

As Per NEP 2020

University of Mumbai



Title of the programme

A- P.G. Diploma in Home Science – Sports Nutrition	}	2023 - 24
B- M.Sc. (Home Science – Sports Nutrition) (Two Years)		
C- M.Sc. (Home Science – Sports Nutrition) (One Year)		2027 - 28

Syllabus for Semester – I

Ref: GR dated 16th May, 2023 for Credit Structure of PG

Preamble

1) INTRODUCTION

In the 1970s, the understanding of the interrelationships between diets and incidence and progression of chronic degenerative disease increased globally along with the realisation that nutrition and lifestyle can impact the long-term health of the nation. It was then that the college of Home Science instituted the department of Foods and Nutrition in 1972 and started the M.Sc. programme in Foods and Nutrition which was later expanded to a M.Sc. in Foods, Nutrition and Dietetics. The postgraduates of this programme are skilled in all arms of the subject and find employability in positions in the food industry, clinical nutrition and public health nutrition.

It was in the 1980s that exercise physiologists worked on the role of nutrition primarily for improved performance of endurance sports and in the 1990s and 2000s, the scope of nutrition in resistance sports and other sports for bettered performance was studied. Keeping the necessity of the changing times and for addressing the need for nutritional guidance for sportspersons in India and to support our sportspersons' performance, the M.Sc. programme in Sports nutrition was started in 2010.

In the current times, the field of Sports Nutrition has increased in its scope with the advent of specialised branches and its effect on optimising performance in sports. Whilst genetic advantages, and the training and efforts put in will impact performance, the role of correct nutrition during training as well as pre and post-game and in between matches can be the game changers between a win and a loss. The nutritional requirements change with the type of sports – from endurance to team sports to resistance and power sports. The nutritional requirements are different for sportspersons of different age groups and those need to be addressed.

Over the last two years, India has made significant strides in the international sports arena, showcasing its prowess and determination across a wide range of disciplines. Cricket has been a sport India excels in and in the current times we have expanded our achievements in many other sports. In 2021, Olympic glory was achieved where India recorded its best-ever medal haul at the Olympics, securing a total of 7 medals, including 1 gold, 2 silver, and 4 bronze medals. The historic gold in javelin throw captured the nation's attention while successes in wrestling, badminton, and weightlifting highlighted India's diverse sporting talents.

India's achievements over the last two years serve as a foundation for future growth in the international sports arena. The government's focus on the Fit India movement, increased investment in sports infrastructure, and emphasis on grooming young talents can contribute to a more robust and diverse sporting landscape. This when combined with the power of nutrition as a fuel to optimise performance can catapult India into the big league of sports achievements.

It is with this background that the M.Sc. in Sports Nutrition has been restructured as per the guidelines and the goals of the National Education Policy 2020. This programme is designed to create sports nutrition professionals who are intensely trained to attain proficiency in advanced and specialised subjects in the field of sports nutrition. It offers a deep understanding of how nutrition needs to be designed for different kinds of sports with both theoretical and practical inputs. Today, with the huge number of sports options available like endurance sports, power sports, team sports and resistance sports with each one of them having specific requirements there arises a need to train more sports nutritionists in the newest aspects of sports nutrition.

The mandatory course work includes concepts of exercise physiology, kinesiology, biochemistry, nutritional and fitness assessment will help the students to acquire a strong foundation in sports nutrition and be able to efficiently practice it in the field.

The elective courses have been designed to provide an opportunity to train learners in the contemporary aspects of sports nutrition. It will give them an opportunity to look at fitness management in a multi-faceted manner and use complementary health strategies to manage their

client. The electives also include entrepreneurship and innovation as a focus as well as there is emphasis placed on the use of technology in sports nutrition.

The course in research methods and statistics will enable the students to interpret recent advances in sports nutritional science and provide them with skills for designing and conducting research.

This is a programme designed to create professionals competent in managing nutrition of sportspersons and to take the nation's sports to a higher, more evolved level. It will lead to the sports nutritionist serving as a cornerstone for the holistic development of sportspersons, ensuring athlete wellbeing and enhancing sports performance. As the sports landscape continues to evolve, the significance of sports nutrition professionals remains paramount in realising the full potential of the sportspersons.

2. Aims and Objectives:

- a. To equip students with the knowledge of food components essential in the sports industry for fitness and good body composition.
- b. To impart to the students a systematic approach to basic and applied aspects of fitness nutrition and optimum body composition using a multi-disciplinary approach.
- c. To familiarize students with the various theoretical and practical aspects of the nutritional requirements of sports nutrition based on the type of sport.
- d. To encourage students to work in conjunction with relevant sports industry to get a deep insight into the subjects of sports and fitness.
- e. To help the students build their research competencies and be able to use the research in the field of sports nutrition.
- f. To foster an entrepreneurial mindset in students in the sports industry, enabling them to identify and seize opportunities within the industry, develop innovative coaching programmes and create sustainable ventures in the field.

3. Programme /Learning Outcomes

The program encompasses a comprehensive range of skills and knowledge, values and mind-set, enabling graduates to excel in the multifaceted field of Sports Nutrition. On successful completion of the program, student will be able to be a competent and valuable member of the fraternity as outlined below:

Programme Outcome (PO)	Definition	Graduate Attribute
	On completion of the programme, the learner will be able to	
PO1	Demonstrate an in-depth knowledge and understanding of core fundamentals of concepts of Sports Nutrition, Fitness Nutrition and Public Health with the integration of all allied subjects required to professionally practice in the area of Sports Nutrition competently	Disciplinary Knowledge
PO2	Effectively develop nutritious and sustainable food products, communicate fitness diets, counsel athletes effectively and explain complex nutritional concepts in simple and understandable terms both orally and in writing to fellow professionals as well as the community	Communication Skills

PO3	Have a capacity to derive efficient methods of meal plans based on the type of the sport and individual and evaluate the modes of nutritional therapies as well as programmes to better health in the sports community.	Critical Thinking
PO4	Creatively construct Dietary, Nutritional and Lifestyle strategies to preserve fitness in health, manage stress, address nutrition related health issues in the sports community, to support the sports industry as a knowledge partner in formulation of healthy food products; and to engage in entrepreneurial initiatives to solve individual and health problems of persons in the sports community	Problem Solving Innovation Entrepreneurial skills
PO5	Competently evaluate traditional as well as recent nutrition practices in relation to evidence-based nutrition and draw applicable conclusions, using a scientific and open mind with the vision of bettering food and nutrition practice in the sports industry.	Analytical and Scientific Reasoning
PO6	Competently explore the cause and effect relationships of food, nutrition and lifestyles on optimum body composition and to construct and follow through a research problem using research techniques and statistical analysis, thus drawing up adequate conclusions for applications of research in the sports industry, community and clinical setups as employee or entrepreneur.	Research related skills
PO7	Successfully work in teams and cooperate and derive meaningful beneficial conclusions for health food requirements through interdisciplinary and collaborative efforts in the community, research, industry and sports organizational set-ups	Cooperation/Team work
PO8	Envision a drive to translate research, recent innovations and personal and professional experiences into applications to benefit sports industry, management of their fitness nutrition and entrepreneurial ventures with self-awareness and introspection	Reflective Thinking
PO9	Use technology for sports foods, nutrition and consumer information, diet planning, nutrition education as well as be aware of using digitization for entrepreneurial ventures with special emphasis in the sports industry.	Information/digital literacy
PO10	Work independently, identify appropriate resources for a project and manage a project to its fruitful and timely completion	Self-Directed Learning
PO11	Be adept with regard to use of national and global multi-cultural aspects of the foods and nutrition requirements of sports person depending upon the type of sport played, thus being able to deliver products and nutrition and lifestyle	Multi-cultural competence

	strategies for health of the individual and the sports community.	
PO12	Practice principles of holistic health, in the most sustainable and effective manner; placing consumer, community and fraternity well-being at the center of operations and refrain from unethical behavior at the workplace.	Moral and Ethical awareness and reasoning
PO13	Take on leadership positions formulating and sharing an inspiring vision and the eagerness to bring productive and sustainable positive results for our sports professionals and the entire sports fraternity using organizational, entrepreneurial and managerial skills	Leadership readiness/qualities
PO14	Continue lifelong learning and be updated with cutting edge knowledge and practices in the sports field and the understanding that ongoing learning has to be a personal and professional way of life; thus, being continuously involved in evolving, up scaling, reinventing and reskilling to the requirements of the times	Lifelong learning

4) Any other point (if any)

5) **CREDIT STRUCTURE OF THE PROGRAMME SEMESTER -I**
(Table as per Parishishta 1 with sign of HOD and Dean)

R _____

Post Graduate Programme in University:

A. P.G. Diploma in Home Science – Sports Nutrition

B. M.Sc. (Home Science – Sports Nutrition) (Two Years)

Parishishta – 1

Year (2 Yr PG)	Level	Sem (2 Yr)	Major		RM	OJT/ FP	RP	Cum Cr.	Degree
			Mandatory*	Electives (Anyone)					
I	6.0	Sem-I	Course 1 Human Physiology and Kinesiology (Th) (4 Cr)	Course 5 Elective 1 A. Comprehensive Health Management (Th) (2 Cr) B. Comprehensive Health Management (Pr) (2 Cr) OR Elective 2 A. Strategies for Sustained Fitness for Children and Elderly (Th) (2 Cr) B. Strategies for Sustained Fitness for Children and Elderly (Pr) (2 Cr)	Course 6 Research Methods in Home Science (4 Cr)			2	PG Diploma (after 3 Year Degree)
			Course 2 Advances in Nutritional and Exercise Biochemistry (Th) (4 Cr)						
			Course 3 A. Principles of Nutritional Assessment (Th) (2 Cr) B. Exercise Physiology and Fitness Assessment (Pr) (2 Cr)						
			Course 4 Descriptive Statistics in Home Science (Th) (2 Cr)						
Sem – I (For PG Diploma/M.Sc Year 1)			14	4	4	-	-	22	

Note: *Curriculum will be enriched by extension work and educational trips for experiential learning with supplemental credits.
A MOOC course on SWAYAM/ NPTEL/COURSERA can be completed with supplemental credits.

CREDIT STRUCTURE OF THE PROGRAMME (SEMESTER – II)
(Table as per Parishishta 1 with sign of HOD and Dean)

R _____

Post Graduate Programme in University

A. P.G. Diploma in Home Science – Sports Nutrition

B. M.Sc. (Home Science – Sports Nutrition) (Two Years)

Parishishta – 1

Exit option: PG Diploma (44 Credits) after Three Year UG Degree

Year (2 Yr PG)	Level	Sem. (2 Yr)	Major		RM	OJT/ FP	RP	Cum. Cr.	Degree
			Mandatory*	Electives (Any one)					
I	6.0	Sem- II	Course 1 Nutrition Across the Life Cycle (Th) (4 Cr)	Course 5: Elective 1 A. Sports and Fitness Based Product Development (Th) (2 Cr) B. Sports and Fitness Based Product Development (Pr) (2 Cr) OR Elective 2 A. Personal Training and Rehabilitation- Insights and Opportunities (Th) (2 Cr) B. Personal Training and Rehabilitation- Insights and Opportunities (Pr) (2 Cr)	-	On the Job trainin g (4 Cr)	-	22	PG Diploma (after 3 Year Degree)
			Course 2 A. Nutrition for Endurance Sports (Th) (2 Cr) B. Diet Planning for Endurance Sports (Pr) (2 Cr)						
			Course 3 Dietary Supplements, Functional Foods and Ergogenic Aids (Th) (4 Cr)						
			Course 4 Advanced Statistics in Home Science (2 Cr)						
Sem – II (For PG Diploma/M.Sc year 1)			14	4	-	4	-	22	
Cum. Cr. For PG Diploma			28	8	4	4	-	44	

Note: Curriculum will be enriched by Extension Work and Educational Trips for Experiential learning with supplemental credits.

A MOOC Course on Swayam/NPTEL/Coursera can be completed with supplemental credits. Students need to complete a mandatory summer internship/project (4 weeks) during the summer vacation with supplemental credits.

CREDIT STRUCTURE OF THE PROGRAMME (SEMESTER – III)
(Table as per Parishishta 1 with sign of HOD and Dean)

R _____
Post Graduate Programme in University
B. MSc (Home Science – Sports Nutrition) (Two Years)
C. MSc (Home Science – Sports Nutrition) (One Year)

Parishishta – 1

Exit option: PG Diploma (44 Credits) after Three Year UG Degree									
Year (2 Yr PG)	Level	Sem (2 Yr)	Major		R M	OJT/ FP	RP	Cum Cr.	Degree
			Mandatory*	Electives (Any one)					
II	6.5	Sem III	Course 1 Advances in Human Nutrition (Th) (4 Cr)	Course 5 Elective 1 A. Intellectual Property Rights (IPR) in Sports Industry (Th) (2 Cr) B Intellectual Property Rights (IPR) in Sports Industry (Pr) (2 Cr) OR Elective 2 A. Technological Applications in the Sports Industry (Th) (2 Cr) B. Technological Applications in the Sports (Pr) (2 Cr)	-	-	Course 6 Research Project (4 Cr)	22	PG Diplom a (after 3 Year Degree)
			Course 2 A. Nutrition for Power and Resistance Sports (Th) (2 Cr) B. Diet Planning for Power and Resistance Sports (Pr) (2 Cr)						
			Course 3 A. Nutrition for Team Sports (Th) (2 Cr) B. Diet Planning for Team Sports (Pr) (2 Cr)						
			Course 4 Ergonomics (Th) (2 Cr)						
Sem – III (For M.Sc. Degree)			14	4	-	-	4	22	

Note: *Curriculum will be enriched by extension work and educational trips for experiential learning with supplemental credits.

A MOOC course on SWAYAM/ NPTEL/COURSERA can be completed with supplemental credits.

CREDIT STRUCTURE OF THE PROGRAMME (SEMESTER – IV)

(Table as per Parishishta 1 with sign of HOD and Dean)

R _____

Post Graduate Programme in University

B. MSc (Home Science – Sports Nutrition) (Two Years)

C. MSc (Home Science – Sports Nutrition) (One Year)

Parishishta – 1

Year (2 Yr PG)	Level	Sem. (2 Yr)	Major		RM	OJ T/ FP	RP	Cum Cr.	Degree
			Mandatory*	Electives (Any one)					
II	6.5	Sem IV	Course 1 A. Nutrition for Weight Management and Fitness (Th) (2 Cr) B. Diet Planning for Weight Management and Fitness (Pr) (2 Cr)	Course 4 Elective 1 A. Food Psychology and Nutrition Counseling (Th) (2 Cr) B. Food Psychology and Nutrition Counseling (Pr) (2 Cr)	-	-	Course 5 Research Project (6 Cr)	22	PG Diploma (after 3 Year Degree)
			Course 2 A. Nutrition for Sports Persons with Special Conditions (Th) (2 Cr) B. Diet Planning for Sports Persons with Special Conditions (Pr) (2 Cr)	OR Elective 2: A. Novel and Indigenous Approaches in Sports Performance and Fitness Management (Th) (2 Cr) B. Novel and Indigenous Approaches in Sports Performance and Fitness Management (Pr) (2 Cr)					
			Course 3 Entrepreneurship and Management in the Sports Industry (Th) (4 Cr)						
Sem – IV (For M.Sc Degree)			12	4	-	-	6	22	
Cum. Cr. For M.Sc. Degree			26	8	-	-	-	44	

Note: Curriculum will be enriched by extension work and educational trips for experiential learning with supplemental credits.

A MOOC course on SWAYAM/ NPTEL/COURSERA can be completed with supplemental credits.

Students can do a summer internship/project (4 weeks) during the summer vacation with supplemental credits. (Optional)

Year & Level	Mandatory	Elective	RM	OJT/FP	RP	Cum. Cr.	Degree
Cum. Cr. for 1 Yr PG Degree	26	8	-	-	10	44	
Cum. Cr. for 2 Yr PG Degree	54	16	4	4	10	88	

Note: * The number of courses can vary for totaling 14 Credits for Major Mandatory Courses in a semester as illustrated

Sign of Head of the Institute:

Sign of Dean:

Name of the Head of the Institute:

Dr. Anuradha J. Bakshi
(I/C Principal)

Name of the Dean

Name of the Department

Foods, Nutrition and Dietetics

Name of the Faculty

Syllabus: M.Sc. (Home Science – Sports Nutrition)

Cumulative Credits = 22

Semester I (_____)

Level 6.0

Mandatory Courses (Credits 14)

Code: —: Course 1 Credits 4 C1: Human Physiology and Kinesiology (Th) (4Cr)

Code: —: Course 2 Credits 4 C2: Advances in Nutritional and Exercise Biochemistry (Th) (4Cr)

Code: —: Course 3 Credits 4 C3: A. Principles of Nutritional Assessment (Th) (2Cr)
B. Exercise Physiology and Fitness Assessment (Pr) (2Cr)

Code__: Course 4 Credits 2 C4: Descriptive statistics in Home Science (Th) (2 Cr)

Elective Course (Credits 4)

Code----: Course 5 Credits 4 A. Comprehensive Health Management (Th) (2 Cr)
B. Comprehensive Health Management (Pr) (2 Cr)

OR

Code---: Course 5 Credits 4 A. Strategies for Sustained Fitness for Children and Elderly (Th) (2 Cr)
B. Strategies for Sustained Fitness for Children and Elderly (Pr) (2 Cr)

Research Methods (Credits 4):

Code__: Course 6 Credits 4 C6: Research Methods in Home Science (Th) (4 Cr)

Syllabus

P.G. Diploma Home Science – Sports Nutrition

M.Sc. Home Science – Sports Nutrition

Semester I

Semester I

Semester I: Mandatory Courses

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester – I****Major (Mandatory Course)**

Course Code	Title of the Course	Th/Pr	Credits
Course 1	Human Physiology and Kinesiology	Theory	4

Course Objectives:

1. To help students build advanced knowledge and an understanding of the skeletal and muscular systems and its functions.
2. To enable skill development in applying biomechanical principles in exercise and sports and to analyze physical activity in terms of musculo-skeletal components and mechanical principles.

Course Outcomes (CO):

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Define key anatomical and physiological terms related to the human body and movement.
CO2	Explain the relationship between structure and function of different body systems involved in movement.
CO3	Apply physiological concepts to analyze the effects of exercise on cardiovascular systems
CO4	Analyze the impact of different types of training on muscle adaptation and strength development
CO5	Critique the validity of scientific studies related to exercise physiology and kinesiology
CO6	Develop strategies to optimize performance and recovery through manipulation of physiological variables.

Unit No.	Course Content	No. of Hours
I.	A. Skeletomuscular system i). Physiology of Skeletal system <ul style="list-style-type: none"> • Bone cells, Bone formation & remodeling • Factors influencing bone formation • Types of joints • Bone injuries during exercise training ii). Physiology of muscle tissue <ul style="list-style-type: none"> • Structure, chemical composition • Types of muscle fibers • Mechanism and energetics of muscle contraction • Muscle fatigue iii). Anatomical and Physiological Fundamentals of Human Motion <ul style="list-style-type: none"> • The Skeletal Framework and Its Movements • Neuromuscular Basis of Human Motion iv). Fundamentals of Biomechanics	15

	<ul style="list-style-type: none"> • Terminology and Measurement in Biomechanics • The Description of Human Motion • The Conditions of Linear Motion • The Conditions of Rotary Motion • The Center of Gravity and Stability 	
II.	<p>B. Digestive and Nervous system</p> <p>i) Physiology of gastrointestinal system</p> <ul style="list-style-type: none"> • Structure of GI and functions • The process of digestion and absorption of food • Factors affecting digestion, absorption and bioavailability of macro and micro nutrients • Importance of GI for sportsperson <p>ii). Physiology of Nervous system</p> <ul style="list-style-type: none"> • Structure of neurons • Nervous system and functions • Membrane potential • Intercellular communication • Importance of Neuro-regulation for fitness and exercise 	15
III	<p>C. Cardiovascular, & Renal systems</p> <p>i) Cardiovascular system</p> <ul style="list-style-type: none"> • Blood composition • Functions of formed elements of blood and plasma proteins • Synthesis of blood elements • Cardiac cycle • Regulation of blood pressure in athletes • Factors influencing Blood Pressure <p>ii) Renal system</p> <ul style="list-style-type: none"> • Structure and Functioning of kidneys • Formation of urine, composition of urine, normal and abnormal constituents of urine, acid - base balance. • Role of kidneys in regulation of systemic physiology in sports person 	15

IV	D. Kinesiology of Fitness and Exercise i) Kinesiology <ul style="list-style-type: none"> • Moving Objects: -Pushing and Pulling -Throwing, Striking, and Kicking, Locomotion: Solid Surface • Locomotion: - The Aquatic Environment, When Suspended and Free of Support ii) Principles of Kinanthropometry <ul style="list-style-type: none"> • Definition and scope of kinanthropometry • Historical background and development • Applications of kinanthropometry for sports persons • Importance of anthropometric measurements in various fields (sports, health, ergonomics, etc) • Ethics and considerations in human measurement research 	15
Total Contact Hours		60

References:

- Betts, J. G., DeSaix, P., Johnson, E., Johnson, J. E., Korol, O., Kruse, D. H., Poe, B., Wise, J. A., Womble, M., Young, K. A. (2013). Anatomy and Physiology. (n.p.): OpenStax.
- Brown, S. (2016). Fundamentals of Kinesiology. United States: Kendall Hunt Publishing Company.
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- Kinanthropometry and Exercise Physiology: Volume One: Anthropometry. (2018). United Kingdom: Taylor & Francis.
- Davies, A, Blakeley, G. H. and Kidd, C (2001) Human Physiology, Harcourt Pub., 1st ed. Edinburgh Churchill Livingstone. Laboratory Manual, NIN.
- McArdle, W.D., Katch, F. L. & Katch, V.L (1996) Exercise Physiology, (4th ed.), Williams & Wilkins, A Waverly Company.
- Rhodes, R & Pflouzer, R (2003) Human Physiology, Thomson Brooks & Cole, (4th Ed).
- Tortora, G. J. and Grabowski, R. S. (1993) Principles of Anatomy and Physiology, (7th ed.). Harper Collins College Publishers.
- Waugh, A. and Grant, A. (2006) Anatomy and Physiology in Health and illness Churchill Livingstone, 10th ed.

Evaluation:

4 credits (Total marks 100)

Continuous Internal Evaluation:	Marks
Written and oral presentations on assigned topic / Literature review with class discussion	20
Swayam/ MOOC/ any online certification course conducted by qualified practitioner with submission of completion certificate	20
Creating learning resources (videos or posters or brochures) for sports persons/ Class tests	10
Total	50

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 3	10
Question 4 from Unit 4	10
Question 5 from multiple units	10
Total	50

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester – I****Major (Mandatory Course)**

Course Code	Title of the Course	Th/Pr	Credits
Course 2	Advances in Nutritional and Exercise Biochemistry	Theory	4

Course Objectives:

1. To help students understand the structure, functions and metabolism of macronutrients, and micronutrients needed as cofactors involved in macronutrient metabolism.
2. To introduce concepts of hormones and enzyme modulators.
3. To help students compare the metabolic inter-relationship between macronutrients.
4. To equip students with knowledge of current research on nutrition, metabolism and dietetics, formulating evidence-based recommendations and propose innovative applications of biochemical knowledge in nutrition and fitness.

Course Outcomes:

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Recall key concepts in nutritional biochemistry, including macronutrients and micronutrients, and their roles in metabolic processes.
CO2	Explain the mechanisms by which different nutrients are absorbed, transported, and utilized in the body.
CO3	Apply biochemical knowledge to analyze and interpret experimental data to recommend personalized nutritional strategies for individuals with specific exercise goals, such as endurance training or muscle gain.
CO4	Analyse complex biochemical pathways and their regulation in various cellular contexts
CO5	Formulate evidence-based recommendations in implications of advancements in biochemistry for nutritional supplementation to enhance exercise recovery and reduce the risk of nutrient deficiencies in athletes.
CO6	Propose innovative applications of biochemical knowledge in nutrition and fitness.

Unit No.	Course Content	No. of Hours
I.	<p>Biomolecules of Nutritional Significance -1</p> <p>i) Carbohydrates – classification of carbohydrates and its role in exercise. Digestion, absorption, transportation and metabolism of carbohydrate. EMP,TCA,HMP,Glycogen metabolism.Cori’s cycle. Carbohydrate metabolism in exercise</p> <p>ii) Proteins – classification of protein and its role in exercise. Digestion, absorption, transportation and metabolism of protein. Formation of specialized products from amino acids and their functions – Glutathione, Creatine – creatinine, biogenic amines (dopamine, norepinephrine, tyranine, serotonin, GABA, histamine). Biologically important peptides (Insulin, ACTH, Oxytocin, Vasopressin, Angiotensin, TRH. Four levels of protein structure and functions of</p>	15

	Insulin, Hemoglobin, Carboxypeptidase, Keratin), General reactions of amino acids, Urea cycle, protein metabolism in exercise	
II.	<p>Biomolecules of Nutritional Significance - 2</p> <p>i) Lipids – classification of lipids and its role in exercise. Digestion, absorption, transportation and metabolism of lipids. Compound Lipids, Fatty acids, MCT's, Cholesterol, Prostanoids, Beta Oxidation, Ketone body formation. ETC, ATP production and Mechanism of Oxidative and Substrate level phosphorylation, Lipid metabolism in exercise.</p> <p>ii) Enzymes- IUB classification of enzymes. Active site, Coenzymes Factors</p> <p>iii) Nucleic acids Structure, properties and functions of DNA, RNA. Outline of Replication, Transcription, Translation in prokaryotes. Mutation ,DNA repair mechanism</p>	15
III	<p>C. Overview of Endocrinology</p> <p>i) Classification of Hormones, mechanism of action, synthesis of hormones – Thyroxine, Catecholamines.</p> <p>ii). Functions and hyper – hypo states of Thyroid, Insulin, Glucagon. Adrenal, medullary and cortex</p> <p>iii) Clinical Research and Ethical Issues- Clinical Trials – Stages I to IV, Clinical Research and its significance , Biomedical ethics in clinical trials</p>	15
IV	<p>D. Nutritional and Exercise biochemistry</p> <p>i) Historical perspective and key developments in the field</p> <p>ii) Energy metabolism- Defining exercise and physical activity, Free energy changes in metabolic reactions, ATP for energy currency, Redox reactions, Phases of metabolism, Overview of catabolism.</p> <p>iii) Interactions between nutrition, exercise and health- aerobic and anaerobic, muscular fitness and flexibility</p> <p>iv) Emerging technologies in nutritional and exercise biochemistry</p> <p>v) Eating disorders and triple syndrome of athlete</p> <p>vi) Fluid and electrolyte effort</p> <p>vii) Personalized nutrition and its implications</p> <p>viii) Discussion on potential future directions</p>	15
	Total Contact Hours	60

References:

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- Hoeger, W., Turner, Low and W. Hafen Brent (2002), Wellness Guidelines for a healthy lifestyle Wadsworth/Thomas Learning USA.
- Brannon, L. and Feist, Jess (2000), Health Psychology IV edition, An Introduction to behavior and health, Wadsworth USA.
- Schafer Walt (1998) Stress Management for IV ed. Wellness Wadsworth USA. Mind, body and soul (1998) The body shop, Bullyinch press book, little Brown and co.
- Bhat and Savur, S. (1998) Fitness for life, Jaico publishing House.

Evaluation:**4 credits (Total marks 100)**

Continuous Internal Evaluation:	Marks
Written and oral presentations on assigned topic / Literature review with class discussion	20
Creating summary documents on specific topics for sports persons/ coaches/ sports nutritionist	20
Class tests / Quiz/ Debate	10
Total	50

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 3	10
Question 4 from Unit 4	10
Question 5 from multiple units	10
Total	50

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester – I****Major (Mandatory Course)**

Course Code	Title of the Course	Th/Pr	Credits
Course 3A	Principles of Nutritional Assessment	Theory	2

Course Objectives:

To enable students:

1. Understand human body composition
2. Learn principles of body composition and nutritional assessment and develop a comprehensive nutritional assessment protocol for a community health program.

Course outcomes:

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Define the different methods of body composition, Dietary & Functional assessment.
CO2	Explain the significance of nutritional assessment in promoting overall health and preventing chronic diseases.
CO3	Apply the principles of nutritional assessment to evaluate the dietary intake of a hypothetical individual based on data from a food diary.
CO4	Evaluate the strengths and weaknesses of various nutritional assessment techniques in identifying specific nutrient deficiencies or excesses.
CO5	Critique the validity and reliability of nutritional assessment methods in different populations, highlighting potential biases and limitations.
CO6	Develop a comprehensive nutritional assessment protocol for a community health program targeting a specific health issue, considering both individual and population-level assessment strategies.

Unit No.	Course Content	No. of Hours
I.	A. Anthropometric Assessments i.) Weight and linear measurements ii) Circumference measurements B. Body Composition Assessments i) Components of body composition ii) Human Body composition- Changes during life cycle iii) Factors influencing Body composition –Gender, Age, Exercise iv) Methods of measuring body composition	15
II.	A. Biochemical & Clinical assessment of nutritional status of various age groups & gender i) Measurement of total body protein & fat using standard formulae & Interpretation ii) Interpretation of Biochemical assessments and its interpretation to	15

	<p>determine nutritional status</p> <ul style="list-style-type: none"> • Haematological Assessment • Assessment of protein nutriture • Evaluation of PEM in pediatric, adult, geriatric and sports persons. • Biomarkers of vitamin status • Assessment of Mineral nutriture <p>iii) Clinical assessment of nutritional status</p> <p>B. Dietary & Functional assessment of nutritional status</p> <p>i) Dietary surveys- Tools of dietary surveys- FFQ, Interview schedules, questionnaires, SGA, Recall & record methods, Food diary, Dietary recall: 24 hour recall and 3 day recall.</p> <p>ii) Assessment Protocols: merits & demerits</p> <p>iii) Functional assessment: Functional indicators of macro and micro nutrients, disturbances & interpretation, GPAQ, WPAQ, IPAQ</p>	
	Total Contact Hours	30

References:

- Nutritional Status Assessment: A Manual for Population Studies. (2013). United Kingdom: Springer US.
- Lee, R. D., Nieman, D. C. (2007). Nutritional Assessment. United Kingdom: McGraw-Hill Higher Education.
- Gibson, R. S. (2005). Principles of Nutritional Assessment. United Kingdom: Oxford University Press.
- Dandekar, S. P., Rane, S. A. (2004) Practical and Viva in Medical Biochemistry, New Delhi, Elsevier/Reed, Elsevier India PVT LTD.
- Godkar, P. B. (2003) Textbook of Medical Laboratory Technology, (2nd ed.), Mumbai, Bhalani Publishing House, Mumbai.
- Sadasivan, S. & Manickam, A, (2003) Biochemical Methods, (2nd ed.), New age International Pvt. Ltd.
- Sauberlich, H. E. (1999) Laboratory tests for the Assessment of Nutritional Status, (2nd ed.), CRC press Laboratory Manual, NIN.

Evaluation:

2 credits (Total marks 50)

Continuous Internal Evaluation:	Marks
Design and conduct surveys on different sports	10
Create nutritional assessment guidelines document for athletes	10
Quiz/ Debate/ Class discussion	5
Total	25

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total	25

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0

Semester – I

Major (Mandatory Course)

Course Code	Title of the Course	Th/Pr	Credits
Course 3B	Exercise physiology and Fitness Assessment	Practical	2

Course Objectives:

1. To enable students to understand the importance of biomarkers of nutritional status in the management of holistic fitness.
2. To equip students with practical skills in conducting health Screening & Risk Stratification using various techniques of body composition analysis.
3. To make students aware of the various techniques of evaluation and assessment of physical fitness of various groups of population.
4. To help students develop skills in creating a comprehensive nutritional assessment protocol for a community health program.

Course Outcomes:

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Apply the principles of nutritional assessment to evaluate the dietary intake of a hypothetical individual based on data from a food diary.
CO2	Evaluate the strengths and weaknesses of various nutritional assessment techniques in identifying specific nutrient deficiencies or excesses.
CO3	Critique the validity and reliability of nutritional assessment methods in different populations, highlighting potential biases and limitations.
CO4	Develop a comprehensive nutritional assessment protocol for a community health program targeting a specific health issue, considering both individual and population-level assessment strategies.

Unit No.	Course Content	No. of Hours
I.	A. Anthropometrical assessment of body composition i) Height, Weight, BMI, Circumference measurements (Head, Arm, waist, abdominal circumference, WHR etc.);, shoulder girth ii) Calculating body composition using standard Formulae iii) Impedance techniques (BIA & Body stat) d) Skinfold measurements & Assessment of Body types using formulae iv) DEXA, BMD (Visit) B. Clinical Assessment of body composition i) Observation of clinical symptoms of nutrient deficiencies ii) Field visits/Demonstrations/Guest lectures C. Health Screening & Risk Stratification i)Theoretical explanation, demonstration and assessment of cardiorespiratory fitness -Treadmill stress test - Spirometry - Step tests - Resting assessments: Heart rate monitoring, Blood Pressure, Body Composition.	30

	ii) Cycle ergometer test etc. iii) Aerobic fitness testing (VO ₂ max testing)	
II	D. Assessment of skeletomuscular fitness-Measurement of: i) BMD (Visit/ Demonstration) ii) Muscle strength iii) Endurance iv) Strength v) Flexibility & agility (Bench press, Jumps, Pushups, Sit and Reach Test), Sit-ups, Shuttle run, Hand grip dynamometer etc) E. Assessment of physical fitness of various groups of population- children, adolescents, adults & elderly –case study. Metabolic Calculations F. Dietary assessment of nutritional status Conduction of Dietary surveys- Tools of dietary surveys- FFQ, Interview schedules, questionnaires, SGA, Recall & record methods, Food diary, Dietary recall: 24 hour recall and 3 day recall.	30
	Total Contact Hours	60

References:

- Nutritional Status Assessment: A Manual for Population Studies. (2013). United Kingdom: Springer US.
- Lee, R. D., Nieman, D. C. (2007). Nutritional Assessment. United Kingdom: McGraw-Hill Higher Education.
- Dandekar, S. P., Rane, S. A. (2004) Practical and Viva in Medical Biochemistry, New Delhi, Elsevier/Reed, Elsevier India PVT LTD.
- Sauberlich, H. E. (1999) Laboratory tests for the Assessment of Nutritional Status, (2nd ed.), CRC press Laboratory Manual, NIN.
- Davier, A, Blakeley, G. H. and Kidd, C (2001) Human Physiology, Harcourt Pub., 1st ed. Edinburgh Churchill Livingstone.
- Laboratory Manual, NIN McArdle, WD., Katch, F. L. & Katch, VL (1996) Exercise Physiology, (4th ed.), Williams & Wilkins, A Waverly Company.
- Rhodes, R & Pflouzer, R (2003) Human Physiology, Thomson Brooks & Cole, (4th Ed).
- Tortora, G. J. and Grabowski, R. S. (1993) Principles of Anatomy and Physiology, (7th ed.). Harper Collins College Publishers.
- Waugh, A. and Grant, A. (2006) Anatomy and Physiology in Health and illness Churchill Livingstone, 10th ed.

Evaluation: 2 credits (Total marks 50)

Semester End Exam	Marks
All questions are compulsory with internal choice.	
Plan a case for anthropometric assessment and health screening	10
Construction a dietary assessment tool	10
Question 3: Viva-voce examination	5
Total	25

Continuous Internal Evaluation:	Marks
Journal	5
Interpret anthropometric or clinical assessment data and create report	10
Preparation of dietary assessment questionnaires/ Conduct surveys in the population	10
Total	25

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester- I****Major (Mandatory Course)**

Course Code	Title of the Course	Th/Pr	Credits
Course 4	Descriptive Statistics in Home Science	Theory	2

Course Objectives:

1. To help students value the sine qua non role of statistics in quantitative research.
2. To enable students to understand the skills in selecting, computing, interpreting and reporting descriptive statistics.
3. To facilitate comprehension of elementary concepts in probability.
4. To introduce students to a specialized statistical software such as SPSS.

Course Outcomes:

On successful completion of the course, the student will be able to:

Course Number	Course Outcome
CO1	Identify the level of measurement of a variable and the corresponding suitable statistical technique to describe this variable.
CO2	Differentiate between, evaluate, and select different descriptive statistical techniques to numerically and graphically summarize data.
CO3	Apply knowledge and skills to design and conduct descriptive research studies.
CO4	Use SPSS for data entry, data management, and descriptive statistics effectively.

Unit No.	Course Content	No. of Hours
I.	<p>A. Introduction and overview to statistics</p> <p>i) Role of statistics in (quantitative) research</p> <p>ii) Definition/changing conceptions</p> <p>iii) Prerequisite concepts in mathematics (e.g., basic algebra, properties of the summation sign)</p> <p>B. Descriptive Statistics for summarizing ratio level variables</p> <p>i) Frequencies and percentages</p> <p>ii) Computing an average/measure of a central tendency Mean, median, mode(s)</p> <p>Contrasting the mean vs. median Computing an average when there are outliers or extreme values in the data set Robust measures of the center (5% trimmed mean; M estimators) Quartiles and percentiles</p> <p>iii) Computing a measure of variability or dispersion Why? (inadequacy of the mean) Minimum value and maximum value, Range, Interquartile range</p>	15

	Variance and standard deviation iv) Discrete and continuous variables v) Histograms and line graphs	
II.	A. Descriptive Statistics for summarizing nominal, ordinal and interval level variables B. Using specialized software such as SPSS i) Data Entry ii) Data Management iii) Descriptive Statistics C. Probability i) Definition ii) Role of probability in research and statistics iii) Elementary concepts in probability Sample space, experiment, event/outcome/element of the sample space Equally likely outcomes and the uniform probability model Stabilization of the relative frequency	15
	Total Contact Hours	30

References:

- Bhattacharyya, G.K., & Johnson, R.A. (1977). Statistical concepts and methods. John Wiley. (classic)
- Jackson, S. L. (2012). Research methods and statistics: A critical thinking approach (4th ed.). Wadsworth Cengage Learning.
- Johnson, R. A., & Bhattacharyya, G. K. (2019). Statistics: Principles and methods (8th ed.). John Wiley.
- Martin, W. E., & Bridgmon, K. D. (2012). Quantitative and statistical research methods. Jossey-Bass.
- Kachigan, S. K. (1986). Statistical analysis: An interdisciplinary introduction to univariate & multivariate methods. Radius Pr.
- Kerlinger, F. N. & Lee, H. B. (2000). Foundations of behavioral research. Harcourt.
- Wheelan, C. J. (2014). Naked statistics: Stripping the dread from the data. W.W. Norton.

Evaluation:

2 credits (Total marks 50)

Continuous Internal Evaluation:	Marks
Written Short Quizzes	10
SPSS data entry & descriptive statistical analysis assignment	5
Problem-solving Exercises (in pairs or individually) & Practice Sums (individually)	10
Total	25

Semester-end Examination	
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total	25

Semester I: Elective Courses

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester – I****Major (Elective Course)**

Course Code	Title of the Course	Th/Pr	Credits
C5- Elective 1A	Comprehensive Health Management	Theory	2

Course Objectives:

1. To help students understand the concepts of spiritual health, its benefits in the healing process and multidisciplinary strategies in preserving health.
2. To facilitate in students the skill development of applications of multidisciplinary strategies in health preservation and as adjuncts in disease management.

Course Outcomes:

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	List key components of a comprehensive health management plan, including preventive measures and health promotion strategies.
CO2	Explain the relationships between lifestyle choices, environmental factors, and health outcomes.
CO3	Apply comprehensive strategies to improve overall health and wellbeing
CO4	Analyze case studies of individuals with chronic health conditions, identifying the multifaceted factors contributing to their health status.
CO5	Assess the effectiveness of health education campaigns in influencing health behaviors and promoting disease prevention.
CO6	Design a holistic health program that addresses specific health needs

Unit No.	Course Content	No. of Hours
I.	A. Introduction to Spiritual Health i) Understanding Spiritual Health ii) Physical, emotional and mental health benefits of spirituality iii) Differentiating between religion and spirituality. iv) Reflecting on personal beliefs and values. v) Self-Awareness and Mindfulness <ul style="list-style-type: none"> • Self-awareness techniques. • Introducing mindfulness meditation. • Cultivating present-moment awareness. vi) Journaling and Reflection vii) Connection and Community	15
II.	B. Holistic Wellness Management i) Gym based aerobic exercises/Gym based resistance training, Exercises for flexibility ii) Calisthenics	15

	iii) Dance- Traditional, contemporary and applied iv) Yoga, Power yoga and meditation v) Other Forms of Fitness vi) Ayurveda vii) Energy healing viii) Laughter therapy ix) Acupuncture / acupressure x) Music therapy xi) Art-based therapy xii) Nature therapy xiii) Hypnotherapy	
	Total Contact Hours	30

References:

- Spirit, Science, and Health: How the Spiritual Mind Fuels Physical Wellness. (2007). United Kingdom: Bloomsbury Academic.
- Spirituality and Religion Within the Culture of Medicine: From Evidence to Practice. (2017). United States: Oxford University Press.
- Rosmarin, David H. & Koenig, Harold G. (2020). Handbook of Spirituality, Religion, and Mental Health. 2nd Edition.
- Spiritual Health: Spirituality, Religion, Science, Health and our Thought Processes. A Paradigm Shift in understanding of their interactions and relations.. (2018). (n.p.): Notion Press.
- Alman, B. M., Lambrou, P. (2013). Self-Hypnosis: The Complete Manual for Health and Self-Change, Second Edition. United Kingdom: Taylor & Fran.
- Angleo, J. (2016). Spiritual Healing: Energy Medicine for Health & Well-being. United Kingdom: Pavilion Books.
- Art Therapy and Health Care. (2012). United States: Guilford Publications.
- Ayurveda: A Preventive Approach to Lifestyle Diseases. (2023). (n.p.): Book Bazoorka Publication.
- Bays, J. C. (2017). Mindful Eating: A Guide to Rediscovering a Healthy and Joyful Relationship with Food (Revised Edition). United Kingdom: Shambhala.
- Circadian Clocks: Role in Health and Disease. (2016). United States: Springer New York.
- Elkins, G. (2016). Handbook of Medical and Psychological Hypnosis: Foundations, Applications, and Professional Issues. United States: Springer Publishing Company.
- Henwood, S., Lister, J. (2007). NLP and Coaching for Health Care Professionals: Developing Expert Practice. Germany: Wiley.
- Jarmey, C., Hearn, G. (2001). The Book of Meditation: Practical Ways to Health and Healing. United States: Journey Editions.
- Khalsa, S. B., Cohen, L., McCall, T., Telles, S. (2016). Principles and Practice of Yoga in Health Care. United Kingdom: Jessica Kingsley Publishers.
- Luthra, O. P. (2016). Healing Without Medicine: Restoring Well-Being with Accupressure. India: B. Jain Publishers Pvt. Limited.
- Nelson JB. (2017). Mindful Eating: The Art of Presence While You Eat. Diabetes Spectr. 2017 Aug;30(3):171-174.
- Sarris, J., Wardle, J. (2010). Clinical Naturopathy: An Evidence-based Guide to Practice. United Kingdom: Elsevier Health Sciences.
- Scott Shannon. (2002). Complementary and Alternative Strategies for Mental Health. Elsevier Inc.
- Tribole, E., Resch, E. (2020). Intuitive Eating, 4th Edition: A Revolutionary Anti-Diet Approach. United States: St. Martin's Publishing Group.

Evaluation:
2 credits (Total marks 50)

Continuous Internal Evaluation:	Marks
Written and oral presentations on assigned topic / Literature review with class discussion	10
Certified course on spiritual or holistic health practices by qualified practitioners	5
Class test/ Quiz/ Debate	10
Total	25

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total	25

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester – I****Major (Elective Course)**

Course Code	Title of the Course	Th/Pr	Credits
Course 5 - Elective 1B	Comprehensive Health Management	Practical	2

Course Objectives:

1. To help students understand the principles of comprehensive approach for health management.
2. To train the students in conducting holistic nutrition and lifestyle education programmes for health management.

Course Outcomes:

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Apply comprehensive strategies to improve overall health and wellbeing
CO2	Analyze case studies of individuals with chronic health conditions, identifying the multifaceted factors contributing to their health status.
CO3	Assess the effectiveness of health education campaigns in influencing health behaviors and promoting disease prevention.
CO4	Design a holistic health program that addresses specific health needs

Unit No.	Course Content	No. of Hours
I.	Planning and organizing information sessions and developing nutrition education resources in comprehensive health wellness management in the aspects of : Spiritual well being Any other evidence based approach/practice	30
II.	Planning and organizing information sessions and developing nutrition education resources in Holistic wellness management in the aspects of : Nutrition and fitness Any other evidence based approach/practice	30
Total Contact Hours		60

References:

- Spirit, Science, and Health: How the Spiritual Mind Fuels Physical Wellness. (2007). United Kingdom: Bloomsbury Academic.
- Spirituality and Religion Within the Culture of Medicine: From Evidence to Practice. (2017). United States: Oxford University Press.
- Rosmarin, David H. & Koenig, Harold G. (2020). Handbook of Spirituality, Religion, and Mental Health. 2nd Edition.
- Spiritual Health: Spirituality, Religion, Science, Health and our Thought Processes. A Paradigm Shift in understanding of their interactions and relations.. (2018). (n.p.): Notion Press.
- Alman, B. M., Lambrou, P. (2013). Self-Hypnosis: The Complete Manual for Health and Self-

Change, Second Edition. United Kingdom: Taylor & Fran.

Angleo, J. (2016). *Spiritual Healing: Energy Medicine for Health & Well-being*. United Kingdom: Pavilion Books.

Art Therapy and Health Care. (2012). United States: Guilford Publications.

Ayurveda: A Preventive Approach to Lifestyle Diseases. (2023). (n.p.): Book Bazooka Publication.

Bays, J. C. (2017). *Mindful Eating: A Guide to Rediscovering a Healthy and Joyful Relationship with Food (Revised Edition)*. United Kingdom: Shambhala.

Circadian Clocks: Role in Health and Disease. (2016). United States: Springer New York.

Elkins, G. (2016). *Handbook of Medical and Psychological Hypnosis: Foundations, Applications, and Professional Issues*. United States: Springer Publishing Company.

Henwood, S., Lister, J. (2007). *NLP and Coaching for Health Care Professionals: Developing Expert Practice*. Germany: Wiley.

Jarmey, C., Hearn, G. (2001). *The Book of Meditation: Practical Ways to Health and Healing*. United States: Journey Editions.

Khalsa, S. B., Cohen, L., McCall, T., Telles, S. (2016). *Principles and Practice of Yoga in Health Care*. United Kingdom: Jessica Kingsley Publishers.

Luthra, O. P. (2016). *Healing Without Medicine: Restoring Well-Being with Accupressure*. India: B. Jain Publishers Pvt. Limited.

Nelson JB. (2017). Mindful Eating: The Art of Presence While You Eat. *Diabetes Spectr.* 2017 Aug;30(3):171-174.

Sarris, J., Wardle, J. (2010). *Clinical Naturopathy: An Evidence-based Guide to Practice*. United Kingdom: Elsevier Health Sciences.

Scott Shannon. (2002). *Complementary and Alternative Strategies for Mental Health*. Elsevier Inc

Tribole, E., Resch, E. (2020). *Intuitive Eating, 4th Edition: A Revolutionary Anti-Diet Approach*. United States: St. Martin's Publishing Group.

Evaluation:

2 credits (Total marks 50)

Continuous Internal Evaluation:	Marks
Journal	5
Planning and organizing information sessions and developing nutrition education resources in spiritual and holistic wellness management	20
Total	25

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Plan case specific comprehensive health management strategies	10
Plan case specific holistic health strategies	10
Question 3: Viva-voce examination	5
Total	25

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0**Semester – I****Major (Elective Course)**

Course Code	Title of the Course	Th/Pr	Credits
Course 5 - Elective 2 A	Strategies for Sustained Fitness for Children and Elderly	Theory	2

Course Objectives:

1. To help students develop exercise routines suitable for children that promote growth, motor skill development, and cardiovascular health.
2. To enable students create safe and effective fitness programs for elderly individuals that enhance balance, mobility, and functional independence.

Course Outcomes (CO):

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	List common health challenges faced by children and elderly individuals when it comes to maintaining fitness.
CO2	Recognize the importance of age-appropriate exercise strategies for children and elderly individuals to maintain overall health.
CO3	Design appropriate exercise routines for children and elderly that take into account their developmental stages and physical capabilities.
CO4	Compare and contrast the benefits and potential risks of various fitness strategies for children and elderly individuals.
CO5	Critique existing fitness programs targeting children and elderly individuals, assessing their effectiveness and appropriateness.
CO6	Construct comprehensive long-term fitness plans for elderly individuals that encompass cardiovascular, strength training, balance, and flexibility exercises, while adapting to changing health conditions.

Unit No.	Course Content	No. of Hours
I.	A. Strategies for Sustained Fitness for Children i) Introduction to Children's Fitness and its benefits ii) Creating a fitness mindsets iii) Parents as role models for fitness- nutrition, overall wellness activity, sleep iv) School as a medium in inculcating good lifestyle choices v) Use of play therapy for fitness in children vi) Use of unstructured sports and recreational play vii) Usage of structured sports and games- gymnastics, etc. viii) Dance, Martial arts ix) Mind games to improve cognitive health x) Nutritional education	15

II.	B. Strategies for Sustained Fitness for Elderly i) Introduction to Fitness for elderly ii) Safe and Effective Exercise Selection iii) Physical - <ul style="list-style-type: none"> • Building Strength and Muscle Mass • Flexibility and Mobility- yoga, stretching and bending exercises • Balance and Fall Prevention iv) Cardiovascular Health and Endurance v) Nutrition and Hydration for Seniors vi) Mental Well-being and Lifestyle <ul style="list-style-type: none"> • Social relationship, Group sessions, laughter club, hobbies • Meditation vii) Physiotherapy and Rehabilitation in case of injuries viii) Lifestyle changes- sleep, stress ix) Exercise to support bone health, arthritis, water based activities x) Neurological disorder xi) Nature bathing	15
Total Contact Hours		30

References:

- Wachira, L.-J. (Ed.). (2023). Sport and Fitness in Children and Adolescents - A Multidimensional View. IntechOpen. doi: 10.5772/intechopen.98108.
- Parenting Matters: Supporting Parents of Children Ages 0-8. (2016). United States: National Academies Press.
- Physical Activity and Educational Achievement: Insights from Exercise Neuroscience. (2017). United Kingdom: Taylor & Francis.
- Brill, P. A. (2004). Functional Fitness for Older Adults. United Kingdom: Human Kinetics.
- Taylor, A. W., Johnson, M. J. (2008). Physiology of Exercise and Healthy Aging. United Kingdom: Human Kinetics.
- Exercise for Aging Adults: A Guide for Practitioners. (2015). Germany: Springer International Publishing.
- Pardini, A., Mahoney, C. (1987). A Resource Guide for Fitness Programs for Older Persons. United States: The Administration.

Evaluation:

2 credits (Total marks 50)

Continuous Internal Evaluation:	Marks
Literature review with class discussion/ Preparation for learning resources (videos or posters or brochures) for children or elderly	15
Critical analysis/ Literature review/ Group discussion/ Quiz/ Tests	10
Total	25

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total	25

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0

Semester – I

Major (Elective Course)

Course Code	Title of the Course	Th/Pr	Credits
Course 5 Elective 2 B	Strategies for Sustained Fitness for Children and Elderly	Practical	2

Course Objectives:

1. To enable students to understand the importance of sustained fitness for children and elderly.
2. To train the students in conducting nutrition education programmes for fitness in children and elderly.

Course Outcomes (CO):

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Design appropriate exercise routines for children and elderly that take into account their developmental stages and physical capabilities.
CO2	Compare and contrast the benefits and potential risks of various fitness strategies for children and elderly individuals.
CO3	Critique existing fitness programs targeting children and elderly individuals, assessing their effectiveness and appropriateness.
CO4	Construct comprehensive long-term fitness plans for elderly individuals that encompass cardiovascular, strength training, balance, and flexibility exercises, while adapting to changing health conditions.

Unit No.	Course Content	No. of Hours
I.	Organizing activities and nutrition education programmes, and creating educational resources for developing long term fitness of children and adolescents.	30
II.	Organizing activities and nutrition education programmes, and creating educational resources for developing long term fitness of the elderly.	30
	Total Contact Hours	60

References:

- Wachira, L.-J. (Ed.). (2023). Sport and Fitness in Children and Adolescents - A Multidimensional View. IntechOpen. doi: 10.5772/intechopen.98108.
- Parenting Matters: Supporting Parents of Children Ages 0-8. (2016). United States: National Academies Press.
- Physical Activity and Educational Achievement: Insights from Exercise Neuroscience. (2017). United Kingdom: Taylor & Francis.
- Brill, P. A. (2004). Functional Fitness for Older Adults. United Kingdom: Human Kinetics.
- Taylor, A. W., Johnson, M. J. (2008). Physiology of Exercise and Healthy Aging. United Kingdom: Human Kinetics.

Exercise for Aging Adults: A Guide for Practitioners. (2015). Germany: Springer International Publishing.

Pardini, A., Mahoney, C. (1987). A Resource Guide for Fitness Programs for Older Persons. United States: The Administration.

Evaluation:

2 credits (Total marks 50)

Continuous Internal Evaluation:	Marks
Journal	5
Organizing activities and nutrition education programmes for fitness for children and elderly	20
Total	25

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Plan case specific fitness management strategy for children and adolescents	10
Plan case specific fitness management strategy for children and adolescents	10
Question 3: Viva-voce examination	5
Total	25

Semester-I: Research Methods

M.Sc. (Home Science – Sports Nutrition)

(Under NEP)

Level – 6.0

Semester- I

Major (Mandatory Course)

Course Code	Title of the Course	Th/Pr	Credits
Course 6	Research Methods in Home Science	Theory	4

Course Objectives:

1. To build in students' appreciation for high quality research in their specialisation and allied areas.
2. To help students master the knowledge and skills needed in conducting specialisation-specific and interdisciplinary research relevant to the multiple disciplines under the umbrella of Home Science.
3. To promote academic, research and professional ethics in students.
4. To introduce students to principles of good scientific writing.

Course Outcomes:

At the end of the course the student will be able to:

Course Number	Course Outcome
CO1	Have heightened appreciation for high quality research in their specialisation and allied areas.
CO2	Identify, differentiate between, evaluate, and select different sampling techniques and research designs for particular research aims.
CO3	Formulate a research proposal on a worthwhile topic in their discipline, as also on interdisciplinary topics.
CO4	Abide with ethical guidelines for research.
CO5	Have the necessary knowledge and skills to contribute to their discipline through conducting primary and original research on socially relevant, green, and high priority topics.

Unit No.	Course Content	No. of Hours
I.	A. Introduction and overview i. What is research? ii. Importance of research in general, and in each specialisation of Home Science and allied areas; illustration of research in each specialisation of Home Science and allied areas iii. Steps in the research process iv. Qualitative versus quantitative research v. Objectivity and subjectivity in scientific inquiry: Premodernism, modernism, and postmodernism B. The beginning steps in the research process	15

	<ul style="list-style-type: none"> i. Identifying broad areas of research in a discipline ii. Identifying interest areas; using multiple search strategies iii. Prioritizing topics; specifying a topic; feasibility iv. Review of literature/scholarly argument in support of study v. Specifying research objectives/hypotheses/questions 	
II.	<p>A. Variables</p> <ul style="list-style-type: none"> i. Definition ii. Characteristics iii. Types iv. Levels of measurement <p>B. Measurement</p> <ul style="list-style-type: none"> i. Conceptual definitions and operational definitions ii. Types of validity and reliability in quantitative research <p>C. Data entry in quantitative research</p> <ul style="list-style-type: none"> i. Codebook and master sheet ii. Creating data files and data management 	15
III	<p>A. Sampling techniques in quantitative research</p> <ul style="list-style-type: none"> i. Probability and nonprobability sampling methods in current use/examples from current research ii. Issues with regard to sampling techniques <p>B. Research designs in quantitative research</p> <p>Distinguishing between the following research designs; and, selecting research designs that are congruent with one's research purpose.</p> <ul style="list-style-type: none"> i. Experimental, quasi-experimental, and pre-experimental research designs; correlational research design Inferring causality, internal validity, external validity ii. Epidemiological research designs (cross-sectional, cohort, & case-control studies); developmental research designs (cross-sectional, longitudinal, sequential research designs; additive, mediator & moderator models; cross-lagged panel analyses); survey and market research designs; meta-analysis iii. Exploratory, descriptive, and explanatory designs iv. Mixed methods research designs 	15
IV	<p>A. Qualitative research methods</p> <ul style="list-style-type: none"> i. Ideology/worldview of the qualitative researcher ii. Research designs in qualitative research iii. Sampling techniques in qualitative research iv. Data collection methods in qualitative research v. Data analytic strategies in qualitative research vi. Reporting of results in qualitative research <p>B. Scientific writing</p> <ul style="list-style-type: none"> i. Distinguishing scientific writing from popular and literary writing styles 	15

	ii. Publication guidelines (APA7); characteristics/principles of scientific writing; examples of good scientific writing iii. Writing a research proposal/research grant; seeking funding iv. Reporting statistical findings in text C. Ethics i. In academia ii. In research in general iii. In research with human participants (Nuremberg Code, Belmont Report, ICMR Guidelines) iv. In research with animal subjects	
	Total Contact Hours	60

References:

American Psychological Association. (2019). Publication manual of the American Psychological Association (7th ed.). APA.

Bhattacharyya, G.K., & Johnson, R.A. (1977). Statistical concepts and methods. John Wiley. (classic)

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Denzin, N. K., & Lincoln, Y. S. (2011). The Sage handbook of qualitative research. Sage.

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Evaluation:**4 credits (Total marks 100)**

Continuous Internal Evaluation:	Marks
Written Short Quizzes	10
Short Exercises	10
Group project to be completed in pairs or threes: Formulating a Research Proposal on a High Priority Topic relevant to each student group's specialization; students can opt to work on interdisciplinary research project proposals with team members from more than one specialization of Home Science	30
Total	50

Semester-end Examination	Marks
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 3	10
Question 4 from Unit 4	10
Question 5 from multiple units	10
Total	50

Letter Grades and Grade Points

Semester GPA/Program CGPA Semester/ Program	% of Marks	Alpha-Sign/ Letter Grade Result
9.00-10.00	90.0-100	O (Outstanding)
8.00-<9.00	80.0-<90.0	A+ (Excellent)
7.00-<8.00	70.0-<80.0	A (Very Good)
6.00-<7.00	60.0-<70	B+ (Good)
5.50-<6.00	55.0-<60.0	B (Above Average)
5.00-<5.50	50.0-<55.0	C (Average)
4.00-<5.00	40.0-<50.0	P (Pass)
Below 4.00	Below 40	F (Fail)
Ab (Absent)		Absent

Team for Creation of Syllabus

Name	College Name	Signature
Dr. Anuradha J. Bakshi I/C Principal	College of Home Science Nirmala Niketan	
Mrs. Vibha Hasija Head of the Department	College of Home Science Nirmala Niketan	
Dr. Sheetal Joshi Assistant Professor	College of Home Science Nirmala Niketan	
Ms. Protity Shuvra Dey Assistant Professor (Temporary: Self-financed Faculty)	College of Home Science Nirmala Niketan	

Sign of Head of the Institute:

Sign of Dean:

Name of the Head of the Institute:

Name of the Dean

Dr. Anuradha J. Bakshi
(I/C Principal)

Name of the Department
Foods, Nutrition and Dietetics

Name of the Faculty

Justification for M.Sc. (Home Science) - Sports Nutrition

	Necessity for starting the course:	<p>The M.Sc. Programme in Sports Nutrition can offer several important benefits to both students and the field of sports science. Sports nutrition is a highly specialized field that involves understanding the unique dietary needs of athletes and active individuals. This program would provide in-depth knowledge about the physiological and nutritional requirements of athletes, which can be critical for optimizing performance, recovery, and overall health. Moreover, it would also equip students with the knowledge and skills to develop personalized nutrition plans tailored to different sports, training regimens, and individual athlete characteristics.</p> <p>Sports nutrition is a dynamic field with ongoing research and evolving trends. A Master's program would ensure that students are exposed to the latest scientific advancements and practical applications in sports nutrition, enabling them to make informed decisions based on evidence-based practices.</p> <p>The M.Sc. of Home Science in Sports Nutrition Program has been meticulously designed following the guidelines of the National Education Policy (NEP). It offers a well-balanced blend of academic knowledge and hands-on application, ensuring students receive thorough disciplinary training while also encouraging a cross-disciplinary approach. The curriculum includes compulsory courses that provide learners with a broad foundation in sports nutrition, while optional courses and practical components focus on cultivating crucial skills and enhancing employability.</p> <p>The multifaceted nature of sports nutrition encompassing areas such as exercise physiology, biochemistry, and dietary planning to enhance sports performance calls for a comprehensive academic programme that equips students with deep knowledge and practical skills.</p> <p>A M.Sc. Degree would empower professionals to address the unique dietary requirements of athletes, aiding in performance enhancement, injury prevention and post recovery nutrition.</p> <p>A Master's programme would not only enhance employability but also open doors to diverse career paths.</p> <p>The postgraduates could position themselves at the forefront of a burgeoning field, where evidence based dietary strategies play a pivotal role in shaping the future of the sports and fitness industry.</p>
2.	Whether the UGC has recommended the course:	YES
3.	Whether all the courses	Master's Course (Home Science) in Sports Nutrition shall

	have commenced from the academic year 2023-2024:	commence from the academic year 2023-2024. Semester I and Semester II shall commence from the academic year 2023-2024. Semester III and Semester IV shall commence from the academic year 2024-2025.
4.	The courses started by the University are self-financed, whether adequate number of eligible permanent faculties are available?	The course is SELF-FINANCED. Adequate Eligible faculties are recruited each year.
5.	To give details regarding the duration of the Course and is it possible to compress the course?	Two Years Full Time (Four Semesters) It is NOT possible to compress the course.
6.	The intake capacity of each course and no. of admissions given in the current academic year:	Intake Capacity: 20 Number of admissions given in the current academic year: Ongoing
7.	Opportunities of Employability/ Employment available after undertaking these courses:	With the growing interest in fitness, wellness, and sports performance, there is an increasing demand for professionals who are well-versed in sports nutrition. Postgraduates can thrive as sports nutritionists, working with professional teams, athletes and fitness enthusiasts to optimize performance. Roles in sports academies, health and fitness clubs and wellness centers are manifold as is aiding individuals in achieving their fitness goals. Opportunities exist to branching out into research and therapeutic sports product development and marketing for sports nutrition brands. Overall, the M.Sc. in Sports Nutrition equips the learner with skills to tap into a wide range of employment within the dynamic and evolving sports and fitness industry.

Sign of Head of the Institute:

Sign of Dean:

Name of the Head of the Institute:

Name of the Dean

Dr. Anuradha J. Bakshi
(I/C Principal)

Name of the Department

Name of the Faculty

Foods, Nutrition and Dietetics