Dr. BMN College of Home Science (Autonomous)

Smt. Manjulaben Gunvantrai Shah Department of Post Graduate Studies

PG Diploma in Sports Science, Fitness & Nutrition

Syllabus as per the National Education Policy 202

SN	Courses	Type of Course	Credits	Marks
	Semester I			
SSFN 101	Human Physiology (Th)	Major (Core)	4	100
SSFN 102	Human Nutrition & Metabolism (Th)	Major (Core)	4	100
SSFN 103	Sports & Exercise Science (Th)	Major (Core)	2	100
SSFN 104	Sports & Exercise Science (Pr)	Major (Core)	2	50
SSFN 105A/B	Nutritional Biochemistry or SWAYAM	Major (Elective)	4	100
SSFN 106	Research Methodology	Minor Stream (RM)	4	100
SSFN 107	Meal Planning (Pr)	Major (Core)	2	50
			22	**550**
	Semester II			
SSFN 201	Anatomy, Kinesiology & Ergonomics	Major (Core)	4	100
SSFN 202	Nutrition for Sports & Exercise (Th)	Major (Core)	4	100
SSFN 203	Nutrition for Sports & Exercise (Pr)	Major (Core)	2	50
SSFN 204	Counseling Techniques for Nutrition	Major (Core)	2	50
SSFN 205 A/B	Introduction to Food Entrepreneurship or Principles for Food Processing	Major (Elective)	4	100
SSFN 206	Internship and Project	OJT	4	100
SSFN 207	Supplements and Ergogenic Aids	Major (Core)	2	50
			22	**550**

Course Syllabus

Semester II

Major (Core)

Course Title	**Anatomy ,Kinesiology and Ergonomics**
Course Credits	**4 (Theory)**
Course Outcomes	After going through the course, learners will be able to
	Understand the basics of Human anatomy, biomechanics, and sport ergonomics.
	Develop application knowledge towards sports performance, exercise performance, and posture balance
Module 1 : Basics of Human Anatomy	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand and apply knowledge of the basics of Human Anatomy and body movement
	2. Understand the basics of Human kinesiology and its relation to body movement
Content Outline	Musculoskeletal system, joints, and it's Anatomy. Definition, explanation, and practical application scope of Kinesiology.
Module 2: Biomechanics	
Learning Outcomes *(Specific related to the module… e.g. Define, Differentiate, Carry out, Design, etc)*	After learning the module, learners will be able to
	1. Understand the concept of biomechanics
	2. Apply the concept for various sports
Content Outline	Basics of biomechanics, principles of stability, dynamometry and joint motion study. Their practical concepts, principles and application.
	Module 3 : Factors affecting performance

Learning outcomes	After learning the module, learners will be able to Understand and learn effect of different environmental and body factors that affect the sport performance.
Content outline	The module highlights varoius factors that effect the work and sport outcome and performance like Thermal stress, Altitude, climatic conditions and rest. It focuses on precautionary measures during training in adverse conditions.
	Module 4: Sports ergonomics
Learning outcome	After learning the module, learners will be able to understand the basics of ergonomics and it's need in sports
Content outline	The module explains definition, principles and need of Ergonomics in sports It highlights cumulative traumatic disorders and principles of designing protective instruments and equipments in sports.

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Individual and group assignments.
2. Continuous assessment – MCQ

References:

Course Title	**Nutrition for Sports and Exercise**
Course Credits	**4 (Theory)**
Course Outcomes	After going through the course, learners will be able to
	1. Understand the contribution of macronutrients and micronutrients to sports.

	2. Recommend sports-specific requirements of energy, macronutrients, and hydration.
Module 1 (Credit 1) - Energy, Carbohydrate, and Fat for Sport	
Learning Outcomes	After learning the module, learners will be able to
	a. Understand the role of energy systems utilized in sports. b. Understand the function and requirements of energy yielding nutrients in exercise and sports.
Content Outline	● Energy - Energy substrate for activities of different intensity and durations. ● Carbohydrates and Fats as a source of energy for exercise and sports - factors affecting intake of carbohydrate and fat. ● Type, timing and quantity of carbohydrate and fat for exercise and sports. ● Nutrient periodization for carbohydrate and fat
Module 2 (Credit 1) - Protein and Hydration for Sports	
Learning Outcomes	After learning the module, learners will be able to
	a. Understand protein needs for exercise and sports. b. Understand the strategies applied for hydration in exercise and sports.
Content Outline	● Protein - Protein and amino acid requirements, Factors affecting Protein intake and turnover. ● Type, timing, and quantity of protein for exercise and sports. ● Importance of periodization and meal timing related to the type of training and exercise intensity ● Hydration - Effect of exercise and sports on fluid balance - Beverage composition and formulation (isotonic, hypotonic and hypertonic), Beverage timing (Pre-exercise hydration, during exercise hydration protocol, Post-exercise rehydration); Beverage palatability and fluid intake
Module 3 (Credit 1) - Sports Specific Nutrition and Hydration	
Learning Outcomes	After learning the module, learners will be able to
	a. Understand the nutrient requirements for different sports. b. Discuss the fluid needs and rehydration strategies for different sports. c. Describe the effects of nutrient timing on recovery and performance in sports.
Content Outline	● Energy systems utilized during endurance, strength, and power sports. ● Distribution of macronutrients and fluid in a daily diet of athletes for endurance, strength and power sports; ● Food and fluid intake before, during, and after endurance, strength, and power sports and exercise. ● Glycemic Load and Glycemic Index in selection of carbohydrates - Carbohydrate loading

	● Guidelines for fuel during different training and competition phases - Training programs, Nutrient timing and periodization for different sports. ● Current literature suggestions on food intake and recovery strategies.
Module 4 (Credit 1) - Nutritional and Hydration Guidelines for Special Populations and Team Sports	
Learning Outcomes	After learning the module, learners will be able to
	a. Understand the nutritional challenges and requirements for age-based athletes. b. Identify nutritional challenges in female athletes.
Content Outline	● Master level and Young athletes - Factors affecting the Nutritional Needs and performance ● Special considerations for young and master-level athletes. ● Female Athletes - Disordered Eating, Eating Disorders, and the Female Athlete Triad

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Individual and group assignments.
2. Flipped learning & Peer Teaching
3. Quizzes & Class tests

References

1. Bean, A. (2022). *The complete guide to sports nutrition*. Bloomsbury Publishing.
2. Benardot, D. (2020). *Advanced sports nutrition*. Human Kinetics Publishers.
3. Fink, H. H., & Mikesky, A. E. (2017). *Practical applications in sports nutrition*. Jones & Bartlett Learning.
4. Campbell, B. (Ed.). (2013). *Sports nutrition: enhancing athletic performance*. CRC Press.
5. Maughan, R. J. (Ed.). (2013). *Sports nutrition* (Vol. 19). John Wiley & Sons.
6. Bhide G, Mandalika S. (2018) Nutritional Guidelines for Sports Persons. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
7. Antonio, J., Kalman, D., Stout, J. R., Greenwood, M., Willoughby, D. S., & Haff, G. G. (Eds.). (2009). *Essentials of sports nutrition and supplements*. Springer Science & Business Media.
8. Driskell, J. A. (Ed.). (2007). *Sports nutrition: fats and proteins*. CRC press.

Course Title	**Nutrition for Sports and Exercise**
Course Credits	**2 (Practical)**
Course Outcomes	After going through the course, learners will be able to
	1. Assess and plan diets for sportspersons based on the sports played
	2. Plan and prepare diets for sportspersons for training and competition phases
Module 1 (Credit 1) - Sports Specific Nutrition	
Learning Outcomes	After learning the module, learners will be able to
	a. Assess the nutritional status of athletes and understand their nutritional requirements. b. Plan meals and recipes required by a sports individual for various sports activities.
Content Outline	● Dietary guidelines for training & competition ● Diet Planning for Endurance Sports (eg: cycling, marathon, Triathlon, swimming, Rowing, sailing, etc.) ● Diet planning for strength and power sports (eg: Sprinting, Throwing, High jump, long jump, Gymnastics) ● Planning and preparation of diets for Weight class sports -Boxing -Wrestling -Weightlifting -Bodybuilding Racket sports athletes -Badminton -Squash -Tennis/Table-tennis ● Planning and preparation of diets for team sports -Cricket -Hockey -Football -Kabbadi -Basketball
Module 2 (Credit 1) - Special meals and preparations for sports and exercise	
Learning Outcomes	After learning the module, learners will be able to
	a. Plan carbohydrate and protein-rich meals for pre and post-exercise consumption. b. Plan products and beverages required by a sportsperson during various sports activities
Course outline	● Fluid & electrolyte replacement strategies for athletes ● Carbohydrate-loading diet ● Pre, during, and post-exercise carbohydrate preparations ● Protein-based meals for exercise training ● Sports Bar - energy bar and protein bar ● Sports drink- energy drink, protein drink

Major (Core)

Course Title	**Techniques of Nutrition Counselling**
Course Credits	**(Theory- 4)**
Course Outcomes	After going through the course, learners will be able to
	Define the Counselling Process and develop counseling skills and techniques of counseling
	Develop and design counseling aids for communicating with individual/mass populations
Module 1 (Credit 1): Nutrition Counselling	
Learning Outcomes	After learning the module, learners will be able to
	1. Define the process of counseling and tactics of counseling
	2. Gain skills and understand underlying strategies for counseling patients
Content Outline	A. Nutrition counseling: Definition; Requirement; Procedures to adopt; Role of a Sports Dietitian and theories and strategies to be adopted in nutrition counseling. B. Tactics and techniques of counseling- evaluating and understanding the clients' attitude, how to identify and express your feelings towards the client, utilizing proper counseling techniques- non-verbal behavior, verbal behavior, and covert behavior. Counseling sessions for individual athletes, teams, coaches, and other supporting staff C. Computer applications and protocols for nutrition counseling
Module 2 (Credit 1): Designing & Development of Tools for Counseling	
Learning Outcomes	After learning the module, learners will be able to
	1. Define different counseling tools and Design effective aids and presentations that can be applied for communicating to individual/ mass population.
Content Outline	A. Tools useful for education; Strategies for effective nutrition education. B. Develop tools and conduct counseling sessions in the campus

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Individual and group assignments.
2. Continuous assessment – Tool development and measuring its effectiveness through counseling session feedback

References:

1. Curry, R.K. and Jaffe, A. (2012): Nutrition Counselling and Communication Skills, W.B. Saunders Co. London.

2. Essential Counseling Skills: Practice and Application Guide (2014), Sandy Magnuson, Ken Norem

3. An introduction to Counselling (2013), John McLeod, Fifth edition

4. Group Counseling Strategies Skills (2023) 8Th Edition by Mass Jacobs Schimmel, Cengage

Major (Elective)

Course Title	**Introduction to Food Entrepreneurship**
Course Credits	**4 (Theory)**
Course Outcomes	After going through the course, learners will be able to
	1. Understand the concepts of entrepreneurship, its needs and scope
	2. Understand the meaning of the term entrepreneur, the classification of entrepreneur, and the qualities of an entrepreneur
	3. Appreciate the concept of innovation
Module 1 (Credit 1): Entrepreneurship in Education – What, Why, When, How	
Learning Outcomes	After learning the module, learners will be able to
	1. To understand the basic concepts of Entrepreneurship
	0. To know about the common core of entrepreneurship
Content Outline	1.1 Terminology of Entrepreneurship 1.2 Who is an Entrepreneur? 1.3 Characteristics of a Successful Entrepreneur
Module 2 (Credit 1): Creativity, Innovation and Entrepreneurship	
Learning Outcomes	After learning the module, learners will be able to
	1. To understand the different ways to assess entrepreneurship
	0. To know about the entrepreneur skills
Content Outline	2.1 The Creative Process 2.2 The Process of Innovation
Module 3 (Credit 1): **Business Requirements for Food Products**	
Learning Outcomes	After learning the module, learners will be able to
	To apprehend the global concept of entrepreneurship
	To understand the insights about entrepreneurship as a business model

Content Outline	3.1 What an Entrepreneur Needs to Consider? 3.2 Marketing skills 3.3 Developing the Business Plan
Module 4 (Credit 1): Understanding the Development of Innovative Food Products	
Learning Outcomes	After learning the module, learners will be able to
	1 To gain practical knowledge through skill-based training
	2. To understand the scaling up of Food products through a practical approach
Content Outline	4.1 Development of Food Products 4.2 Innovations Modification & Standardization 4.3 Packaging & Food Labeling 4.4 FSSAI Rules & Regulations

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Individual and group assignments.
2. Formative assessment through quizzes and MCQ
3. Concept Mapping
4. Practical Approach

References:

- Abes, E. S., Jackson, G. & Jones, S. R. 2002. Factors that motivate and deter faculty use of service learning. Michigan Journal of Community Service Learning, 9, 5-17.
- Ajzen, I. 1991. The theory of planned behavior. Organizational behavior and human decision processes, 50,179-211.
- Amabile, T. & Kramer, S. 2011. The progress principle: Using small wins to ignite joy, engagement, and creativity at work, Harvard Business Press
- Black, P. & Wiliam, D. 2009. Developing the theory of formative assessment.
- Educational Assessment, Evaluation, and Accountability, 21,5-31.
- Blank, S. 2005. The four steps to the epiphany, Cafepress.com.
- Blank, S. G. & Dorf, B. 2012. The startup owner manual: the step-by-step guide for building a great company, K&; S Ranch, Incorporated.

Major (Elective)

Course Title	**Principles for Food Processing**
Course Credits	**4 (Theory)**

Course Outcomes	After going through the course, learners will be able to
	1. Familiarize with different methods of food processing and their applications in food preparation.
	2. Identify different types of food packaging and health claims.
Module 1 (Credit 1): Use of High Temperature	
Learning Outcomes	After learning the module, learners will be able to
	3. Identify different methods of applying heat for food processing and the effect of heat on the food product. 4. Identify the benefits and limitations of dehydration and concentration as a method of food processing and the different methods available for dehydration.
Content Outline	D. Use of Heat for Cooking (Dry & Moist) E. Blanching F. Canning G. Sterilization H. Pasteurization I. Dehydration & Concentrations (Methods & techniques used, changes caused).
Module 2 (Credit 1): Low Temperature & Non-Thermal Method	
Learning Outcomes *(Specific related to the module… e.g. Define, Differentiate, Carry out, Design, etc)*	After learning the module, learners will be able to
	Understand the methods of cold temperature for food processing and the effect of cold temperature on the food product. Gain knowledge about the mechanism of non-thermal methods of food processing. Identify the applications of using food enzyme in food processing industry.
Content Outline	**Use of Low Temperature** Cold Preservation- Freezing & Refrigeration Changes in food during cold processing **Non-Thermal Methods of Food Processing** Ionizing Radiation & Microwave Heating – Mechanism & Application Food Enzyme - Application in food processing
Module 3 (Credit 1): Traditional & Recent Methods of Food Processing	

Learning Outcomes *(Specific related to the module… e.g. Define, Differentiate, Carry out, Design, etc)*	After learning the module, learners will be able to
	Differentiate between the methods followed traditionally & recent advances to increase the shelf life of food products.
	Understand the effect of traditional and new methods on the quality of food products and their applications.
Content Outline	**Traditional Methods of Food Processing** Smoking Sun drying Pickling/ Salting Fermentation **Recent Methods of Food Processing** Use of technology for minimal processing Use of Hurdle Technology Cold Pressed Techniques
Module 4 (Credit 1): Food Packaging & Preservation	
Learning Outcomes *(Specific related to the module… e.g. Define, Differentiate, Carry out, Design, etc)*	After learning the module, learners will be able to
	Identify different types of food packaging material used by food industries. Understand the different types of preservatives used for extending the shelf life.
Content Outline	**Food Packaging & Labelling** Role of Food Packaging and Labelling Different Packaging Materials Labelling details and Health Claims **Food Preservation** Food Additives Food Preservatives Laws & Regulation

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

- Individual and group assignments.
- Continuous assessment – MCQ

References:

1. Borvers, J. (1992). Food Theory and Application (2ndEd), New York: Maxwell MacMillan International Edition. Manay, N. S. and Sharaswamy, S. M. (1997).Foods: Facts and Principles New Delhi: New Age International Publishers.
2. McWilliams, M (2007). Foods: Experimental Perspectives 5th Ed, New Jersey: Macmillar Publishing Co.
3. Potter, N. N. and Hutchkiss, J. H. (1997).Food Science, 5th Ed, New Delhi: CBS Publishers and Distributors.
4. Rick Parker (2003) Introduction to Food Science, New York: Delmar Thomson Learning.
5. Scottsmith and Hui Y.H (Editors) (2004) Food Processing – Principles and Applications London Blackwell Publishing.
6. Subbulakshmi, G and Udipi, S. A. (2001).Foods Processing and Preservation, New Delhi: New Age International (P) Ltd. Publishing.
7. Swaminathan, M. (1995).Food Science Chemistry and Experimental Food. The Bangalore Printing and Publishing Co. Ltd.
8. Vacklavick, V. and Christian, E. (2003).Essentials of Food Science. New York: Kluwer Academic/ Plenum Publisher. ** All new journals related to Food Preservation**

Major (Core)

Course Title	**Supplements and Ergogenic Aids**
Course Credits	**2 (Theory)**
Course Outcomes	After going through the course, learners will be able to
	1. Classify different ergogenic aids & understand the guidelines related to their consumption.
	2. Apply the knowledge of dosage & duration of various nutritional supplements and any toxicity involved while planning diet for athletes.
Module 1 (Credit 1): Macronutrient Ergogenic Aids	
Learning Outcomes *(Specific related to the module.* *e.g. Define, Differentiate, Carry out, Design, etc. …)*	After learning the module, learners will be able to
	5. Classify different types of Ergogenic Aids and related guidelines and regulations for sportspersons.
	6. Define the dose, guidelines, and duration of micronutrient supplements. 7. Understand the effect of macronutrient supplements on sports performance.
Content Outline	**Introduction to Ergogenic Aids** Definition and Classification of Ergogenic Aids Regulations & Anti-Doping Guidelines **Macronutrient Supplements** J. Protein Supplements (Plant & Animal Proteins) K. Amino Acid Derivatives L. Fat Derivatives M. Energy Bars & Supplements
Module 2 (Credit 1): Micronutrient and Other Supplements	
Learning Outcomes *(Specific related to the module…* *e.g. Define,*	After learning the module, learners will be able to
	2. Define the dose, guidelines, and duration for micronutrients & other supplements.

Differentiate, Carry out, Design, etc)	3. Understand the effect of adding functional food supplements on sports performance.
Content Outline	**Micronutrient Supplements** a. Vitamins b. Anti-oxidant nutrients c. Minerals- Ca, Mg, Fe **Other Supplements** a. Herbal Supplements b. Functional Foods c. Fat Burners d. Sports Drinks & Electrolytes Market Survey for Nutritional Ergogenic Aids

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

3. Individual and group assignments.
4. Continuous assessment – MCQ

References:

1. Goldberg, I 1994. Functional Foods: Designer Foods, Pharma foods, Nutraceuticals Chapman & Hall
2. Gibson, GR and William, CM. 2000. Functional foods - Concept to Product. Woodhead publishing.
3. Aluko, R.E. (2012). Functional Foods and Nutraceuticals. Springer
4. Manfred L (2015), Antioxidants in Sports Nutrition, CRC Press.
5. Antonio J et al, (2008), Essentials for Sports Nutrition and Supplements, Humana Press.
6. Bhide G & Subhadra M (2017), Nutritional Guidelines by Sports Person, Jaypee Brothers Medical Publishers.