

Nutrition in Health and Exercise PET 3361 (3 credits)  
Dept. of Exercise Science and Health Promotion  
College of Education, Davie Campus  
Florida Atlantic University

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Course Description: Study of the nutritional needs of apparently healthy persons and athletes. Topics include: fat, carbohydrate, protein, vitamin, mineral and water needs; digestion/absorption of nutrients; energy transfer/production; optimal nutrition; thermoregulation; ergogenic aids; body composition assessment; weight management; eating disorders.

Textbook: Fink, HH, Burgoon, LA, Mikesky, AE. Practical Applications in Sports Nutrition. Jones and Bartlett, Sudbury, MA, 2009. ISBN: 978-0-7637-5494-5

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|--------------------|--------------------------|---------------------|
| <u>Evaluation:</u> | Exams 5 @ 50 points each | 250 points          |
|                    | Exam 6 = 30 points       | 30                  |
|                    | Comprehensive Final      | 100 points          |
|                    |                          | <hr/>               |
|                    |                          | 380 possible points |

Grading Scale:

Grading scale(%): A=100-95, A-=94-91, B+=90-87, B=86-82, B-=81-78, C+=77-74, C=73-70, C-=69-67, D+=66-64, D= 63-61, D-= 60-58, F=<58

Honor Code

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [http://www.fau.edu/regulations/chapter4/4.001 Honor Code.pdf](http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf).

***SEE THE DATES FOR TAKING THE EXAMS VIA  
BLACKBOARD UNDER ANNOUNCEMENTS.***

## Disabilities

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton - SU 133 (561-297-3880), in Davie - MOD I (954-236-1222), in Jupiter - SR 117 (561-799-8585), or at the Treasure Coast - CO 128 (772-873-3305), and follow all OSD procedures.

General Guidelines: The syllabus, all PowerPoint slides, and the actual exams can be found on Blackboard (<http://blackboard.fau.edu>). Prepare for exams by answering the questions for each chapter shown in the syllabus. **See the textbook for ALL answers (review PowerPoint slides).**

**WE NEVER PHYSICALLY MEET FOR THIS CLASS (STRICTLY INTERNET).** If you have technical problems, contact me or Information Resource Management (IRB) - Distance Learning (297-0160) or the computing help line (297-3999).

**YOU MUST COMPLETE THE EXAMS WITHIN THE TIME FRAME GIVEN (NO EXCEPTIONS!)**

Topical outline - Nutrition in Health & Exercise

Dr. Whitehurst

| CHAPTER | Lecture Topics & study questions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Pages in Text | PowerPoint file (#) See Blackboard |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------|
| 1       | <b>Introduction to Sports Nutrition</b> – What is and why study sports nutrition? What are and what is the function of the macronutrients, vitamins, minerals and water? How is energy produced within the body? What are the dietary reference intakes? What are enriched and fortified foods? What are the basic nutritional guidelines? What is the food pyramid? How should athletes utilize food labels to maximize their nutrient intake? What factors must be taken into account when developing an individualized dietary plan for an athlete or active person?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2-25          | 1                                  |
| 2       | <b>Ingestion to Energy Metabolism:</b> What are the primary structures of the gastrointestinal tract (GI)? What is the purpose of the esophagus? Which of the three sections of the small intestine is the site of most of the digestion? What are villi? What are the primary actions of the colon during the digestive process? What is the purpose of the salivary glands? What is the purpose of salivary amylase? What is a polysaccharide? What is the role of pancreatic amylase in digestion? What are the brush border disaccharides? What is the role of sucrase, maltase and lactase in carbohydrate digestion? Explain the difference between facilitated diffusion, passive diffusion, active transport and endocytosis. What happens to carbohydrates once they are absorbed into the blood (via villi of small intestine)? What are glucose transporters? What is the fate of glucose once it enters the muscle cell? What are several characteristics of lipids? Most dietary lipids exist in what form? What is the role of emulsifiers in the digestion of fats? What is the role of lingual lipase, gastric lipase cholecystokinin, secretin and pancreatic lipase in the digestion of fats? What is the purpose of lipoproteins and chylomicrons | 26-61         | 2                                  |

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|   | <p>and how are they formed? What is the location of most of protein digestion? What is denaturation? What are proteases and peptidases? Are transport carriers for amino acids in competition and if so, what effect would taking excess protein (protein supplements) have on absorption? What is meant by the term “the bodies amino acid pool”? What role does DNA, mRNA, ribosomes and tRNA play in protein construction? What is essential about essential amino acids? What are basal metabolic rate and resting metabolic rate? Which form of energy is used by animals to sustain life and support all movement? What is ATP and how is it made or resynthesized in the cell? What are the three energy systems available in the muscle cell to resynthesize ATP and what are their characteristics with regards to the rate of ATP resynthesis? Can you distinguish between anabolic and catabolic pathways? What pathways contribute to the formation of ATP via aerobic energy production (i.e. see page 51 – glycolysis, beta-oxidation, deamination, Krebs Cycle, electron transport chain). What is the purpose of the Krebs (AKA Citric ) cycle? What role do NAD and FAD have in aerobic energy production and where in the cell does this occur? How does carbohydrate intake impact protein metabolism? How do the three energy systems work together to supply ATP during exercise or sport performance?</p> <p><b>Exam 1</b></p> | <b>2-61</b> | <b>1-2</b> |
| 3 | <p><b>Carbohydrates (CHO)</b> – what is the nature, what kinds and what are the sources of CHO, distinguish between simple and complex CHO, discuss the health implications (lipid profile, heart disease) for dietary fiber, explain glycogen dynamics (i.e. synthesis and breakdown), what is the recommended dietary intake of CHO, discuss glycemic index/load, what is the primary role of CHO in the body (i.e. energy source, metabolic primer, fuel for central nervous system), what is the best strategy for CHO intake before, during and after exercise in order to maximize performance.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 62-97       | 3          |
| 4 | <p><b>Lipids or Fats</b> – what is the nature, what kinds and what are the sources of lipids 1) simple lipids – most common is triacylglycerols - <b>tri·ac·yl·glyc·er·ol</b>, explain differences between saturated and unsaturated fats, what is the health risk associated with animal fats and trans fatty acids, what , what are essential fatty acids; 2) compound lipids – triacylglycerols combined with other chemicals form phospholipids, lecithin, glycolipids, lipoproteins (i.e. chylomicrons, HDL, LDL, VLDL); 3) derived lipids – cholesterol - what are it’s functions and relationship to heart disease, what is the recommended dietary intake of lipids, what are the American Heart Association recommendations for polyunsaturated fatty acids to saturated fatty acids, what is the role of lipid in the body, what is the recommended intake of fats prior to during and after exercise</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 98-125      | 4          |
| 5 | <p><b>Protein</b> - what are proteins and peptide bonds, what are essential and non-essential proteins, what is a complete protein, identify sources of protein that have the highest protein rating, what problems, if any, does the vegan encounter regarding dietary protein, what is the recommended dietary intake for protein and does that recommendation differ for physically active persons, what is the role of protein in the body, discuss the dynamics of protein metabolism (i.e. catabolism, deamination,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 126-151     | 5          |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |            |
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|   | transamination), what is positive protein balance, trace the alanine-glucose cycle, what are the best sources of protein and are commercial protein products worthwhile, how much protein should be consumed prior to during and after exercise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |            |
|   | <b>EXAM 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>62-151</b>  | <b>3-5</b> |
| 6 | <b>Vitamins</b> – what is the nature and importance of vitamins and RDA’s, what are and what is the role of fat (A,D,E,K) and water soluble vitamins, to what extent are vitamins stored in the body, what is the role of vitamins and what are the dietary reference intakes for vitamins (e.g. estimated average requirement (EAR), recommended dietary allowance (RDA)), what is the contribution of water soluble vitamins (particularly B’s) to energy metabolism, how do specific antioxidant type vitamins (e.g. A, C) provide protection against disease, what are carotenoids and what is their role, what are free radicals and risk do they pose at rest and during exercise, are vitamin supplements required for active persons or athletes | 152-187        | 6          |
| 7 | <b>Minerals</b> - what is the nature of minerals and what are the major and minor or trace minerals, what are the sources of minerals and what is their role in the body, what is bioavailability and what factors impact bioavailability, explain the role of calcium in bone health, what is osteoporosis and what are the primary risk factors for the disease, why is exercise helpful in combating osteoporosis, what is the role of phosphorus in bone health, why is magnesium such an important mineral, explain how iron is involved in oxygen transport and what is meant by anemia and should iron supplements be used by endurance athletes, what are electrolytes and what is their primary purpose, how much sodium does a person require  | 188-219        | 7          |
| 8 | <b>Water</b> - What are the functions of water in the body, what are the sources of water and how much water can be lost at rest and during exercise, explain how exercise performance can be impacted by poor water balance, how can you monitor your hydration level, how much fluid should be consumed before, during and after exercise, what types of fluid should be consumed during exercise to maximize fluid absorption, what is hyponatremia                                                                                                                                                                                                                                                                                                   | 220-253        | 8          |
|   | <b>Exam 3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>152-253</b> | <b>6-8</b> |
| 9 | <b>Nutritional Ergogenics</b> – what is an ergogenic aid, what are the different types of ergogenic aids, what is a dietary supplement and how likely are athletes to take supplements, are there regulations and governing bodies with regards to what supplements can be taken to enhance performance, what is the role of the Federal Trade Commission (FTC) with regards to supplements, what is doping and substances come under this category, what are anabolic agents and what is their function, are there supplements designed to reduce body fat – what are they and are they effective, which vitamin/minerals are used as ergogenic aids,                                                                                                   | 254-279        | 9          |

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| 10 | <b>Nutrition Consultation with Athletes</b> – what is the purpose and likely significance of a nutritional consult with an athlete, which professionals are in the best position to advise athletes with regard to their diet, how would you outline the steps taken by a nutrition specialist when advising the athlete, what is a food diary and how might the nutritional quality of the athlete’s diet be analyzed, when doing a nutritional consult – what type of data will be obtained                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 280-311        | 10          |
| 11 | <b>Weight Management</b> - is obesity a problem in the US and why, what factors play a role in obesity, is body weight an effective measure of ideal body weight, what are the more common methods to assess body weight and body composition, how is energy intake determined and what are the components of energy expenditure, what weight loss methods are most effective, what is a reasonable weight loss strategy, to what extent is physical activity effective in promoting weight loss and weight maintenance, how do you maximize success when attempting to lose weight, how can you accomplish effective weight loss/gain for sport, What is disordered eating and what may be some of the causes?, what types of athletes may be at risk for disordered eating, what is the prevalence of disordered eating among athletes, define and discuss the causes behind and management strategies for anorexia nervosa and bulimia nervosa | 312-355        | 11          |
|    | <b>Exam 4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>254-355</b> | <b>9-11</b> |
| 12 | <b>Endurance and Ultra-Endurance Athletes</b> – what energy systems are used during endurance exercise, are energy needs different among endurance athletes and how do you calculate energy needs, are micronutrient needs different for endurance athletes, calculate daily caloric needs for an endurance athlete, what is an effective carbohydrate loading strategy and how much CHO should be taken immediately prior to, during and immediately following endurance exercise, are protein needs different for the endurance athlete and how do you determine their needs, what does the research tell us about protein intake prior to, during and after exercise, what about fat intake prior to, during and after exercise, are vitamin/mineral needs of the endurance athlete different, are fluid needs different for the endurance athlete and what is a recommended fluid replacement strategy                                        | 356-393        | 12          |
| 13 | <b>Strength/Power Athlete</b> – which energy systems are dominant among strength/power athletes and therefore dictate type of foods that should be emphasized, to what extent are the micronutrient needs of the strength athlete different from the endurance athlete, if so – what adjustments need to be made, when calculated do the energy needs of the strength/power athlete differ from other athletic groups, are there differences in vitamin/mineral and water requirements for the strength/power athlete, outline a dietary plan for the strength/power athlete.                                                                                                                                                                                                                                                                                                                                                                     | 394-423        | 13          |

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| <b>14</b>   | <b>Team Sport Athletes</b> – are the utilization of energy systems different for team sports, calculate energy expenditure for various team sports, calculate micronutrient calories for team sports, are there different needs for the team sport athlete in terms of vitamins/minerals and fluids, what are some examples of foods that might be available for athletes during competition – particularly day long events                                                                                                                                                                                                                                                                                                                                                                                                                | 424-454        | 14           |
|             | <b>Exam 5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>356-453</b> | <b>12-14</b> |
| <b>15</b>   | <b>Special Populations</b> – define special population, what are important considerations for the diabetic athlete, what are the types of diabetes, how is diabetes managed including self monitoring, drug usage/dosage and what must the diabetic be most aware of during training and competition, are there special considerations for the pregnant athlete including exercise variables (e.g. intensity, duration, frequency, caloric requirements, micronutrient requirements, vitamin/mineral requirements, what considerations/precautions must be taken when working with the child and teen athlete including fluids, micronutrients, vitamins/minerals, what are several nutritional concerns for the collegiate and masters athletes, how can you assure a high quality diet that meets all the RDA for the vegetarian athlete | 454-491        | 15           |
| <b>16</b>   | <b>Jobs in Sports Nutrition</b> – what are the steps in becoming a registered dietician, how can students and professional obtain practical experience in the field of sports nutrition, how is the job market, what are the daily responsibilities of the RD when working with athletes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 492-505        | 16           |
|             | <b>Exam 6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>454-505</b> | <b>15-16</b> |
| <b>1-16</b> | <b>Comprehensive Final Exam</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>2-505</b>   | <b>1-16</b>  |

### **References and Additional Sources of Information**

Mahan, Kathleen L., Escott-Stump, Sylvia, Krause's Food, Nutrition, & Diet Therapy, 10<sup>th</sup> edition, Philadelphia, W.B. Saunders Co. 2000.

Tufts University Health & Nutrition Letter

International Journal of Sports Nutrition

Medicine & Science in Sports & Exercise

See: [www.medscape.com](http://www.medscape.com)

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