

UNIVERSITY OF MUMBAI

No.UG/379 of 2008.
Mumbai 400 032,
13th August, 2008.

The Principal,
College of Home Science
Nirmala Niketan,
49, New Marine Lines,
MUMBAI-400 020.

Madam,

I am to inform you that the recommendation made by the Ad-hoc Board of Studies in Home Science at its meeting held on 7th June, 2008 has been accepted by the Academic Council at its meeting held on 13th June, 2008 vide item No.4.28 and subsequently approved by the Management Council at its meeting held on 27th June, 2008 vide item No.13 and that in accordance therewith the M.Sc.(Home Science) degree course in Sports Nutrition is introduced by the University from the academic year 2008-09.

Further that in exercise of the powers conferred upon the Management Council under Section 54(1) and 55(1) of the Maharashtra Universities Act, 1994 it has made Ordinances 5769 and 5770 and Regulations 5891, 5892, 5893, 5894, 5895 and 5896 including scheme of examinations and syllabi relating to the M.Sc.(Home Science) degree course in Sports Nutrition is as per Appendix and the same has been brought into force with effect from the academic year 2008-2009.

Yours faithfully,

(O. E. KATE)
for REGISTRAR

MUMBAI-400 032
13th August, 2008

A.C/4.28/13.06.2008
M.C./13/27.06.2008

No.UG/379-A of 2008,

MUMBAI-400 032

13th August, 2008.

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Science.
- 2) The Chairperson, Ad-hoc Board of Studies in Home Science
- 3) The Controller of Examinations,
- 4) The Co-ordinator, University Computerization Centre.

(O. E. KATE)
for REGISTRAR



UNIVERSITY OF MUMBAI



Ordinances, Regulations,
And Syllabus
for M.Sc. (Home Science) degree Course
in
Sports Nutrition

(Introduced With effect from the academic year 2008-2009)

M.Sc. I & M.Sc. II

PATTERN OF THEORY PAPER

- 1) For a 100 mark paper 25 marks will be internal 75 University exam for which
 - a) Q.No.1 will be compulsory of 15 marks
 - b) 6 more questions to be set of 15 marks each of which 4 to be attempted
 - c) In all 5 questions of 15 marks to be answered, totaling to 75 marks
 - d) Paper will be of 3 hours duration
- 2) For a 75 mark paper, 15 marks will be internal, 60 marks University exam for which
 - a) Q.No.1 of 15 marks will be compulsory
 - b) 5 more questions of 15 marks will be set of which 3 have to be attempted
 - c) Totally 4 questions of 15 marks to be answered , totaling to 60 marks
 - d) Paper will be of 2 hours duration
- 3) For 50 mark paper, 10 marks will be internal, 40 marks for University exam for which
 - a) Q.No. 1 is compulsory of 10 marks
 - b) 5 more questions of 10 marks each will be set of which 3 questions will be attempted.
 - c) Totally 4 questions of 10 marks to be answered, totaling to 40 marks.
Paper will be of 1 ½ hours duration

O ~~5769~~ Title of the course (Home Science) ^{course}
M.Sc. IN SPORTS NUTRITION

Objectives of the course:

1. To impart knowledge on the Nutritional basis for enhanced exercise and sports performance with due emphasis on
 - Physiology and body composition,
 - Nutritional requirements
 - Weight Management
 - Holistic health
 - Ergogenic aids
2. To prepare students for a career in fitness academies, sports institutes, educational and health institutions; pharmaceutical industries and corporate sectors.

O ~~5770~~ Eligibility:

B.Sc. with Home Science (any branch)
B.Sc. with Biochemistry, Life Sciences,
B.Sc. with Nursing/ Physiotherapy
Medical graduates any discipline
Male and Female Candidates can apply for the course

R ~~5891~~ STUDENT INTAKE CAPACITY: 30

M.Sc. (HOME SCIENCE)
SPORTS NUTRITION
R-5892-FEE STRUCTURE

S.NO.	HEAD	AMOUNT/STUDENT (Rs.)	
		M.Sc. I	M.Sc. II
1	TUITION FEES		
2	LABORATORY FEES	25,000	25,000
3	LABORATORY DEPOSIT	4,500	5,000
4	LIBRARY FEES	500	--
5	LIBRARY DEPOSIT	2,000	2,500
6	GYMKHANA FEES	500	----
7	IDENTITY CARD	500	500
8	EXAMINATION FEES	75	75
9	MAGAZINE	1,000	1,000
10	PROSPECTUS (handbook, syllabus & application form)	100 700	100 ---
11	PROJECT EVALUATION	---	1,000
12	CAUTION MONEY	500	500
13	UNIVERSITY REGISTRATION	825	---
14	UNIVERSITY SHARE OF TUITION FEES	800	800
15	FIELD VISITS*	1,000	1,000
	TOTAL	38,000	37,975

* Additional charges will be levied for outstation visits/ conferences

SUBJECTS	THEORY/ PRCS	INTERNAL MARKS	UNIV MARKS	TOTAL	PERIODS / WEEK	UNIV EXAM HOURS	INT EXT
Research Methods and Statistics	Theory	25	75	100	4	3	Both
Exercise Physiology	Theory	15	60	75	3	3	"
Nutritional Biochemistry	Theory	25	75	100	4	3	"
Nutrition through the Life Cycle	Theory	10	40	50	2	2 ½	"
Sports Nutrition paper – I	Theory	10	40	50	2	2	"
Exercise Physiology	Practical	15	60	75	5	5	"
Assessment of nutritional fitness	Practical	10	40	50	3	3	"
TOTAL				500	23		

***Students will be graded for their performance during internship**

- Visits To Gymnasiums, Health Clubs Will Be Arranged To Impart Practical Knowledge To The Students
- Students Will Be Participating in relevant Seminars/Workshops/Conferences to upgrade their knowledge.

RESEARCH METHODS AND STATISTICS -THEORY

Objectives:

1. To help students develop the skills needed in conducting a research in their specialization.
2. To promote academic, research and professional ethics in students.
3. To introduce students to principles of good scientific writing.
4. To enable in students the skills in selecting, computing, interpreting and reporting statistics.

Marks - 100
Periods - 4/WK

UNIT	CONTENTS	NO. OF LECTURES
1	A: Introduction and overview (a) What is a research? (b) Objectivity and subjectivity in scientific inquiry. B: Steps in the research process (a) Identifying broad areas of research in a discipline (b) Identifying interest areas; using multiple search strategies (c) Prioritising topics; specifying a topic; feasibility (d) Review of literature/scholarly argument in support of study (e) Specifying research objectives/hypotheses/questions C : Qualiitative VS Quantitative Research	2 7 1
2	A: Variables (a) Definition (b) Characteristics (c) Types (d) Levels of measurement B: Validity and reliability in quantitative research	5 3
3	A: Research designs in quantitative research Distinguishing between the following research designs; and, selecting research designs that are congruent with one's research purpose. (a) Longitudinal and cross-sectional (b) Experimental, quasi-experimental and correlational	6

	(c) Exploratory, descriptive, and explanatory	
	B: Sampling techniques in quantitative research	
	(a) Probability and nonprobability sampling methods	
	(b) Sampling methods in current use/examples from current research	
	(c) Issues with regard to sampling techniques	
4	A: Data entry in quantitative research	4
	(a) Contrasting paper-and-pencil (master sheet and codebook) vs. computer-based/technology-aided data entry (data file and dictionary information on variables)	
	(b) Creating data files and data management	
	B: Qualitative research methods	6
	(a) Research designs in qualitative research	
	(b) Sampling techniques in qualitative research	
	(c) Data collection methods in qualitative research	
	(d) Data analytic strategies in qualitative research	
	(e) Reporting of results in qualitative research	
5	A: Ethics	5
	(a) In research in general	
	(b) In research with human subjects	
	(c) In research with animal subjects	
	B: Scientific writing	7
	(a) Distinguishing scientific writing from popular and literary writing styles	
	(b) Characteristics/principles of scientific writing (avoiding plagiarism; use of citations, quotations, a reference list or a bibliography; writing from an outline, sectioning the document/using headings and subheading; avoiding redundancy; avoiding ambiguity; avoiding jargon)	
	(c) Writing a research proposal	
	(d) Reporting statistical findings in text	
6	Statistics	
	A : Introduction and overview	2
	B: Descriptive Statistics for summarizing nominal level variables	3
	(a) Frequency (also known as a count)	
	(b) Raw frequencies vs. relative frequencies	
	(b) Percentages (how, when, and why)	
	(c) Barcharts and piecharts	

A :	(a) Descriptive Statistics for summarizing ratio level variables (b) Frequencies and percentages (c) Computing an average/measure of a central tendency Mean, Median, Mode(s), 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 (d) Computing a measure of variability or dispersion Variance and standard deviation (e) Discrete and continuous variables (f) Histograms and line graphs	10
B: Descriptive Statistics for summarizing interval level variables		1
C: Descriptive Statistics for summarizing ordinal level variables	(a) Frequency and relative frequency per ascending category (b) Mean and median with decoding (c) Barcharts with bars with ascending categories on the x axis	1
A: Probability: Foundation of Advanced/Inferential Statistics	(a) Definition (b) Role of probability in research and statistics (c) Elementary concepts in probability	6
B: Other concepts needed for the use of advanced/inferential statistics	(a) Types of distribution, Frequency distribution, Normal distribution Probability distribution, Sampling distribution (b) Type I and type II errors (c) Central limit theorem (d) Point estimation vs. interval estimation (e) Standard error (and confidence intervals) (f) Parametric and nonparametric methods	6
Unit 9: Using an advanced statistical method	(a) Steps in the use of an advanced statistical method (b) Selecting and justifying the use of a test procedure (c) Contrasting the observed value with the critical value and declaring test results, Level of significance (p values), Meaning, Cut-offs (in various disciplines), Interpreting and reporting significance, Non-significant vs. insignificant (d) Describing & Discussing the results	12

10	(e) To study statistics that allows us to contrast phenomena Univariate chi-square test, Bivariate chi-square test, t- or z- test for contrasting two independent groups, Paired t- test	
	(f) To study statistics that allows us to examine relationships between variables Bivariate chi-square test, Product-moment correlation coefficient	
	A: Ethics in the use of statistics	2
	B: Demonstration of computer software such as the Statistical Package for the Social Sciences (SPSS) – Data entry, Data Management and Descriptive Statistics	5

References:

- Bhattacharyya, G.K., & Johnson, R. A. (1977). *Statistical concepts and methods*. NY: John Wiley.
- Dwiwedi, R. S. (1997). *Research methods in behavioral sciences*. Delhi: Macmillan India.
- Gravetter, F. J., & Wailnau, L. B. (2000). *Statistics for the behavioral sciences*. Belmont, CA: Wadsworth/Thomson Learning.
- Kerlinger, F. N., & Lee, H. B. (200). *Foundations of behavioral research*. Orlando, Florida: Harcourt.
- Leong, F.T.L., & Austin, J. T. (Eds.) *The psychology research handbook*. New Delhi: Sage.

EXERCISE PHYSIOLOGY (Theory)**Objectives:**

1. To impart knowledge on the physiological effects of exercise on human body composition.
2. To explain to the students the body compositional requirement for various athletic and sports categories.
3. To enable the students understand the role of exercise in fitness.
4. To enable the students understand the therapeutic benefits of exercise.

Marks – 75
Periods – 3/WK

UNIT	COURSE CONTENT	NO. OF LECTURES
1.	BODY COMPOSITION - An overview of human body composition - Factors influencing body composition-Age, Sex, etc... with special emphasis on Exercise. - Effect of ergogenic aids on body composition of athletes - Physique and sports performance.	15
2.	MUSCLE PHYSIOLOGY - Structure, composition, types and Functioning of muscles - Types of muscle exercise- endurance, resistance and flexibility; and their effect on the composition and strength of muscle. - Effect of training on muscle - Exercise related Muscle injuries - Adaptation to exercise causes and concerns - Markers of muscle fitness	15
3.	CARDIOVASCULAR & PULMONARY RESPONSE TO EXERCISE - Physiology of Cardiovascular System - Effect of aerobic and anaerobic Exercise training on pulmonary and cardiovascular fitness. - Markers of cardiovascular & pulmonary fitness - Regulation of cardio respiratory functioning - Adaptation of cardio respiratory system to exercise - Role of exercise in the diseases of CV & pulmonary system	20
4.	EXERCISE & SKELETAL FITNESS - Bone Physiology-Structure of bone, Bone formation and remodeling - Types of joints - Bone injuries during exercise training Exercise and bone health	12

	A) EFFECT OF EXERCISE ON FLUID AND ELECTROLYTE BALANCE & ACID BASE BALANCE	7
	B) EXERCISE & THERMAL STRESS; EFFECT OF EXERCISE ON THERMOREGULATION.	6

References:

1. Rhodes, R & Pflouzer, R (2003) Human Physiology, Thomson Brooks & cole, 4th Ed.
2. Waugh, A and grant, A (2006) Anatomy and Physiology in Health and illness Churchill Livingstone, 10th ed.
3. Davier, A, Blakeley, GH and Kidd, C (2001) Human Physiology, Harcourt Pub., 1 st ed.
4. Tortora, GJ and Grabowski, RS (1993) Principles of anatomy and Physiology, harper Collins College Pyblishers, 7th ed.
Laboratory Manual, NIN
5. McArdle, WD., Katch, FI & Katch, VL (1996) Exercise Physiology, 4th ed., Williams & Wilkins, A Waverly Company

NUTRITIONAL BIOCHEMISTRY**Objectives:-**

This course will focus on Nutrition as a Science that integrates biochemistry from the cellular level and would help to understand the metabolism of macronutrients in the body and how it would relate to nutritional health at the tissue, organ and system level.

At the completion of this course the student should be able to

1. Describe structure, functions and metabolism of macronutrients.
2. Describe hormonal and enzymatic modulators to the metabolism of macronutrients.
3. Describe the biochemistry and metabolism of the macronutrients during different physiological states.
4. List important micronutrients needed as cofactors involved in macronutrient metabolism.
5. Explain the metabolic inter relationship between macronutrients.

Have knowledge of current research on Nutrition, Metabolism and dietetics.

MARKS: 100
PERIODS: : 4/WK

UNITS	CONTENTS	NO. OF LECTURES
1	Basic Chemistry and Classification of Macromolecules w.r.t. carbohydrates, proteins, Lipids.	10
2	Digestion and absorption of macromolecules w.r.t. enzyme action and Biochemical mechanism.	5
3	Metabolism of macronutrients carbohydrates, EMP, TCA, Gluconeogenesis, HMP, Glycogen metabolism, Uronic acid pathway Metabolism of Fructose, Galactose. Protein –Urea cycle, Glucose-Alanine Cycle, NH ₃ transport. Biosynthesis of Glutathione, Creatinine haem, carnitine, neurotransmitters.	12 5
	Lipid:- Oxidation and biosynthesis of even C fatty acid and Cholesterol biosynthesis.	5
4	Measurement of energy, Laws of Thermodynamics Redox reactions, Electron Transport chain, ATP, Mechanism of Oxidative phosphorylation , phosphogens	5

5	Chemistry of Nucleic Acids, DNA and Types of DNA, RNA and types, structure and functions	4
6	DNA & RNA Metabolism Transcription, Translation and Protein biosynthesis. Regulation of Gene expression, Nutrient gene interactions	3 3
7	Enzyme chemistry IUBC Classification, identification of active site, factors affecting enzyme activity, K_m and its significance, enzyme inhibition, drug-enzyme interactions, enzymes of clinical significance.	5
8	Nutrient and Drug Interactions. -Drug metabolism, drugs as antimetabolites, effect of drugs on nutrient status, Drug Food and drug-nutrient incompatibilities. -Body defense mechanisms. Detoxification and role of cytochrome p450, Free radicals, antioxidants.	5 5
9	Hormones: Chemistry, mechanism of secretion, physiological function of Thyroxine, Catecholamines, Insulin, Glucagon, Corticosteroids; Growth hormone.	5
10	Interrelationship of nutrients Vit A – Zn Vit E – Se Vit C – Fe Vit D – Ca, P B-Complex Mn, Mg, Co.	3

References:

1. Berg J.M. Tynocрко, John, L et al Biochemistry 5th ed. New York W.H. Freeman and Co 2002.
2. Brody Tom. Nutritional Biochemistry 2nd ed. New Delhi El sevier/Reed El sevier India Pvt Ltd. 2004
3. Chatterjea M.N. Shinde and Rana textbook of Medical Biochemistry 6th ed. New Delhi Jaypee Brothers Medical Oublishers 2005.
4. Devlin Thomas, M (ed) textbook of Biochemistry with Chm, Corr. New york, John Wiley and Sons Inc. 1997.

5. Montgomery, rex and others Biochemistry A case oriented Approach St. Louis The C.V. Mosby Co. 1977.
6. Murray, R.K. and others. Harper's Biochemistry 25th ed. Connecticut, Appleton and large Publications.
7. Nelson D.L. and Cox. M.M. Lehminnges, Principles o Biochemisiry 3rd ed. New York. Worth Publishers Macmullan Press, 2000
8. Puri Dinesh Textbook of Biochemistry. A Clinically oriented Approach New Delhi B.I. Churchill Livingstone Pvt. Ltd. 2002.

M.Sc. PART I- SPORTS NUTRITION

NUTRITION THROUGH THE LIFE CYCLE

Objectives:

- To understand the changes in Human body composition during different stages of life.
- To study the influence of Nutrition on man during the different stages of life cycle.
- To be aware of, and update the knowledge in the field of nutrition as applied during the life cycle.

MARKS: 50
NO. OF LECTURES: 2/WK

UNIT	CONTENTS	NO. OF LECTURES
1	A.) Basics of Nutrition – A brief overview of functions, sources & deficiency of Macro and Micronutrients	5
	B) Balanced Diet	2
2	A) Nutrition during Pregnancy i) Reproductive Physiology (Male and Female) in brief. ii) Nutrition related disruptions in fertility (under and over nutrition) iii) Physiology of pregnancy iv) Effect of Nutritional Status on pregnancy outcome. v) Nutritional requirements and dietary guidelines vi) Nutrition related complications vii) Complications of pregnancy viii) HIV/AIDS during pregnancy – Dietary concerns ix) Role of Exercise & Fitness x) Adolescence Pregnancy	15
	B) Nutrition during Lactation i) Physiology of Lactation ii) Human milk composition iii) Nutritional requirements & dietary guidelines iv) Benefits of Breast Feeding v) Galactagogue vi) Lactation Management in Normal & Special conditions	11
3	A) NUTRITION IN INFANCY - Physiologic development, Motor, Cognitive development. - Energy and nutrient needs. - Feeding in early and late infancy - Development of infant feeding skills - Common nutrition problems	6

	Feeding Preterm and low birth weight infants	
	B) NUTRITION IN TODDLERHOOD AND PRESCHOOL CHILDHOOD PREADOLESCENT. - Growth and development - Nutritional requirements - Nutrition for children with special health care needs - Feeding problems - Nutritional concerns and prevention of nutrition related disorders a. Obesity – underweight b. Deficiency condition c. Allergies, eating disorders.	8
	C) NUTRITION IN ADOLESCENCE - Growth and development - Physiological and Psychological changes - Nutritional requirements of adolescents - Health and eating related behaviour. - Situation with special needs a. Pregnancy b. Eating disorders c. Obesity – underweight d. Substance abuse e. Deficiency conditions f. Sports and athletics	10
4	NUTRITION IN THE ADULT YEARS. - Physiological and Psychosocial changes - Common nutritional concerns - Defensive Nutrition paradigm - Nutritional requirements and dietary recommendation. - Physical Activity in adulthood.	8
5	NUTRITION IN AGING/ELDERLY. - Theories of Aging, Physiological and Psychosocial changes - The Aging Process - Nutritional requirements of the Elderly - Nutrition care - Nutrition needs during illness and chronic conditions. * Sensory loss - Oral health - GI functions - Neuromuscular & skeletal functions - Renal and cardiac function - Immunocompetence	10

References.

- Bennion H (1979) Clinical Nutrition, New York Rapper and Raw
- Donald, B, Mc Colmick, Dennis M. Bier (1997) Annual review of Nutrition (vol. 19)
- Goodhart, R.S.S and Shils, M.E. (1998) Modern Nutrition in health and disease. Philadelphia Lea and Febiger.
- Groff, J.L and Gropper SS (1999) Advanced nutrition and human metabolism, Belmont CA Wadsworth/Thomson Learning.
- Jackson, marc S. (1997) Adolescent nutritional disorders. New York: The New York Academy of Science.
- Judith E. Brown (1998) Nutrition now. West/Wadsworth. International Thomson Pub. Co.
- L. Kathleen Mahan, Sylvia Escott-Stamp, Krause's Food Nutrition and Diet Therapy.
- Lee Robert S and Carol Marcus 91990) Omega – 3 fatty acids in health and disease.
- Mahan K.L. Stump S.E. – 11th ed. 2004 – Krause's Food Nutrition and diet Therapy – Saunders – ELSEVIER USA.
- Wardlaw G.M. Insel P.M. Seyler M.F. (1994) Contemporary Nutrition; Issues and insights St. Louis Mosby.
- Warthington R. Vermecrush J. Williams S (1985) Nutrition in pregnancy and Lactation St. Louis Times Mirror.Mosby College Publishing.
- Lee Roberts and carol Marcus 91990) omega 3 Fatty Acids in health and disease – Marcel dekker Inc.
- Brown J.E. Issacs sugarman J, 2002 Nutrition through the life cycle – Wadsworth Thomson learning.
- Ziegler, EE and Filer L.J 91996) present knowledge in nutrition Washington D.C. International Life Science institute.

List of journals for both subjects -

1. Journal of American Dietetic Association USA – The American dietetics Association.
2. Nutrition reviews, New York Springer verlog
3. The American – Journal of clinical Nutrition – USA Official journal of the American Society for Clinical Nutrition Inc.
4. The Indian journal of Nutrition and dietetics.

M.Sc PART I- SPORTS NUTRITION

SPORTS NUTRITION PAPER - I

Objectives

1. To gain the knowledge and understanding of nutrition required for exercise and sport in order to enhance performance.
2. To learn the role and significance of macro nutrients and micronutrients in achieving fitness.

Marks: 50**Periods: 2**[illegible]

▪ Total fat intake ▪ High carbohydrate diets ▪ Dietary fibre ▪ Alcohol - Influence of exercise - Type of exercise - Gender influence - Lipid metabolism - Weight Loss	
(iii) <u>Amino Acids and Protein</u> - an overview of digestion, absorption. - amino acid metabolism, related to exercise - a pool during and after exercise BCAA - protein turnover and exercise - protein synthesis – mechanism and control. - physical activity and protein requirements - Balance studies to determine requirements. - Utilisation of protein during exercise. - Protein intake and performance.	8
ROLE OF VITAMINS IN EXERCISE - Effect of exercise on fat soluble and water soluble vitamins in the body - Food Sources - Requirements of vitamins for sport and exercise.	8
ROLE OF MINERALS AND OTHER TRACE ELEMENTS IN EXERCISE - Influence of exercise on selected minerals Calcium, Iron and Zinc - Food sources - Requirements for exercise and sport.	8
ASSESSMENT OF NUTRITIONAL STATUS OF ATHLETES - Kinanthropometry - Methodologies for assessing body composition - Assessment of nutritional status-Dietary intake and interpretation - Biochemical analysis - Clinical examination	10

References

1. Summerfield Lianne M (2001), Nutrition Exercise and Behaviour An integrated approach to weight management, Belmont (USA). Wadsworth/Thompson Learning
2. Burke Louise and Deakin Vicki (2006) Clinical Sports Nutrition, Mc Graw – Hill Pvt. Ltd. Australia.
3. Wolinsky I, Drishill Judy (1997) Sports and Nutrition Vitamins and Trace elements, CRC Prese BY.
4. Wolinsky I (1998) Nutrition in Exercise and Sports CRC press NY.
5. Browns Fred and Caustan – Cargill (2002) essentials of Sports Nutrition – 2nd edition John Wiley and Sons, England.
6. Bernadoi dan (1999) Nutrition for serious Athletes, Human Kinetics USA.
7. Wolinskoy Ira, Driskell J. (2004) Nutritional Ergogenic aids, CRC Press NY.

M.Sc PART I- SPORTS NUTRITION

PRACTICAL IN EXERCISE PHYSIOLOGY

Objectives:

1. To enable students understand the methods of assessing the physiological fitness.
2. To train the students in planning exercise and counseling strategies for special conditions – weight management, diabetes, CVD etc.

MARKS-75
PERIODS-5/WK

UNITS	CONTENT
1	Theoretical explanation and Demonstration of
A	Assessment of Cardio respiratory fitness Cardio respiratory exercises (Vo2 Max etc...)
B	Assessment of Muscular fitness Muscle Strength, Endurance and Flexibility Exercises (bench press, Jumps, Push ups, Sit & reach Test etc...)
C	Assessment of skeletal fitness – BMD
2	Suitable Exercise programme for special conditions
A	- Weight reduction and Weight Management
B	Therapeutic conditions-CVD, Diabetes, Arthritis etc...

R-5894 EXAMINATION SCHEME

Q.NO.

MARKS

- | | | |
|----|---|----|
| 1. | Planning of suitable exercise programmes for weight management /weight reduction/clinical condition | 25 |
| 2. | Spots | 10 |
| 3. | Viva Voce | 15 |
| 4. | Journal | 10 |

PRACTICAL - I: ASSESSMENT OF NUTRITIONAL FITNESS

Objectives:

1. To enable students understand the importance of biomarkers of nutritional status in the management of holistic fitness.
2. To help the students acquire practical skills in the biochemical assessment of nutritional status of individuals.

MARKS-50
PERIODS-3/WK

UNITS	COURSE CONTENT
1	ASSESSMENT OF PROTEIN NUTRITURE: - Estimation of serum Protein, Albumin and A: G Ratio (Biuret method) - Urinary creatinine/Height index, Urinary urea. - Evaluation of PeM IN pediatric, adult, geriatric and sports persons.
2	ASSESSMENT OF GLUCOSE TOLERANCE - GTT - Estimation of fasting and postprandial blood glucose levels using kit methods.
3	BIOMARKERS OF VITAMIN STATUS - Fat soluble vitamins: - Serum Retinol, Conjunctival Impression Cytology (CIC) and Dark Adaptation technique. - Serum Alkaline Phosphatase, (Vitamin D) - Serum Total tocopherol level and TBARS (Spectrophotometric analysis) - Water Soluble Vitamins. - Serum and Urinary Vitamin C (dye method) - Microscopic examination of RBC for megaloblastic anaemia - Microbiological assay for Vitamin B-12 and Folic acid.
4	ASSESSMENT OF MINERAL STATUS: - Serum Iron (Dipyridol method), Serum transferrin and TIBC - Haemoglobin - Urinary Iodine and Tests for Thyroid Function
5	NUTRITIONAL SURVEYS : - Anthropometrical assessment for protein and body weight abnormalities. - Clinical symptoms of nutritional deficiencies - Diet Surveys – Rapid Assessment surveys, Dietary recall and Record methods, Food Frequency questionnaires etc.

REFERENCES:

1. Sauberlich, HE (1999) Laboratory tests for the Assessment of Nutritional Status, 2nd ed., CRC press Laboratory Manual, NIN.
2. Dandekar Sucheta, P., Rane, S.A (2004) Practicals and viva in medical biochemistry, New Delhi, Elsevier/Reed Elsevier India PVT LTD.
3. Godkar Praful, B. (2003) Textbook of Medical Laboratory Technology, II ed., Mumbai, Bhalani Publishing House, Mumbai
4. S. Sadasivan, & A. Manickam (2003) Biochemical Methods, II Ed., New age International Pvt Ltd.

R5895 EXAMINATION SCHEME – MARKS-40

Q.NO.		MARKS
1	Analysis of body fluid for markers of protein/mineral/vitamin nutriture	15
2.	Spots	10
3	Viva Voce	10
4	Journal	05

M.Sc PART II- SPORTS NUTRITION

SUBJECTS	Theory/ Practical	Internal Marks	Univ. Marks	Total	Periods / Week	Univ Exam Hours	Int /Ext
Sports Nutrition Paper - II	Theory	25	75	100	4	3	Both
Nutritional management of Degenerative/metabolic diseases	Theory	15	50	75	3	3	„
Holistic fitness	Theory	10	40	50	2	2	„
Food Service Management in Health Care Settings.	Theory	25	50	75	3	3	„
Nutrition & Exercise for Special Conditions	Practical	10	40	50	4	5	„
Project		50	50	100	4		„
Seminar		25	--	25			Internal
Internship (2 months)	Practical	25		25			Internal
TOTAL				500	20		

- Visits To Gymnasiums, Health Clubs Will Be Arranged To Impart Practical Knowledge To The Students
- Students Will Be Participating in relevant Seminars/Workshops/Conferences to upgrade their knowledge.

M.Sc PART II- SPORTS NUTRITION

SPORTS NUTRITION PAPER II

Objectives

- To acquire knowledge about specific nutrient required for various sport activities.
- To understand important issues, concerns on enhancing performance.
- To learn about techniques used to assess nutritional status of athletics and sports persons.

UNITS	COURSE CONTENT	MARKS-100 PERIODS-4/WK
		NO. OF LECTURES
1	NUTRIENT BIOENERGETICS - Energy Cycle - Sources of body fuels and their utilization - Relationship of specific cells to metabolism - Adipocytes - Muscle fibre - Energy balance	10
2	NUTRITIONAL CONCERNS FOR - female athletes - Vitamins and Mineral malnutrition (Athletic Triad) - Eating disorders.	10
3	NUTRITIONAL ISSUES FOR SPECIAL ENVIRONMENTS AND CONDITIONS. - Training and competing at different altitudes - At extreme climates - While traveling long distances	10
4	NUTRIENT REQUIREMENTS FOR COMPETITIVE SPORTS PERSONS. - Power Sports - Endurance Sports - Combined	10 8
5	OXIDATIVE STRESS & EXERCISE PERFORMANCE Role of Antioxidants	10
6	WATER & ELECTROLYTE REQUIREMENTS -Fluid replacement strategies in various sports activities	14

7	MEAL PATTERNS AND DIETARY INTAKE - For Anaerobic power - For Aerobic power - Timing of meals.	14
8	SUPPLEMENTS AND ERGOGENIC AIDS. - Nutritional and non Nutritional supplement - Amino Acid derivatives - Lipid derivatives - Other substances present in food - Pharmacologic and chemical substance. - Evaluation of effectiveness.	6
9	NUTRITION FOR IMMUNITY - Factors affecting immunity Age, Sex, Exercise etc.	8
10	GERIATRIC NUTRITION Nutritional Requirements and common Nutritional Problems among geriatric sports and non sports persons.	

References:

8. Summerfield Lianne M (2001), Nutrition Exercise and Behaviour. An integrated approach to weight management.
9. Burke Louise and Deakin Vicki (2006) Clinical Sports Nutrition. Mc Graw – Hill Pvt. Ltd. Australia.
10. Wolinsky I, Drishill Judy (1997) Sports and Nutrition Vitamins and Trace elements, CRC Press NY.
11. Wolinsky I (1998) Nutrition in Exercise and Sports CRC press NY.
12. Browns Fred and Caustan – Cargill (2002) essentials of Sports Nutrition – 2nd edition John Wiley and Sons, England.
13. Bernadot dan (1999) Nutrition for serious Athletes, Human Kinetics USA.
14. Wolinskoy Ira, Driskell J. (2004) Nutritional Ergogenic aids, CRC Press NY.

M.Sc PART II- SPORTS NUTRITION

**NUTRITIONAL MANAGEMENT OF DEGENERATIVE AND METABOLIC DISEASES
(THEORY)**

Objectives:

To enable students understand

- Principles of nutritional management in various therapeutic conditions.
- The importance and process of nutritional counseling for athletic and non athletic persons.
- The symptoms and dietary treatment of nutrient deficiencies.

MARKS-75
PERIODS-3/WK

[illegible]

3	C. Eating disorders - Prevalence, Causes & Metabolic / Physiologic Consequences - Role of Nutrition and Lifestyle modification	
	NUTRITIONAL MANAGEMENT OF SELECTED CLINICAL CONDITIONS: A-Gastro Intestinal Disorders :- Peptic Ulcer, Duodenal Ulcer, liver diseases etc... - Etiology, Pathophysiology and effect of Exercise.	10
	B- Diabetes Mellitus and CVD - Etiology, Pathophysiology, metabolic alterations, Complications, Assessment and Management.	10
	C-Osteoporosis - Bone Physiology, Effect of Nutrition age, sex and exercise on bone health. - Assessment of skeletal fitness. - Preventive and curative strategies of osteoporosis	6
4	NUTRITIONAL MANAGEMENT OF EXERCISE INJURIES	10
5	MANAGEMENT OF SELECTED MACRO AND MICRONUTRIENT DEFICIENCY DISEASES PEM, EFA deficiency, Vitamin A, Iron and Iodine deficiency disorders.	10

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1. Ira Wolinsky (1998) "Nutrition in Exercise & Sport", 2nd ed.
2. Fred and Brouns (2002) "essentials of sports Nutrition" 2nd ed., John Wiley & Sons pub.
3. W.D. Mc Ardle & Katch (2005) "Sports and Exercise Nutrition", 4th ed. Williams & Wilkins, A Waverly Company.
4. Williams C & Delvin JT (1992) Foods, Nutrition & Sports Performance", 1st ed., E & FN Sons' Pub.
5. Burke L Y Deking V (2006) Clinical Sports Nutrition", 3rd ed., Tata McGraw Hill Pub.
6. Summerfield Lianne M (2001), Nutrition Exercise and Behaviour An integrated approach to weight management, Belmont (USA). Wadsworth/Thompson Learning

M.Sc PART II - SPORTS NUTRITION

HOLISTIC FITNESS

OBJECTIVES:

- To know about all dimensions of fitness
- To understand the concepts of stress and its implications on Health
- To imbibe knowledge about strategies that could be used to modify unhealthy behavior

MARKS-50
PERIODS-2/WK

UNITS	COURSE CONTENT	NOL
Unit I	HOLISTIC HEALTH - Definition and Meaning - Dimensions of wellness - Physical - Social - Emotional - Spiritual - Environmental - Psychological - Occupational	3
Unit II	EXERCISE FOR FITNESS - Health benefits of exercise. - Component of health related physical fitness. - Physiological responses to exercise. - Starting and maintaining a fitness program.	7
Unit III	NUTRITION FOR HEALTH - An overview of sound nutritional principles for healthy living. - Defining Nutrient Needs for different age groups. - Consumer concerns on food safety and nutritional adequacy Interrelations of diet/ Exercise for weight control - Effects obesity and being oversight on health - Fads and Faliacies of weight control - Behavioral modifications - Counseling strategies	12

Unit IV	a) STRESS AND HEALTH - Interplay of mind, body and behavior - Stress responses, relaxation responses and homeostasis - Stress prone personality patterns - Stress related chronic diseases/ disorder - Effects of depression on health: - Suicide—warning signs and prevention stress assessment - Managing stress - Modifying unhealthy behavior b) ADDICTIVE BEHAVIOR AND IT'S EFFECT ON HEALTH - Risk factors of addiction - Harmful effects of substance abuse - Strategies to overcome substance abuse	14
Unit V	a) FITNESS ASSESSMENT FOR WELLNESS - Evaluation of health status - Measuring cardio respiratory fitness - measuring muscle endurance - Flexibility - Field assessment of body composition b) LIFETIME FITNESS - Adherence to a fitness program regime - Factors that affect adherence - Problems of adherence	14

References:

1. Powers S, Dodd Stephen (1996) – Total fitness Allyss and Bacon, Univ. of Florida
2. Hoeger, W. Turner Low, W. Hafen Brent (2002), Wellness Guideliness for ahealthy life style, wadsworth/Thomas Learning USA.
3. Brannon L. Feist Jess (2000), Health Psychology IV edition, An Introduction to behaviour and health, wadsworth USA.
4. Schafer Walt (1998) Stress Management for IV ed. Wellness wadsworth USA.
5. Mind, body and soul (1998) The body shop, Bullyinch press book, little Brown and co.
6. Bhat and Savur S (1998) Fitness for life, Jaico publishing House, Mumbai.
7. Hamlyn encyclopedia for Complimentary Health (1996)

M.Sc. . PART II - SPORTS NUTRITION

FOOD SERVICE MANAGEMENT IN HEALTH CARE SETTINGS

OBJECTIVES:

- a) To apply the principles of management in food service organizations (health settings)
- b) To understand the importance of quality management and process improvement in food service organizations
- c) To learn about the food product flow in specific food production units
- d) To gain knowledge about entrepreneurship in the food service sector

MARKS: 75
PERIODS-3/WK

UNIT	COURSE CONTENT	NOL
Unit 1	FOOD SERVICE OPERATING PRACTICES -self operating, contracting, franchising Food service operations in---schools Hospitals Other health care centers(fitness, wellness clinics) -emergency food service operations -correctional facilities	8
Unit 2	a) MANAGEMENT FUNCTIONS --organizational design --leadership and motivation --personnel management --performance improvement --marketing food services b) QUALITY MANAGEMENT --approaches to quality improvement --tools used in process management --issues for quality improvement --standards of quality in food service organisations.	22
Unit 3	MENU PLANNING --Trends in menu planning --Menu pattern and structure	10

Unit 4	FOOD PRODUCT FLOW --procurement -- production --service --Kitchen design --Equipment layout --Safety, sanitation and maintenance	24
Unit 5	ENTREPRENEURSHIP IN FOOD SERVICE --starting of a food service business(location, layout) --management of finances -- legal requirements --skills/ knowledge needed for an entrepreneur in food service sectors. --planning strategies for marketing of food services/ products.	10

References:

1. Spears marian C and Gregoine Mary B (2006) Food Service organization – A managerial and System Approach Person Prentice Hall USA.
2. Payne – Palacio, Theis Monica (2005) Introduction to Food Service, Pearson Prentier Hall USA.
3. Aswathappa K. (2005) Human Resource and Personnel Management – Fourth editions, Tata McGraw – Hill Publishing Company limited. New Delhi.
4. Robbin Stephen, Coult Mary (2002), Management, 7th edition, Ashoka K. Ghosh,Prentice – Hall of India, Pvt. Ltd. New Delhi.
5. Buttle Francis (1992), Hotel and Food Service Marketing – A managerial Approach, ELBS edition, Cassel Educational Ltd, London.
6. Sudan Amik Sadan, (2002) Food Service operations, Anmol Publications, New delhi.
7. negi JagMohan (2004) Food and Beveigeleaws (Food Safety and Hygiene), Aman Publication, New Delhi.
8. Bagchi S.N. Sharma Anita (2004) Textbook of Food and Beverage Service 2nd revised edition Aman Publications, New Delhi.
9. Subject Kumar, Sandeep mallik (2007) Food Service Facilities, Aman Publishers New Delhi.
10. Hughes Diane, Goizen Godfrey (1986) Running your own restaurant, Kojan Page limited, London.
11. Erdosh George (2000) Start and run a profitable cater, business, Jaico Publishing House, Mumbai.

PRACTICAL IN NUTRITION & EXERCISE FOR SPECIAL CONDITIONS

OBJECTIVES:

1. To enable students plan and prepare diets for weight management and malnourished conditions.
2. To impart the skill of coordinating exercise programme and diet in special conditions.
3. To impart theoretical knowledge and practical skills in planning and preparation of diets for sports persons of various categories.

**MARKS-100
PERIODS-5/WK**

UNITS	CONTENTS
1	PLANNING & PREPARATION OF DIETS FOR - Male and Female Non-sports persons of different activity levels. - Sports Persons of various categories: - Endurance and Resistance sports persons: - Track events (Runners & Swimmers) - Team events (Cricket, Hockey etc.,) - Strength events (wrestlers, weight lifters etc. - Body builders
2	PLANNING AND PREPARATION OF DIETS FOR SPORTS AND NON-SPORTS PERSONS SUFFERING FOR THE FOLLOWING CONDITIONS. - Eating Disorders - Weight Management : Weight Loss and Weight gain - Hypertension - CHD - Ulcers (Peptic Duodenal) - Jaundice - PEM - Anaemia - Dehydration-Preparation of sports drinks.
3	PLANNING OF EXERCISE PROGRAMMES FOR SPECIAL CONDITIONS.

References:

1. Burke L & Deakin, V (2006) clinical Sports Nutrition, 3rd ed., The McGraw hill Companies
2. Mahan, LK and Escott-Stumps, S (2000) Krause's Food, Nutrition & diet therapy, 11th ed., CRC press.

R5896 EXAMINATION SCHEME

Q.NO.		MARKS
1.	Planning of diet for selected sports persons	20
2.	Preparation of the diet	30
3.	Viva Voce	20
4.	Journal	05

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