VIDYASAGAR UNIVERSITY

Midnapore, West Bengal

PROPOSED CURRICULUM&SYLLABUS (DRAFT) OF

B.Sc. (HONOURS/ HONOURS WITH RESEARCH)

MAJOR IN NUTRITION

DRAFT

4-YEAR UNDERGRADUATE PROGRAMME

(w.e.f. Academic Year 2023-2024)

Based on

Curriculum & Credit Framework for Undergraduate Programmes

(CCFUP), 2023& NEP, 2020

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VIDYASAGAR UNIVERSITY
BACHELOR OF SCIENCE (HONOURS/ HONOURS WITH RESEARCH) MAJOR IN NUTRITION
(under CCFUP, 2023)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B.Sc. (Hons./ Hons. with Research)	4th	VII	SEMESTER-VII							
			Major-14	NUTHMJ14	T: Biostatistics; P: Practical	4	3-0-1	15	60	75
			Major-15	NUTHMJ15	T: Nutritional Data Management and Computer Applications in Nutrition; P: Practical	4	3-0-1	15	60	75
			CRM	NUTHCRM	T: Research Methodology and Ethics	4	3-1-0	15	60	75
			Major Elective-03	NUTHDSE03	T: Functional foods, Nutraceuticals and Oxidative Stress Management; P: Practical	4	3-0-1	15	60	75
			Minor-07	NUTMIN07	T Therapeutic Nutrition; P: Practical	4	3-0-1	15	60	75
					Semester-VII Total	20				375

MJ = Major, MI = Minor Course, DSE = Discipline Specific Elective Course, CRM= Compulsory Research Methodology, CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical

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SEMESTER-VII

MAJOR (MJ)

MAJOR (MJ) 14: BIOSTATISTICS
CREDIT: 4; FM: 75
HOURS: 60

COURSE LEARNING OUTCOMES:

Upon successful completion of this course, students will be able to:

- Understand the principles of biostatistics in nutrition and health research.
- Apply statistical methods for analysis and interpretation of biological data.
- Develop skills in statistical software for data management and analysis.
- Summarize and visualize categorical and continuous biological or clinical datasets using descriptive statistics and graphical methods
- Calculate required sample sizes, determine statistical power, and design methodologically sound experiments

MJ-14T: Biostatistics(Theory) **Credits 03 (45 hrs.)**

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Course content

1. Introduction to Biostatistics

- Applications of statistics, variables (measurement variables, ordinal variables and variables in experiments), population and sample, sampling methods.
- Presentation of data- frequency distribution , graphical presentation (Bar diagram, Histogram, Pie chart, Line graph, Frequency polygon)
- Statistics of location-Mean, Median and Mode
- Statistics of dispersion- Range, Variance, standard deviation and Coefficient of variation
- Sampling statistics-Sampling errors, standard errors and degree of freedom.

2. Probability distribution & Testing of Hypothesis

- Normal distribution, student's t distribution, Null hypothesis, Error of inference, one tail and two tail t test.
- Skewness and Kurtosis.
- t-Test for significance of difference between means & t-Test for paired observations.
- Analysis of variance-models of anova, one-way anova, multiple comparison tests (Bonferroni adjustment)

3. Correlation and regression

- Product-moment correlation
- Correlation (Pearson and Spearman)
- Linear regression

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4.Non parametric statistics

- Chi square tests
- Introduction to statistical software (MS Excel/SPSS/R)

MJ-14P: Biostatistics (Practical) **Credits 01 (30 hrs.)**

Course Content

1. Preparation of frequency tables (qualitative and quantitative frequency distribution).
2. Construction of pie, bar diagram.
3. Calculation of Mean, Median, Mode
4. Calculation of Standard Deviation and Coefficient of Variation
5. Calculation of Standard Error and Confidence Interval
6. Student's t-test
7. Chi-square test
8. Correlation analysis
9. Simple linear regression
10. Excel based data coding and compilation; use of SPSS software.

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MAJOR (MJ) 15:

NUTRITIONAL DATA MANAGEMENT AND COMPUTER APPLICATIONS IN NUTRITION

CREDIT: 4; FM: 75

HOURS: 60

MJ-15T: Nutritional Data Management & Computer Applications in Nutrition (Theory) Credits 03

Course content

1. Introduction to Nutritional Data Management

- Concept, scope, and importance.
- Types and sources of nutritional data.
- Nutrition information systems.
- Data quality, validity, reliability, and accuracy.
- Ethics, confidentiality, and data security.

2. Nutritional Data Entry and Database Management

- Data coding, Data entry, Database creation.
- Validation and quality control.
- Storage, backup and security, Data cleaning.
- Nutrient intake calculation, Comparison with recommendations.

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3. Spreadsheets and Computer Applications in Diet Planning

- MS Excel, Google Sheets): cells, formulas, functions.
- Use of spreadsheets for nutrient computation from food composition tables.
- Diet planning and menu formulation using spreadsheets.
- Anthropometric calculations: BMI, BMR, energy requirements using formulas.
- Graphs and charts for representing dietary and nutritional data.

4. Internet, Software, and Digital Applications in Nutrition

- Internet resources for nutrition: databases, journals, and government/WHO/FAO portals.
- E-learning and Learning Management Systems (LMS) in nutrition education.
- Mobile applications and software for dietary assessment, counselling, and fitness tracking.
- Emerging trends: Artificial Intelligence (AI) and mobile health (mHealth) applications in nutrition (basic concept)

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MJ-15P: Nutritional Data Management & Computer Applications in Nutrition (Practical) Credits 01

Course Contents:

1. Preparation of Food exchange lists and portion size estimation from food composition databases.
2. MS Word: preparation of a nutrition education pamphlet/handout.
3. MS Excel: entering food intake data and computing nutrient intake using food composition tables.
4. MS Excel: calculation of BMI, BMR, and total energy expenditure using formulas.
5. MS Excel: preparation of a one-day/one-week diet plan with nutrient analysis.
6. MS Excel: graphical representation of dietary/nutritional data (bar charts, pie charts).
7. MS PowerPoint: preparation of a presentation on a nutrition topic for community/clinical use.

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COMPULSORY RESEARCH METHODOLOGY (CRM)

[For both Hons. and Hons. with Research students]

CRM: RESEARCH METHODOLOGY AND ETHICS

CREDIT: 4; FM: 75

HOURS: 60

Learning Objectives:

- To introduce the fundamental concepts, characteristics, and types of research, and to distinguish between research methods and methodology.
- To develop the ability to identify and formulate research problems, review literature critically, and frame appropriate research questions and hypotheses.
- To equip students with knowledge of research design, data collection methods, sampling techniques, and proposal writing skills.
- To cultivate ethical awareness in research by emphasizing research integrity, academic honesty, and responsible conduct in data handling and publication.
- To familiarize students with research metrics, publication ethics, and modern tools for evaluating the quality and impact of research.

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Course contents:

1. Data and Methods of Data Collection:

- Data collection, primary and secondary sources of data, and collection of primary data through questionnaires and schedules.
- Collection of secondary data, processing, and analysis of data.
- Probability sampling- simple random sampling, stratified random sampling, systematic sampling, cluster sampling, area sampling, and multistage sampling.
- Non-Probability sampling- Convenience Sampling, Purposive (Judgment) Sampling, Snowball Sampling, Quota Sampling.
- The pilot survey, scaling techniques, validity & reliability.

2. Fundamentals of research

- Meaning and objective of research, types of research (basic, applied and patent oriented).
- Defining research problem, research process and steps involved in research process,
- Formulation of Research Question – Stepwise Approach.

3. Writing & Communication of Research:

- Scientific writing (including language proficiency), state-of-the-art scientific literature comprehension.
- Art and ethics of writing research reports/papers.
- Writing of an abstract for the scientific community and general public.

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4. The Research Proposal or synopsis:

- Guidelines for writing a research proposal or synopsis.
- The References as per standard formats.
- Use of reference managing software (such as Mendeley, Endnote, Zotero).
- Impact factor, rating, indexing and citation of journals.

5. Research ethics:

- Guidelines, plagiarism, fabrication, falsification, copyright, authorship, correspondence, citation, plagiarism checking tools.
- Institutional Ethics Committee for animal Research and Human Research. Role of CPCSEA for research using animals. Role of ICMR in research using human subject. Process to submit a proposal for ethical clearance from institution.
- Human ethical committee registration and permissions through NAITIK Portal and clinical trial permissions through the CDSCO Portal.

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MAJOR ELECTIVE (MJE)

MAJOR ELECTIVE (DSE)-03:
FUNCTIONAL FOODS, NUTRACEUTICALS AND OXIDATIVE STRESS MANAGEMENT
CREDIT: 4; FM: 75
HOURS: 60

COURSE LEARNING OUTCOMES:

Upon successful completion of this course, students will be able to:

- To introduce students to the concepts, classification, and regulatory aspects of functional foods and nutraceuticals
- To build an understanding of bioactive compounds and their physiological/health-promoting roles
- To develop knowledge of free radical biology and oxidative stress and its role in disease
- To familiarize students with antioxidant defense mechanisms and dietary strategies for oxidative stress management
- To provide hands-on exposure to the development, evaluation, and quality assessment of functional foods and nutraceuticals

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MJDSE-3T: Functional foods, Nutraceuticals and Oxidative Stress Management (Theory)
Credits 03

Course content:

1.Introduction to Functional Foods and Nutraceuticals

- Concept of functional foods, nutraceuticals, and designer foods.
- Classification of functional foods: conventional, modified, fortified, enriched.
- Classification of nutraceuticals: food components, dietary supplements, herbal/phytochemical products, probiotics/prebiotics.
- Global and Indian regulatory framework: FSSAI, Codex Alimentarius, FDA.

2. Free Radicals and Oxidative Stress

- Free radicals: definition, types (ROS, RNS), and sources (endogenous and exogenous).
- Mechanisms of free radical generation: mitochondrial, enzymatic, and environmental sources.
- Concept of oxidative stress: oxidative damage to lipids, proteins, and DNA.
- Role of oxidative stress in aging and chronic diseases: cardiovascular disease, cancer, diabetes, neurodegenerative disorders.

3. Antioxidant Defense Systems and Dietary Antioxidants

- Endogenous antioxidant defense: enzymatic (SOD, catalase, glutathione peroxidase) and non-enzymatic systems.

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- Dietary/exogenous antioxidants: vitamins (C, E), carotenoids, polyphenols, minerals (selenium, zinc, copper)
- Role of diet and lifestyle in modulating oxidative stress.
- Pro-oxidant vs. antioxidant balance, concept of hormesis.
- Antioxidant-rich foods and their incorporation in diet planning.

4. Application, Product Development, and Safety Aspects

- Role of functional foods and nutraceuticals in management of lifestyle diseases (obesity, diabetes, cardiovascular disease, cancer)
- Functional foods and nutraceuticals in immune modulation and healthy aging
- Product development: formulation, fortification, and encapsulation techniques (overview)
- Quality control and standardization of nutraceutical products
- Safety, toxicity, and drug–nutraceutical interactions

MJDSE-3P: Functional foods, Nutraceuticals & Oxidative Stress Management (Practical)

Credits 01

Course Outline:

1. Identification and study of common functional food/nutraceutical sources available in the market
2. Estimation of total phenolic content in a selected food sample (Folin-Ciocalteu method)
3. Estimation of total flavonoid content in a selected food sample
4. Determination of antioxidant activity by DPPH radical scavenging assay
5. Determination of antioxidant activity by FRAP (Ferric Reducing Antioxidant Power) assay

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MINOR (MI) 7: THERAPEUTIC NUTRITION
CREDIT: 4; FM: 75
HOURS: 60

COURSE LEARNING OUTCOMES:

By the end of this course, students will be able to:

1. Identify the key components, indications, and contraindications for major therapeutic diets.
2. Develop standardized meal plans and menus that adhere to specific therapeutic diet prescriptions.
3. Modify food textures and consistencies appropriately for patients with dysphagia and other chewing/swallowing impairments.
4. Perform nutrient analysis on therapeutic menus to ensure they meet prescribed guidelines.
5. Demonstrate practical food preparation and cooking techniques for various therapeutic diets in a kitchen lab.

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MI – 7T: Therapeutic Nutrition (Theory) **Credits 03**

Course content

1.Basics of Therapeutic Nutrition

- Diet Progression (NPO, Clear Liquid, Full Liquid, Soft).
- Standard Hospital Diets.
- Menu Planning Fundamentals.

2. Cardiac and Lipid-Restricted Diets and Diets for Diabetes and Weight Management

- Sodium-Restricted (2g, 1g).
- Therapeutic Lifestyle Changes (TLC).
- DASH Diet.
- Carbohydrate Counting, Consistent Carbohydrate Menu.

3. Diets for Gastrointestinal Disorders Allergy and Elimination Diets

- Fiber-Modified (Low-Residue, High-Fiber).
- Low-FODMAP.
- Lactose-Restricted.
- Gluten-Free diet.
- "Top 8" Allergen-Free Elemental Diets.

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4. Renal Diets and Specialized Nutritional Support

- Sodium, Potassium, Phosphorus, and Fluid Control.
- Introduction to Enteral Formula Composition and Modular Components.
- Par-enteral nutritional support.

MI – 7P: Therapeutic Nutrition (Practical) **Credits 01**

Course Outline:

1. Planning and preparation of clear fluid diets.
2. Planning and preparation of full fluid diets.
3. Planning the preparation of soft diets.
4. Planning the preparation of Therapeutic Lifestyle Changes (TLC).
5. Planning the preparation of DASH.

Suggested Readings:

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