



**हरियाणा केंद्रीय विश्वविद्यालय**  
**CENTRAL UNIVERSITY OF HARYANA**  
 (संसदके अधिनियम सं. 25 (2009) के तहत स्थापित)  
 (Established vide Act no. 25 (2009) of Parliament)  
 जांट-पाली, महेंद्रगढ़ (हरियाणा) - 123031  
 Jant-Pali, Mahendergarh (Haryana) – 123031

**DEPARTMENT OF PHYSICAL EDUCATION & SPORTS**

**Ph.D. SCHEME AND SYLLABUS (2020-21)**

| Semester | Core/<br>Elective                                | Paper Code                | Title of the Paper                         | Credits  |            |   |
|----------|--|---------------------------|--|--|------------|---|
|          |  |                           |  | Theory   | Practicals |   |
| I        | Core   | SOE PHE 02 01 01<br>C4004 | Research Methodology in Physical Education | 4  |            |   |
|          | Core   | SOE PHE 02 01 02<br>C4004 | Statistics and Computer Applications       | 4  |            |   |
|          | Core   | SOE PHE 02 01 03<br>C1022 | Research and Publication Ethics            | 1  | 1          |   |
|          | <b>Discipline Centric Elective Courses(DCEC)</b> |                           |  |  |            |   |
|          |  |                           | SOE PHE 02 01 02<br>E3024                  | Research Based Kinesiology and Sports Biomechanics | 3          | 1 |
|          |  |                           | SOE PHE 02 01 03<br>E3024                  | Scientific Principles of Sports Training           | 3          | 1 |
|          |  |                           | SOE PHE 02 01 04<br>E3024                  | Psycho-Socio Basis of Physical Education           | 3          | 1 |

|                    | Total Core Course Credits | Total Elective Course Credits | Total Credits |
|--------------------|---------------------------|-------------------------------|---------------|
| <b>Semester- I</b> | 10                        | 4                             | 14            |

**Note:** For more details regarding Credit and other Academic requirement Ordinance II (A) of the University may be referred.

# RESEARCH METHODOLOGY AND STATISTICS IN PHYSICAL EDUCATION

Course Code: SOE PHE 02 01 01 C4004

| L | T | P | Credits |
|---|---|---|---------|
| 4 | 0 | 0 | 4       |

## Learning Outcomes

After completion of the course, the students will be able to:

- Explain various approaches in the field of research.
- Develop a research proposal.
- Select an appropriate sampling design for a research study.
- Construct tools for different types of research.
- Document and disseminate research findings in physical education.
- Explain the significance of intellectual property rights in the field of research.

## UNIT-I

### Introduction to Research

1. Basic concept of Research and its scope in physical education
2. Types/Classification of Researches

### Review of Literature

1. Importance, location of the research material – index, books, bibliography, reviews, abstract, critical and allied literature
2. Steps in reviewing literature and critically writing of review of literature

### Selection of Research Problem

1. Identification of area for research in Physical Education
2. Selection of problem & variables, writing of title and objectives, Hypothesis and its form, limitation and delimitation of research problem, rationale of research study

## **UNIT-II**

### **Methods of Research**

1. Analytical Research- Philosophical, Historical and Meta-Analyses
2. Descriptive Research –Case Study and Survey (Cross-sectional, Longitudinal and Correlational)
3. Qualitative and Quantitative Research
4. Experimental Designs: Pre-experimental Designs, True Experimental Designs and Quasi Experimental Designs

## **UNIT-III**

### **Sampling and Tools in Research**

1. Sampling: Population, Sample, Frame, Probability and Non- Probability Sampling Techniques, Sample size and sampling error
2. Characteristics of a good research tools
3. Types of tools for data collection – standardised and non-standardised
4. Questionnaire, Interview, Observation, Psychological Test, Sociometric Techniques, Scales, and Inventories
5. Procedure of development and standardization of tools
6. Methods for establishing reliability and validity
7. Primary and secondary sources for data collection

## **UNIT-IV**

### **Academic Writing**

1. Different formats for reference and bibliography- APA, MLA, Chicago and Harvard
2. Silent features of writing research proposal/report - Language & style, Precision, Consistency, Continuity, use of third person, use of tense, Use of headings, Table, Graph and Front page of thesis
3. Research Proposal Writing
4. Method of writing research papers for seminars and publication in journals
5. Introduction to Poster Presentation
6. Writing of research dissertation and thesis
7. Writing of research Project

**Transaction Mode:** Lecture, Demonstration, Group Discussion, Project Method, Seminar, Dialogue

**Suggested Readings:**

- Kothari, C. R and Garg Gaurav (2014). *Research Methodology: Methods and Techniques*, 3<sup>rd</sup> Edition, New Age International Publishers.
- Kumar, R. (2005). *Research Methodology: A Step-By-Step Guide for Beginners*. 2nd Edition, Pearson Education.
- Pannerselvam, R. (2009). *Research Methodology*. Prentice Hall.
- Prathapan, K. (2014). *Research Methodology for Scientific Research*. IK International.
- Sansanwal, D.N. (2020). *Research Methodology and Applied Statistics*. Shipra Publisher.
- Singh, Y.K. (2008). *Fundamentals of Research Methodology and Statistics*. New Age International Publishers.

# STATISTICS AND COMPUTER APPLICATIONS

Course Code: SOE PHE 02 01 02 C4004

| L | T | P | Credits |
|---|---|---|---------|
| 4 | 0 | 0 | 4       |

## Learning Outcomes

After completion of the course, the students will be able to:

- Explain different Measuring Scales of Data
- Explain application of different data Analysis Software
- Illustrate data analysis with multiple correlation and regression techniques
- Analyze and present data with multivariate techniques.

## UNIT-I

### Computer Application

1. Using MS Word for typing, formatting, editing, reviewing, and preparing references/bibliography
2. Using MS Power Point for preparing academic presentations
3. Using MS Excel for data processing and analysis
4. Using SPSS, R (R Foundation for Statistical Computing), MATLAB, MINITAB, and STATA for data processing and analysis
5. Google form for data collection, Padlet, Google Drive, Reference Manager

## UNIT-II

### Nature of Data, Hypothesis Testing and Design of Experiments

1. Nature of data and levels of measurement.
2. Measures of Central Tendency and variability, Co-efficient of Variation.
3. Testing normally Shapiro Wilk and Kolmogorov Smirnov test, Q-Q plot and Box plots for identifying outliers, Developing profiles, Concept in hypothesis testing: Type I and II error, Power of the test, Sample size determination.
4. Parametric and Non-Parametric test, One & Two sample T-test, Analysis of Variance (One Way & Two-Way ANOVA), Chi-Square test.
5. Post-hoc analysis Test: LSD, Scheffe's, Tukey- HSD, Correction for Inflating Type I error due to multiple comparisons. Effects size.

### **UNIT-III**

#### **Correlation and Regression Analysis**

1. Correlation- Partial and multiple, limitations, Testing of significance
2. Regression Analysis- Simple and multiple regressions. Estimating intercept and slope.
3. Least square methods, analyzing residuals, Residual Plot: Testing assumptions in the regression model Standard error of estimate, Testing significance of slope and model, Coefficient of Determination ( $R^2$ )
4. The Multiple Regression Model- Developing a Multiple Regression Model, Standardized regression coefficients. Different ways of testing a regression model, testing the significance of overall model and regression coefficients.
5. Analyzing residuals, standard Error of the Estimate, The coefficient of determination ( $R^2$ ). Adjusted  $R^2$ , Testing the significant of  $R^2$ . Different approaches in developing multiple regression model: Stepwise, Forward, Backward and Enter

### **UNIT-IV**

#### **Introduction to Statistical Design and Multivariate Analysis**

1. Analysis of Covariance: Concept of Analysis of Covariance, ANCOVA model, Hypothesis tested.
2. Application of ANCOVA in sports research. Statistical test used, Preparation of data file, Defining variables for the data in table. Output generated in the analysis and its interpretation.
3. Classification of Multivariate Techniques: Techniques for understanding dependency and Interdependence. Techniques for understanding structural modeling.
4. Factor analysis (Exploratory and Confirmatory.), Logistic Regression. Multivariate Analysis of Variance (MANOVA) model.

**Transaction Mode:** Lecture, Demonstration, Group Discussion, Project Method, Seminar, Dialogue

**Suggested Readings:**

Sansanwal, D.N. (2020). *Research Methodology and Applied Statistics*. Shipra Publisher.

Verma, J.P. (2019). *Statistics and Research Methods in Psychology with Excel*. Springer Nature Singapore Pte Ltd.

---. (2015). *Repeated Measures Design for Empirical Researchers*. John Wilkey& sons.

---. (2014). *Statistics for Exercise Science and Health with Microsoft Excel*. John Wilkey& sons.

---. (2012a). *Data Analysis in Management with SPSS Software*. Springer Science & Business Media.

---. (2012b). *Statistics for Psychology*. Tata McGraw Hill Education Private Limited.

**Course Code: SOE PHE 02 01 03 C1022**

| <b>L</b> | <b>T</b> | <b>P</b> | <b>Credits</b> |
|----------|----------|----------|----------------|
| 1        | 0        | 2        | 2              |

### **Learning Outcomes**

After completion of the course, the students will be able to:

- Explain the philosophy and ethics of research
- Prepare research in a scientific manner
- Present articles in standardized journals/ publications
- Understand and usage of tools to check plagiarism.

### **UNIT-I**

#### **Philosophy and Ethics**

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

### **UNIT-II**

#### **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-III**

#### **Publication Ethics**

Publication Ethics: definition, introduction and importance. Best Practices/Standards setting initiatives and guidelines: COPE, WAME, etc. Conflict of Interest. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice-versa, types. Violation of publication ethics, authorship and contributorship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals.

### **Practicals**



## 1. Open Access Publishing

Open Access Publications and Initiatives. SHERPA/ ROMEIO online resource to check publisher copyright & self-archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder / Journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

## 2. Publication Misconduct

Subject specific ethical issues, FFP, authorship. Conflict of Interest. Complaints and Appeals: examples and fraud from India and Abroad. Use of Plagiarism software like TURNITIN, URKUND and other Open Source Software tools.

## 3. Database and Research Metrics

Indexing Databases, Citation Databases: Web of Science, Scopus, etc. Impact factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: H-index, G index, I10 index, altmetrics.

**Transaction Mode:** Lecture, Demonstration, Group Discussion, Project Method, Seminar, Dialogue

### **Suggested Readings:**

Beall, J. (2012). *Predatory Publishers are Corrupting Open Access*. Nature.

Bird, A. (2006). *Philosophy of Science*. Routledge.

Chaddah, (2018) *Ethics in Competitive Research: Do Not Get Scooped; Do Not Get Plagiarized*.

Indian National Science Academy (INSA). (2019). *Ethics in Science Education, Research and Governance*.

Resnik, D.B. (2011). *What is Ethics in Research and why is it Important*. National Institute of Environmental Health Sciences.

# RESEARCH BASED KINESIOLOGY AND SPORTS BIOMECHANICS

Course Code: SOE PHE 02 01 02 E3024

| L | T | P | Credits |
|---|---|---|---------|
| 3 | 0 | 2 | 4       |

## Learning Outcomes

After completion of the course, the students will be able to:

- Understand about the importance of applied kinesiology and Sports Biomechanics.
- Analyse the action of muscles.
- Classify the different types of motion and force and its application in sports.
- Understand about the Methods /Tools /Software to Analysis of Human Movements.

## UNIT-I

### Introduction and Trends in Kinesiology

1. Aims and objectives of Kinesiology.
2. Need and importance of Kinesiology in Physical Education.
3. Joints, Types of joints, Description of Human movement.
4. Axis and Planes – types and their interrelationship
5. Muscles and Role of muscles. Structural and classification of muscle.

## UNIT-II

### Introduction and Trends in Sports Biomechanics

1. Classification of force system.
2. Classes of Lever and their principles in sports and physical activities.
3. Concepts of Equilibrium and Stability.
4. Motions, Laws of motion, their application and Kinematics.

## UNIT-III

### Analysis of Techniques of Sports Movement

1. Analysis of static positions of the body
  - a) Sitting /Standing and Lying
2. Analysis of Locomotion.
  - a) Walking / Running and Jumping

- b) Hopping or Leaping
- 3. Basic steps of Analysis Sport Technique
  - a) Development of Model
  - b) Observation
  - c) Identification of Faults
  - d) Evaluation of Faults
  - e) Instruction to the Performer

#### **UNIT-IV**

##### **Analysis of Techniques with modern Equipments**

1. Methods of analysis of sport skills:
  - a) Qualitative Methods
  - b) Quantitative Method
2. Methods of investigation:
  - a) Photo instrumentation: Camera, Films, Exposure Meters, Calibration of Camera Speed, Filming Fundamentals, Films Analysis, Fundamentals of film analysis.
3. Others methods of investigation:
  - a) Goniometry
  - b) Accelerometers
  - c) Dynamometry
  - d) Electro-Myograph

##### **Practicals**

1. Goniometry – measurement of joint ROM / Elgon.
2. Manual testing of big muscles of the body.
3. Basic anthropometric measurements (stature, sitting height, different body segment length, weight, BMI and skin fold measurements).
4. Action of Muscles of upper and lower extremities by palpations method.
5. Manual calculations of various kinetic and kinematic parameters – distance, displacement, speed, velocity, acceleration, momentum, force, mass, weight, resultant vector, pressure, work, power, energy etc.

6. Stick diagram (basic techniques; anatomical posture, walking, push up, sit ups etc.).
7. Goniometry – measurement of joint ROM / Elgon.
8. Basic anthropometric measurements (stature, sitting height, different body segment length, weight, BMI and skin fold measurements).
9. Classification of different movement according to axes in plane.

**Transaction Mode:** Lecture, Demonstration, Group Discussion, Project Method, Seminar, Dialogue

**Suggested Readings:**

- Carl, J. Payton & Adrian, Burden. (2017). *Biomechanical Evaluation of Movement in Sport and Exercise*. The British Association of Sport and Exercise Sciences Guide, Routledge.
- Duane, Knudson. (2012). *Fundamentals of Biomechanics*. Springer publication; 2nd edition.
- Hoffman, S.J. (2005). *Introduction to Kinesiology*. Human Kinesiology PublicationIn.
- Knudson, D. (2007). *Fundamentals of Biomechanics*. SpringerPublication.
- Kumar, P. (2019). “Biomechanical Analysis of Forward Head Posture among Pondicherry University Research Scholars Based On the Laptop Working Hours: An Analytical Study”. *International Journal of Emerging Technologies and Innovative Research*, 6 (6), 463-466.
- Kumar, P., & Singh, R. R. M. (2019). “Biomechanical analysis of anisomelia among the young children’s in Puducherry”. *Discrepancy (LLD)*, 330, 19.
- Peter, M. & Mc. Ginnis. (2013). *Biomechanics of Sport and Exercise*. Human Kinetic Publication, ThirdEdition.
- Raj Lakshmi, D. (2007). *Biomechanics for Sports and Games*. Sports Educational Technologies.
- Singh, R. R. M. (2019). “Biomechanical Analysis of Footprint Measurement among School Boys: A Positive Approach to Posture”. *Journal of the Gujarat Research Society*, 21(1), 167-169.

# SCIENTIFIC PRINCIPLES OF SPORTS TRAINING

Course Code: SOE PHE 02 01 03 E3024

| L | T | P | Credits |
|---|---|---|---------|
| 3 | 0 | 2 | 4       |

## Learning Outcomes

After completion of the course, the students will be able to:

- Understand the concept of training and planning.
- Develop mastery on training sessions.
- Understand about how the psychological factors affect sports performance.
- Develop the concept of periodization.
- Aware about the preparation for competition.

## UNIT-I

1. Teaching, Training and Coaching: Meaning, aims & Characteristic
2. Principles of Training
3. Training Load: Meaning & characteristic of training load
4. Principles of Load & Adaptation, Judgment of Load
5. Over Load: Causes, Symptoms and tackling of over load and Altitude Training-Cross Training.

## UNIT-II

1. Strength: Meaning, Importance & types of Strength, Methods & Precautions of Strengthtraining.
2. Endurance : Meaning, Importance & types of Endurance, Factors determining endurance, Methods of Endurance Training.
3. Speed: Meaning, Importance & types of Speed, Factors Determining Speed, Methods of speedtraining.
4. Flexibility: Meaning, Importance & types of flexibility, Factors Determining flexibility, Methods of flexibility development.
5. Co-ordinative Ability: Meaning, Importance & types of Co-ordinative ability, Factors determining Co-ordinative ability & Methods of development.

## UNIT-III

1. Training Methods
  - a) Weight training, Circuit training
  - b) Continuous training, Interval training
  - c) Fartlek training
  - d) Repetition training- Isometric, Isotonic
2. Technical Training & Tactical Training: Meaning, Importance of Methods of Technical training.
3. Doping: Definition & type of doping.

#### **UNIT-IV**

1. Planning of training: Meaning of Planning, Importance, and Principles of Planning of types of Training Plans. Training plan, Macro cycle, Meso cycle, Micro cycle, short term and long-term plan.
2. Periodization: Meaning and its types, contents for various period of training, General Principles of training schedules. Single, Double and Multiple periodization
3. Factor influencing the Performance in Sports.

#### **Practicals**

1. Measurement of Height and Sitting Height.
2. Measurement of Biacromial Diameter (Shoulder Width)
3. Measurement of HumerusBicondylar Diameter (Elbow Width)
4. Measurement of Chest Circumference (Normal and Maximal)
5. Determination of Body Mass Index.
6. Evaluation of Flexibility (Sit & Reach Test)
7. Evaluation of Strength (Grip Strength, Leg Strength and Back Strength)
8. Estimation of Target Heart Rate
9. Measurement of heart rate
10. Blood Pressure measurement (sphygmomanometer)
11. Evaluation of Percent Body Fat and Lean Body Mass by the through skin fold (Durninand Rehman Chart)

**Transaction Mode:** Lecture, Demonstration, Group Discussion, Project Method, Seminar, Dialogue

**Suggested Reading:**

- Bompa, T. O., & Buzzichelli, C. (2018). *Periodization-: Theory and Methodology of Training*. Human kinetics.
- Bompa, T., Bompa, T. O., & Carrera, M. (2005). *Periodization Training for Sports* (2<sup>nd</sup> Edition). Human Kinetics.
- Jesudoss, S. J. (2015). *Principles of Sports Training*. Friends Publications. (ISBN-9789384603304).
- Kurz, T. (2001). *Science of Sports Training: How to Plan and Control Training for Peak Performance*. Stadion.
- Loehr, J. E. (1995). *PDF The New Toughness Training for Sports: Mental Emotional Physical Conditioning From One of The World Premier Sports Psychologists*. Online Book.
- OBE, F. W. D. (2014). *Sports Training Principles: An Introduction To Sports Science*. Bloomsbury Publishing.
- Viru, A. (2017). *Adaptation In Sports Training*. Routledge Publishers.

**PSYCHO-SOCIO BASIS OF PHYSICAL EDUCATION**

**Course Code: SOE PHE 02 01 04 E3024**

| <b>L</b> | <b>T</b> | <b>P</b> | <b>Credits</b> |
|----------|----------|----------|----------------|
| 3        | 0        | 2        | 4              |

**Learning Outcomes**

After completion of the course, the students will be able to:

- Develop understanding about various learning, personality and motivation theories.
- Understand about how the psychological factors affect sports performance.
- Develop the concept of team cohesion and leadership.
- Understand how to assess anxiety, coordination and reaction of athletes.
- Understand the usage of different psychological and sociological test.

**UNIT-I**

**Introduction**

1. Relationship of sport psychology with other sports sciences
2. Psychological Profiling of Sportsmen/Athletes
3. Self-regulation, Bio-feedback, Self Confidence and Self efficacy
4. Coping with stress and anxiety, Preparing athlete for major competition  
Goal setting and Sports Performance.

**UNIT-II**

**Personality-based tests**

1. Personality traits of Sportsmen and Theories of Personality
2. Anxiety – Types, Theories and Effect of Anxiety on performance
3. Effects of Spectators, society, family, etc. on sports performance, Personality Test: 16 PF, EPQ.
4. Interest, Attitude test

**UNIT-III**



## **Social Implications**

1. Sociology of Sports as a separate discipline, inter-relation of sports and Sociology.
2. Social Significance of Sports, Social Evils- Drugs, Smoking, Violence, Inequality.
3. Psycho-Social implications and impact of organized youth sport.
4. Society as a web of social relationship, Place of sport and games in different societies, Role of Physical Education in the context of social problems.
5. Relationship of sports with social institutions- Family, School, Education system, Peer groups, Voluntary Association, Religion, Organized sports programmes for children.

## **UNIT-IV**

### **Psychological Skills Training**

1. PST and Sports Performance, Designing and Implementing PST Programme.
2. Common problems in Implementing PST Programme.
3. Importance of Psychological Skill Training Programme.
4. Imagery, Types of Imagery, VMBR, PMR, Autogenic Training, Deep Breathing, Guided Imagery.
5. Cognitive Technique for Building Confidence Concentration and Attention Control Training, Intervention strategies for activation techniques.

### **Practicals**

1. Assessment of Personality {Personality Tests [Eysenck, Big Five] and introduction to Projective Technique [Thematic Apperception Test and Rorschach Test].
2. Assessment of Motivation - Achievement Motivation, Participation Motivation and SMS Incentive Motivation inventory.
3. Assessment of Emotions and Emotional Intelligence in sport.
4. Measuring Anxiety and Assessment-Spielberger Anxiety Test, Sport Competition Anxiety test (SCAT).
5. Reaction Time Experiments, Anticipation, Adaptive Spatial Ability, Depth Perception.
6. Measuring Cohesion, Designing and implementing PST programme.
7. Assessment of Socio-Psychological aspect of sport participation.
8. Attentional Span, Memory Experiments and Intelligence testing (Jalota, Ravens Progressive

Matrices).

**Transaction Mode:** Lecture, Demonstration, Group Discussion, Project Method, Seminar, Dialogue

**Suggested Readings:**

Cox, R.H. (1998). *Sport Psychology – Concepts and Applications*. Iowa Champaign, IL. Human Kinetics Publishers.

Cratty, Bryant. J. (1973). *Movement Behavior and Motor Learning*. Philadelphia: Lea and Febiger.

DC Gonzalez, (2013). *The Art of Mental Training - A Guide to Performance Excellence*. Gonzo Lane Media Publisher.

John Perry, (2016). *Sports Psychology - A Complete Introduction*. Teach Yourself Publisher.

Ronald E. Smith, (2012). *Sport Psychology for Youth Coaches: Developing Champions in Sports and Life*. Rowman & Littlefield Publishers.