

**HIMACHAL PRADESH UNIVERSITY SUMMER HILL,
SHIMLA**



Scheme and Syllabus

**Ph.D. Physical Education
(CBCS w.e.f. Academic Session 2024-25)**

**Department of Physical Education
Faculty of Education**

Scheme of Examination and Syllabus for the Course Work Ph.D. (Physical Education), 2024-2025 onwards)

1. Preamble:

Research is a methodical and logical process of analyzing information to increase our understanding of the phenomenon under study. It adds to our existing knowledge of the phenomenon and helps to communicate that understanding to others. Therefore, the PhD program of the Department of Physical Education, H. P. University, Shimla is designed to accomplish local and regional aspirations, fulfill national obligations, and honor international commitments through high-quality research in the field of physical education and sports. The Ph.D. coursework thus aims to provide a scientific understanding of research to the researchers.

2. Program Outcomes (PO's)

PO1-Knowledge and Intellectual Ability: Demonstrate a thorough knowledge of the literature and a comprehensive understanding of innovative methods and techniques applicable to interdisciplinary research.

PO2-Research Competency and Technological Proficiency: Exhibit research competency and technological proficiency in the development of multidisciplinary profession of Physical Education, Fitness, and Sport.

PO3-Personal Effectiveness: Apply a significant range of advanced and specialised skills and be able to act autonomously in the planning and implementation of research.

PO4-Research Governance and Organisation: Critically and creatively evaluate current issues, research and advanced scholarship in the discipline and manage complex ethical and professional issues.

PO5-Consultancy, Influence and Impact: Work collaboratively with all stakeholders to create, develop and exchange research knowledge to influence and benefit society and the economy.

3. Eligibility criteria for admission to the Ph.D. Programme: As per the guidelines of H.P. University, Shimla.

4. Duration of the Programme: As per the guidelines of H.P. University, Shimla.

5. Procedure for admission: As per the guidelines of H.P. University, Shimla.

6. Allocation of Research Supervisor: As per the guidelines of H.P. University, Shimla.

7. Courses in Ph.D. (Physical Education) Programme:

Every research scholar admitted for Ph. D. Programme in Physical Education is required to pass a coursework of a minimum 12 credits. A total 12 credits assigned for coursework which have been distributed in the following categories of course;

Course-1: Research and Publication Ethics, RPE (common for all HPU's PhD programs) with a Credit weightage of 2.

Course-2: Research Methodology (Discipline-wise) with a Credit weightage of 5. The course will consist of five modules/units.

Course-3: Discipline-specific research-oriented Elective course with a credit weightage of 5. The course will consist of five modules/units.

8. Course Structure for Ph.D. (Physical Education)

Course Code	Course Name	Course Type	Credit Hours Per Week				Distribution of Marks			
			L	T	P	Credit	CCA	ESE	ESP	Total Marks
Core Course										
RPE-PhD	Research and Publication Ethics	DSC	2	0	0	2	-	50	-	50
PHDPE-CC-101	Research Methodology and Applied Statistics in Physical Education and Sports	DSC	5	0	0	5	-	100	-	100
Specialization/ Elective Courses: Choose any one Course										
PHDPE-EC-101	Physiology of Exercise	DE	5	0	0	5	-	100	-	100
PHDPE-EC-102	Sports Biomechanics									
PHDPE-EC-103	Sports Psychology									
PHDPE-EC-104	Sports Training									
	Total		12	0	0	12		250	-	250

Syllabus of Ph. D. Course Work

Course Code: RPE-PhD

Marks = 50

Course Title: Research and Publication Ethics

Course Outcomes:

L	T	P	Cr
2	0	0	2

On completion of the course, the students shall be able to:

- Promote the importance of research integrity
- Discuss the principles of publication ethics.
- Educate on identifying research misconduct and predatory publishing.
- Discuss indexing and citation databases.
- Provide information on open-access publications and research metrics.
- Introduce various plagiarism detection tools.

Unit 01: Philosophy and Ethics.

- Introduction to philosophy: definition, nature and scope, concept, branches.
- Ethics: definition, moral philosophy, nature of moral judgments and reactions.

Unit 02: Scientific Conduct

Ethics with respect to science and research.

- Intellectual honesty and research integrity.
- Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP).
- Redundant publications; duplicate and overlapping publications, salami slicing.
- Selective reporting and misrepresentation of data.

Unit 03: Publication Ethics

- Publication ethics: definition, introduction, and importance.
- Best practices/standards setting initiatives and guidelines: COPE, WAME, etc.
- Conflicts of interest.
- Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types.
- Violation of publication ethics, authorship and contributorship.

6. Identification of publication misconduct, complaints and appeals.
7. Predatory publishers and journals.

Unit 04: Open Access Publishing

- 1 Open-access publications and Initiatives.
2. SHERPA/ROMEO online resource to check publisher copyright & self-archiving policies.
3. Software tool to identify predatory publications developed by SPPLU.
4. Journal finder journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal, etc.

Unit 05: Publication Misconduct

A. Group Discussions.

1. Subject-specific ethical issues, FFP, authorship.
2. Conflicts of interest.
3. Complaints and appeals examples and fraud from India and abroad.

B. Software tools.

Use of plagiarism software like Turnitin, iThenticate, and other open-source software tools.

Unit 06: Databases and Research Metrics

A. Databases.

1. Indexing databases.
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics.

- 1 Impact Factor of journal as per Journal Citation Report, SNIP, SIR, IPP, Cite Score.
2. Metrics: h-Index, g index, i10 index, altmetrics.

Suggested Readings

- Beali, J. (2012). Predatory publishers are corrupting open access. Nature, Vol. 489(7415), 179.
- <https://doi.org/10.1038/489179>.
- Bird, A. (2006). Philosophy of Science. Routledge.
- Bretag, Tracey (2016). The Handbook of Academic Integrity. Springer.
- Chaddah. P. (2018). Ethics in Competitive Research: Do not get scooped: do not get Plagiarized
- ISBN:978-9387480865.

- Grudniewicz, Agnes, D. Moher, Kelly D. Cobey+32 authors (2019). Predatory journals: no definition, no defense. Nanee, Vol. 576.
- Indian National Science Academy (2019), Ethics in Science Education, Research and Governance (2019), ISBN 978-81-939482-1-7
- <http://www.intaindia.res.in/p/Ethics Book.pdf>
- Israel, Mark, Iain Hay (2006). Research Ethics for Social Scientists. London.
- Lang. James M. (2013). Cheating Lessons Learning from Academic Dishonesty. Harvard University Press.
- MacIntyre, Alasdair (1967). A Short History of Ethics. London.
- National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On Being a Scientist: A Guide to Responsible Conduct in Research. Third Edition. National Academies Press.
- Resnik, D. B. (2011). What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10.
- <https://www.nichs.nih.gov/research/resources/bioethics/whatis/index.cfm>
- Whitley Jr., Bernard E. & Patricia Keith-Spiegel (2001). Academic Dishonesty An Educator's
- Gulde. Psychology Press.

Course Code: PHDPE-CC-101

Marks = 100

Course Title: Research Methodology & Applied Statistics in Physical Education and Sports

L	T	P	Cr
5	0	0	5

Course Outcomes:

On completion of the course, the students shall be able to:

- Understand and comprehend the basics in research methodology and applying them in research/project work.
- Understand the various research tools and their use in research.
- Develop skills in qualitative and quantitative data analysis and presentation.
- Prepare the research proposals and develop skills for thesis writing.
- Understand and comprehend the basics of statistics & statistical techniques.
- Recognize the research situations where non-parametric tests are appropriate.

Unit-I

Introduction to Research

- Research: Meaning and objectives of research; basic steps of research and types of research.
- Review of related literature: Meaning, necessity, sources and steps in reviewing literature.
- Library data base: Introduction to database, Pubmed search, Scopus/Web of science, Science direct & getting full articles, use of Google scholar and introduction to Cochrane library.
- Formulation and development of research problem: Selection of problem & variables, framing of title and objectives for various types of research, research questions, limitations and delimitations of research problem, rationale of research study.
- Hypothesis: Meaning, forms, importance, characteristics of a good hypothesis and testing of hypothesis- Type I and II error and power of the test.

Unit-II

Research Methods, Design and Sampling

- Quantitative research methods: Surveys, longitudinal studies, cross-sectional studies, and correlational studies.
- Qualitative research methods: Interviews- structured and unstructured, focus groups, ethnography, and content analysis.
- Mixed methods research: Sequential explanatory, sequential exploratory, concurrent triangulation, and embedded.
- Research Design: Concept, importance and types of research design- descriptive, experimental, correlational, diagnostic, explanatory, and case study research design.
- Sampling: Probability and non-probability sampling techniques, determination of sample size and sampling error.

Unit-III

Research Tools and Academic Writing

- Research tools: Meaning and characteristics of good research tools, types of data collection tools/techniques: Questionnaire, observation, psychological test, sociometric techniques, scales, and inventories.
- Different formats for reference and bibliography: APA, MLA, Chicago and Harvard,
- Salient features of writing research proposal/report: Language & style, precision, consistency, continuity, use of third person, use of tense.

- Format and components of writing thesis and dissertations, methods of writing discussion of results, and methods of writing of research project.
- Method of writing abstract and full-length research papers for presenting in a conferences, seminars and to publish journals.

Unit-IV

Introduction to Statistics and Descriptive Statistics

- Definition of Statistics, types and importance of statistics in physical education and sports research.
- Statistical terms: Population, sample, parameter, statistic, variables, attribute, degree of freedom, level of significance, and level of confidence.
- Measures of central tendency and variability: Computation of mean, median, quartile deviation and standard deviation.
- Normal curve: Definition and principles of normal curve, properties of normal curve, skewness and kurtosis.
- Testing normally: Shapiro Wilk and Kolmogorov Smirnov test, Q-Q plot and box plots for identifying outliers.
- Correlation: Meaning, assumptions, types (simple, partial and multiple) and computation of Pearson's coefficient of correlation and rank order correlation.

Unit-V

Parametric and Non-Parametric Statistics

- Meaning, assumptions, and computation of comparing two means with dependent and independent t-tests.
- Meaning, assumptions, and computation of One Way ANOVA. Computation of post-hoc analysis test: LSD, Scheffe's and Tukey.
- Meaning and assumptions of Analysis of Covariance (ANCOVA).
- Meaning and assumptions and types of regression- simple, linear, and non-linear regression.
- Assumptions and computation of sign test for single sample and two sample problems (for paired and independent samples).
- Assumptions and computation of Chi-Square test, Wilcoxon rank-sum test, Mann-Whitney test and Kruskal-Wallis's test.

Suggested Readings

- Anderson, J. (2001): Thesis and Assignment writing, 4th ed., Wiley, USA.
- Bryman, Alan (2004), Social Research Methods, Oxford University Press, Oxford, 2nd edition.
- Kamlesh, D. M. (2019). Methodology of Research in Physical Education and Sports. Sports Publication.
- Kothari, C. (2019). Research Methodology: Methods and Techniques. New Age International Publishers.
- Koul, Lokesh (1988), Methodology of Research, Vikas, New Delhi.
- Thomas, J. R. (2016). Research Method in Physical Activity. US: Human Kinetics.
- Verma J.P. (2019). Statistics and Research Methods in Psychology with Excel. Springer Nature Singapore Pte Ltd.
- Dhinu, M. R. (2017). Applied Statistics in Physical Education and Sports. Friends Publications.
- Garrett, H.E. (1973), Statistics in Psychology and Education Vakils, Feffer and Simon, Bombay.
- Sansanwal DN (2020). Research Methodology and Applied Statistics. Shipra Publisher, Delhi, India.

Elective Courses

Course Code: PHDPE-EC-101

Marks = 100

Course Title: Physiology of Exercise

L	T	P	Cr
5	0	0	5

Course Outcomes:

On completion of the course, the students shall be able to:

- Describe the physiological effects of exercise or sports training on different systems of the body or on an individual.
- Comprehend bioenergetics & apply the practical knowledge of energy systems during exercise and sports.
- Understand the role of sports or event specific nutrition, its applicability in energy production & develop ability to assess and evaluate nutritional intake.
- Demonstrate the knowledge of general overall physiological principles associated with metabolic processes and how to assess it.

- Develop proficiency in performing laboratory techniques and subsequent analysis of data generated in human performance laboratory.

Unit-I

Emerging Trends in Exercise Physiology and Fundamentals of Exercise Physiology

- Emergent Trends in the field of Exercise Physiology.
- Effects of Exercise or Sports Training on different Body Systems.
- Transportation of O₂ and CO₂ in systemic and pulmonary circulation.
- Bohr's effect and Chloride exchange shift.
- Haldane Effect, Regulation of A-aDO₂ and PaO₂ during exchange.

Unit-II

Energy Systems, Bioenergetics and Biochemical mechanism of Movement

- Energy Systems, their impact on exercises and Sources of Energy System.
- Metabolism of Carbohydrates and Fats.
- Concept of GLUT-4, Regulation of glycolysis and Electrontransport chain.
- Assessment of energy costs of diverse physical activity.
- Cardiovascular Control and Respiratory Regulation during Exercise.

Unit-III

Neuroendocrinological Regulatory Mechanisms of Movement and Environmental Factors in Exercise & Sport

- Hormonal Regulation of Exercise, Muscular and Neurological Control of Movement.
- Exercise and Thermoregulation in Diverse Environments, Quantification of Sport Training, Exercise in Hypobaric, Hyperbaric and Microgravity Environments.
- Physical Activity for Health and Fitness, Effects of Altitude on Performance.
- Physical Activity for Health and Fitness, Effects of Altitude on Performance

Unit-IV

Nutritional Ergogenics and Neuromuscular Aspects of Physical Activity

- Nutrition and Nutritional Ergogenics, Optimal Body Weight for Performance.
- Bioelectric potential: Resting potential, Graded Potential and Action potential.
- Neuromuscular Junction and Neuromuscular fatigue.
- EMG and its applications in exercise science.

- Biomechanics and Neuromuscular performance

Unit-V

Related Literature Survey and Practical Orientation Exercise Physiology Equipment

- Orientation to the Effects of diverse Training Programmes on different Body Systems.
- Orientation to the Effects of Altitude Training on Performance.
- Orientation to the Effects of Environmental Training on Performance.
- Orientation to the Effects of Ergogenic Aids on different Body Systems.
- Orientation to Pulmonary Function Tests (Spirometry), Heart Rate Variability Tests, Body Fat Analyzer, BMR Apparatus and Bicycle/Treadmill Ergometer.
- Orientation to Blood Sample Collection, Processing, Storage and Analysis.

Suggested Readings:

- Mathew, D. K. and Fox, E. L. (1976). Physiology basis of Physical Education and athletics. Philadelphia: UBS company
- Pearce Evelyn. (1992). Anatomy and physiology for nurses, Calcutta: Oxford university press.
- Marieb Elaine N. (1984). Human Anatomy and physiology (3rd Ed.). Cal: The Benjamin Cumming.
- Clarke, H. David Exercise Physiology.
- William D. Mcardle, Frank I. Katch, and Victor L. Katch Exercise physiology.
- Koley, Shyamal Exercise Physiology.
- Frank J. Corno and Harold W. Borton. Exercise physiology for health.
- Eston, R. and Reilly, T. (2001). Physiology Laboratory Manual Second Edition Volume 2: Exercise Physiology Tests, Procedures and Data.
- Tanner, R. K. and Gore, C.J. (2013). Physiological tests for elite athletes. Australian Institute of Sport. 2nd ed.

Course Code: PHDPE-EC-102

Marks = 100

Course Title: Sports Biomechanics

L	T	P	Cr
5	0	0	5

Course Outcomes:

On completion of the course, the students shall be able to:

- Comprehend the concepts of Biomechanics and kinesiology in relation to human performance.
- Evaluate the different fundamental movements and understand the importance of analysis.
- Describe the cause and effect of various mechanics on sports specific movements.
- Exercise the practical knowledge of biomechanics in research and suggest performance enhancing measures.

Unit-I

Emerging Trends and Fundamentals of Sports Biomechanics

- Current trends and importance of biomechanics.
- Description of human movement.
- Classification of force systems: Linear force system, Parallel force system, Concurrent force system, General force system, Composition, and Resolution of forces.
- Location of center of gravity: Segmentation method.

Unit-II

Qualitative and Quantitative Methods Sports Skill Analysis

- Methods of analysis of sports skills: Qualitative methods and quantitative methods.
- Methods of investigation: Photo instrumentation; camera, films, exposure meters, calibration of camera speed, filming fundamentals, film analysis, fundamentals of film analysis.
- Other methods of investigation: Goniometry, accelerometers, dynamometry and electromyography.
- Application of biomechanical research in the enhancement of sports performance.

Unit-III

Biomechanical Performance Analysis Methods in Sports

- Analysis of static positions of the body: Sitting, standing, and lying.
- Analysis of locomotion: Walking, running, jumping, hopping or leaping.

- Analysis of techniques of track and field events: Sprinting event, jumping event and throwing event.
- Analysis of techniques of sports events: Basketball: Lay-up shot; Volleyball: Spiking; Football: Kicking & throwing; Gymnastics: Forward and backward somersault; Swimming: freestyle and Cricket: Drive.

Unit-IV

Recent Advancements in research

- Latest instruments and software used in biomechanical analysis.
- Two-dimensional and three-dimensional video analysis of human motion.
- Role of biomechanics in designing the sports equipment, Protective sports material, and sports surface material.
- Preparation of research proposal on any of the biomechanical problem.

Unit-V

Related Literature Survey

- Kinematics and kinetics characteristics with reference to sports performance.
- Methods of analysis in Sports.
- Sports equipment's and surfaces.
- Videographic analysis in sports.
- Application of biomechanical principles in sports performance

Suggested Readings:

- Hay, J (1981). The Biomechanics of sports techniques. New Jersey: Prentice Hall.
- Bunn, J. W. (1981). Scientific principles of coaching. Englewood: Cliffs. Prentice Hall.
- McGinnis, P. M. (2005). Biomechanics of sports exercises. USA: Human Kinetics.
- Sunderrajan, G.S. Biomechanics of sports and games. Ludhiana: Tondon Publication.
- Susan, J. H (2003). Basic Biomechanics. (4th Edn.) Mc.Graw Hill Publication.
- Raj Lakshmi, D. (2007). Biomechanics for sports and games. Sports Educational Technologies.
- Hoffman, S.J. (2005). Introduction to Kinesiology. Human Kinesiology Publication.
- Uppal. A. K. and Lawrence, M. P. Kinesiology. New Delhi. Friends Publication: India.

Course Code: PHDPE-EC-103

Marks = 100

Course Title: Sports Psychology

L	T	P	Cr
5	0	0	5

Course Outcomes:

On completion of the course, the students shall be able to:

- Get acquainted with the meaning, nature, and scope of sports Psychology.
- Know & prepare psychological profiles of sportsmen.
- Know the various psychological problems and its coping techniques for better sports performance.
- Introduce the role of leaders, counsellors, and social psyche in the performance enhancement.
- Formulate New Psychological Tests and be able to conduct these tests on subjects.

Unit-I

Introduction to Sports Psychology

- Concept, importance and areas of research in sports psychology.
- Research on cognitive, affective, and psychomotor domains.
- Psychological profiling of sportsmen/athletes.
- Concept of self-regulation, biofeedback, self-confidence, self-efficacy, goal setting and mental imagery.

Unit-II

Concept of learning and Cognitive Learning

- Application of research on theories of play.
- Application of research on theories of learning.
- Effect of peer pressure, family, coach, spectator and media on individual and team sports.
- Applications of techniques of cognitive process: Relaxation technique in sports, imagery in sports, cognitive technique for building confidence, progressive muscle relaxation (PMR), autogenic training and deep breathing.

Unit-III

Psychological Testing

- Psychological tests: Motivation, personality, anxiety, aptitude, and intelligence test.
- Latest sports-specific test related to sports psychological.
- Construction and standardization of psychological tests/questionnaires.

- Assessment of reaction time, coordination, anticipation time, creativity, and kinesthetic perception.

Unit-IV

Psychological Skill Training and Imagery

- Applications of psychological skill training in individual and team sports.
- Psycho-social aspects of the differently abled pupil.
- Imagery, types of imagery, VMBR, autogenic training, and guided imagery
- Cognitive Technique for Building Confidence.
- Preparation of research proposal on any of the psychological variables.

Unit V

Related Literature Survey

- Psychological profiling of sportspersons.
- Anxiety, stress, personality and motivation and sports performance.
- Mental toughness, emotional intelligence and Psychological/Mental skill training
- Autogenic and VMBR training and sports performance.

Suggested Readings:

- B. J. Cratty. Psychology of Contemporary sports Champaign: Human Kinetics Publishers,
- John M. Silva & Roberts. Psychological Foundations of Sport. Champaign: HumanKinetics Publishers.
- Diane Gills, Psychological Dynamics of sports. Champaign: Human KineticsPublishers.
- Cox, Sports Psychology. Champaign: Human Kinetics Publishers.
- Richard M. Sumin, "Psychology in Sports, Methods & Application. New Delhi: Surjeet Publication.
- But, Lusan Dorcas, Psychology of Sports. Network: Van Nostrand ReinholdCompany
- Cratty, Bryant. J. (1973). Movement Behavior and Motor Learning. Philadelphia: Lea and Febiger.
- Kamlesh M. L. Psychology of Physical Education and sports (London, Boston Rutledge and Kegan Paul.
- Linda K. Binket, Robert J. Ratella and Ann/, S. (1972). Really Sports, Psychology, Psychological Consideration Maximizing Sports Performance. Dubugne Jowa: C. Brown Publishers.

Course Code: PHDPE-EC-104

Marks= 100

Course Title: Sports Training

L	T	P	Cr
5	0	0	5

Course Outcomes:

On completion of the course, the students shall be able to:

- Understand the role of energy in training process.
- Comprehend the current trends of Sports Training and Super compensation.
- Understand the Principles of load and its adaptation in sports training.
- Formulate Periodization and develop training models.
- Get acquainted with the recent training methods in research.

Unit-I

Introduction and Physiological aspects of sports Training

- Current trends and importance of sports training.
- Energy system: Physiology and mechanism of energy system with reference to aerobic and anaerobic activities.
- Physiological aspects of the development of strength, speed, endurance and flexibility.
- Relationship of physiological parameters with the training process.
- Uses of technology on training, coaching and competition.

Unit-II

Training Load and Methods of Training

- Components of training load, adaptation process and super compensation.
- Types of training methods, means and methods of recovery.
- Technique training & its implication in various phases.
- Methods employed for technique training and tactics.
- Means of evaluation of progress in learning technique.
- Means of evaluation of progress in tactical learning: Match analysis and method used for match analysis.
- Resistance training: Types of resistance training and their effect on Bio-motor components.

Unit-III

Development of Bio-Motor Abilities

- Speed: Speed performance and speed training, factors affecting speed, means & method to develop speed.
- Strength: Role of strength, importance of strength, factors determining strength and developments of strength.
- Endurance: Role of endurance, factors determining endurance and methods of development of endurance
- Flexibility: Principles, characteristics & role of flexibility, types, importance of flexibility and guidelines for the development of flexibility
- Current issues and latest research on the development of motor abilities.

Unit-IV

Periodization and Development of Training Programme

- Concept of peaking, taper, and types of planning- long-term and short-term training plans.
- Periodization of strength, speed, and Integrated periodization plan.
- Design and evaluation of training program.
- Development of the training model and training schedule.
- Preparation of research proposal on any of the biomotor abilities.

Unit-V

Related Literature Survey

- Orientation to conduct of related literature survey and its presentation with reference to sports performance: Speed, flexibility, endurance, agility etc.
- Effects of different training on sports performance.
- Development of training program and plans.
- Strategy and tactics in sports performance.

Suggested Readings:

- Singh, H. (1991). Science of sports training. New Delhi: DVS publication
- Rainer Martens (2005). Successful coaching
- Beachel & Taylor (2006). Essentials of strength training & conditioning
- Beotra Alka, (2000), Drug education handbook on drug abuse in sports. Delhi: Sports Authority of India.

- Bunn, J.N. (1998). Scientific principles of coaching, New Jersey Engle Wood Cliffs, Prentice Hall Inc.
- Cart, E. & Daniel, D (1999) Modern principles of athletic training, St. Louis C. V. Mosphy Company
- Daniel, D (1991) Principles of athletic training, St. Luis, Mosby Year Book
- David R (1996) Drugs in sport, School of Pharmacy, Liverpool: John Moore University
- Gary, T. Moran (1997) – Cross training for sports, Canada: Human Kinetics
- Jensen, C.R. & Fisher A.G. (2000). Scientific basic of athletic conditioning, Philadelphia
- Ronald, P (1998) Concepts of athletics training, 2nd Edition, London: Jones and Bartlett Publications
- Yograj Thani (2003), Sports training, Delhi: Sports Publications

10. Evaluation Scheme: At the end of the course, a final written examination of 100 Marks will be conducted.

- a. Students with at least 75% attendance will be eligible for the final written examination.
- b. The exam will be conducted for a three-hour duration.

Note for Paper Setting (Course 1):

There will be 7 questions covering all the units. The first six questions (1, 2, 3, 4, 5 & 6) of 6 marks each will consist of one question from each unit, with internal choice provided, meaning there will be two questions from each unit. The 7th question will consist of 10 short answer type questions using Roman numerals (i, ii, iii, x) each with 2 marks. There will be at least one question from each unit, and students will be required to attempt any seven questions out of ten.

Note for Paper Setting (*course 2-3*):

There will be 11 questions covering all the units The first 10 questions of explanatory answers (1, 2, 3....10) of 12 marks each will consist of one question from each unit, with internal choice provided, meaning there will be two questions from each unit (5X2=10). The students will be required to attempt one question from each unit. The 11th question will consist of 10 short answer type questions using Roman numerals (ii, iii, x) each with 5 marks, covering all the units. The students will be required to attempt any eight questions out of ten

12. General Guidelines:

- The minimum passing marks for PhD coursework will be 55% aggregate, with minimum 50% in each individual course.
- The Ph.D. Course Work should be completed within stipulated time as per university guidelines.