



**SYLLABUS & PROGRAMME STRUCTURE
OF FOUR YEARS UNDERGRADUATE
PROGRAMME**

PHYSICAL EDUCATION

(Minor Papers)

(Under National Education Policy – 2020)

(Effective from the Academic Session 2023-2024)

**MAHARAJA BIR BIKRAM UNIVERSITY
AGARTALA, TRIPURA: 799004**

National Education Policy 2020

SEMESTER WISE TITLES OF THE PAPERS IN PHYSICAL EDUCATION

List of all Papers in Six Semester					
Year	Sem	Course Code	Paper Title	Theory/ Practical	Credits
<i>Certificate in Faculty</i>					
FIRST YEAR	I	PE101M	History, Foundation of Physical Education and Fundamental Activities	Theory & Practical	4
	II	PE201M	Anatomy & Physiology and Yoga	Theory & Practical	4
<i>Diploma in Faculty</i>					
SECOND YEAR	III	PE301M	Health & Health Education and Basic Concepts on Track and Field Event	Theory & Practical	4
	IV	PE401T	Measurement & Evaluation in Physical Education and Racket Games	Theory & Practical	4
<i>Bachelor in Faculty</i>					
THIRD YEAR	V	PE501T	Sports Training, Sports Psychology and Ball Games & Indigenous Games	Theory & Practical	4
	VI	PE601T	Kinesiology, Biomechanics and Individual Games	Theory & Practical	4

SEMESTER-I

Paper-101M

HISTORY AND FOUNDATION OF PHYSICAL EDUCATION AND FUNDAMENTAL ACTIVITIES

Credit: 04

Max. Marks: 100

Sessional Marks: 40

End semester exam marks: 60

Learning outcomes:

1. Students will be able to identify the era and relate with the History of Physical Education.
2. Students will be able to comprehend the relationship between Philosophy, Education and Physical Education.
3. Students will be able to know recent developments and academic foundation of Physical Education.

PART: A

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Unit-I

Introduction and Foundation of Physical Education

- 1.1 Meaning, definition, Scope, aim and objectives of Physical Education
- 1.2 Needs and importance of Physical Education in present era. (Modern Era).
- 1.3 Principles, Concepts and Misconceptions about Physical Education.
- 1.4 Relationship of Physical Education with Humanities, Science and other disciplines.
- 1.5 Philosophical foundation: Idealism, Pragmatism, Naturalism, Realism and its Relationships with Physical Education.

Unit-II

Historical Development of Physical Education

- 2.1 Historical Development during- Vedic Period, Early Hindu Period and Later Hindu Period, Medieval period
- 2.2 Development of Physical Education in India (Pre and Post Independence)
- 2.3 Historical Development of Ancient Olympic Games and its significances.
- 2.4 Development of the Modern Olympic movement, India at Modern Olympic Games.
- 2.5 Brief introduction of the following Games & Awards- Asian Game, Commonwealth Game, South Asian Games (SAF), Arjuna Award, Dronacharya Award, Major Dhyan Chand Khel Ratna Awards.

PART: B

Max. Marks: 50
Sessional Marks: 20
End semester exam marks: 30

Fundamental Activities

1. Fundamental Activities: Warm up, general exercise and cooling down.
2. Drill and Marching- Attention, stand at ease, Right turn, Left turn, About turn, Marching.
3. Freehand exercise.
4. Exercise with Apparatus.
5. Recreational and Minor Games.
6. Preparation of practical notebook.

Teaching Learning Strategies: The class will be taught by using lectures and demonstration, seminars, classroom discussion, videos, charts and presentations method. Virtual instructional platforms such as online lectures, webcast, etc. are to be used. Students can participate in coursework through instant messages, emails and video conferencing. Google class room, Cisco Webex Meeting, OERS, Swayam Platform (www.swayam.gov.in), Swayam Prabha (www.swayamprabha.gov.in) (available on Door darshan (free dish TV), E-Yantra (www.e-yantra.org), Virtual Labs (www.vlabs.co.in), FOSSEE (www.fossee.in), application of spoken tutorials (www.spoken-tutorial.org), National Digital Library (www.ndl.iitkgp.ac.in), electronic journals (www.ess.infibnet.ac.in) etc. are to be used. Courses may also integrate DVD videos as part of the training process. Students may examine current topics in the field through the use of e-textbooks and e-physical education journals. Students can complete some portion of the education at approved testing sites for the practical components wherever necessary. Initiating Brain based learning-A stress free environment will be created. Constant feedback regarding their performance will be given to initiate learning from mistakes. Creative thinking for new ideas and innovations will be encouraged. Break in learning will be filled with recreational and constructive activities for boosting cognitive functions.

Activities: Lecture/ Project Work/ Seminars/ Term Papers/Assignments/ Presentations/ Study etc.

Assessment Rubric: Classroom Test, Project Work, Assignments, Presentations.

References:

1. Bucher, C. A. (n.d.) - Foundation of physical education. St. Louis: The C.V. MosbyCo.

2. Deshpande, S. H. (2014) - Physical Education in Ancient India. Amravati: Degree college of Physical education.
3. Dash, B.N. (2003.) –Principles of Education, Neel Kamal publication, Hyderabad,
4. Kamlesh, M.L. (2002) –Sociological Foundation of Physical Education, Metropolitan Book co. Pvt.Ltd., Delhi,
5. Pandey, R.S. (1991) Philosophical & Sociological Foundation of Education, Vinod Pustak Mandir, Agra.
6. Bhatia, K.K. & Narang, C.L. (1984) Philosophical & Sociological Bases of Education, Prakash Bros., Ludhiana,
7. Adams, William. (1991) – Foundation of Physical Education Exercises and Sports Sciences, Lea and Febigor, Philadelphia,
8. Dr. Kamlesh M.L. (2004) - Principles and History of Physical Education and Sports, Friends Publication (India) New Delhi.
9. Dr.B.C.Kapri, Fundamentals of Physical Education, Friends Publication, Dariya Ganj, Delhi (India).

SEMESTER-II

PAPER: 202M

ANATOMY & PHYSIOLOGY AND YOGA

Credit: 04

Max. Marks: 100

Sessional Marks: 40

End semester exam marks: 60

Learning Outcomes:

- 1.1 The students will be oriented with the basic structure and function of human body by identifying, comparing and relating different systems, organs and their functional and structural units.
- 1.2 Students will be able to relate and interpret the role of exercise on body systems and its relation to well-being, through literature reviews and physical conditioning exercises.
- 1.3 Adapt the art to apply the knowledge of anatomy and physiology in physical activity classes at school level.
- 1.4 Construct anatomy and physiology related pedagogical materials exploring their creative imaginations while working in group and using technology.

PART: A

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Unit-I

Introduction

- 1.1 Introduction and importance of Anatomy & Physiology in the field of Physical Education
- 1.2 Basic concept, structure and functions of Cell, tissue, organs and systems of the body.
- 1.3 Skeletal System- Bone, Joints, fiber (Fast and slow twitch), Movement around joints
- 1.4 Muscular system (classification, structure, functions, properties of muscle, types of muscles and muscular contraction.
- 1.5 Concept of Oxygen debt, Second Wind, VO_2 Max., Target Heart Rate, Athletic Heart.

Unit-II

Brief Introduction of the Following System:

- 2.1. Respiratory system (Structure, types and mechanism of respiration)
- 2.2 Circulatory system (Structure of heart, mechanism of blood circulation and Cardiac cycle)
- 2.3 Endocrine System (Location and function of major Endocrine glands)
- 2.4. Structures and function of Digestive system & Excretory system.

2.5. Nervous system (structure and function of brain, spinal cord and Neuron)

PART: B

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

YOGA

1. **Asanas**-Padmasana, Sukhasana, Vajrasana, Gomukhasana, Vakrasana, Kakasana, Naukasana, Dhanurasana, Savasana, Halasana, Bhujangasana, Sarvangasana, Shirsasana, Makarasana, Paschimottanasana, Ustrasana, Salabhasana, Trikonasana, Vrikshasana, Tadasana.
2. **Pranayama** and its benefits.
3. **Meditation** (Basic concept of Dharana, Dhyana, Samadhi)
4. **Yogic Kriyas**- Neti, Trataka, Kapalbhathi, Dhauti, Nauli.
5. Preparation of practical notebook.

Teaching Learning Strategies: The class will be taught by using lectures and demonstration, seminars, classroom discussion, videos, charts and presentations method. Virtual instructional platforms such as online lectures, webcast, etc. are to be used. Students can participate in coursework through instant messages, emails and video conferencing. Google class room, Cisco Webex Meeting, OERS, Swayam Platform (www.swayam.gov.in), Swayam Prabha (www.swayamprabha.gov.in) (available on Door darshan (free dish TV), E-Yantra (www.e-yantra.org), Virtual Labs (www.vlabs.co.in), FOSSEE (www.fossee.in), application of spoken tutorials (www.spoken-tutorial.org), National Digital Library (www.ndl.iitkgp.ac.in), electronic journals (www.ess.infn.net.ac.in) etc. are to be used. Courses may also integrate DVD videos as part of the training process. Students may examine current topics in the field through the use of e-textbooks and e-physical education journals. Students can complete some portion of the education at approved testing sites for the practical components wherever necessary. Initiating Brain based learning- A stress free environment will be created. Constant feedback regarding their performance will be given to initiate learning from mistakes. Creative thinking for new ideas and innovations will be encouraged. Break in learning will be filled with recreational and constructive activities for boosting cognitive functions.

Activities: Lecture/ Project Work/ Seminars/ Term Papers/Assignments/ Presentations/ Study

etc.

Assessment Rubric: Classroom Test, Project Work, Assignments, Presentations.

References:

1. Appuseries (2012) How the Human Body Works – Kids Animation Learn Series. [Online] Available from: https://www.youtube.com/results?search_query=APPUSERIES+human+body+%5BAccessed20th+July2016%5D.
2. Bannister, L. H. & et.al. (2000) Gray's Anatomy. Churchill Living Stone.
3. Boone, T. (2014) Exercise physiology. Jones & Bartlett Learning.
4. Davidson, D.S. & Morgan, B. (2002) Human body revealed. Great Britain, Dorling Kindersley.
5. E-Learning for kids- Founding Dreams (Date not Available) Science- Body Parts. [Online] Available from: <http://www.e-learningforkids.org/science/lesson/body-parts/> [Accessed 20th July 2016].
6. Foss, M. L., Keteyian, S. J. & Fox, E. L., (1998). Fox's physiological basis for exercise and sport. Boston, Mass, WCB/McGraw-Hill.
7. Get Body Smart (2016) An online examination of human anatomy and physiology- Animated Text Narrations and Quizzes to Explain the Structures and Functions of the Human Body Systems. Available from [http:// www.getbodysmart.com](http://www.getbodysmart.com) [Accessed 20th July 2016].
8. Hall, J. E. & Guyton, A. C. (2011). Guyton and Hall textbook of medical physiology. Philadelphia, PA, Saunders Elsevier.

Semester-III

PAPER: 301M

HEALTH & HEALTH EDUCATION AND TRACK & FIELD

Credit: 04

Max. Marks: 100

Sessional Marks: 40

End semester exam marks: 60

Learning outcomes:

At the end of the course student will be able to-

1. Understand the concept & importance and determinants of health.
2. Understand the changing concept of health education, need of a comprehensive health education program and approaches to health education.
3. Understand reasons, effects & preventive ways of substance use & abuse.
4. Understand typical stages of diseases, and help them to understand certain communicable and non-communicable disease.

PART: A

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Unit-I

Health & Health Education

- 1.1 Definition, Meaning and Concept of Health and Health Education
- 1.2 Aim, Objectives, Importance and Principle of Health Education
- 1.3 Dimensions of Health, Spectrum of Health and School Health Services.
- 1.4 Communicable and non-communicable diseases and their prevention and management process (HIV/AIDS, Malaria, Hepatitis, Cholera, Tuberculosis)
- 1.5 First Aid: Definition, purpose, Golden rules of first aid, Types of bandage

Unit-II

Nutrition & Posture

- 2.1 Concepts of Nutrients, Nutrition & Malnutrition.
- 2.2 Carbohydrate, Fat, Protein, Vitamins, Minerals: - Basic concept, classifications and its function.
- 2.3 Concept of diet, Balance diet, and their role, Diet before, during and after the competition, Obesity
- 2.4 Concept of Posture and Somatotype, and their Significance.

- 2.5 Postural deformities: cause and corrective exercises of kyphosis, scoliosis, lordosis, knock knees, Bow legs, Flat Foot.

PART: B

Max. Marks: 50
Sessional Marks: 20
End semester exam marks: 30

Track and Field

1. Basics of track events (200m, 400m track).
2. Marking of track.
3. Fundamental Skill of running: Start, Running action, Finishing and Rules of running.
4. Jumping Events: Long Jump/ High Jump/ Triple Jump/ Pole Vault, Approach Run, take-off, flight and landing, Rules and regulation of jumping events.
5. Throwing events: Shot-put/ Discuss/ Javelin/ Hammer, Rules of throwing events
6. Preparation of practical notebook.

Reference:

1. David K. Miller & T. Earl Allen, Fitness, A life time commitment, Surjeet Publication Delhi 1989.
2. Dificore Judy, the complete guide to the postnatal fitness, A & C Black Publishers Ltd. 35 Bedford row, London 1998
3. Dr. A.K. Uppal, Physical Fitness, Friends Publications (India), 1992. Warner W.K. Oeger& Sharon A. Hoeger, Fitness and Wellness, Morton Publishing Company, 1990.
4. Elizabeth & Ken day, Sports fitness for women, B.T. Batsford Ltd, London, 1986.
5. Bucher, Charles A. "Administration of Health and Physical Education Programme".
6. Delbert, Oberteuffer, et. al." The School Health Education".
7. Ghosh, B.N. "Treaties of Hygiene and Public Health".
8. Hanlon, John J. "Principles of Public Health Administration" 2003.
9. Turner, C.E. "The School Health and Health Education".
10. Moss and et. At. "Health Education" (National Education Association of U.T.A.) Nemir A. "The School Health Education" (Harber and Brothers, New York).

Semester-IV

Paper-401M

**MEASUREMENT & EVALUATION IN PHYSICAL EDUCATION AND
RACKET GAMES & INDIGENOUS GAMES**

Credit: 04

Max. Marks: 100

Sessional Marks: 40

End semester exam marks: 60

Learning outcomes:

1. The students will be able to recognize and relate the concept of test, measurement and evaluation in the context of Physical Education.
2. The students will be able to construct and conduct the physical fitness and sports skill test.
3. The students will be able to implement the criteria of test selection.
4. It will orient the students in the art of applications of test, measurement and evaluation in physical and sports activities with simultaneous development of practical competency in conducting physical fitness and sports skill tests.

PART: A

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Unit-I

Test, Measurement, Evaluation & Management

- 1.1 Meaning and Importance of Test, Measurement & Evaluation in Physical Education.
- 1.2 Criteria of selecting an appropriate/good test.
- 1.3 Meaning, Definition and Phases of management.
- 1.4 Administration of testing programme.
- 1.5 Tournament: Definition, Types, Method of preparing fixture

Unit-II

Physical Fitness and Sports Skill Tests

- 2.1 **Physical Fitness Test**-AAHPER Youth Physical Fitness Test, Harvard Step Test, Newton Motor Ability Test, Phillips JCR Test, Cooper 12 minutes Run and Walk Test, Indiana Motor Fitness Test.
- 2.2 **Sports Skill Tests**- Lockhart and McPherson Badminton test, Johnson's Basketball Test, McDonald's Soccer Skill Test, Harbans Singh Field Hockey Test, Brady's Volleyball Skill Test.

PART: B

Max. Marks: 50
Sessional Marks: 20
End semester exam marks: 30

Racket Games & Indigenous Games

1. Racket games: Badminton/ Table Tennis/ Lawn Tennis.
 - Basic fundamental techniques/skills and rules.
2. Indigenous Games: Kabaddi/ Kho-Kho/ Wrestling/Tug of War.
 - Basic Skills, measurements, rules & regulations.
3. Preparation of practical notebook.

Teaching Learning Strategies: The class will be taught by using lectures and demonstration, seminars, classroom discussion, videos, charts and presentations method. Virtual instructional platforms such as online lectures, webcast, etc. are to be used. Students can participate in coursework through instant messages, emails and video conferencing. Google class room, Cisco Webex Meeting, OERS, Swayam Platform (www.swayam.gov.in), Swayam Prabha (www.swayamprabha.gov.in) (available on Door darshan (free dish TV), E-Yantra (www.e-yantra.org), Virtual Labs (www.vlabs.co.in), FOSSEE (www.fossee.in), application of spoken tutorials (www.spoken-tutorial.org), National Digital Library (www.ndl.iitkgp.ac.in), electronic journals (www.ess.infn.net.ac.in) etc. are to be used. Courses may also integrate DVD videos as part of the training process. Students may examine current topics in the field through the use of e- textbooks and e-physical education journals. Students can complete some portion of the education at approved testing sites for the practical components wherever necessary. Initiating Brain based learning- A stress free environment will be created. Constant feedback regarding their performance will be given to initiate learning from mistakes. Creative thinking for new ideas and innovations will be encouraged. Break in learning will be filled with recreational and constructive activities for boosting cognitive functions.

Activities: Lecture/ Project Work/ Seminars/ Term Papers/Assignments/ Presentations/ Study etc.

Assessment Rubric: Classroom Test, Project Work, Assignments, Presentations

References:

1. Bangsbo, J. (1994). Fitness training in football: A scientific approach. Bagsvaerd, Denmark: Ho+Storm.
2. Barron, H. M., & Mchee, R. (1997). A practical approach to measurement in physical education. Philadelphia: Lea and Febiger.
3. Kansal, D.K. (1996). Test and measurement in sports and physical education. New Delhi: D.V.S. Publications.

Semester V
Paper-501M
SPORTS TRAINING, SPORTS PSYCHOLOGY AND
BALL GAMES

Credit: 04
Max. Marks: 100
Sessional Marks: 40
End semester exam marks: 60

Learning outcomes:

1. Students will understand the scientific sports training process & principles.
2. Students will be able to develop attitudes and skills in designing sports training programs.
3. Students will be able to understand principles related to sport psychology.

PART: A

Max. Marks: 50
Sessional Marks: 20
End semester exam marks: 30

Unit-I

Sports Training and Physical Fitness

- 1.1 Introduction, definition, importance & principles of sports Training.
- 1.2 Concepts of physical fitness and its components, warming up and cooling down.
- 1.3 Load, overload, adaptation and recovery,
- 1.4 Methods of developing training components (Resistance Training, Interval Training, Circuit Training, Ballistic Training, Fartlek Training, Repetition Training, Weight Training, Plyometric training)
- 1.5 Basic concept of Sport injury- Prevention and management.

Unit-II

Psychology and Sports Psychology

- 2.1 Meaning, Definition & importance of general psychology and sports Psychology.
- 2.2 Concept of Individual differences, Growth & development and heredity & environment.
- 2.3 General characteristics of various stages of growth and development (infancy, childhood, adolescence, adulthood)
- 2.4 Learning- Concepts and types, learning Curve, Laws of learning, transfer of learning.
- 2.5 Concepts and role of Anxiety, stress, aggression, interest, personality, motivation

PART: B

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Ball Games

1. Ball Games: Football, Volleyball, Basketball, Handball & Cricket.
-Basic Skills, measurements, rules & regulations.
3. Preparation of practical notebook.

References

1. Beotra Alka, (2000), Drug Education Handbook on Drug Abuse in Sports. Delhi: Sports Authority of India.
2. Bunn, J.N. (1998) Scientific Principles of Coaching, New Jersey Engle Wood Cliffs, Prentice Hall Inc.
3. Cart, E. Klafs & Daniel, D. Arnheim (1999) Modern Principles of Athletic Training St. Louis C. V. Mosphy Company
4. Daniel, D. Arnheim (1991) Principles of Athletic Training, St. Luis, Mosby Year Book
5. David R. Mottram (1996) Drugs in Sport, School of Pharmacy, Liverpool: John Moore University
6. Gary, T. Moran (1997) – Cross Training for Sports, Canada : Human Kinetics
7. Hardayal Singh (1991) Science of Sports Training, New Delhi, DVS Publications
8. Jensen, C.R. & Fisher A.G. (2000) Scientific Basic of Athletic Conditioning, Philadelphia
9. Ronald, P. Pfeiffer (1998) Concepts of Athletics Training 2nd Edition, London: Jones and Bartlett Publications
10. Yograj Thani (2003), Sports Training, Delhi : Sports Publications

Semester-VI

Paper-601M

**KINESIOLOGY, SPORTS BIOMECHANICS AND
INDIVIDUAL GAMES**

Credit: 04

Max. Marks: 100

Sessional Marks: 40

End semester exam marks: 60

Learning outcomes:

1. The student will be able to be oriented with the skeletal structure of human body by identifying the origin and insertion of various muscles.
2. Orient the students in basic structure and functions of primary joints of the body.
3. Relate and interpret the role of various mechanical principles in human movement.

PART: A

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Unit-I

Kinesiology and Biomechanics

- 1.1 Meaning and Definition and Importance of Kinesiology and Biomechanics in sports.
- 1.2 Concept: All and None Law, Reciprocal innervations, Gravitational Force, Angle of pull.
- 1.3 Lever: Meaning, Definition, Types and its application to human Body
- 1.4 Newton's Laws of Motion – and their application to sports activities
- 1.5 Spin & Friction: Definition and its types and its applicability in sports

Unit-II

Kinetic/Kinematics Concept for Analysis Human Motion

- 2.1 Basic Concept related to kinetics- Mass, Force, Density, Impulse, Torque, Axis and Planes.
- 2.2 Linear Kinematics: - Distance, Displacement, Speed, Velocity, Acceleration and its calculation
- 2.3 Projectile: Definition and factors influencing projectile trajectory.
- 2.4 Centre of Gravity & Line of Gravity: Definition and its application.
- 2.5 Equilibrium: Definition and its application.

PART: B

Max. Marks: 50

Sessional Marks: 20

End semester exam marks: 30

Individual Games

1. Individual Games: Gymnastics/ Swimming.
2. Basic fundamental techniques/skills and rules.
3. Basic demonstration and drills of First Aid.
4. Preparation of practical notebook.

Teaching Learning Strategies: The class will be taught by using lectures and demonstration, seminars, classroom discussion, videos, charts and presentations method. Virtual instructional platforms such as online lectures, webcast, etc. are to be used. Students can participate in coursework through instant messages, emails and video conferencing. Google class room, Cisco Webex Meeting, OERS, Swayam Platform (www.swayam.gov.in), Swayam Prabha (www.swayamprabha.gov.in) (available on Doordarshan (free dish TV), E-Yantra (www.e-yantra.org), Virtual Labs (www.vlabs.co.in), FOSSEE (www.fossee.in), application of spoken tutorials (www.spoken-tutorial.org), National Digital Library (www.ndl.iitkgp.ac.in), electronic journals (www.ess.infibnet.ac.in) etc. are to be used. Courses may also integrate DVD videos as part of the training process. Students may examine current topics in the field through the use of e- textbooks and e-physical education journals. Students can complete some portion of the education at approved testing sites for the practical components wherever necessary. Initiating Brain based learning- A stress free environment will be created. Constant feedback regarding their performance will be given to initiate learning from mistakes. Creative thinking for new ideas and innovations will be encouraged. Break in learning will be filled with recreational and constructive activities for boosting cognitive functions.

Activities: Lecture/ Project Work/ Seminars/ Term Papers/Assignments/ Presentations/ Study etc.

Assessment Rubric: Classroom Test, Project Work, Assignments, Presentations

References:

1. Anthony J. Blazevich (2017). Sports Biomechanics: The Basics: Optimizing Human Performance :blooms burry
2. By Peter M. (2013), Biomechanics of Sport and Exercise: Human Kinetics
3. Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: PoompugarPathipagam.
4. BeotraAlka, (2000) Drug Education Handbook on Drug Abuse in Sports: SportsAuthorityof India Delhi.
5. Clarke,D.H.(1975).ExercisePhysiology.NewJersey:PrenticeHallInc.,EnglewoodCliffs.
6. David, L Costill. (2004). Physiology of Sports and Exercise. Human Kinetics.
7. Fox, E.L., and Mathews, D.K. (1981).The Physiological Basis of Physical Education and Athletics. Philadelphia: Sanders College Publishing.
8. Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sandersco.

9. Richard, W. Bowers.(1989). Sports Physiology. WMC: Brown Publishers.
10. Sandhya Tiwaji. (1999). Exercise Physiology. Sports Publishers.
11. Shaver, L. (1981). Essentials of Physical Education