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BANGLADESH KRIRA SHIKKHA PROTISHTHAN

ZIRANI, SAVAR, DHAKA

Post Graduate Diploma in Sports Bio-mechanics-2014

SPECIALIZATION AREA

SPORTS BIO-MECHANICS
Syllabus
Paper-I

UNIT-I

1 Introduction:

Meaning of Bio-mechanics

Importance of Bio-mechanics in sports

2 Movement analysis:

- 2.1 Kinesiological Analysis
- 2.2 Mechanical Analysis
- 2.3 Bio-mechanical Analysis

3 Kinesiology

- 3.1 Meaning of Kinesiology and its importance in Sports
- 3.2 Planes and Axes
- 3.3 Types of Joints and Muscles
- 3.4 Movements around various joints
- 3.5 Major muscles of the body and their action

UNIT-II

1 Linear, Angular and General Motions:

- 1.1 Distance and Displacement (Linear and Angular)
- 1.2 Speed and Velocity (Linear and Angular)
- 1.3 Acceleration (Linear and Angular)
- 1.4 Relationship of linear and angular motions
- 1.5 Newton’s laws of Motion.

UNIT-III

1 Force:

- 1.1 Meaning of force and its units
- 1.2 Effects of force
- 1.3 Sources of force
- 1.4 Systems of force

SPECIALIZATION AREA

SPORTS BIO-MECHANICS
Syllabus
Paper-II

UNIT-III

1. Centrifugal and Centripetal Forces
2. Friction
3. Pressure
4. Moment of Force
5. Levers
6. Work, Power and Energy

UNIT-IV

1 Freely falling bodies and projectiles
2 Equilibrium and factors affecting equilibrium
3 Impact and Elasticity and its application in Sports
4 Spin and its types. Effect of spin on angle of rebound
5 Fluid Mechanics
- 5.1 Air Resistance
- 5.2 Water Resistance

6 Methods of Analysis of Sports Skills
- 6.1 Qualitative Methods
- 6.2 Quantitative Methods

7 Methods of Investigation
- 7.1 Goniometry
- 7.2 Dynamometry

8 Development of Model and Identification and Evaluation of Faults
9 Location of Center of Gravity
- 9.1 Mannikin Method
- 9.2 Reaction Board Method
- 9.3 Segmentation Method

UNIT-V

1 Analysis of Fundamental Skills
- 1.1 Walking
- 1.2 Running
- 1.3 Throwing
- 1.4 Jumping
- 1.5 Lifting
- 1.6 Pulling and Pushing
- 1.7 Catching

2 Analysis of skills of following games / sports
- 2.1 Track and field
- 2.2 Gymnastics
- 2.3 Swimming
- 2.4 Soccer
- 2.5 Hockey
- 2.6 Basket ball
- 2.7 Cricket
- 2.8 Boxing
- 2.9 Tennis
- 2.10 Shooting

SPECIALIZATION AREA

SPORTS BIO-MECHANICS
(Practical Syllabus)

1. Calculation of speed and velocity (Linear and Angular)
2. To make times distance curve for calculation of speed and its interpretation
3. Calculation of acceleration (Linear and Angular)
4. Location of main muscles in the human body using drawings and figures
5. To demonstrate the involvement of muscles in fundamental movements using palpation method
6. Determination of grip strength, leg strength and back strength using dynamometers.
7. Measurement of range of motion using goniometer
8. To demonstrate law of action and reaction using turn table
9. Studying the effect of different types of spin on the path of ball in the air
10. Studying the effect of different types of spin on the angle of rebound.

List of Books

1. Mechanics of Athletics-Dyson
2. Scientific Principles of Coaching-Bunn, J. W.
3. Mechanical Kinesiology- Berham, J.
4. Biomechanics of Sports Techniques-Hay, J. G.
5. Kinesiology-Luttens, K and Hamilton, N.
6. Analysis of Human Motion-Scott, M. G.
7. Biomechanics of Athletic Movement-Hochmuth, G.
8. Biomechanics of Sports-Miller, D. I. and Nelson, R. C
9. Techniques for the Analysis of Human Movement-Grieve, Miller, Mitchelson, Paul and Smith.
10. Mathematics in Sport-Townend, M. S.
11. Qualitative Analysis of Human Movement-Knudson, D. V. and Morrison, C. S.
12. Biomechanics of Sports and Exercise-McGinnis, P. M.
13. Kinematics of Human Motion-Zatsiorsky
14. Biomechanics-Motion, Flow, Stress and Growth-Fung

SUBSIDIARY AREA

SCIENTIFIC PRINCIPLES OF SPORTS TRAINING
Syllabus
Paper-I

UNIT-I

1. Sports Training
   - 1.1 Definitions of conditioning sports training and coaching
   - 1.2 Aim, tasks and characteristics of sports training
   - 1.3 Principles of sports training

2. Training Load
   - 2.1. Definition of training load
   - 2.1. Important features of training load
   - 2.1. Principles of training load
   - 2.4 Adaptation process and conditions of adaptation
   - 2.5 Overload, its causes and symptoms. Tackling of over load.

UNIT-II

Training for Motor Components – 1 (Conditional Abilities)

1. Strength
   - 1.1 Definition and forms of strength
   - 1.2 Factors determining strength
   - 1.3 Principles of strength training
   - 1.4 Methods and means of strength training

2 Endurance
   - 2.1 Definition and forms of endurance
   - 2.2 Factors determining endurance
   - 2.3 Methods and means of endurance training

3 Speed
   - 3.1 Definition and forms of speed
   - 3.2 Factors determining speed
   - 3.3 Methods and means of speed training
   - 3.4 Speed barrier and how to tackle it.

UNIT-III

Training for Motor Components-II

1 Flexibility
   - 1.1 Definition and forms of flexibility
   - 1.2 Factors determining flexibility
   - 1.3 Methods and means of flexibility training

SUBSIDIARY AREA

SCIENTIFIC PRINCIPLES OF SPORTS TRAINING
Syllabus
Paper-II

Unit-III

Training for Motor Components-II

1 Coordinative Abilities
- 1.1 Definition of coordinative abilities
- 1.2 Characteristics of coordinative abilities
- 1.3 Importance of coordinative abilities
- 1.4 Different coordinative abilities affecting performance in games and sports
- 1.5 Training for coordinative abilities.

UNIT-IV

1 Technique Training
- 1.1 Definition of skill, style, technique and technical training
- 1.2 Characteristics of technique
- 1.3 Phases of skill acquisition
- 1.4 Methods of technique training
- 1.5 Causes and correction of faults.

2 Tactical Training
- 2.1 Definition of tactics and strategy
- 2.2 Basic tactical concepts-Offensive. Defensive and High Performance Tactics
- 2.3 Methods of tactical training

UNIT-V

1 Planning and Organization of training

Definition and important of planning
Principles of planning
Systems of planning

2 Periodisation
- 2.1 Definition and types of periodisation
- 2.2 Content of training for different periods

3 Competition Planning and Preparation
- 3.1 Meaning and importance of competition
- 3.2 Frequency of competition
- 3.3 Forms of competition
- 3.4 Direct preparation for an important competition.

Reference Books:

Dick W. Frank. Sports Training Principles (London: Lepus Books)
Harre, Dietrich. Principles of Sports Training (Berlin: Sportverlag)
Matveyew L. P. Fundamentals of Sports Training (Moscow: Progress Publishers)
Paish Wilfred. The Complete Manual of Sports Science, A and C Black London, 1998
Singh H. Sports Training: General Theory and Methods (Patiala: NSNIS)
Tandon D. K, Uppal A. K., Alegaonkar P. M. and Singh Kanwaljeet. Scientific Basis of Physical Education and Sports. Friends Publication (India), Delhi. 2001.
Uppal A. K. Scientific Principles of Sports Training. Friends Publication (India), Delhi, 2001.

SUBSIDIARY AREA

MEASUREMENT AND EVALUATION
Syllabus
Paper I

UNIT-I

1 Introduction:

Meaning of Evaluation

Importance of Evaluation

Principles of Evaluation

2 Selection and constructions of tests

Criteria of test selection-Scientific Authenticity (Reliability, Objectivity, Validity and Norms)

Classification of tests-Standardized and Teacher made tests (Objective and Subjective tests)

Construction of tests-Knowledge tests (written tests) and Skill tests.

UNIT-II

1 Measurement of Organic Functions. Motor Fitness and General Motor Ability

Organic Function Tests

Coopers 12 min Run/Walk Test

Tuttle Pulse Ratio Test

Harvard Step Test and its modifications

Hymens Cardio-pulmonary Index (CPI)

1.2 Motor Fitness Tests

1.2.1 Oregon Motor Fitness Test

1.2.2 J.C.R Test

1.2.3 AAHPER Youth Fitness Test

1.2.4 Canadian Fitness Test (CAHPER)

1.2.5 Indian Motor fitness Test

1.3 General Motor Ability Tests

Mc Cloys General Motor Ability Test

Methany Johnson Test

UNIT-III

1 Tests for Strength

1.1 Rogers Physical Fitness Index

1.2 Kraus Weber Strength Test

SUBSIDIARY AREA

MEASUREMENT AND EVALUATION
Syllabus
Paper-II

1 Skill Test
- 1.1 Procedure of skill test construction
- 1.2 Method of establishing reliability, objectivity and validity of a skill test
- 1.3 Preparation of norms

UNIT-IV

1 Anthropometric Measurements

Height Measurement
Width Measurement
Length Measurement
Girth Measurement

2 Somatotypes

Sheldon's technique (Ectomorph. Mesomorph and Endomorph)

3 Posture tests

IOWA Posture Test
Kelley's Foot Test
Tests for detecting Kyphosis, Scoliosis and Lordosis.

UNIT-V

1 Introduction

Meaning and definition of statistics
Importance of statistics
Meaning of data and types of data
Frequency Table-Meaning and construction

2 Fundamentals of Statistics

Measures of Central Tendency-Meaning, Uses and Calculation
Measures of Variability-Meaning, Uses and Calculation.
Percentiles and their Calculation
Correlation - Meaning, Uses and Calculation.

Reference Books:

Barrow M. Harold and Mc Ghee Rosemary A. Practical Approach to Measurement in Physical Education (Philadelphia: Lea and Febiger)

Clarke H. David and Clarke Harrison H. Application of Measurement to Physical Education (Englewood Cliffs: Prentice Hall. Inc)

Larson L. A. and Yocom R. C. Measurement and Evaluation in Physical. Health and Recreation Education (St. Louis: C. V. Mosby Co)

Mathew, Donald K. Measurement in Physical Education (London: W. B. Saunders Co.)

DIPLOMA IN SPORTS SCIENCE

GENERAL RULES (Examination Ordinance)

1. The examination for Diploma in Sports Sciences shall consist of two parts:

   Part A (Theory)
   Part B (Practical)

The duration of the course shall be one academic year.

2. A candidate shall be eligible for appearing at the examination for Diploma in Sports Sciences if:

   (a) He/She has passed the Bachelor Degree Course form any recognized university of Bangladesh or the other equivalent examinations conducted by any university recognized by Bangladesh.
   (b) Has gone through the admission criteria and secured admission to the course.
   (c) Has put in 90% attendance in theory and practical classes separately.

3. There shall be a final examination at the end of the academic year and a candidate shall have to separately pass in Part-A (Theory) and Part-B (Practical).

4. To pass the examination, a candidate must secure 40% marks in each theory paper, sessional and practical examination.

5. The sessional marks in each theory paper and in practical examination shall be added to the total marks secured by the candidate in the final examination.

6. The sessional marks shall be calculated based on the marks secured by the candidate in the term examinations, unit tests and assignments.

7. If a candidate fails in any one part (Theory or Practical) or both, he/she will be required to reappear and pass the examination in full.

8. A candidate must complete the course of study and pass the examination within a total period of three years commencing from his first admission to the course.

9. The division shall be assigned to the successful candidate on the following basis:

   Second Division: 45% and above but below 60% of the aggregate marks.
   First Division: 60% and above of the aggregate marks.

   Distinction: 80% and above in a paper of Part-A (Theory) or Part-B (Practical) Distinction and division obtained by the candidate shall be Mentioned in the Diploma awarded to the candidate.

10. Those candidates who fail in only one theory paper or Part-B (Practical) shall be eligible to appear at the supplementary examination in that paper of Part-A (Theory) or Part-B (Practical) to be held as per the dates announced by the university.

11. For supplementary candidates, the result of the final examination shall be declared on the basis of the marks actually obtained by the candidate in each of the papers he/she has passed in the annual examination plus the marks obtained in the paper in which he/she took the supplementary examination. The supplementary candidate shall be ineligible for division and place on the merit list.

12. The candidate who is declared failed in the annual examination shall appear as an ex-student in all the papers and the sessional marks previously obtained by him shall be carried over.

13. The examination fee as prescribed by the university will be charged.

14. In partial fulfillment for the requirements of the course every candidate shall write a project on an approved topic and submit to the Institute one week prior to the commencement of final examination. The Project will carry 200 marks of which 50 marks will be assigned for viva-voce.

SCHEME OF EXAMINATION

Paper	Nomenclature of paper	Sessional Marks	Min. pass mark	Marks
I	Specialization (Theory)-Two Papers	20	40%	200
II	Specialization (Practical)	20	40%	200
III	Subsidiary Area-I - Two Papers	20	40%	150
IV	Subsidiary Area-II - Two Papers	20	40%	150
V	Project	20	40%	200
	Total	100		900

Grand Total 1000

P.G. DIPLOMA IN SPORTS SCIENCE TIME TABLE
(w. e. f. 11 June, 14)

Notice

Day	First Period 10.00 AM to 10.50 AM	Second Period 11.00AM to 11.50 PM	Third Period 12.00PM to 12.50PM	Fourth & Fifth Periods 3.00PM to 5.00PM
Sunday	*Specialization (Theory)* a) Exercise Physiology Md. Bakhtiar b) Sports Psychology Md. Shafiqul Islam c) Sports Biomechanics Mrs. Sadeka Yasmin	**Science of Sports Training** Nasreen Akther	**Measurement & Evaluation** Md. Shafiqul Islam	**Specialization (Practical)** a) Exercise Physiology b) Sports Psychology c) Sports Biomechanics d) Science of Sports Training
Monday	*Specialization (Theory)* a) Exercise Physiology Md. Bakhtiar b) Sports Psychology Nusrat Sharmeen c) Sports Biomechanics Abu Tareq	**Science of Sports Training** Nasreen Akther	Exercise Physiology **(Allied Area)** Md. Bakhtiar	**Specialization (Practical)** a) Exercise Physiology b) Sports Psychology c) Sports Biomechanics d) Science of Sports Training
Tuesday	*Specialization (Theory)* a) Exercise Physiology Md. Bakhtiar b) Sports Psychology Md. Shafiqul Islam c) Sports Biomechanics Mrs. Sadeka Yasmin	**Science of Sports Training** Md. Bakhtiar	**Sports Biomechanics (Allied Area)** Sadeka Yasmin	**Specialization (Practical)** a) Exercise Physiology b) Sports Psychology c) Sports Biomechanics d) Science of Sports Training
Wednesday	*Specialization (Theory)* a) Exercise Physiology Md. Bakhtiar b) Sports Psychology Nusrat Sharmeen c) Sports Biomechanics Abu Tareq	**Science of Sports Training** Nusrat Sharmeen	**Measurement & Evaluation** Md. Shafiqul Islam	**Specialization (Practical)** a) Exercise Physiology b) Sports Psychology c) Sports Biomechanics d) Science of Sports Training
Thursday	**Specialization-Library Work** Exercise Physiology **(Allied Area)** Md. Bakhtiar	**Sports Biomechanics (Allied Area)** Abu Tareq	**Library Work**	*Specialization (Practical)* a) Exercise Physiology b) Sports Psychology c) Sports Biomechanics d) Science of Sports Training

Resource Persons:

Exercise Physiology - Dr. Emadul Hoque & Md. Bakhtiar
Sports Psychology - Mrs. Nusrat Sharmeen & Md. Shafiqul Islam
Sports Biomechanics - Mrs. Sadeka Yasmin & Abu Tareq
Science of Sports Training- Nusrat Sharmeen, Md. Bakhtiar, Nasreen Akther, Md. Shafiqul Islam

Emadul Hoque
Deputy Director (Sports Science)
BKSP