to show how dietetics and dietitian nutritionists can improve nutritional health for an individual or a population (e.g. malnutrition). Any Practice Setting • Write a report on how advocacy has changed policies or other situations

5.0 Evidence-Based Practice and Application of Research			
	Competency	Behavioural objectives or learning outcomes	Examples of Behaviour
5.1	Integrates knowledge of food and food systems, human nutrition and dietetics in the provision of services	Uses knowledge of food, nutrition and dietetics in the prevention and treatment of disease and promotion of health Explains why new and revised information about food, human nutrition and dietetics is necessary for provision of a safe service	Clinical Practice • Writes nutrition care plan / case reports / meal plans for simulated and/or real cases which shows the use of a knowledge of food and nutrition • Uses food composition data appropriately when considering a care plan Public Health/Community Nutrition • Makes plans for group education / community projects demonstrating needs assessment and giving rationales / evidence for plans and implementation Foodservice Management

			• Reports by supervisors confirm use of knowledge of food and food systems, human nutrition and dietetics • Describe aspects of food systems from procurement through preparation and distribution that affect nutritional well-being of patients/clients • Shows the application of knowledge of food science and basic food preparation techniques when speaking with users Any Practice Setting • Finds and shares new knowledge about human nutrition and dietetics with colleagues

5.2	Integrates knowledge of biomedical sciences in the provision of services	a) Uses knowledge of biomedical sciences (e.g. nutrition, anatomy, physiology, immunology, biochemistry, epidemiology, genetics, pharmacology) to support safe practice	Clinical Practice • Presents case reports which show how a knowledge of biomedical sciences has informed the care of patients • Uses biochemical parameters, physical and anthropometric data, laboratory tests (compared to reference values and standards) when formulating care plans
5.3	Integrates a knowledge of behavioural and social sciences in the provision of dietetic services	a) Can develop a basic business plan for dietetics and nutrition services b) Shows how leadership, management skills and resources (financial, human, physical and/or material resources) affects service provision	Clinical Practice • Shows how theories of behaviour change are used in practice to improve eating behaviours Foodservice Management • Provides evidence of how management of individual cases or food service has used behavioural and social sciences, for example, where health inequalities are present

5.4	Integrates business and management principles and skills in the provision of service	a) Can develop a basic business plan for dietetics and nutrition service b) Shows how leadership, management skills and resources (financial, human, physical and/or material resources) affects service provision	Any Practice Setting • Writes a basic business plan for nutrition and dietetic services using business, financial and management principles and skills Any Practice Setting • Writes a reflective log entry on teamwork and group work tasks or activities at university or in real world settings, considering integration of business, financial and management principles and skills
5.5	Integrates a knowledge of organisational, professional and legislative requirements in the provision of dietetic services	c) Recognises how a systematic understanding of the relevant rganisational and legislative requirements relates to a safe professional dietetics service b) Explains how a systematic understanding of relevant professional requirements can affect a safe and professional service	Foodservice Management • Reports on how organisational and legislative requirements (e.g. Health & Safety Regulations, Food & Drug Regulations, Nutrition Labelling Regulations) were recognised during the practical placement Any Practice Setting

			• Documents evidence of compliance with relevant professional codes, guidelines and standards of practice and ethics • Shows how a critical incident reflection related to professional or legal issue affected subsequent practice

Competency Standards for Dietitian-Nutritionists Minimum requirements for entrance into the profession at the point of qualification

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Chapter 6

Minimum Standard Requirements:

Bachelor in Nutrition and Dietetics program

All existing Nutrition and Dietetics Colleges or A new College will impart Nutrition and Dietetics education is suggested the following conditions are fulfilled :

1) Infrastructural, Functional & Equipment, and Human Resource Requirements The establishment of a Nutrition and Dietetics college – No person shall establish a college/institute except after obtaining prior permission from the National Commission (NCAHP). Nutritional Sciences education prepares a person for independent practice and involves extensive clinical training in almost every specialty & super specialty of nutritional care. The following organizations shall be eligible to apply for permission to set up a Nutrition and Dietetics College, namely: -

1. A State Government/Union territory;
2. A University and Deemed to be a University
3. An autonomous body promoted by Central and State Government by or under a Statute for medical education;
4. A society registered under the Societies Registration Act, 1860 (21 of 1860) or corresponding Acts in States; or
5. A public religious or charitable trust registered under the Trust Act, of 1882 (2 of 1882) or the WAKFS Act, 1954 (29 of 1954).

Hospital / Hospital Attachment

- If the college is on the premises of MCI/NMC permitted/recognized Medical College as constituent college, then, there is no requirement for attachment to any other hospital.
- In all other cases Proof of availability of own/attached hospital (Government/Private) for clinical training of 30 students shall be furnished (student: OPD ratio of 1:5). The hospital must be within a 20 km radius of the College. The college must provide mandatory bus service to the students if the hospital is located more than 1 km away from the College. Within 5 years of application of these Rules, the colleges must have their Own Prescribed Hospital in the college Premises.

- College can be affiliated to a maximum five (05) hospitals having indoor and outdoor facility in the above-mentioned specialty clinics.
- Tie-up hospitals cannot get attached to more than two colleges. If the affiliated hospital is attached with two colleges, the OPD strength must be adequately divided among the colleges as per the prescribed student: OPD ratio.
- .The affiliated hospital shall provide information regarding any MOU with other colleges, if any & MOU should be for at least five years.
- The MOU should mention the available clinical specialties, patient loads, and availability of required equipment for clinical training with names and designations of the faculties responsible for the training in the hospital.

- Faculty: The college/institute must arrange for Nutrition and Dietetics faculty members for supervision and clinical teaching of students inside the hospital.
- Hospitals may recruit its Registered Clinical Dieticians for supervision and training of Nutrition and Dietetics students and supervision of interns

Land And Building

- If the college is on the premises of a permitted/ recognized medical college, no separate land is required. Existing norms of land for medical college will suffice. Besides that, the constructed area/Building norms for Nutrition and Dietetics College must be fulfilled as per the requirement mentioned below. In all other cases, the applicant must provide the land details on which the institution will be established for providing Nutrition and education education. It should be in the name of the society/ Trust/company applying for the same (sale deed/lease/gift deed etc.). That the applicant Institution / Trust should have an independent building for
- Nutrition And Dietetics College and facilities for clinical training as per the curriculum as prescribed by the commission from time to time.
- Such a building should be constructed in such a way that there is adequate parking space and recreational area or open space for students as prescribed by the commission.
- Such a building should have adequate space and should have an outpatient Dietetics department, various laboratories as needed, office space, classrooms, a hostel, and other ancillary facilities. Dietetics OPD and the college can be placed in different buildings within 50 KM (or as per the NCAHP regulations) distance in the same state of India.

- Minimum exclusive built-up area for such a college should be 38400 sq.ft for the intake of 60 students per batch.
- Building should be universally accessible to persons with disability and as per NBCI guidelines (National Building Code of India).
- Building must be recorded on the appellate institute name or if the land is under lease agreement, it must be for at least 10 years
- Building must have requisite clearances from the respective civic and administrative authorities like - Fire NOC, structural stability certificates, land use certificates, etc.
- The building must have CCTV cameras for CCTV surveillance in every area of common use as can be prescribed.
- Biometric facility for students and staff, faculty attendance record/documentation.

3) Nutrition and Dietetics Departments

Faculty requirement for UG: Full time (FT); Part-time (PT)

It is recommended that a core faculty and student ratio for UG 1:10 be followed.

Ideally, all the faculties should be full-time. In case of non-availability of full-time faculty, 40% may be part-time/visiting/Ad hoc faculties (non-core subjects only)

Faculties appointed for academics for teaching purposes are considered full-time (Maximum of 8 hours per day or Minimum of 40 hours per week).

Qualified Dieticians may be taken as part-time Visiting faculties

Guidelines of Building and Laboratories

Teaching Block

For a college with an annual admission capacity of 60 students, the constructed area of the college should be a minimum of 38400 sq.ft.

The details of the constructed area are given below for an admission capacity of 60 students.

S. No.	Teaching Block	Minimum Area (in sq. feet)
1.	Lecture Hall	8 @ 900=7200
2.	Skill labs for 30 students 1. Nutrition Lab (Food Analysis) 2. Nutritional Biochemistry 3. Institutional Food Service Management 4. Food Microbiology Lab 5. Anatomy & Physiology Lab 6. Nutritional Assessment Lab	 1500 1500 1500 1500 1500 1500
3.	Computer lab (1:5 computer student ratio as per student intake)	2000
4.	A.V.Aids Room	1000
5.	Multipurpose Hall	3000
6.	Common Room for Boys	1000
7.	Common Room for Girls	1000
8.	Principal Room with toilet	500
9.	Vice Principal Room	300
10.	Library	3000
11.	One Room for each Head of Departments	5@200=1000
12.	Faculty Room with Ladies and Gents Toilet	2400
13.	Provisions for Toilet for Boys	600
14.	Provisions for Toilet for Girls	600
15.	Admin Room	800
16.	Waiting/Lounge area with Ladies' and Gent's Toilet	1000
17.	Store Room	5 @ 500=2500
18.	Canteen with Pantry	1500
	Total Area	38400 sq.ft.

Clinical Infrastructure

The minimum Equipment (for 30 students) for the Bachelor in Nutrition and Dietetics in Honors Program for various labs is as follows:

1. Nutrition Lab (Food Analysis)
2. Nutritional Biochemistry
3. Food Production and Service Lab Management
4. Meal Management/Dietetics Lab
5. Food Microbiology
6. Anatomy & Physiology Lab

1. **Nutrition Lab**

Undergraduate students will learn how to measure Body mass, body composition, and the assessment of nutritional status: anthropometric, biochemical lab., clinical and dietary intake.

Equipment/Instrument

- Weighing Machine Digital platform scale 200Kg/BMI electronic scale - 2 no
- Heightometer -medical height measuring weight scale, Stadiometer -2no
- Tape for circumference- Non-stretchable tape - 2 no
- MUAC tape - Coded tape -2
- Skinfold measurements - Harpenden Skinfold Calipers -1no.
- Infantometer -1
- STEP for fitness test -1
- Stadiometer
- Calibration weights -1
- BP Instrument = Digital/Manual -1 no.
- Digital food weighing Balance-1no.
- Body Composition Analyzer- 1 no.

2.Nutritional Biochemistry Lab

- Weighing balance – Regular with Beam balance - 4
- Digital weighing balance - 2
- pH meter
- Water Bath
- Colorimeter- 2
- Spectrophotometer- 1
- Distillation apparatus
- Soxhlet glass apparatus
- Nitrogen analyzer – glass unit
- RM number - glass unit
- Hot air oven
- Muffle furnace
- centrifuge
- Refrigerator
- Test tube stand

Glassware

- Beakers
- Test tubes & Test Tube Holder
- Burette + Burette stand
- Standard flask
- pipettes
- Conical flask

3. Institutional Food Service Management

Cleaning and Washing

- Stainless steel commercial kitchen sinks
- Dishwasher
- Washing machine (Clothes)

Storage

- Refrigerator Commercial
- Deep freezer
- Water storage unit
- Non perishable food storage containers
- Perishable Food storage containers
- Hot food storage racks (cooked food)

Food preparation

- Stainless steel LPG burner
- Gas stock pot stove
- Commercial Mixer
- Heavy duty mixer and grinder
- Induction bulk cooking stove
- Wet grinder
- Roti maker
- steaming equipment
- frying pans
- Cooking pots
- Microwave
- Oven
- Exhaust fans
- Coffee and Tea machines
- Utensils
- Cooking vessels (assorted sizes)
- Kettles
- Steaming equipment
- Idly steamer
- Dosa pans
- Colanders
- Cutting boards
- Double boilers
- funnels

- graters
- Kitchen knives (assorted)
- Measuring spoons and cups (assorted)
- Weighing scales
- spatulas
- Ladles
- Peelers
- Mashers
- Cutlery
- Crockery
- Assorted serving spoons,cups, plates and bowls
- Choppers
- Food processor
- Motor and Pestle
- Can openers
- Slicers
- Pressure cookers
- Frying pans and pots
- Deep frying pan
- Hot and cold food displays
- Thalis with compartments

Safety Equipment

- Fire extinguisher
- Hot food holding gloves

4. Meal Management/Dietetics Laboratory

Equipment/Instrument -

- Gas stoves /Induction stove - 15-20 no.
- Refrigerator -1
- Oven -1
- Microwave-1
- Mixer/Grinder/Chopper-1

Utensils for Preparation and Cooking - 15-20 sets

- Types of kadai
- Pressure Cooker
- Steamers for idli, dhokla, dumplings etc.
- Tawa
- Frying Pan, saucepan
- Sandwich maker/ Griller
- Knives, peelers, graters
- Spatula, spoons, Slotted Turner, Slotted Spoon, Solid Spoon, Soup Ladle, Whisk, Tong,
- Set of 5 Measuring Cups,
- Set of 5 Measuring Spoons
- Measuring jar
- Chopping board
- Mixing bowls

Utensils for Serving- 15-20 sets

- Plates- full, quarter
- Bowls- Large, medium and small
- Soup bowl and spoons
- Teacups/ Mugs
- Casserole
- Microwave-proof serving bowls
- Trays
- Spoons
- Glasses
- Serving Spoons

Utensils for Storage -

- Large, Medium and small boxes for provisions
- Storage cupboards
- Vegetable Bags
- Baskets for vegetables and fruit

Serving Linen -

- Table mats etc.
- Cloth napkins
- Table Covers
- Kitchen towels

5. Food Microbiology Laboratory

- Weighing balance
- pH meter
- Autoclave
- Hot air oven
- Laminar flow (Vertical /Horizontal)
- Colony counter
- Light Microscope
- Fume chamber
- Incubator
- Refrigerator
- Centrifuge
- Bunsen Burner
- Gas Cylinder
- Glassware -
- Test tubes
- Petri dishes
- Wire loop
- Pipettes
- Burettes
- Beakers
- Standard flask
- Test tube holder and Test tube stand
- Conical flask

6. Anatomy and Physiology Laboratory Models -

- Human torso
- Human Respiratory system
- Organ system

Individual organs -

- Human lungs
- Kidney and Bladder
- Brain
- liver and pancreas
- Sahli's pipette
- Microscope (Light/ Digital)
- Hot air Oven
- Colorimeter
- Haemoglobin meter
- Centrifuge
- Blood pressure monitor
- Sphygmomanometer
- Stethoscope
- Haemocytometer
- Bunsen Burner
- Refrigerator
- Tripod stand
- Steamers
- Water bath
- Electric kettle
- Balances
- Thermometer
- Wash bottles
- Body fat Analyser (Desirable)
- Brushes
- Tongs
- Cotton

- Spirit
- Syringes
- Hb Pipettes
- Stop watch
- Mounted slides
- Cover slip
- Test tube holder
- Test tubes
- Capillary tubes
- Crucible
- Lancets
- Pipettes
- Beakers
- Graduated Spatula
- Watch glass
- Tissues -
- Epithelial
- Connective
- Muscular
- Nervous
- Bone
- Charts – Different Concepts/ aspects
- A school of Nutrition and Dietetics should have an attached clinic/hospital to cater to clinical learning.

Guidelines for standalone institutes:

A clear legally vetted (Notarised stamp paper) Memorandum of understanding (MoU) needs to be provided for any institute/hospital to share the infrastructure and it should follow the NCAHP guidelines

Desirable Batch size for Bachelor of Nutrition and Dietetics in Honors :

It should be proportional to the OPD (Outpatient Department) of the clinic/hospital. Each student should be able to examine a minimum of 5 patients per day. For example: For an OPD of 150, one can have an intake of 30 students per batch. A clinic/hospital having an OPD of 500 can have an intake of 100 students per batch. If the intake is more than 30, infrastructure should also be increased proportionally. Student and faculty ratio is 10:1. The maximum batch size should be proportional to infrastructure, number of faculties, and OPD.

Desirable Batch size for Masters in Bachelor of Nutrition and Dietetics:

A maximum of 25% of the Bachelor's program shall be the batch size of a post-graduate program. Teachers at the level of Assistant Professor II or Scientist D and above shall guide the students.The teacher-student ratio for dissertation guidance shall be 1:4.

Faculty requirement for PG:

Principal/Vice Principal/HOD is the same for both UG and PG programs.

It is recommended that a core faculty and student ratio of 1:3 for PG to be followed.

Student-faculty ratio needs to be 3:1 at least Associate Professor Level for PG teaching. In case of non-availability of full-time faculty, 30% may be part-time/visiting/Ad hoc faculties.

Separate facilities need to be provided for PG students/Fellowship programs/PhD programs.

Library Details:

Item	Requirements
Text Books As per the syllabus; one copy of the Book per 10 students.	Approximately 450 books for 30 intake and 900 books for 60 intake for UG.
Reference Books	100 Advanced Books As per requirement
Journals	At least 2 international and 2 national journals
subscription to electronic databases/e-journals	Required
Mandatory Internet facility Access to e-library Equipment	Minimum 15 computer terminals for 60 students/8 for 30 students

Suggested faculty strength for UG

30 seats (5*30=150 students)	40 seats (5*40=200 students)	50 seats (5*50= 250 students)	60 seats (5*60= 300 students)	100 Seats (5*100= 500 students)
Professor-1 Associate Professor-2 Assistant Professor-12	Professor-1 Associate Professor-3 Assistant Professor-16	Professor-1 Associate Professor-4 Assistant Professor-20	Professor-2 Associate Professor-4 Assistant Professor-24	Professor-4 Associate Professor-8 Assistant Professor38

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Note: All members of the Nutritional Sciences task force have deliberated upon and provided counsel regarding the aforementioned curriculum, drawing from their extensive years of experience in the field of Nutrition and Dietetics. It is noted that all aspects delineated within the curriculum are subject to modification by the regulations set forth by the National Commission for Allied & Healthcare Professions (NCAHP)