

**DEPARTMENT OF STRENGTH TRAINING AND CONDITIONING
(SPORTS SCIENCE)
RAJIV GANDHI UNIVERSITY**



**SYLLABUS
FOR THE DEGREE OF**

**Certificate in Sports Anthropometry
ONE SEMESTERS CERTIFICATE PROGRAMME**

(Under Credit Based Continuous Evaluation Grading System)

Session: 2021-22

**Approved by the Ministry of Youth Affairs and Sports
Government of India**



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SYLLABUS DETAILS

Title of the Course: Certificate Course Sports Anthropometry

Duration of the Course: 6 Months

Course Objective:

One of the fundamental assumptions of the proposed curriculum is based on possibilities of independent thinking, ability to integrate and synthesize from a trans- disciplinary and multicultural perspective, to evolve a knowledge based system for preparing Sport Anthropologist of India who would contribute and participate effectively in the emergent world of Sport, with capacities to remain locally relevant and globally effective.

1. Not only confined to the knowledge base and theoretical foundations of the discipline of Sports Anthropometry. It will also attend to the pedagogical considerations emanating from experiential learning, research-driven problem solving and mentoring athlete.

2. Curriculum proposes to have a strong interface between regular as well as innovative teaching pedagogies.

3. Empower the students to inculcate specific job oriented skills, as well as building other behavioral skills and competencies to cater to the needs of athletes and coaches.

4. The Course is designed to have fine blend of virtual and actual class rooms for imparting knowledge by video lectures, small group discussions, tutorials, individual presentations and projects.

PROPOSED SCHEME OF EXAMINATION SEMESTER I

Course Code	Course Name	Credit	Teaching Hours	Internal Marks	External Marks	Total Marks
PART- A (THEORY)						
CSANTH -CC:101	Anatomy & Physiology	4	64	20	80	100
CSANTH -CC:102	Kinesiology and Sport Biomechanics	4	64	20	80	100
CSANTH -CC:103	Kinanthropometry	4	64	20	80	100
CSANTH -PC:101	Practical of Kinanthropometry	4	64	20	80	100
TOTAL		16	256	80	320	400

Evaluation and Award of Grades

Weightage of marks: The weightage of marks between continuous Internal Assessment and End Semester Examination shall be 20 and 80 respectively.

Passing Minimum: A student is declared to have passed a given course only when he/she secures a minimum of 50 % marks in the End-Semester Examination and 50 % marks for the internal assessment component.

Eligibility

Bachelors / Masters Degree in Sports Sciences / Physical Education and Sports/Anthropology or equivalent thereto in 10+2+3 or 10+2+4+2 pattern from a recognized university with a minimum of 50% marks in aggregate.

CSANTH-CC: 101 Human Anatomy and Exercise Physiology

Learning Outcome: Students will be ready to study effect of exercise in detail and in application perspective. Students will also be able to measure the changes and interpret them in the context of sports.

Unit: I (Skeleton System and Muscular System)

1. Skeleton System: Structure and functions of skeleton
2. Classification of Skeleton (according to shape and according to location)
3. Joints: Definition and function of joints, Classification and characteristics of joints
4. Bones articulation at different joints: Shoulder, Elbow, Knee, Ankle, Inter-vertebral joints, Wrist joint
5. Definition, classification and function of muscles
6. Classification of Skeleton Muscles: Structural and functional

Unit: II (Cardiorespiratory System)

1. Definition of Cardiorespiratory System
2. Components of Cardiorespiratory System
3. Structure and function of Heart
4. Structure and function of Lungs

Unit: III (Bioenergetics for Exercise)

1. Aerobic and Anaerobic Glycolysis
2. Aerobic and Anaerobic System during Rest and Exercise
3. Macro and Micronutrients for Performance

Unit: IV (Neural Control of Exercise Muscle)

1. Function of Nerve, The Nerve Impulse
2. Nerve to Nerve Synapses, Neuromuscular Junction
3. Motor Unit, All or Non Law, Neuromuscular Fatigue
4. Muscles Spindles

Unit: V (Effect of Exercise on Different Systems of Human Body)

1. Effect of Exercise on Skeleton System

2. Effect of Exercise on Muscular System
3. Effect of Exercise on Cardiovascular System
4. Effect of Exercise on Respiratory System

References:

1. Exercise Physiology by J. Stregemann : Geroge Thieme Verlag, Stuttgart, NY
2. Human Physiological work capacity by Shephard : Cambridge Univ., Press, NY
3. Principles of Anatomy & Physiology : Harper Collins Publisher.
4. Sports Physiology by E.L Fox : W.B. Saunde5rs Co., Philadelphia
5. The Autonomic Nervous System & Exercise by J. Hillary Green : Ms. Chapman & Hall Ltd., London
6. Exercise Physiology by William D. McArdle, Frank L. Katch and Victor L. Katch
7. Exercise Physiology for Health, Fitness and Performance by Sharon A. Plowman and Denise L. Smith, Wolters Kluwer Publisher
8. Physiology of Sports and Exercise by W. Larry Kenney, Jack H. Wilmore and David L. Costill, Human Kinetics Publication

CSANTH -CC:102 Kinesiology and Sports Biomechanics

Learning Outcome: Students will be able to understand the interpretation of Kinesiological concept to understand the mechanics of fitness and how Kinesiological factors determine the fitness.

Unit: I

Foundations of Kinesiology

1. Definition, Importance in Human Motion Analysis
2. Anatomical and Fundamental Standing Position
3. Anatomical Directions, Anatomical Plane and Axis
4. Terminology of Fundamental Movements
5. Posture: Meaning, Types and Factors affecting Posture
6. Importance of Good Posture

Unit: II

Kinesiology of Skeletal System:

1. Functions of Skeleton System
2. Composition of Human Skeleton
3. Bone Growth and Development
4. Bone Hypertrophy and Atrophy

Unit: III

Kinesiology of Skeletal Muscles:

1. Physiological Properties of Skeletal Muscles
2. Classification of Skeletal Muscles: Structural and Functional Classification
3. Types of Muscle Contraction, Muscle Size and its Effect on Force Production
4. Role of Muscles in Movement (e.g., agonist, antagonist, synergist, neutralizer, stabilizer)

Unit: IV

Basics of Biomechanics:

1. Definition and Implication of Biomechanics in Exercise

2. Fundamental of CG, LOG, Inertia, Weight, Mass & Momentum
3. Force - Meaning, Definition, Types and its Application to Physical Activities
4. Lever - Meaning, Definition, Types and Its Application to Human Body
5. Newton's Laws of Motion–Meaning, Definition and its Application to Physical Activities

References:

1. Bruce Abernethy, Vaughan Kippers, Stephanie Hanrahan, Marcus Pandy, Ali McManus, Laurel Mackinnon. Biophysical Foundations of Human Movement 3 Edition. 2013; Human Kinetics.
2. Bunn, J. W. (1972). Scientific Principles of Coaching. Englewood Cliffs, N.J.: Prentice Hall Inc.
3. Declan Connolly. Basic and Applied Sports Kinesiology. 2016; LWW
4. Hay, J. G. & Reid, J. G. (1982). The Anatomical and Mechanical Basis of Human Motion. Englewood Cliffs, N.J.: Prentice Hall Inc.
5. Hay, J. G. & Reid, J. G. (1988). Anatomy, Mechanics and Human Motion. Englewood Cliffs, N.J.: Prentice Hall Inc.
6. Hay, J. G. & Reid, J. G. (1988). Anatomy, Mechanics and Human Motion. Englewood Cliffs, N.J.: Prentice Hall Inc.
7. Hay, J. G. (1970). The Biomechanics of Sports Techniques. Englewood Cliffs, N.J.: Prentice Hall, Inc.
8. Peter Klavara. Foundations of Kinesiology Studying Human Movement and Health. 3rd Edition, 2007; Sport Books Publisher.
9. Susan J. Hall, Basic of Biomechanics. 4th Edition. 2004, McGraw Hill.
10. Terry Wood, Weimo Zhu. Measurement Theory and Practice in Kinesiology. 2006; Human Kinetics

CSANTH -CC: 103: KINANTHROPOMETRY

Section-A

1. Introduction Significance of kinanthropometric knowledge in sports medicine.
2. Age determination a. Skeletal age b. Dental age
3. Body measurements a. Gross size and mass b. Lengths or heights of body parts c. Circumstances of body parts d. Skinfold thickness
4. Kinanthropometric study group measurements
 - a. Planes of the body b. Axes of the body c. Landmarks on the body

Section-B

1. Body Proportions:
 - a. Body mass index
 - b. The phantom stratagem
 - c. The Z – scores
 - d. The O – scale system

Section-C

Body Composition:

- a. Different Body composition
- b. Various methods to estimate body composition
- c. Water displacement method
- d. Under water weighing methods
- e. Kinanthropometric determination of the body composition (skinfold)
- f. Application of surface anthropometry (the body profile)
- g. Bioelectrical impedance analysis

- h. Ultrasound assessment of fat
- i. Arm X-ray assessment of fat
- j. Computed tomography (CT) assessment of fat

Section-D

1. Somatotyping
 - a. Sheldon's method of somatotyping
 - i. Critical evaluation of Sheldon's method of somatotyping
 - b. Heath – Carter method of somatotyping
 - ii. The rating scales
 - iii. Kinanthropometric measurements
 - iv. First, Second and Third Components
 - v. Somatotyping
 - vi. Somatotype distribution
2. Growth, maturation and physical performance

Practicals: The students will undergo hands on training on various Kinanthropometry equipment for body composition analysis, somatotyping and age determination.

References:

1. Singh and Malhotra: Kinanthropometry, Lunar Publications
2. H.S. Sodhi: Sports Anthropometry (A Kinanthropometric Approach), Anova Publications
3. Verma and Mokha: Nutrition, Exercise and Weight Reduction, Exercise Science Publication Society
4. Ostym, Beunen and Simons: Kinanthropometry II, University Park Press, Baltimore
5. James A.P. Day: Perspectives in Kinanthropometry, Human Kinetics Publishers, Inc. Champaign, Illinois
6. L.S. Sidhu Et. Al: Sports Sciences – Health, Fitness and Performance, IASSPE
7. L.S. Sidhu Et. Al: Trends in Sports Sciences, IASSPE

CSANTH -PC: 101

Unit: I

Introduction of Anthropometric Equipments:

- Weighing Machine, Digital Weighing Machine and Sitting Box
- Stadiometer
- Sliding Calipers
- Anthropometric Rods
- Skinfold Caliper
- Spreading Caliper
- Thoracometer
- Pelvimeter
- Calibration of Equipments

Unit: II

- Sport Specific Anthropometric Measurements
- Estimation of Muscle Mass
- Estimation of Bone Mass
- Estimation of Fat Mass

Unit: III

Skinfold Measurement:

- Skinfold Measurement Landmarks
- Location of Landmarks to Measure Skinfold
- Three Site Skinfold Measurement
- Four Site Skinfold Measurement
- Seven Site Skinfold Measurement

Unit: IV

Girth Measurement:

- Location of Site to Measure Girth
- Arm Girth Measurement
- Fore Arm Girth Measurement
- Chest Girth Measurement
- Waist Measurement
- Thigh Girth Measurement
- Calf Girth Measurement
- Hip Girth Measurement
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Unit: V

Measurement of Different Dimensions

- Depth Measurement
- Width Measurement
- Length Measurement

References:

1. Singh and Malhotra: Kinanthropometry, Lunar Publications
2. H.S. Sodhi: Sports Anthropometry (A Kinanthropometric Approach), Anova Publications
3. Verma and Mokha: Nutrition, Exercise and Weight Reduction, Exercise Science Publication Society
4. Ostym, Beunen and Simons: Kinanthropometry II, University Park Press, Baltimore
5. James A.P. Day: Perspectives in Kinanthropometry, Human Kinetics Publishers, Inc. Champaign, Illinois
6. L.S. Sidhu Et. Al: Sports Sciences – Health, Fitness and Performance, IASSPE
7. L.S. Sidhu Et. Al: Trends in Sports Sciences, IASSPE
8. J. Morrow Jr., A. Jackson, J. Disch & D.Mood: Measurement and Evaluation in Human Performance, Human Kinetics
9. Phillip A. Bishop: Measurement and Evaluation in Physical Activity Applications: Exercise Science, Physical Education, Coaching, Athletic Training, and Health, Routledge
10. Johnson & Neilson: Practical Measurements for Evaluation in Physical Education, Burgers Publication