

**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY  
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# **B.Sc. FITNESS AND LIFESTYLE MODIFICATION**

## **SYLLABUS**

### **BSc Fitness and Lifestyle Modification**

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**Preamble**

India would greedily grab the unenviable 'largest population' status in the world in a few decades with a staggering present population of 1.24 billion. The annual death toll reaches a mind-boggling figure of 9.861 million a year. A silent Tsunami torments Indians in the form of Non Communicable Diseases (NCDs) which takes nearly 5 million and more precious lives every year. The NCDs are the deadliest Nuke ever, Made in India, Delivered in India, mercilessly dropped by India on its own soil with the usual pride of ignorance, indifference and incapacity to contain NCDs. The statistics are alarming and the consequences would be devastating. The agony and anguish of an avoidable tragedy of just not mere morbidity but premature mortality through the NCDs which arrive in different parts of the country marching menacingly towards its victims, invited only by the victims themselves through their lifestyle behaviors. The NCDs are preventable, within the human capacities to transform lifestyles to increase the quantity and quality of life. This would be the first course of its kind in the country addressing Fitness and Lifestyle Modification who would be the warriors of the NCDs, the diseases of Inactivity.

## Theory Core Subjects, English Language and Practicals

### **I Year:-**

#### **University Theory Papers:**

Paper-1 Anatomy and Physiology  
Paper-2 Exercise Physiology and Fitness  
Assessment  
Paper-3 Nutrition

#### **Internal Papers:**

Paper-1 Yoga for Fitness and Lifestyle  
Modification. Paper-2 English  
Paper-3 Research & Biostatistics

#### **Practical Papers:**

Practical 1 Exercise Physiology and Fitness Assessment  
Practical 2 Yoga for Fitness and Lifestyle Modification

### **II Year:-**

#### **University Theory Papers:**

Paper-1 Psychology  
Paper-2 Fitness for Lifestyle Diseases Part 1  
Paper-3 Strength and Conditioning for Fitness  
Paper-4 Kalari, and Martial Arts for Fitness and Lifestyle Modification

### **Practical Papers:**

Practical-1 Strength and Conditioning for Fitness

Practical-2 Kalari and Martial Arts for Fitness and Lifestyle Modification

### **III Year:-**

Paper -1 Fitness for Life Style Diseases Part

2 Paper- 2 Fitness for Women, Children and Elderly Paper- 3 Strength and Conditioning for Sports

Paper- 4 Dance for Fitness and Lifestyle Modification

### **Practical Papers:**

Practical-1 Fitness for Life Style Diseases

Practical- 2 Dance for Fitness and Lifestyle Modification

## **Examination**

### **SCHEME OF EXAMINATION**

#### **Theory Examination**

- The Theory Examination would be on non-semester pattern.
- The examination would be for a total of 100 marks each. The candidate should get a minimum of 50% for a pass, anything less than 50% would be considered as fail and anything at 75% and above is considered as distinction. The candidates must fulfill the attendance requirements as prescribed below to give the exams in theory or practical.
- All theory papers would have a examination conducted for a 100 marks each and marks given after evaluation by the University would be calculated to 70 percent. Also, a theory exam would be conducted internally and the marks obtained in these theory papers would make up the remaining 30 percent.
- **Examination Pattern for all the Theory Papers:-**
  - Total 100 marks:-

- 20 MCQs \*1mark each = 20
- 10 Short Note questions \*5 marks each = 50
- 2 Essay type/ Long Answers \*15 marks each = 30

## Practicals

- Each Year has 2 practical papers with each paper having an exam with a total of 100 marks with a minimum pass of 50.

## Internal Assessment

- The **Logbook, Records** and other **Assignments**, would have a total of 100 marks each and would be evaluated through each year of the Course. A minimum of 50 % in each is required to pass.
- The student will be assessed internally for the **Language Paper** for a total of 100 marks each with a minimum pass of 50.

## YEAR 1

S.No	SUBJECT/ PAPERS	UNIVERSITY EXAMINATION						INTERNAL EXAMINATION		TOTAL	
		THEORY PAPER		PRACTICALS		VIVA		THEORY PAPER		Ma x	Min
		Max	Min	Ma x	Mi n	Ma x	Min	Ma x	Mi n		
1	Paper-1 Anatomy and Physiology	100	50	*	*	50	25	50	25		
2	Paper-2 Exercise Physiology and Fitness Assessment	100	50	10 0	50	50	25	50	25		

3	Paper-3 Nutrition	100	50	*	*	50	25	50	25		
4	Paper -4 Yoga for Fitness and Lifestyle Modification			100	50	*	*	50	25		

<b>INTERNAL ASSESSMENT</b>			
<b>S.No</b>	<b>SUBJECT</b>	<b>MAX</b>	<b>MIN</b>
1	Language Paper :- English Language	100	50
2	Biostatics & Research	100	50
3	<b>LOGBOOK</b>	100	50
4	<b>ASSIGNMENTS</b> given throughout the course	100	50
5	<b>RECORD</b> (for Exercise Physiology lab)	100	50

## **YEAR 2**

<b>S.No</b>	<b>SUBJECT/PAPERS</b>	<b>UNIVERSITY EXAMINATION</b>						<b>INTERNAL EXAMINATION</b>	
		<b>THEORY PAPER</b>		<b>PRACTICALS</b>		<b>VIVA</b>		<b>THEORY PAPER</b>	
1	Paper-5 Psychology	100	50	*	*	50	25	50	25
2	Paper-6 Fitness for Lifestyle Diseases Part 1	100	50	*	*	50	25	50	25

3	Paper-7 Strength and Conditioning for Fitness	100	50	100	50	50	25	50	25
4	Paper-8 Kalari, and Martial Arts for Fitness and Lifestyle Modification	100	50	100	50	*	*	50	25

<b>INTERNAL ASSESSMENT</b>			
<b>S.No</b>	<b>SUBJECT</b>	<b>MAX</b>	<b>MIN</b>
1	<b>LOGBOOK</b>	100	50
2	<b>ASSIGNMENTS</b> given throughout the course	100	50
3	<b>RECORD</b>	100	50

### **YEAR 3**

<b>S.No</b>	<b>SUBJECT/PAPERS</b>	<b>UNIVERSITY EXAMINATION</b>						<b>INTERNAL EXAMINATION</b>	
		<b>THEORY PAPER</b>		<b>PRACTICALS</b>		<b>VIVA</b>		<b>THEORY PAPER</b>	
		<b>Max</b>	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>	<b>Min</b>
1	Paper -9 Fitness for Life Style Diseases Part 2	100	50	100	50	50	25	50	25
2	Paper- 10 Fitness for Women, Children and Elderly	100	50	*	*	50	25	50	25
3	Paper- 11 Strength and Conditioning for Sports	100	50	*	*	50	25	50	25

4	Paper- 12 Dance for Fitness and Lifestyle Modification	100	50	100	50	*	*	50	25
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<b>INTERNAL ASSESSMENT</b>			
<b>S.No</b>	<b>SUBJECT</b>	<b>MAX</b>	<b>MIN</b>
1	<b>LOGBOOK</b>	100	50
2	<b>ASSIGNMENTS</b> given throughout the course	100	50
3	<b>RECORD</b>	100	50

## Attendance

The candidate would require a total of 85% attendance for the theory and practicals. Condonation may be given for 10 days by the course director and another 10 days for medical leave. Anything more than the above mentioned period would require University permission.

## Infrastructure Requirements:

**Exercise Physiology Lab Equipments:-** Indirect Calorimeter with Gas Analyser, Telemetric Heart Rate monitors, Treadmill - 2nos., Cycle Ergometer 1 no., Elliptical trainers - 2 nos., Skin Fold Calipers, Lacate Analyser.

**Biomechanics Lab Requirements:-** Image Camera with built in Body Tracking sensor, Depth Sensing sensor, 3D Compatible, built in IR sensor with Multi-array microphone- 1 no., 1080p/HD camera- 1 no., Motion Analysis Software, 55 inch Ultra HD TV cum Monitor, CPU with dedicated USB 3, 8GB memory, 64 bit Processor, Tripod with camera mount, 20 metre track, Treadmill.

**Rehabilitation Equipments:-** Strength Training Equipments for Upper Body and Lower Body, Cardio-Respiratory Training Equipments, 20 metre Track, Dumbbells, Kettle bells, Barbells and other free weights, Swiss Balls, Peanut balls, Medicine balls, Trampolines, Balance boards, Resistance Tubes/bands/loops, Steppers

**Aquatherapy/AquaGym:-**

Warm Pool at least 4 feet depth, Aqua-Crane, Aquagym Props(aqua dumbbells, aqua noodles, etc.)

**Fitness Equipments:-**

The above + Functional Trainer, Multi-gym, Crossfit training equipments (tyres, monkey bars, rebounders, Hammers, , Martial Arts Kalari Kalam & Weapons, Suspension Trainers

**Dance :-** Room with Mirrored wall, Music:- Stereo set with Amplifier and Speakers

**Treatment Equipments:-** Interferential Therapy, Electrical Stimulator, Ultrasound Therapy, Pulsatron .ie. Pulsed Electro-Magnetic Field Therapy.

**Emergency first aid Equipments:-**

Automatic External Defibrillator, Resuscitation Cart with all emergency Drugs, Ambu bag- mask, Oxygen cylinders

# Paper 1

## Anatomy and Physiology

### Unit 1

Cytology, Cell and its organelles, and Cell Division, Tissues, Epithelial, Connective Muscular and Neural, Muscular anatomy and histology in detail, the structure of sarcomere and sliding filament theory, properties of a Skeletal, Cardiac and Smooth muscle.

### Unit 2

Cardiovascular and Respiratory System Structure of the heart, Systemic Circulation and Pulmonary circulation, Arteries, Veins and Capillaries, Structure of the Respiratory system , Trachea, Bronchi, Bronchioles, Alveoli and exchange of gases,

### Unit 3

Neuro- Immuno- Endocrine System:- Nervous System, Central and Peripheral Nervous System, Somatic and Autonomic Nervous System, Sympathetic and Para-Sympathetic Nervous System Brain & Spinal Cord, Nerves- Cranial & Spinal, Reticulo-Endothelial System, Lymphoid organs, Lymphatics and Lymph Nodes, Endocrine Glands and its Hormones, Functions, Feedback - Regulation of Hormone release. Intricate Interaction between Neuro-Immuno- Endocrine system.



## Unit 4

Special senses and Skin Sensory System, Skin, Receptors, sensations, Peripheral and Central Nervous system, Special Senses: Vision: Eye, Retina, optic nerve - Hearing: Ear, Taste: Tongue, Tastebuds, Smell: Nose, Balance: Vestibule, Proprioceptors, retina, Brain and Spinal cord.

## Unit 5

Gastrointestinal System:- Anatomy of the Alimentary Tract, Functions, Ingestion, Digestion, Absorption and Assimilation, Excretion, Liver, Pancreas. Regulation of the Gastro-Intestinal System by Autonomic Nervous system.

## Unit 6

Renal System: Anatomy: Kidneys, Ureter, Bladder, Glomerular Filtration, Tubular Reabsorption and Secretion, Micturition, Removal of wastes and Toxins (Detoxifying), Fluid and Electrolyte Homeostasis, Acid- Base Balance, Regulation of Erythropoiesis, Regulation Of Blood pressure- Renin Angiotensinogen

# Paper 2

## Exercise Physiology and Fitness Assessment

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### Unit 1

Metabolism, Anabolism and catabolism, Energy for muscular contractions, ATP, Creatine Phosphate, Glycolysis, Lactic acid, Aerobic oxidation, Fat metabolism, Krebs Cycle, Regulation, Bioenergetic Pathways, Responses to Exercise Acute and Chronic, Short Term High Intensity Exercise, Transition from rest to light exercise, Prolonged Submaximal Exercise, Progressive Incremental Exercise, Immediate cardiac responses to exercise, Heart rate, Stroke volume, Cardiac output, Arteriovenous Oxygen difference, Blood flow and Blood pressure, Pulmonary ventilation, Maximal Oxygen consumption, Anaerobic Threshold,

## Unit 2

Adaptation to Exercise, Cardiac and Respiratory, Gender specific improvement and trainability, SAID principle, Training Principles affecting the training response, Responses to resistance exercise, Neuromuscular changes, Motor unit recruitment and Muscle fiber type, DOMS, Principles of Resistance training programme, PRE, Periodisation, Programme Variables, Choice of equipment, choice of exercise, order of exercise, Reps and sets, Intensity, Hemodynamic response to resistance exercise, Muscle fibre transformation Hyperplasia and Hypertrophy, Enzymatic changes, energy substrate, capillary and Mitochondrial density, Body composition Endurance Exercises and glycogen supply, Fatigue, Detraining effects, effects on Bone, Bed rest and body composition,

## Unit 3

Environmental factors affecting exercise, WGBT, Heat related disorders, Protective measures to prevent heat disorders, Cold related disorders symptoms and signs, cold stress during exercise, Exercise at High altitude, Eldoret and Kenyan Runners, Genetic predisposition story, Himalayan Sherpas, High Altitude illness, HACE, HAPE and AMS, Air Pollution and exercise, Particular matter, soot, dust and smoke, Carbon monoxide, sulphur dioxide smoking and performance,

## Unit 4

Pre-exercise Fitness Assessment, safety, Risk factors, Health behaviours, PARQ and coronary artery risk factor, Preparticipation Risk assessment, Sudden Cardiac death Health related factors affecting exercise, Submaximal exercise testing, and pretest Screening, and fixed test protocols, Field tests, Cycle test Treadmill test,

## Unit 5

Assessment of Muscular strength, and endurance, definition of muscular strength and endurance, the principle of overload, overreaching and overtraining, 1 RM test, Type of contraction, ROM, Velocity of contraction, unilateral or bilateral resistance, Measurement of Muscular endurance statically and dynamically, Definition of Flexibility and Range of Motion, Dynamic and static Flexibility, Factors affecting ROM, ROM of major joints, Active and Passive movements,, Measurement devices, Inclinometers, Goniometers, Tape measures, Identifying risk factors for activity.

## Unit 6

Body Composition, Anthropometry, Bioelectrical Impedance Analysis, BIA, Body Mass Index, BMI, Body fat percentage, Methods of Body Composition Assessment, Skin Fold measurements, Validity, and reliability of the tests, Experience and skill of the measure , type of caliper, equation chosen, Compressibility of the skinfold, appropriate reference method used. DEXA. Assessment of Health related Fitness, and Skill related Fitness. Balance, Coordination, Timing, reflexes, Power, core strength,

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# Paper 3

## Nutrition

### Unit 1

Macronutrients and Micronutrients, Definition of food, diet and nutrition, Elements required in large quantities everyday, medium quantities, everyday, small amounts everyday, Vitamins and cofactors, Essential Amino Acids, Essential Fatty Acids, synergy of nutrition,, Biochemical individuality, Lifestyle Dynamics, Precision and Physiological Dynamic multiple interaction of nutrients, The RDA and reliability, confusion with requirements of specific individual, buying clean water.

### Unit 2

Fluid replacements, hypohydration and dehydration, thirst and its nonreliability, Heat production, conduction, convection and radiation, sweat production and rate of sweating, highest sweat rate recorded, temperature and humidity, ACSM position stand on hydration, drinking during performances, concentrated fruit juices, aerated drinks, beverages, Sports drinks oral rehydration,

### Unit 3

Balanced diet , Food Pyramid, Food is associated with every dimension of fitness, Physical , Emotional, Social, Intellectual, Spiritual, Environmental and Occupational, Dietary fibre and its importance, Sources of soluble and insoluble fibre, Carbohydrates, simple and complex sugars, Carbo loading, Fats, saturated, PUF and MUF, Cholesterol, HDL, LDL, and VLDL , Optimal calcium requirements, and bone banking, Phyto chemical and antioxidants, exercise and free radicals, role of antioxidants in preventing damage and recovery time, Selenium and Vitamin C deficient diet, ,Iron and Performance Nutrition Labeling and eating out.

### Unit 4

Special Nutritional Concerns, Vegetarian diets, Pregnancy and Aging, Special needs of working women, female athletes, Weighing scales and reliability, Obesity and over weight, Causes of Obesity, Energy Balance equation, Fat-cell theory, Set-point theory, Heredity, Metabolism, Hypothyroidism especially post pregnancy, Factors affecting BMR, Weight Cycling, Diet plan claims and reality, Reliable weight loss programme, strategies for successful lifetime weight management, Iron and Serum Ferritin and Transferrin Food, Emotional and Exercise management, Eating to Gain weight, Culture and weight gain, Size 0.

## Unit 5

Ergogenic Aids and Doping :- Supplements- Amino Acids, BCAAs, Whey Proteins, Other Protein Supplements, Creatine, Caffeine, Herbal Supplements-Tribulus, Ashwagandha etc., Substances that enhance Performance: Anabolic steroids, Blood Component Transfusion, Sympathomimetic agents, Hormone derivatives or analogues, prohormones, etc., Substances used for Hypertrophy, Substances used for weight loss, Fat Burners, Diuretic etc. . Safety and efficacy, Quality assurance of Supplements, Doping, Prohibited/Banned Substances. Anti Doping Agency

## Unit 6

Eating Disorders:- Anorexia, Bulimia, Binge-eating, Dysmorphia

# Internal Paper - 1

## Yoga for Fitness and Lifestyle Modification - Internal Paper.

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### Unit 1

Introduction, Definition of Yoga, Origin of the word Yoga -Yuj', Meaning of the word Hatha, Stages of Yoga, Types of Yoga, Karma yoga, Gnana Yoga, Bhakti Yoga, Kriya Yoga, Buddhism and Yoga, Yoga as a Universally accepted term, Tibetan forms of Yoga, Schools of Yoga, KYM, Iyengar, Ashtanga Yoga, Thitumoolar Yoga, Shivananda Yoga, Kaivalyadham Yoga, Bihar School, Bikram Yoga, - Ashtanga yoga as 8 stages of Yoga, Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana, Samadhi, Ancient Texts and Yoga Scriptures, Thirumantiram, Patanjali Yoga Sutra, Hatha Yoga Pradhipika,

### Unit 2

Surya Namaskara Kriya, Bhandas, Jalandhara Bhandha, Uddhiyana Bhandha, Muladhara Bhandha, and Kriyas, Hatha Yoga, Movement & Posture The Neuro-Musculo Skeletal System — The Nervous system— Reflexes — The Vestibular System, Sight and Touch — Connective Tissue Restraints — Stretching — Three Postures, Breathing, The design of the Respiratory System — the muscles of Respiration — How Breathing affects Posture — the Somatic and Autonomic Nervous system — the Physiology of Respiration — Thoracic Breathing — Paradoxical Breathing — Supine Abdominal Breathing — Abdominal Breathing in Sitting Postures — Diaphragmatic Breathing, Postures targeting Abdominopelvic Region

### Unit 3

Foundation of the body — Sitting Boat Postures — The Peacock — The Pelvis and The Anatomical Perineum — Ashwini Mudra — MulaBandha — Agni Sara — UddiyanaBandha — Nauli — Contraindications & Benefits, UddhiyanaBandha in Pilates as TA activation, difference between yoga and Tantra, Chakras and their anatomical sites and counterparts, Pineal gland, Pituitary, Thyroid, Heart and thymus, Cardiac plexus, Coeliac Ganglion and Coeliac Plexus, or Solar plexus, Superior mesenteric plexus, Inferior mesenteric plexus, Perineal body and Pubococcygeus,

### Unit 4

Postures, Sugam- comfort and Sthiram, Standing The Skeletal system and movement — Anatomy of the Spine — Symmetry and Asymmetry — Standing Postures — Backward Bending — forward bending — Side bending — the triangle postures — balancing Postures — Benefits, Postures :- Back bending The Anatomy of Flexion and Extension — Breathing and Back bending — The Cobra Postures — The Locust Postures — the Prone Boat Postures — the Bow Postures — the knee joint — Supine Back Bending Postures — Kneeling Backbend- the camel — Contradictions — benefits, Vinyasas

### Unit 5

Forward Bending , Head, Neck and Chest — Lumbar and Lumbosacral Forward bending — Sacroiliac Nutation and Counter Nutation — Forward bending at the Hip Joints — Forward bending at the Ankle and in the Feet — Clinical matters and caution — The posterior stretch — The Down- Facing Dog — The Child's Pose — Breathing and Forward bending — Sacroiliac Flexibility — Hip Flexibility — Benefits

Twisting Postures, The Fundamentals of Twisting — The skull, the Atlas, and The Axis — Movements of the Head & Neck — Thoracic Twisting — Lumbar Twisting — The lower extremities — Supine Twists — Standing twists — Inverted twists — Sitting Spinal Twists — Benefits, - Headstand and its implication, Variations in Head stand, Shoulder stand Postures, Relaxation and Dhyana- meditation

### Unit 6

Pranayama, Introduction & Theory- Prana and Pranayama — Pranayama and the Respiratory system — Nadis and Chakras — Guru and Sisya — Food — Obstacles and Aids — The effect of Pranayama, the art of sitting in Pranayama — The Art of Preparing the mind for Pranayama — Mudras and Bandhas — The art of Inhalation (Puraka) and Exhalation (Rechaka) — the art of Retention (Kumbhaka) - Grades of Sadhaka in Pranayama — Bija Pranayama — Vritti Pranayama, Ujjayi Pranayama — Viloma Pranayama — Bhramari, Murchha and Plavini Pranayama — Digital Pranayama and the art of placing the fingers on the nose — Bhastrika and Kapalabhati Pranayama — Sitali and Sitakari Pranayama — Anuloma Pranayama — Pratiloma Pranayama — Surya Bhedana and Chandra Bedhana Pranayama — NadiSodhana Pranayama, Contribution by Patanjali & Thirumular/ 18 Siddhis

## **ENGLISH**

### **Communication:-**

Role of communication  
Defining Communication  
Classification of communication  
Purpose of communication  
Major difficulties in communication  
Barriers to communication  
Characteristics of successful communication – The seven Cs  
Communication at the work place  
Human needs and communication “Mind mapping”  
Information communication

### **Comprehension passage:-**

Reading purposefully  
Understanding what is read  
Drawing conclusion  
Finding and analysis

### **Explaining:-**

How to explain clearly  
Defining and giving reasons  
Explaining differences  
Explaining procedures  
Giving directions

### **Writing business letters:-**

How to construct correctly  
Formal language  
Address  
Salutation  
Body  
Conclusion

### **Report writing:-**

Reporting an accident  
Reporting what happened at a session  
Reporting what happened at a meeting

# II Year Paper 1

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## Psychology

### Unit 1

Motor Development and Skill Acquisition during childhood and Adolescence  
— Attention — Augmented Feedback in Motor Skill Acquisition — Practice  
— An Integrative Modelling Approach to the study of Intentional Movement  
Behaviour — Expert Performance in Sport and Dance Psychological  
Characteristics of High-Level Performance Modeling: Considerations for Motor  
Skill Performance and Psychological Responses — Personality and the Athlete  
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### Unit 2

The Development of Talent in Sport — Stress Anxiety — Arousal and  
Performance — Self- Efficacy Beliefs of Athletes, Teams, and Coaches —  
The Psychophysiology of Sport: A Mechanistic Understanding of the  
Psychology of Superior performance Motivation Intrinsic and Extrinsic  
Motivation in Sport and Exercise: A review using the Hierarchical Model  
of Intrinsic and Extrinsic motivation — Achievement Goal Theory in Sport:  
Recent extensions and Future Directions — Attributions: Past, Present, and  
Future — Group Cohesion in Sport and Exercise Psychological Techniques for  
Individual Performance Goal Setting in Sport: Investigating the Goal  
Effectiveness Paradox — Imagery in Sport and Exercise

### Unit 3

Understanding and Enhancing Self-Confidence in Athletes — Self  
Regulation: Concepts, Methods, Strategies in Sport and Exercise Life Span  
Development Moral Development and Behaviour in Sport — Youth in Sport:  
Psychological Considerations — Physical Activity and Quality of Life —  
Career Termination among Athletes Exercise and Health Psychology Using  
Theories of Motivated Behaviour to Understand Physical Activity:  
Perspectives on Their Influence — Helping People Initiate and Maintain a  
more active Lifestyle: A Public Health Framework for Physical Activity  
Promotion Research — Physical Activity and Mental Health  
— Psychology of Injury Risk and Prevention — Psychology of Sport Injury  
Rehabilitation — A social-Cognitive Perspective of Perceived Exertion and  
Exertion Tolerance Current Trends & Future Directions in Sports Psychology.

# Paper 2

## Fitness for Lifestyle Diseases Part1

### Unit 1

Coronary Artery Disease - Coronary Atherosclerosis : Normal Coronary Arterial Anatomy, Atherogenesis, Risk Factors, Non-Atherosclerotic Coronary Obstruction, Coronary Obstruction after Cardiac Intervention, Risk Factor modification to retard the Progress or to cause Regression of Coronary Atherosclerosis - Manifestations of Coronary Atherosclerosis: Myocardial Blood Flow and Metabolism, Stable Coronary Artery Disease, Acute Coronary Syndromes Including Myocardial Infarction, Treatment of Acute Myocardial Infarction, Sudden Cardiac Death, Chronic Heart Failure - Diagnosis of Coronary Artery Disease History, ElectroCardioGram, Exercise ECG, Radionuclide Imaging, EchoCardioGraphy, Exercise EchoCardiography, Coronary Angiography-

### Unit 2

Medical and Invasive Interventions in the management of Coronary Artery Disease : Risk Factor management, Lipid Disorders, Stable Angina Pectoris, Acute Coronary Syndrome, Acute Myocardial Involvement, PerCutaneous Coronary Intervention, Coronary Artery Bypass Graft Surgery - Comprehensive Cardiovascular Risk Reduction in Patients with Coronary Artery Disease: Progression or Regression of Atherosclerosis, Myocardial Perfusion and Clinical events - Guidelines for Clinical Practice - Role Of Cardiac Rehabilitation - Monitoring a Cardiac Patient - Exercise prescription for Cardiac patients

### Unit 3

Exercise and Diabetes Mellitus: Types Of Diabetes mellitus, Type 1, Blood Glucose Regulation, Insulin, Type 2, Oral Hypo Glycemic Agents, Gestational Diabetes Mellitus, Complications of Diabetes, Autonomic Neuropathy, Peripheral neuropathy, Retinopathy, Nephropathy, Exercise recommendations/ Prescription and Special considerations.



## Unit 4

Exercise and Hypertension: Overview, Epidemiology, Pathophysiology, Complications, Implications for Exercise Testing and Training, Acute Blood Pressure Responses to exercise, Mechanisms By which Exercise may reduce hypertension, Medical therapy and Implications of exercise, Aerobic Exercise and Treatment of High blood Pressure, Exercise Guidelines, Aerobic exercise and Resistance Exercise. Exercise in the Peripheral Arterial Disease: Overview, Pathophysiology, surgical and Pharmacological treatments, Methods of evaluation, Exercise Rehabilitation

## Unit 5

Exercise for Skeletal Health and Osteoporosis Prevention: Overview Of the skeletal system, Purpose and organisation of the skeletal System, Bone Remodelling, Bone Mass Assessment, Bone mass Changes with Age, Exercise and Bone mass - Amenorrhoeic and Postmenopausal women, Exercise and Risk Of Falling, Practical Implications- activity Guidelines for different Age Group, Exercise.

## Unit 6

Exercise and Poly Cystic Ovarian Syndrome:- Obesity and Oestrogen - Nutritional Strategies and Lipoproteins, Overview of Lipoproteins, Interactions of Lipoproteins, Serum Lipids levels, Exercise training And Lipoproteins, Strategies to Improve Blood Lipids, Role of Exercise Therapy, Exercise guidelines for Improving Blood Lipids

# Paper 3

## Strength and Conditioning for Fitness

### Unit 1

Introduction to Strength Training and Conditioning: Definition, Benefits, Health Benefits & Performance Benefits, Fitness Components- Health Related Fitness components (Muscular Strength, muscular Endurance, Cardiovascular endurance, flexibility and Body Composition), Skill Related Fitness components (Power, Speed, Agility, balance and Coordination, Reaction time), resistance training, Variables & terminologies of resistance Training (Muscle action, Concentric, Eccentric, Isometric, Repetition, Sets, Volume, Intensity, Frequency, Exercise Order, Intervals/Rest Period, Rep Velocity/Tempo) Weight Training vs Bodybuilding vs Weightlifting vs Powerlifting

Biomechanics of Force Production - Kinetics, Kinematics, muscle Length, Stretch- Shortening Cycle, Velocity of Muscle Contraction, Muscle Architecture, Muscle fiber Arrangement, Torque, Leverage, Action/Reaction Forces, Stability, mass, Inertia, friction, Momentum, Intra- Abdominal and Intra Thoracic pressures

### Unit 2

#### **Physiological Responses and Adaptations -**

Neural Adaptations to Training:- Functional organisation of the Nervous System, Central and Peripheral Nervous System, Somatic Nervous System, Autonomic Nervous System, Neuron, Neural Synapses, Brain, Spinal Cord, Motor Units, Recruitment, Firing Rate, Motor Unit Synchronisation, Antagonist Muscle Activation, Neuromuscular Junction, Sensory Nervous System, Muscle Spindles, Golgi Tendon organs

Muscular Adaptations to Training- Types of Muscle Cells, Skeletal Muscle- Anatomy, Actions/Roles, Fiber Organisation/Orientation, Contraction of Muscle- Sliding Filament Theory, Skeletal Muscle Characteristics and Adaptions (Fiber Formation, Types, Transitions, Hypertrophy, Hyperplasia, Structural Changes)

Connective Tissue Adaptations to Training- Stimuli for Connective Tissue Adaptations, Types of Stress - Skeletal System, Bone Anatomy, Bone Remodelling, Bone Adaptations to Exercise, Training to Increase Bone Size and Strength, Dense Connective Tissue, Tendon, Ligament, and Fascial Adaptations, Cartilage Adaptations to Training.

### Unit 3

Endocrine System Responses and Adaptations, Hormone Actions, Types, Endocrine Glands, Hormone Production, Release, and Transportation, Receptor Interaction, Hormones & Exercise, Testosterone, Oestrogen, Glucagon, Cortisol, Catecholamines, Insulin, Growth Hormone.

Metabolic Responses and Adaptations to Training - Definition of Metabolism, ATP and Metabolic systems, Glycolysis, Aerobic Metabolism, Anaerobic Metabolism, Metabolic Demands and Exercise, Basal Metabolic rate, Oxygen consumption and Acute training variables, Body Fat Reductions,

### Unit 4

Responses and Adaptations of the Cardiorespiratory System - Anatomy of the Heart, Major blood vessels, Regulation of Heart, Blood Components, Cardiovascular function and Variables (Heart rate, Blood pressure, Stroke Volume, Cardiac Output), CardioVascular Responses, Blood Lipids, Respiratory System, Lung Volumes and Capacities, Control of Breathing Pulmonary Adaptations to training, Ventilatory Muscle-Specific Training

Principles of Strength Training and Conditioning- Progressive Overload, Aerobic Endurance, Specificity, Variation, Progression and Program Design, Individualisation, Detraining, Supervision

### Unit 5

Strength Training and Conditioning Program Design

Warm-Up and Flexibility: Warm-Up, Physiology, Effect on Performance, Post-activation Potentiation, Dynamic vs Static warm-up, Flexibility - role in Injury Prevention, Types of Stretching (Static, Dynamic, Proprioceptive Neuromuscular Facilitation Stretching, Practical Aspect of Stretches), Cool down

Resistance Training Program Design- Individualisation of resistance Training Programs, Training Status, Designing a Training Program (Exercise Selection, Exercise Order and Structure, Intensity, Volume, Rest Intervals, Repetition Velocity, Frequency, Advanced Resistance Training Techniques.

### Unit 6

Resistance Training Equipment and Safety- Modalities and Equipments(Body weight, Free Weights, Machines, Medicine Balls, Stability Balls, Bosu Balls, Balance Devices, Elastic Bands, Tubes, Chains, Springs) Free weights Vs Machines, Movement Specific Equipments (Kegs, Kettlebells, Logs, Tires, Sledgehammers, etc.), Training in the Water, Vibration Devices.

Resistance Training Exercises - Exercise Kinesiology, Muscles targeted and activated in each exercise, Practical learning - Lower Body Exercises (Squat, Deadlift, Lunge, Step-up, Leg Press, Push Press, Front Squat, Overhead Squat, Hamstring Curls, Calf raises, etc., etc.), Upper Body exercises ( Push-Up, Pull-Up/Chin-Up, Dips, Bench Press, Shoulder Press, Row, LatPulldown, Cable crossover, TricepPulldown, Bicep Curls, TricepExtns, etc., etc.), Core exercises ( Plank, Crunches, Spinal Extns, Superman, etc.,etc.)

Aerobic Training- Factors Related to Aerobic exercise Performance, Modes of Aerobic exercise (Walking, Hiking, Running/Jogging, Aerobic Dance, Step Aerobics, Skating, Cycling, Swimming, Stair climbing, Rowing), Intensity, Frequency, Volume Duration, Types Aerobic Endurance training workouts ( Continuous Long Slow distance training, Tempo training, Fartlek training, Repetition training, Interval training, High Intensity, Interval Training HIIT).

# Paper 4

## Kalari and Martial Arts for Fitness and Lifestyle Modification

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### Unit 1

The meaning of the word Kalari and kalaripayyatu in Tamil, Its origin, How it is a war preparation for the Cheras, Chozhas and Pandyas, Mal and Pallavas,, Preservation of the art by Kerala and Kanyakumari, the design of the programme according to the Grammar of Tamil, The Teachers Command, Archery and its Tradition, Relationship to Acupuncture, weapons used in Kalari and their significance in the order of learning, The Purananooru and its record on the warriors of the Tamil State, The construction of the lesson forms, the similarity to the Surya Namaskar in Yoga, Mallyutha and its roots in Gujarat and Punjab, Payalvans, Their present training systems, JettiMallas, The significance of the word Mallaas in India, Silambam, its evolution and significance to the styles evolved based on communities, Tiger Dance in Tamil Nadu and its similarities to Dragon Dance in China, Brazilian Jujitsu the most deadliest form of unarmed combat in the world, Its origin from mal, Gracy family.

### Unit 2

The styles of schools, The revival of the Kalaripayyatu in Kerala by CV Narayanan, Thalacherri, The 100 year old tradition, The contribution by the CVN to the Art of Kalari, The Different Styles of Kalari, Thekkan, Vadakkan and Nadunadu Styles, The significance of the Uzhichall for the preparation of the kalari and the treatment of injuries, Importance of the King not manifesting the post war damages on his body, The scars, as sign of Bravery and the celebrity status, Participation of women in Kalari and its significance, The reason for the women being restricted at war-field, The preparation of the weapon, The costumes of Kalari and its significance, The tying of the Kaccha and its use in the war field, The southern forms of Martial arts, Silambam, CheddiKutchi, Chiramam, Chuvadu or foot work, The significance of the word Paradu, or marching of the army its transformation as Parade by the British, Chiramam and its specific contribution to Police Latti for the British.

### Unit 3

The weapons of Kalaripayyatu, and their prayogam (application), The lack of protective gear, The reason for the crown, The Animals used in warfare, Their preparation, The meipayyatu as preparation of the human body, Its significance as an anaerobic and an aerobic form of training, The lesson forms, Wooden weapons, Kettukeri, Muchan, Kadari, Vall (sword) and Kedayam (shield), SurulVall, Marapidichakundam or Spear, VerungaiPor or Unarmed combat, Application of the varmas, the reason for the secrecy maintained, The contribution of great teachers of Kerala and Tamil Nadu, GovindanKuttyGurukkal, The Rubber Man of India, GopalakrishnanAcharya, PanikkarAssan The Dangerous Man of Chennai, GopalanGurukal, Chandrasekargurukal, VasudevanGurukkal, Bruce Lee and Kalari, The significance of kalari in Dance and Chandralekha.

#### Unit 4

The martial arts at Shaolin, Bodhidharma of Kanchipuram, and his contribution to the Shaolin from 527 AD, The destruction of the data in India and its perseverance in China, The techniques of Bodhidharma, The 18 Arhats and the Vajrapani style, Chi Kung and its importance, Tai Chi and its different styles, Chen, Yang and other styles, the maintenance of health and longevity, The Kung Fu and its weapons, The hard and the soft form of martial arts, The drunken style,

#### Unit 5

The Japanese Martial arts Bujutsu, the Samurai and the Katana, the swordsmiths of Japan, The Ninjutsu and the Ninjas as Mercenaries, The Jujutsu, The Kendo, The Sumo, Karate from Okinawa, and the ancient form of GoJuRyu, and other styles in existence. The Aikido, The ShurinjiKempo, The Korean Martial Art, Taek Won Do its origin and practice. The Filipino martial form of Amis, Kali and Eskrima, their origin and practice, The Muothai, the Martial form of Thailand, Martial arts of Manipur

#### Unit 6

The Introduction of Martial Arts in the Olympics, Judo and the Tokyo Olympics 1964, The introduction of the system for evaluating Martial Arts as a Sport, The importance of the break-fall technique, and its importance in applying in all sports activities The Introduction of the Taek Won Do at the Seoul in 1992, Olympics, The system of evaluation as a sport, The Wushu system introduced in Olympics in 2008, Beijing, The weapon systems used in Wushu, The system of scoring in these forms. Dream of the Indian Martial form, Kalari, to be introduced in Olympics and its need, The changes required for such an introduction.

## III Year- Paper 1

# Fitness for Life Style Diseases Part 2

#### Unit 1

Exercise and Chronic Lung Disease :- Pulmonary Adaptations to Dynamic Exercise: Coupling of Internal and External Respiration, The Ventilatory (Anaerobic) Threshold, Ventilatory Response to Exercise, Breathing mechanics, Breathing pattern(Nasal Vs Mouth), Gas Exchange, Pulmonary Hemodynamics: Pulmonary Circulation, Bronchial circulation, Airway Fluid Balance - Pathophysiology of Lung Disease: Normal Ventilatory Mechanics, Obstructive Airway Diseases, Chronic Obstructive Pulmonary Disease, Chronic Bronchitis, Emphysema, Small Airway Disease, Asthma, Restrictive lung Diseases, Pulmonary Vascular Disease.

## Unit 2

Hypoventilation Syndromes, Obstructive Sleep Apnea, Obesity  
Hypoventilation Syndrome, Exercise Limitation in Lung Disease (Blunting of ventilatory response, Mechanical Ventilatory Limitation, Gas Exchange Limitation, Shunting Diffusion Limitation) - Pulmonary Assessment: Pulmonary Function Testing, Maximum exercise Tolerance, Ventilatory Limitations, Pulmonary Gas Exchange, Cardiovascular Responses to exercise, Shortness of Breath - Special Considerations for Exercise training - Pulmonary Rehabilitation Model, Psychological Benefits of Exercise Programs, Physiological factors limiting Exercise tolerance in COPD, Design of Endurance Exercise Training Programs for COPD patients, Characteristics of Effective Endurance Training Program, Prescribing Intensity of Endurance Training, Resistance Training, Training program Considerations for Patients with Lung disease other than COPD., diseases associated with smoking.

## Unit 3

Role of Exercise and Weight Management in Cancer: Observational Studies and Intervention Trials in Exercise, Diet, and Cancer Prevention Research - Physical Activity Measurement - Measurement of Body Fat and Energy Balance — Physical Activity and Cancer Incidence:- Breast Cancer - Physical Activity and Colorectal Cancer - Physical Activity and Prostate Cancer Risk — Mechanisms Associating Physical Activity with Cancer Incidence - Physical Activity Effects on Sex Hormones - Exercise and Insulin Resistance.

## Unit 4

Mechanisms Associating Physical Activity with Cancer Incidence: Exercise and Immune Function - Exercise and Prostaglandins- Animal Models - Physical Activity Intervention Studies in Humans Genetics, Physical Activity, and Cancer - Overweight/Obesity and Cancer Incidence - Obesity, Weight Change, and Breast Cancer Incidence - Body Size, Obesity, and Colorectal Cancer - Endogenous Hormone Metabolism and Endometrial Cancer- Obesity and Pancreatic Cancer - Obesity and Overweight in Relation to Adenocarcinoma of the Esophagus — Mechanisms Associating Obesity with Cancer Incidence - Obesity and Sex Hormones - Obesity and Insulin Resistance - Obesity, Cytokines, and Other Inflammatory Markers -

## Unit 5

Mechanisms Associating Obesity with Cancer Incidence: Animal Models - Genetics, Obesity, and Cancer — Physical Activity and Cancer Prognosis - Quality of Life and Fatigue in Breast Cancer - Exercise and Quality of Life in Survivors of Cancer Other Than Breast - Physical Activity and Physiological Effects Relevant to Prognosis - Energy Balance and Cancer Prognosis:- Breast Cancer - Colon, Prostate, and Other Cancers — Implementation - Physical Activity and Energy Balance - Diet and Other Means of Energy Balance Control - Population- Based Approaches to Increasing Physical Activity - Incorporating Exercise and Diet Recommendations into Primary Care Practice - Promoting Physical Activity in Cancer Survivors - Obesity and Early Stage Breast Cancer Outcome - Incorporating Weight Control into Management of Patients with Early Breast Cancer

## Unit 6

Exercise Prescription In Neurological Conditions:- All diseases resulting in Plegia/Paresis following Brain injury (Vascular: Stroke, Traumatic, Inflammatory: post-GBS etc ) Cerebral Palsy, Autistic Disorder, Learning Disorders, Muscular Dystrophy. Diseases Other Than Lifestyle Diseases where Exercise Prescription plays a Significant role :- Inflammatory Arthritis: Rheumatoid Arthritis, SLE, Scleroderma, Psoriatic Arthropathy — Mental and Psychological Disorders: Physical Activity and Mental health, Major Depressive Disorders, Anxiety Disorders, Panic Disorder, Bipolar Disorder.

Exercise Prescription in Paediatric and Adolescent Obesity:- Co-relation between Childhood, Adolescent Obesity and Metabolic syndrome in Adulthood

## Paper 2

# Fitness for Women, Children and Elderly

## Unit 1

Female Physiology, Differences/Special considerations, Endocrine system and Female hormones, Menstruation, PCOS, Osteoporosis

## Unit 2

Fitness for the Female Athlete: Importance, Strength Training, Aerobic Endurance training, Flexibility Training.

## Unit 3

Pregnancy and Exercise:- Pre-natal, Post-natal exercise, Strength Training, Cardio- Vascular training and Flexibility Training during Pregnancy – Special precautions.

## Unit 4

Children and Adolescent:- Difference of the growing Body from the Adult, Physiology, Nutrition requirements for Growth and Exercise, Physiology.

## Unit 5

Fitness for Children and Adolescent:- Importance/Significance, Weight Training, Myths, Special Precautions, Aerobic Endurance Training, Training the Children and Adolescents in Sports and Games (Young Athlete), Special Precautions, Flexibility Training for the Young,



## Unit 6

Fitness for the Elderly:-Difference, Importance of fitness in the Elderly, Maintenance of Mobility, Muscular Strength & Balance training for the Geriatric population, Flexibility Training for the Elderly, Health conditions.

# Paper 3

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## Strength and Conditioning for Sports

This Paper is a Progression of Paper 7 from Year 2. Basic Foundations & Principles, the Physiology and Basics of Strength training and Conditioning are covered in the previous year.

### Unit 1

The Functional Training Advantage - Developing The Sports performance Foundation :- Establishing a Solid fitness Base - Baseline Sports-Fitness Testing:- Functional Movement Assessment/Screening - Performance Flexibility - Muscular Strength and Stamina - Explosive Power - Lightning Quickness - Balance and Core Stability - Agility and Co-ordination - Acceleration and Speed - Aerobic Capacity for Endurance

### Unit 2

Plyometric Training- Definition, Physiology, Exercise Selection, relation with Athletic Performance, Depth Jump, Designing a Plyometric program, Practical Learning - Exercises ( Depth Jumps, Hops, Vertical Jumps, Broad Jumps, Squat jumps, Medicine ball Chest pass, Overhead Med Ball Throw, depth Push-ups, Clap Push-ups, Bag Thrusts, etc. etc.)

### Unit 3

Sprint and Agility Training - Speed, Agility, Reaction ability, Speed endurance, Increasing Sprint Speed, Sprint Training, mechanics, Basic Sprint Training Drills, Overspeed Training, Resisted Sprint Training - Agility Training: Balance, Posture, Foot Contact, Agility Equipment, Agility Training Drills, Speed Endurance Training

## Unit 4

Training for Endurance Sports, Training Altitude, Live High Train Low, Compatibility between High Intensity Aerobic training & Anaerobic training, Aerobic training for Anaerobic Athletes, Aerobic Endurance Training in Hot and Cold Environments.

## Unit 5

Training Periodisation and Tapering- Definition of Periodisation and its Terminologies (Phases, Sub-phases, Macrocycles, Meso-cycles, macrocycles), Importance, Basic Models of Periodisation( Classical Model, Non-Linear Model, Reverse Linear, Periodisation for Different types of Athletes (athletes with major multiple competitions, Strength/Power athlete in a Team Sport), Periodisation of Sprint, Agility and Plyometric Training, Periodisation Of Aerobic Endurance Training, Periodisation of Aerobic and Anaerobic training Components

## Unit 6

Developing a Sports Performance Training Program :- Incorporating Sports Specific Skills into Conditioning for various Sports (Athletic Track events, Field Events, Basketball, Football, Distance running, American Football, Tennis, Volleyball, cricket, etc.) - Periodisation for Peak Performance - Designing Periodised Training Programs for various sports (Athletic Track events, Field Events, Basketball, Football, Distance running, American Football, Tennis, Volleyball, cricket, etc.), Restoring Performance after Injury.

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# Paper 4

## Dance for Fitness and Lifestyle Modification

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### Unit 1

Natyasastra and its scope and its importance, Eyal, Esai and Nataka in Tamil History, the basic text, short history of the study, difficulties of the translation, meaning of the word Natya, The contribution of ElangoAdigal in Silapathigaram regarding Madavi's Dance and the stage, lighting and the screens, The four aspects of drama, theory of initiation, time and Place, occasion for performance, date of Natyasastra, Costume and ornaments, and make-up, the Arthasastra, Psychology.

## Unit 2

BharathaNatyam Evolution and history, Essence of BhrathaNatyam, Broad Classification of Nrtya, Hasta Bhedhas or the Hand Gestures, Patakahastas, PripatakaHastasetc as non combined hand gestures, Combined hand gestures, PadaBheddas or Movements of the feet, Basic structure Allaripu, Jatiswaram, Sabdam and Varnam, Javali, Padam and Thilana, Nrta, Anga, Pratyanga, and Upanga, Mandala, Uthplanava, Bramhari, Cari, Abhinaya, Angika, Vacika, aharya, Sattvika. The warm up before dance and fitness for the dance, Strength, and Endurance, Flexibility, Balance and Timing, Year round programme for Training, Fitness for BharathaNatyam.

## Unit 3

Oddisi, Kuchipudi, Kathak, Kathakali, Mohiniyattam, Manipuri and Folk Dance Oddisi:- History – Theoretical Foundations in NatyaShastra - Mangalacharana, Nrta, Nritya, Natya, Moksha –Maharis&Gotipuas – Basic Moves: Bhangas, Belis, Uthas, Baithas, Sthankas, Chaalis, Burhas, Samabhanga, Abhanga, Tribhanga- Mudras: Asamyukta Hasta, Samyukta Hasta, Nrtya Hasta - AbhinayaDarpana&NatyaShastra, Music.

Kuchipudi:- History – Theoretical Foundations – Nrta, Nritya, Natya, Kavutvams - Jatis, Jatiswarams, Tirmanas, Tilanas – Padams, Varnams, Shabdams and Shlokas, Music.

Kathak: History, Theoretical Foundations, Nrta, Nritya, Natya - Gharanas: Jaipur, Benares, Lucknow, Music

Katakali: History, Theoretical Foundations, Attakatha, Shloka, Pada – Nine Facial Expressions (Navarasas and Bhavas), 24 main Mudras – Music.

Mohiniyattam: History, Theoretical foundations, Nrta, Nritya -AtiBhanga - Atavus or Atavukal: taganam, Jaganam, Dhaganam, Sammisram – Music

Manipuri: Chali or Chari, Ras, VasantRas, Gopis, GopaRas.

Other Folk Dances: Bihu Dance, JhumurNaac, Munda, Panthi, DandiyaRaas, Yakshagana, Bayalata, Kud, Tertali, Charkula, PavriNach, Thang ta, Cheraw dance, Garadi, Bhangra, Ghoomar, SinghiChham, Hojagiri, etc. etc.

## Unit 4

### Aerobic Dance and Zumba

Aerobcis:- What is Aerobics, Components:- Warm up, Cardio-Vascular conditioning, Muscular Strength & Conditioning, Cool-down, Stretching & Flexibility, Freestyle Aerobics, Step Aerobics, Water

Aerobics, Choreography, practical Aspects:- Grape wine, “L” steps, Jumping Jacks, “V” steps, Ham Curls etc. etc., Aerobic Instructors

Zumba:- What is Zumba, Origin, development, Forms incorporated : Hip-Hop, Soca, Samba, Salsa, Merengue, Mambo. Exercises incorporated:

Squats, Lunges, Nine types of classes: Zumba Gold, Zumba Step, Zumba Toning, Aqua Zumba, Zumba in the Circuit, Zumba Kids and Zumba Kids Jr., Zumba Gold-Toning, Zumba Senato, Zumba Instructors (ZIN),

Practical Aspects:-

## Unit 5

The History/Origin, Development, Repertoire and Practice of the Following forms of Dance:-

Professional Performance dances:- Ballet, Contemporary Dance, Concert Dance, Modern Dance, Tap Dance

Ballet: History of Ballet, Origins, Italian, French, and Russian - Styles of Ballet: Classical Ballet, Romantic Ballet, Neoclassical Ballet, Contemporary Ballet, Ballerinas, Tutus, Pointe work

Modern Dance:- House Dance, Punk dance, Rave Dance, Disco Dance, Bollywood Dance

## Unit 6

The History/Origin, Development, Repertoire and Practice of the Following forms of Dance:-

Ballroom Dance: Waltz, Tango, Cha-Cha-Cha, Viennese Waltz, Rumba, Mambo, Jive, Quick Step, Bolero, Samba

Jazz:- Charleston, Swing, Moonwalk, Boogie-Woogie

Latin:- Salsa, Flamenco, Argentine tango, Lambada, Polka, Capoeira, Belly Dance, Jive, East Coast swing.

Hip-Hop and Funk dance:-

Breakdance, Bounce, Electric Boogaloo, Street Jazz, Jookin, Locking, Popping. Special mention:-Adumu : African masais Tribe,

# YEAR 1

## Practical 1

### Exercise Physiology and Fitness Assessment

Pre-exercise Fitness Assessment, safety, Risk factors, PARQ and coronary artery risk factor, Preparticipation Risk assessment, Submaximal exercise testing, and pretest Screening, and fixed test protocols, Field tests, Cycle test Treadmill test.

Assessment of Muscular strength, and endurance, 1 RM test, Measurement of Muscular endurance statically and dynamically, measurement of ROM of major joints, Active and Passive movements,, Measurement devices, Inclometers, Goniometers, Tape measures, Identifying risk factors for activity.

Body Composition, Anthropometry, Bioelectrical Impedance Analysis, BIA, Body Mass Index, BMI, Body fat percentage, Methods of Body Composition Assessment, Skin Fold measurements, Validity, and reliability of the tests, Experience and skill of the measure , type of caliper, equation chosen, Compressibility of the skinfold, appropriate reference method used. Assessment of Health related Fitness, and Skill related Fitness. Balance, Coordination, Timing, reflexes, Power, core strength,

## Practical 2

### Yoga for Fitness and Lifestyle Modification

#### 1. Practical learning & Demonstration

of Yoga:- Asanas:-

Standing Postures, Backward Bending, forward bending, Side bending, the triangle postures, balancing Postures, Vinyasas, Twisting Postures, Head stand, Shoulder stand Postures,

Pranayama, :-

Mudras and Bandhas,

Inhalation (Puraka) and Exhalation

(Rechaka) Retention (Kumbhaka)

(Bija Pranayama, Vritti Pranayama, Ujjayi Pranayama

Viloma Pranayama , Bhramari, Murchha and Plavini

Pranayama Digital Pranayama , Bhastrika and

Kapalabhati Pranayama Sitali and Sitakari Pranayama,

Anuloma Pranayama

Pratiloma Pranayama, Surya Bhedana and Chandra

Bedhana Pranayama NadiSodhana Pranayama)

Dhyana

## **YEAR 2**

### **Practical-1**

#### **Strength and Conditioning for Fitness**

Strength Training and Conditioning Program Design Warm-Up and Flexibility: Warm- Up, Dynamic vs Static warm-up, Flexibility - Types of Stretching (Static, Dynamic, Proprioceptive Neuromuscular Facilitation Stretching, Practical Aspect of Stretches), Cool down, Resistance Training Program Design- Individualisation of resistance Training Programs, Training Status, Designing a Training Program (Exercise Selection, Exercise Order and Structure, Intensity, Volume, Rest Intervals, Repetition Velocity, Frequency, Advanced Resistance Training Techniques. Resistance Training Equipment and Safety- Modalities and Equipments(Body weight, Free Weights, Machines, Medicine Balls, Stability Balls, Bosu Balls, Balance Devices, Elastic Bands, Tubes, Chains, Springs), Machines, Movement Specific Equipments (Kegs, Kettlebells, Logs, Tires, Sledgehammers, etc.), Training in the Water, Vibration Devices. Resistance Training Exercises - Lower Body Exercises (Squat, Deadlift, Lunge, Step-up, Leg Press, Push Press, Front Squat, Overhead Squat, Hamstring Curls, Calf raises, etc., etc.), Upper Body exercises ( Push-Up, Pull-Up/Chin-Up, Dips, Bench Press, Shoulder Press, Row, LatPulldown, Cable crossover, TricepPulldown, Bicep Curls, TricepExtns, etc., etc.), Core exercises ( Plank, Crunches, Spinal Extns, Superman, etc.,etc.). Aerobic Training- Walking, Hiking, Running/Jogging, Aerobic Dance, Step Aerobics, Skating, Cycling, Swimming, Stair climbing, Rowing, Intensity, Frequency, Volume Duration, Types Aerobic Endurance training workouts, Continuous Long Slow distance training, Tempo training, Fartlek training, Repetition training, Interval training, High Intensity, Interval Training HIIT.

### **Practical - 2**

#### **Kalari and Martial Arts for Fitness and Lifestyle Modification**

1. Practical learning, Demonstartion of the Kalaripayattu :- Kalari Vandanam, 8 animal Poses, Meipayattu, 3 lessons in Meiadavus, 1 lesson in Kettikeri, 1 lesson in short staff (muchan), 1 lesson from sword and shield.

# **YEAR 3**

## **Practical-1**

### **Fitness for Life Style Diseases**

1. Practical application of all the concepts, principles of Training, & Types and modes of exercise intervention in lifestyle diseases like  
type 2 Diabetes mellitus,  
Obesity & weight  
management,  
Cardiovascular diseases like  
atherosclerosis, heart  
disease(Coronary Heart Disease),  
Stroke,  
Hypertension,  
Dyslipidaemia and  
diseases associated with smoking,
2. Demonstration of the exercises

## **Practical- 2**

### **Dance for Fitness and Lifestyle Modification**

1. Practical learning & Demonstration of the of the following  
Dances :- Bhratha Natyam:- ( Hasta Bhedhas or the Hand  
Gestures, non combined hand  
gestures, Combined hand gestures, Pada Bheddhas or Movements of the  
feet, etc.) Oddisi,  
Kuchipud  
i,  
Kathak,  
Kathakal  
i  
Aerobics  
Zumba  
Ballroom Dances

# Reference Books

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- 1) Fitness and Sports Medicine, a Health Related Approach 3<sup>rd</sup> Edition, David CNeiman
- 2) Clinical Sports Medicine , Peter Brukner and Karim Khan 3<sup>rd</sup> Edition
- 3) Kinesiology Scientific basis of Human Motion, Kathryn Luttgens, Nancy Hamilton
- 4) Hand Book of Sports Psychology, Robert Singer, Heather Hausenblaus, Christopher Janelle 2<sup>nd</sup> Edition.
- 5) Sports Psychology, Concepts and Applications, Richard Cox, 4<sup>th</sup> edition
- 6) Sports Selection Dr Robert Arnot and Charles Gaines
- 7) Sports Psychology From theory to Practice, Mark Anshel 3<sup>rd</sup> Edition
- 8) A Wellness Way of Life and Test Well Gwen Robbins, Debbie Powers.
- 9) Physiology of the Joints Volume 1 The Upper Limb, Kapandji, 6<sup>th</sup> edition
- 10) Physiology of the Joints Volume 2 The Lower Limb Kapandji, 6<sup>th</sup> edition
- 11) Physiology of the Joints Volume 3The Spinal Colmn, Pelvic girdle and Head
- 12) Facilitated Stretching, Robert E McAtee/ Jeff Charland, 2<sup>nd</sup> edition
- 13) The Complete Guide to Sports Nutrition, Anita Bean
- 14)Introduction to Kinesiology, Studying Physical Activity, Shirl Hoffman, Janet Harris Human Kinetics
- 15) The complete Guide to Stretching Christopher M Norris,
- 16) The Complete Guide to Functional Training Allan Collins
- 17) The Complete Guide to Postnatal Fitness Judy DiFlore,
- 18) Qualitative and Analysis of Human Movement, Duane V. Knudson, Craig Morrison
- 19) Rehabilitation of the Spine, A Practioner's Manual, Craig Liebenson
- 20) The Complete Guide to Pregnancy and Fitness Moure Coulson and Sarah Bolitho,
- 21) Essentials of Strength Training and Conditioning National Strength and Conditioning Association Thomas Baechle , Roger Earle.
- 22) The Injured Athlete David Kulund Second Edition
- 23) Exercise and the Heart Victor Frolicher, Jonathan Myers, William Follanshee, Arthur Labovitz
- 24) Adapted Physical Education, A Multidisciplinary Approach Recreation Claudrine Sherrill
- 25) Structural Kinesiology Thompson Floyd
- 26) Anatomy Trains, Myofascial Meridians for Manual and Movement Therapists , Thomas Myers
- 27) American College Of Sports Medicine, Resource manual, Guidelines for Exercise Testing and Precription.
- 28) The Sports Gene, David Epstein
- 29) Biomechanics, a Qualitative Approach for Studying Human Movement, Ellen Kreighbaum, Katharine Barthels
- 30) Biomechanics and Biology of MovemntBennoNigg , Brian Macintosh, Joachim Mester
- 31) The Biomechanics of the Foot and Ankle Robert Donatelli
- 32) Measuring Physical Actvity and Energy Expenditure, Henry Montoy, Han Kemper, Wim Saris, Richard Washburn



- 33) Sports Physiotherapy Zuluaga et all
- 34) Biomechanics in Ergonomics Edited by Shrawan Kumar
- 35) Orthotics Clinical Practice and Rehabilitation, John Redford, John Basmaran, Paul Trautman,
- 36) Yoga for Every Athlete, Secrets of an Olympic Coach, AladarKogler
- 37) Sports Nutrition Review EAS, The latest Research on Performance Nutrition.
- 38) Yoga for Sports, BKS Iyengar
- 39) Yoga, The Path to Holistic health, BKS Iyengar
- 40) The Exercise Bible, The Definitive Guide To Total Body Health and Well Being, Joanna Hall.
- 41) Optimum Sports Nutrition, Your Competitive Edge, Dr Michael Colgan
- 42) Aerobic Exercise and Medicine, Edited by D Garlick, University of New South Wales, Australia.
- 43) KARANAS:common dance codes of India and Indonesia Volume 1, 2, & 3 - by Dr. Padma Subrahmanyam