SEVA MANDAL EDUCATION SOCIETY'S
DR. BHANUBEN MAHENDRA NANAVATI COLLEGE OF HOME SCIENCE
(AUTONOMOUS)
NAAC Re-accredited 'A+' Grade with CGPA 3.69 / 4 (3rd Cycle)
UGC Status: College with Potential for Excellence
BEST COLLEGE AWARD 2016-17: Adjudged by S.N.D.T. Women's University
338, R.A. Kidwai Road, Matunga, Mumbai – 400019

APPROVED SYLLABUS UNDER AUTONOMY

Department of post Graduate Studies

PROGRAMME: *P.G. SPORTS SCIENCE, FITNESS & NUTRITION*

Semester: I & II

ELIGIBILITY:

- The minimum percentage is 50% or B grade for students who have the following degrees: B.Sc. Foods and Nutrition, B.Sc. Food Science and Nutrition, B.Sc. Clinical Nutrition and Dietetics/Nutrition and Dietetics, B.Sc. Public Health and Nutrition, B.Sc. Applied Nutrition.
- The minimum percentage is 55% or B grade for students with a degree in Pure Sciences: B.Sc. Life Sciences, B.Sc. Biochemistry, B.Sc Biotechnology, B.Sc. Physiology, B.Sc Zoology, B.Sc. Molecular Biology, B.Sc. Clinical and Laboratory Sciences.
- Minimum 50% or B grade for students with Postgraduate Diplomas in Dietetics, Applied Nutrition, Sports Sciences Fitness and Nutrition, Public Health, Clinical Research.
- NOTE: Applicants who do not have specialization in Foods and Nutrition at Undergraduate level should have completed a total 32 credits under the semester pattern or 600 marks under the annual pattern in the following subjects:
- Chemistry
- Biology
- Physiology

- ***Program Objectives:***

- To train and develop students with expertise in fitness and nutrition management for services in wellness/fitness centers, weight management programmes, and into school/college/university teams, health centers and sports academies.
- To develop capabilities to provide individual counseling and group education in nutrition, exercise and fitness.
- To prepare students for careers as entrepreneurs in organizing, directing or managing physical fitness programmes with a holistic approach to fitness and wellness.
- To counsel sports person under different sports category.

- ***Program Specific Objectives:***

Program Outcomes

After successful completion of the course, the learner will be able to:

- Develop expertise in fitness and nutrition management for services in wellness/fitness centers, weight management programmes, and into school/college/university teams, health centers and sports academies.
- Design and provide diet plan for individual counseling and group education in nutrition, exercise and fitness.
- Understand the unique but important concept of sports psychology which plays an impact on the performance of the athletes.
- Construct their careers as entrepreneurs in organizing, directing or managing physical fitness programmes with a holistic approach to fitness and wellness.
- Counsel sports person under different sports category as per their body composition and nutritional needs.
- Analyze and evaluate recent research advances in the field of sports nutrition.

Semester I

Sr. No.	Course	No of lecture	T.C.	Th Cr.	Pr. Cr	Internal marks	External marks	Total marks
Core component								
1	Human Physiology	60	4	4	-	50	50	100
2	Human Nutrition Pr	120	4	-	4	50	50	100
3	Sports and Exercise Science Th	60	4	4	-	50	50	100
4	Sports and Exercise Science Pr	120	4	-	4	50	50	100
5	Anatomy, Kinesiology and Ergonomics	60	4	4	-	50	50	100
6	CBCS: Human Nutrition and Metabolism/ Functional Foods	60	4	4	-	50	50	100
Value-Added Courses								
1	Nutritional Biochemistry	30	2	2	-	50	50	100
2	Bridge Course*	60	4	4	-	50	50	100

*Compulsory for students from non-nutrition background

Course Title: HUMAN PHYSIOLOGY

SSFN101

Course Description: This course introduces students to the physiology of the human body. Students understand the mechanisms of body function, organized around the central theme of homeostasis – how the body meets changing demands while maintaining the internal constancy necessary for all cells and organs to function.

Course outcomes:
At the end of the course, the learner will be able to:

- Discuss the fundamental & physiological processes of homeostasis, cell physiology, nervous system, urinary system, digestive system, respiratory system, circulatory and immune system.

- Explain the alteration in structure and function of normal physiology that takes place due to clinical disorders and vice versa.

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
SSFN101	Human Physiology	60	4	4	-	50 M	50 M	100 M

Contents:

levels of organization for Human Anatomy and body fluids (15 Lectures)

Module No	Objectives	Content	Evaluation

1	The module enables students to: a. Understand basics of human cell structure and levels of organization for human anatomy b. Understand types, distribution and specific functions of tissues in human body c. Understand composition, location and functioning of different fluids present in human body	**1. Cell Structure** a) Levels of cellular organization b) Types of cell organelles, tissues, organs and systems c) Regulation of cell Multiplication **2. Tissues** Structure, physiological properties and function of: a) Epithelial tissue b) Muscle tissue c) Nervous tissue d) Skeletal tissue (bone and cartilage) **3. Body Fluids** a) Lymph b) CSF c) Ocular d) Interstitial e) Pleural f) Pericardial g) Synovial fluids h) Blood: Blood formation, composition, coagulation, factors affecting coagulation, hemostasis. Blood groups and histocompatability, blood indices, Anemia.	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

Focus on Homeostasis: cardio-respiratory system & Gastro-intestinal system *(10 Lectures)*

Module No	Objectives	Content	Evaluation
2	The module will enable students to: a. Understand structure, location and functions of cardiac and respiratory systems in human body b. Understand the regulatory mechanism of cardio-respiratory system	**2.1. Heart and Circulation** a) Basic Structure, special junctional tissues, cardiac muscle properties b) Cardiac cycle, cardiac output, factors affecting cardiac output c) Normal ECG, heart failure d) Systematic, pulmonary, coronary and portal circulation	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/

	c. Understand the mechanism of breathing d. Understand the normal ECG pattern and the concept of blood pressure • Understand various pathological conditions that can be manifested by individuals due to changes in structure and functioning of these organs/ systems	e) Blood pressure, control and factors affecting blood pressure. **2.2. Respiratory System** a) Structural components of Respiratory System b) External and Internal respiration c) Mechanical control of respiration d) Chemical control of respiration e) Neural control of respiration	conducted for each module

Focus on Homeostasis: gastro-intestinal, excretory & reproductive system (15 Lectures)

Module No	Objectives	Content	Evaluation
3	a) Understand structure, location and functions of gastro-intestinal, hepatic-biliary system, excretory and reproductive system in human body and its regulatory mechanism • Understand various pathological conditions that can be manifested by individuals due to changes in	**3.1 Gastrointestinal system and Hepato biliary system** a) Structure, physiology and functions of the GI tract and accessory organs and role of hormones and enzymes involved in digestion process **3.2 Excretory System** a. Components of Excretory System, Kidney: Structural and functional relation b. Overview of urine formation process c. Regulation of water balance, excreting dilute or concentrated urine d. Regulation of acid base balance e. Blood supply to kidney **3.3 Reproductive System** a. Female Reproductive System – Structure and function of Ovary, Uterus b. Hormonal control of menstrual cycle	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

	structure and functioning of these organs/ systems	c. Male reproductive system – Structure and Function of Testis, hormonal control of spermatogenesis.	

<u>Focus on Homeostasis: Endocrine and nervous system & Biological aspects if Immunity (15 Lectures)</u>

Module No	Objectives	Content	Evaluation
4	This module enables students to: • Understand advances in molecular biochemistry • Understand structure, metabolism of nucleotides and its related disorders • Understand gene expression and factors involved in its regulation.	**Biochemical aspects of purine and pyrimidines** a. Metabolism of purines b. Metabolism of pyrimidines **c.** Role of purine and pyrimidine nucleotides in metabolism. **Biochemistry of Nucleic Acids** a. Metabolism of DNA b. Metabolism of RNAs c. DNA replication, mutation, repair and recombination concepts d. Disorders of nucleic acid metabolism **Protein Biosynthesis** a. Gene expression and its regulation, transcription, translation, post-translational modification b. Inhibitors of protein biosynthesis c. Gene expression in mitochondria d. Systems Biology including Metobolomics and Proteomics	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

<u>EVALUATION</u>

Evaluation	Details	Marks
Internal	Unit test (offline/ online)	25

	Continuous evaluation: Projects/ Quiz/ Class tests/ Assignment & Presentations.	25
External	Written examination test	50
	Total marks	100

References:

1. West, J.B.: Best and Taylor's Physiological Basis of Medical Practice, 11th Edition.
2. Chatterjee, C.C. (2002): Human Physiology: Medical Allied Agency, Calcutta.
3. Guyton and Hall (2003): Test Book of Medical Physiology, 9th Edition, Prism Books Pvt. Ltd., W.B. Sanders Company, USA.
4. Tortora (2003) Principles of Anatomy and Physiology.. John Wiley and sons.
5. Keel and Neil: Samson and Wright's Applied Physiology (12th edition), Oxford University Press. London.
6. Ross and Wilson: Anatomy and physiology in Health and Illness, 8th Edition, Church Hill Livingstone, N.Y

Course Name: HUMAN NUTRITION PRACTICALS

Course Code: SSFN102

Course Description:

The course is designed to introduce students to the concept of meal planning and to design meals for specific life stages.

Course Outcome

At the end of the course, the learner will be able to:

- Explain the concept of standardization, food groups and their application in daily meal plans.
- Develop a basic diet plan for different life stage population and make necessary changes in the dietary habits needed.
- Evaluate and alter basic recipe in a healthy preparation by introducing minor changes.

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
SSFN102	Human Nutrition (P)	60	4	-	4	50	50	100

Human Nutrition: Basics and Introduction (20 lectures)

Module No.	Objectives	Content	Evaluation
1	This module enables students to: a) Gain an understanding of the fundamentals of Nutrition Understand the portion control and thereby the basics of standardization	i. Basic five food groups, dietary guidelines and food pyramid Standardization of common recipes	Students will be evaluated on basis of diet plan submission/ journal competition/ assignments/ planning exams

Principles of meal planning & nutrition for different age groups (40 lectures)

Module No.	Objectives	Content	Evaluation
2	This module enable students to: a. Understand basic principles of meal planning b. Prepare a basic meal plan which is nutritionally adequate for all the age groups of the general population.	Meal Planning and Preparation: (a) Principles of meal planning (b) Planning and preparation of nutritionally adequate diets for - Adult man - Adult woman - Adolescent - School going child - Preschooler - Pregnant woman - Lactating women	Students will be evaluated on basis of diet plan submission/ journal competition/ assignments/ planning exams

MODULE 3: planning of different recipes (60 lectures)

Module No.	Objectives	Content	Evaluation
3	This module enable students to: • Plan and prepare simple recipes rich in particular nutrient which can be used during specific conditions.	Planning and preparation of: - Energy dense recipes - High fibre recipes - Low fat recipes - Low sodium recipes - Micronutrient dense recipes	Students will be evaluated on basis of diet plan submission/ journal competition/ assignments/ planning exams

EVALUATION

Evaluation	Details	Marks
Internal	Journal work & assignment/ project submission	50
External	Practical examination test & Viva Voce	50
	Total marks	100

Course Name: SPORTS AND EXERCISE SCIENCE (TH)

Course Code: SSFN103

Course Description

This course provides instruction and the opportunity for participation in a variety of lifetime sports and physical fitness activities. Skills, strategies, rules, and personal wellness of sports person.

Course Outcome

At the end of the course, the learner will be able to:

- Understand the scientific background of exercise and sport activities.
- Develop and monitor the athletic and fitness programmes for individuals and groups.
- Construct appropriate health and fitness goals for athletes

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
4103	Sports & Exercise Science	60	4	4	-	50	50	100

Contents

Body composition, types and principles of exercise (10 lectures)

Module No	Objectives	Topics	Evaluation
1	This module enable students to: a) Understand the basics of various sports, games and exercise and their role in athletes.	Sports, Games and Exercise, Types and description. Principles of exercise, importance, advantage and disadvantages of types of exercises including Aerobics, yoga, Resistance exercise, isometric and isotonic exercise etc. Body composition: Body cell mass, Lean body mass, direct and indirect techniques for	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/

	a. Understand various components and techniques used to assess body composition.	determining body composition; Body types, Kinanthropometry.	Presentations assigned/ conducted for each module

<u>Functional tests of health & Fitness (20 lectures)</u>

Module No	Objectives	Topics	Evaluation
2	This module enables students to: **a)** Understand the working of cardio respiratory system in the body of an athlete and the effect of exercise on these systems. **b)** Understand the various methods available to assess energy expenditure in sports and exercise athletes.	The Cardio Respiratory system –Athletic heart. Acute and chronic adaptation (effect of different types of exercise), Index of training, Importance of heart rate monitoring, over training and detraining. Respiratory system- control during physical exercise. Effect of training on heart and lung performance, chronic and acute adaptation, Hypoxia and hypercapnia. Lung function test and its importance, Spirometry Determination of energy expenditure in sports and exercise using various methods.	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

<u>Musculo-skeletal and nervous system (15 lectures)</u>

Module No.	Objective	Content	Evaluation
3	This module enable students to: a) Understand the different types of muscle in the human body and their role in various activities. b) Understand the effect of over training on the human body with	Skeletal muscle types, relation with different types of activities. Physiological adaptations to strength training. Effects of over training and detection, Muscle fatigue, prevention and recovery. Effects of exercise on nervous system.	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations

	measures for its prevention and recovery. Understand the effect of exercise on nervous system.		assigned/ conducted for each module

Sports related issues, injury & Doping (15 lectures)

Module No.	Objective	Content	Evaluation
4	This module enable students to: a) Understand the problems associated with female athletes, its causes and curative and preventive measures. b) Understand the basics of various injuries a sports person faces with its preventive and curative measures. Understand doping as a legal matter and various policies associated with doping.	Menstrual problems of female athletes. Female athletic triad. Sports injury and rehabilitation. Stress and strain, Basic injuries in upper and lower limb, neck, trunk and hip joint and nerve injuries, acute and chronic back ache, foot problem in sports, role of physiotherapy and yoga, preventive exercise program. Doping and its control.	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

EVALUATION

Evaluation	Details	Marks
Internal	Unit test (offline/ online)	25
	Continuous evaluation: Projects/ Quiz/ Class tests/ Assignment & Presentations.	25
External	Written examination test	50
	Total marks	100

REFERENCES

1. Fox EL (1983).Sports Physiology.Holt-Saunders International Editions,
2. McArdle, W.D.; Katch, F.I and Katch V.I.(eds)..Exercise Physiology, Energy, Nutrition and Human performance. Latest edition
3. McArdle, W.D.; Katch, F.I and Katch V.I. (eds).Essentials of Exercise Physiology. Latest edition
4. Satyanarayan, K; Nageshwar Rao. C; Narsinga Rao,B.S.; Malhotra, M.S. (1985). Recommended Dietary Intakes for Indian Sportsman and Women, Hyderabad, National Institute of Nutrition.
5. Bloomfield J, Ackland TR. and Elliot BC (1994). Applied Anatomy and Biomechanics in Sportsssss. Blackwell Scientific Publications.
6. Kirkendall D, Gruber J J and. Johnson R E. (1987). Measurement and evaluation for Physical Educators -. Human Kinetics Publishers Inc.

Course Name: SPORTS AND EXERCISE SCIENCE (Pr)
Course Code: SSFN104

Course Description :

This course provides theoretical knowledge with the practical application of scientific principles and technology to help individuals maximize their sports performance.

Course Outcome

At the end of the course, the learner will be able to:

- Design, administer, and evaluate different type of exercise techniques for individuals and group.
- Assess the physiological and functional capacity of individual and groups.
- Discuss the possibility and prevention of any contradictions for exercise and create appropriate solutions for the same

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
SSFN104	Sports & exercise Science (P)	120	4	-	4	50	50	100

Contents

Functional tests (40 lectures)

Module No	Objectives	Content	Evaluation (50 M)
1	This module will enable students to: a) Gain knowledge for assessing cardiac functioning, and application of ergometer.	Physiological tools for testing and monitoring of training-Blood pressure, Heart rate, Calculating Training heart rate. Exercise ergometry- Cycle ergometer, treadmill	Students will be evaluated on basis of journal competition/ assignments/ execution of activities assigned

Physical fitness assessment (40 lectures)

Module No.	Objective	Content	Evaluation
2	This module will enable students to: Gain knowledge and skills to interpret body composition of an individual and its implication for human health	Physical fitness assessment- Body composition, and other indices for assessment of obesity, body fat percentage by skinfold method and Somatotyping. BMI, Ideal body weight. Assessment of Muscle Mass and Bone mass	Students will be evaluated on basis of journal competition/ assignments/ execution of activities assigned conducted for each module

Aerobic fitness tests (40 lectures)

Module No.	Objective	Content	Evaluation
3	This module will enable students to: a. Gain knowledge and skills to asses methods used for cardio- respiratory fitness and its interpretation b. Gain knowledge about components of fitness and its application on filed	Cardio-respiratory fitness - Max aerobic capacity using modified Harvard test (Queens college test) , Nine minute walk / run test, One mile walk Assessment of Physical work capacity (PWC) Physiological response on Bicycle ergometer/ treadmill. Anaerobic threshold. Assessment of Flexibility, Muscular endurance, Strength and Power.	Students will be evaluated on basis of journal competition/ assignments/ execution of activities assigned conducted for each module

EVALUATION

Evaluation	Details	Marks
Internal	Journal work & assignment/ project submission	50
External	Practical examination test & Viva voce	50
	Total marks	100

Course Name: ANATOMY, KINESIOLOGY AND ERGONOMICS

Course Code: SSFN105

Course Description.

The course begins with core topics from anatomy, kinesiology and the physiology of work as applied to human abilities and limitations. It also explores biomechanics, anthropometry, physical and psychosocial ergonomic risk factors and analytic methods to mitigate risk exposure.

Course Outcome

At the end of the course, the learner will be able to:

- Explain and discuss with sportsmen/athletes and physically active individuals who exercise to use optimum energy to maximize performance under normal and stressed conditions while minimizing injury
- Provide the essential inputs for design of sports and exercise equipment.

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
SSFN105	Anatomy, kinesiology & Ergonomics	60	4	4	-	50	50	100

Basics of human anatomy (10 lectures)

Module No	Objectives	Content	Evaluation (50 M)
1	This module will enable students to: a) Understand the basics of Human Anatomy and its applied aspects in human body movement. a) Understand the basics of Kinesiology and its relation to basis of human movement.	Introduction, definition and scope Human anatomy and its applied aspects in body movement. Musculoskeletal system, general anatomy of bones, joints and muscular attachments, joints and their kinds. Muscle structure, functional units , their function, muscle types, recruitment and contraction of muscle fibre, neuromuscular structure. Introduction, definition and scope of Kinesiology.	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

		Axis and planes, levers, kinematics (osteo and ortho), kinetics, Types of contraction, motion, velocity, development of force and its relation to muscular contraction, basis of human movement.	

Biomechanics (20 lectures)

Module No.	Objective	Content	Evaluation
2	This module will enable students to: Understand and apply knowledge of basics of biomechanics in various sports.	Basic rules of mechanics and its application in sports, external and internal forces, principles of stability, whole body centre of gravity, movement of inertia, dynamometry, static and dynamic forces, joint motion study. Posture, concepts, principles and adjustments	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

Factors affecting performance (15 lectures)

Module No.	Objective	Content	Evaluation
3	This module will enable students to: Understand the role of different kind of work environment on an athlete performance.	Effect of work environment on health, safety and performance. Altitude, different climatic condition. Body temperature control and its importance in sports and performance. Process of heat transfer, thermal stress on physiological variables at rest and during activity. Heat tolerance, precautionary	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews

		measures during the training in adverse conditions.	Assignments/ Presentations assigned/ conducted for each module

Sports ergonomics (15 lectures)

Module No.	Objective	Content	Evaluation
4	This module will enable students to: Understand the basics of ergonomics and its need in sports.	Definition of and need for sports Ergonomics Principles of ergonomics (Basic human factors and MME system). Cumulative traumatic disorders, types, risk factors and prevention. Principle of designing protective equipments in sports -shoes, helmets, shoulder pads, braces etc.	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

EVALUATION

Evaluation	Details	Marks
Internal	Unit test (offline/ online)	25
	Continuous evaluation: Projects/ Quiz/ Class tests/ Assignment & Presentations.	25
External	Written examination test	50
	Total marks	100

References

1. Joint structure and Function - Pamela K. Levangie and Cynthia Norkin ; 4th edition
2. Sports Injuries - Christopher Noriris
3. Industrial Therapy - Glenda Key
4. Ergonomics Edge - Dan Macloid
5. Sports Physiology, by Edeard L. Fox, Holt-Saunders International Editions, PP418, 1983.
6. The Physiological Basis of Physical Education and Athletics, by E. L. Fox and D.K..Mathews, Published by Holt-Saunders, 1981.
7. Text Book of Work Physiology, by P. Astrand and K.Rodahl, Published by McGraw-Hill, 1970.
8. Textbook of Medical Physiology, by A.C.Guyton, Published by W.B.Saunders Co., PP1014, 1991.
9. Fitting the task to the man, by E.Grandjean, Published by Taylor & Francis Ltd.1980.
10. Indian Anthropomeetric Dimensions: for ergonomics design practice, by D.Chakrabarti, Published by National Institute of Design, 1997.
11. The Mechanics of Athletics by G. Dyson, Published by Dover Publications Inc., 1962.

An Introduction to Measurement in Physical Education, by H. J. Montoye, Published by Allyn and Bacon Inc., 1978

Course Name: HUMAN NUTRITION AND METABOLISM

Course Code: SSFN106 A

Course Description

The course is designed to provide information about principles of Human Nutrition and an integrated overview of the physiological requirements and functions of protein, energy, and the major vitamins and minerals that are determinants of health and diseases in human populations.

Course Outcome:

At the end of the course, the learner will be able to:

- Explain major properties, functions, and important food sources of the nutrients;
- Discuss the human nutrient and energy needs throughout the life span and in physical training.
- Translate human nutrient and energy needs into daily food selection utilizing appropriate standards and guidelines;
- Evaluate meal plans for nutritional adequacy, nutrient density, balance, variety, and calorie control.

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
SSFN106 A	Human Nutrition & Metabolism	60	4	4	-	50	50	100

EVALUATION

Evaluation	Details	Marks
Internal	Unit test (offline/ online)	25
	Continuous evaluation: Projects/ Quiz/ Class tests/ Assignment & Presentations.	25
External	Written examination test	50
	Total marks	100

Module 1:

Introduction to human nutrition and carbohydrates

(15 lectures)

OBJECTIVES	CONTENTS	EVALUATION
This module enable students to: a) Understand the various factors influencing the food intake b) Understand the basics of metabolism of Carbohydrates Know the functions, deficiencies and toxicity of carbohydrates	Nutrition and its relation to health Food Acceptance and Food Behavior Internal and external factors influencing the intake of food Digestion of Food- Role of gastrointestinal tract, hepatobiliary system and pancreas Absorption- mechanisms of transport Digestion, Absorption and metabolic conversions (in brief), functions, sources, requirements effects of deficiencies and excess of Carbohydrates: sugar, starches, fiber Metabolic conversions to include utilization of glucose(postabsorptive), conversion to glycogen and fat Glucose Homeostasis and role of Hormones (in brief)	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

Module 2:

Proteins and Lipids

(15 lectures)

Objectives	Content	Evaluation
This module enable students to: a) Understand the basics of metabolism of Lipids b) Understand the role of lipoprotein and its implications on health. c) Understand the basics of metabolism of Proteins and its requirements during different stages of life cycle	Digestion, Absorption, Transport (in brief), functions, sources, requirements, effects of deficiencies and excess of Lipids : fatty acids, fat, cholesterol Role of lipoproteins and implications for health (in brief) Digestion, Absorption and metabolic conversions (in brief), functions, sources, requirements during different stages of life cycle, effects of deficiencies and excess **of** Protein and amino acids- essential and non-essential amino acids Disposal of nitrogenous wastes – role of liver and kidney Protein synthesis and breakdown vis-à-vis the intake	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

Module 3:
Vitamins
(15 lectures)

Objectives	Content	Evaluation
This module enable students to: a) Understand the basics of metabolism of fat soluble and water soluble vitamins b) Understand the various functions and sources of fat soluble and water soluble vitamins. c) Identify the deficiencies and potential toxic effects of fat soluble and water soluble vitamins leading to various disorders.	Absorption and transport, functions(physiological and biochemical), sources, requirements during different stages of life cycle, effects of deficiencies and excess of : Fat soluble vitamins - Vitamin A - Vitamin D - Vitamin E - Vitamin K Water soluble vitamins - Vitamin C - Thiamin - Riboflavin - Niacin - Pyridoxine - Folic acid - Vitamin B12 - Pantothenic acid - Biotin	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

Module 4:

Minerals

(15 lectures)

Objective	Content	Evaluation
This module enable students to: a) Understand the basics of metabolism of minerals and trace elements b) Understand the various functions and sources of minerals and trace elements. c) Identify the deficiencies and potential toxic effects of minerals and trace elements leading to various disorders.	Absorption and transport, functions(physiological and biochemical), sources, requirements during different stages of life cycle, effects of deficiencies and excess of Minerals and trace elements - Calcium and phosphorus - Iron - Zinc - Fluoride - Iodine - Selenium - Copper Sodium, Potassium and Chloride	Students Will be evaluated based on their performance in Quizes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

REFERENCES:

1. Groff, James L & Gropper, Sareen S: Advanced nutrition and human metabolism. 3rd ed. Stamford : Wadsworth Publ, 1999.
2. Barasi, Mary E : Human nutrition : a health perspective. London : Arnold, c1997.
3. Present Knowledge in Nutrition. International Life Sciences Institute.
4. Eastwood, Martin & Edwards, Christine & Parry, Doreen : Human nutrition : a continuing debate. London : Chapman & Hall, c1992.

5. The Role of Fats in Human Nutrition/edited by F B Padley and Podmore. Chichester : Ellis Horwood, c1985.(Ellis Horwood Series in Food Science and Techology, edited by I D Morton)
6. Guthrie Helen (1986) Introductory Nutrition. Times Mirror/ Mosby College Publishing.
7. Mudambi, S.R., Rajgopal, M.V.(1990) Fundamentals of Foods and Nutrition, New Age International Pvt. Ltd.
8. Nutrient Requirements and Recommended Dietary Allowances for Indians- I.C.M.R. Publication 1999.
9. Robinsson, and Lawler. (1986) Normal and Therapeutic Nutrition. Mac Millan Pub.Co.
10. Elenaor N., Whitney S., Rady R. (1993): Understanding Nutrition, West Publishing Company, Minneapolis.
11. Wardlaw (1993): Perspectives in Nutrition, Paul Insel Mosby.
12. Bhatia Arti: Nutrition & Dietetics- Anmol Publication Pvt. Ltd.- New Delhi.
13. C. Gopalan, B.V. Ramasastri and S.C. Balasubramanian (1989)- Nutritive Value of Indian Foods. NINICMR Hyderabad 500 007

Course Title: FUNCTIONAL FOODS

Course Code: SSFN106 B

Course Description: This course is designed to explore research based knowledge about specific food products or nutrients having health benefits that can prevent, manage clinical conditions

Course outcomes:
At the end of the course, learners will be able to:

- Understand the concept of functional food and active components of food.
- Apply research-based knowledge and evidence-based facts of functional foods for preventive and therapeutic nutrition.
- Discuss the mechanism of action for functional food and its safe intake levels.

Code No.	Course	No of lec	T.C.	Th Cr.	Pr. Cr	Internal	External	Total
SSFN106 B	Functional Foods	4	4	4	-	2/50	2/50	100 Marks

EVALUATION

Evaluation	Details	Marks
Internal	Unit test (offline/ online)	25
	Continuous evaluation: Projects/ Quiz/ Class tests/ Assignment & Presentations.	25
External	Written examination test	50
	Total marks	100

Contents:

Modulle 1:
Prebioic, Probiotic & Symbiotics
(15 lectures)

Objective	Content	Evaluation
a. To learn about the functioning and benefits for prebiotics, probiotics and symbiotics	**Introduction:** Definition, history, classification – Type of classification (Probiotics, probiotics and synbiotics; Nutrient vs. Non-nutrient; according to target organ; according to source or origin). **Probiotics** a. Taxonomy and important features of probiotic micro-organisms. b. Health effects of probiotics including mechanism of action. c. Probiotics in various foods: fermented milk products, non-milk products etc. d. Quality Assurance of probiotics and safety. **Prebiotics** Unit 1. Definition, chemistry, sources, metabolism and bioavailability, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases, perspective for food applications for the following: • Non-digestible carbohydrates/oligosaccharides: • Dietary fibre • Resistant starch • Gums	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

	Application for gut microflora, GI dysfunctions, Immune related disorders and infections	

<u>Module 2:</u>
<u>Biodynamic compounds</u>
<u>(15 lectures)</u>

Objective	Content	Evaluation
To understand plant based functional ingredients and food's chemistry and benefits To learn their application in suitable clinical conditions	**Potential health benefits of the following biodynamic principles:** Definition, chemistry, sources, metabolism and bioavailability, effect of processing, physiological effects, effects on human health and potential • Polyphenols: Flavonoids, catechins, isoflavones, tannins Curcumin, Resveratrol • Phytoesterogens/ Isoflavones • Phytosterols • Glucosinolates • Pigments : Lycopene, Carotenoids • Organo sulphur compounds • Other components – Phytates, Protease inhibitors, saponins, Amylase inhibitors, haemagglutinins	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

Module 3:

Spices & herbs : Application of functional food in therapeutic conditions

(30 lectures)

Objective	Content	Evaluation
a. To learn about the active ingredient, present naturally in spices, herbs and other plant based foods, their implication and benefits for clinical conditions, sports etc.	Active biodynamic principles in spices, condiments and other plant materials and their evidence-based effects Application of functional food(s) for: 1. Communicable and infectious diseases AIDS/ HIV, air-borne, vector-borne, food-borne, water- borne diseases 2. Non communicable diseases: obesity and metabolic syndrome, cardiac disorder, liver and kidney issues, endocrine abnormalities 3. Cancer prevention and management of symptoms 4. At different life stages 5. Sports athletes 6. Neurological health	Students Will be evaluated based on their performance in Quizzes/ Class tests/ Unit test/ Projects/ literature reviews Assignments/ Presentations assigned/ conducted for each module

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