தமிழ்நாடு உடற்கல்வியியல் மற்றும் விளையாட்டுப் பல்கலைக்கழகம்
TAMILNADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY
Accredited with "B" Grade by NAAC
India's First State University in Physical Education and Sports

CRITERION - 1

KEY INDICATOR 1.2: ACADEMIC FLEXIBILITY

THE SYLLABUS OF NEW COURSES

(2023-2018)

Registrar
Tamilnadu Physical Education
and
Sports University
Chennai - 600 127.

DEPARTMENT OF YOGA

APPROVED SYLLABUS FOR VARIOUS NEW COURSES(2022-23)

UYO22CT104 - ANATOMY

Program Objectives:

- To know about the structure and function of cell
- To know about the Nervous system
- To understand the Digestive system
- To know about the Respiratory system
- To know about the Cardiovascular system
- To Know about the Endocrine system

Unit 1

Tissue cell: Cell structure- groups of Tissue- Epithelial tissue, muscular tissue. Connective tissue- their functions-The skeletal system- Bones, joints and muscles of the skeleton- tendons and ligaments- their functions.

Unit II

The circulatory system- structure of the heart- the cardiac cycle- composition of blood -Blood pressure- Blood vessels- Hematological system-their functions- arteries, veins & capillaries. The Digestive system- alimentary canal-mouth- pharynx- esophagus - stomach- small and large intestine- the peritoneum- Liver- gall bladder- Pancreas- their functions- metabolism- physiology of digestion -

The respiratory system - The respiratory passages - nose, pharynx, larynx, bronchi, lungs, their function - oxygen consumption - Physiology of respiration.

Unit III

The Nervous System- The central nervous system- autonomic nervous system- Brain-spinal cord- Sympathetic and parasympathetic systems- their functions-sensory organs-skin- eyes- car- tongue- nose- their functions: Posture- active posture- inactive posture- ideal posture- control of posture.

Unit IV

The Endocrine system- Hypothalamus, Pituitary gland- Thyroid gland, Parathyroid glands- Thymus gland- Adrenal gland- Pineal gland- their functions. The urinary system- Kidneys, ureters, bladder, urethra, renal function.The reproductive system- puberty- menopause- testes, uterus, ovaries- their functions.

Unit V

Impact of yogic practices on the Anatomy and physiology of different systems of human body-cells, bones, joints and muscles, skin.Cardio-vascular system, respiratory system, digestive & excretory system.Hematological and immune system, glands, nervous system, body metabolism, special senses, locomotor system.

Program Outcomes:

- Student can get the basic knowledge about cell.
- They will get the idea about Nervous system of our body.
- Student can get Knowledge about Respiratory system.
- They can get knowledge about Cardiovascular system.
- They can get knowledge about endocrine system.
- Finally, the student will get full knowledge about cells, Tissues, Respiratory system, Cardiovascular system and Nervous system of our body.

References:

1. Telles Shirley (2006) A Glimpse of the human body, Bangalore, Swami Vivekananda yoga prakashana
2. Shri Krishna (1988) Notes on structure and functions of human body and Effects of yogic practices on it, Mumbai: ICYHC, Kaivalyadhama.
3. Ray S Dutta (2001) Yogic Exercise: Physiologic and psychic processes, New Delhi:
4. Evelyn C peace (1997) Anatomy and physiology for nurses, New Delhi: Jaypee Brothers.

5. Leslie Kumar (2007) Yoga Anatomy, Champaign: Human Kinetics
6. Nagendra Kumar (2007), Yoga Bhyasa for week days, Bangalore: OM mantra DevoBhava.
7. Gore M.M. (2003) Anatomy and Physiology of yogic practices, Lonavala Kanchanprakshan.
8. Bruce, J. Noble (1986) Physiology of Exercise and Sport. St. Louis C.V. Mospy.
9. Shavel LG (1981) Essentials of Exercise Physiology, New Delhi: Surjeet Publication.
10. Fax. E.L. and Mathew D.K., (1981) The Physiological basis of Physical Education and Athletics III Ed. Philadelphia W.B. Sannders.
11. Clerke D.H., (1975) Exercise Physiology, New Jersy: Prentice Hall.
12. Selvalakshmi. S (2017) Anatomy and Physiology Madurai: Shanlax Publications.

UYO22CL101 - CLASSICAL YOGIC PRACTICES – I

Program Objectives:

- To know about the Essential of Yoga Practices
- To know about the Loosening Exercise
- To understand the Basics of Asanas.
- To know about the Pranayama & Kriyas.
- To know about the concept of Bandas, Mudras and Relaxation Techniques.

UNIT - I

Essentials of Yogic Practices - cleanliness and food, bath, time, sun, closing eyes, place, breathing, awareness, age limitations, sequence, blanket, clothes, position, emptying the bowels and stomach counter pose, contra-indications, duration, straining, special provisions for women and patients, fitness, posture, side effects.

UNIT - II

Loosening Exercise (sithalikarmavyayama) and Surya Namaskar (Bihar school of yoga 12 Steps) -Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, and Benefits.

UNIT – III

Asana

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every asana.

Standing:

Ardhachakrasana, Padhahastasana, Trikonasana, Ekapadasana.

Sitting:

Padmasana, vajrasana, Ustrasana, Patchimotasana.

Supine:

Utthanapadasana, Arthahalasana, Savasana.

Prone:

Bhujangasana, Ardha shalabasana, Makrasana.

UNIT - IV

Pranayamaand Kriyas

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Pranayama- Surya nadi, Chandra nadi, suryabhedhana, Chandra bhedhana, Nadisudhi.
Kriya – Kapalapathi, Vamana dhauti.

UNIT – V

Bandha, Mudra and Relaxation Technique

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Bandha

Jalandira Bandha, Moola Bandha.

Mudras

Chin mudra, chinmaya mudra, adi mudra, Brahma mudra, Bhairava mudra, Bhairavi mudra.

Relaxation Techniqe:

Instant Relaxation Technique, Quick Relaxation Technique.

Program Outcomes:

- Student can get the basic knowledge about Essential of Yogic Practices.
- They will get the full idea about the Asanas.
- Student can get full knowledge about Pranayama and Kriyas.
- They can get full knowledge about Mudras and Bandhas

- Finally, the student will get full theoritical Knowledge about Relaxation Technique.

References:

1. Iyengar B. K. S (1976) Light on yoga, London, Unwin paper packs.
2. Sivananda Saraswathi swami (1934) Yoga Asanas Madras: My magazine of India.
3. Satyendra Saraswathi swami (2008) Asana, Pranayama, Mudra, Bandha, Munger: Yoga publications trust.
4. Iyengar B.K.S (2008) Light on pranayama, New Delhi: Haper Collins publishers India.
5. Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York Pocket Books.
6. Chandrasekaran K (1999) sound health through yoga Sevdvfdapatti: Prem Kalyan Publications.
7. Yogeshwaranandsaraswathi swami (1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
8. Coulter, H David (2001) Anatomy and Hatha yoga, USA:Body and Breath Inc.
9. Kirk Martin (2006) Hatha Yoga Illustrated Champaign: Humenkinetics.
10. Gharote (2004) Applied yoga, Lonvla: Kaivalyadhama.
11. Kathy Lee Kapppmeier and Diane M. Ambrosini (2006) Instructing Hatha Yoga, Champaign: Human Kinetics.

UYO22CL102 - ANATOMY (PRACTICAL)

Program Objectives:

- To know about the Myology.
- To know about the Bones and Joints.
- To understand the Organs and Viscera.
- To know about the Human Skeleton.
- To know about the Osteology.

UNIT – I

Demonstration of Osteology Myology

UNIT – II

Demonstration of Organs and Viscera

UNIT – III

Demonstration of Bones and Joints

UNIT – IV

Demonstration of Human Skeleton

UNIT – V

Continuous Evaluation by the Teachers

Program Outcomes:

- Student can get the basic knowledge about Demonstration of Human Skeleton.
- They will get the full idea about the Osteology and Myology.
- Student can get full knowledge in Bones and Joints.
- They can get the knowledge about Demonstration of Organs and viscera.
- Finally, the student will get full practical knowledge in Anatomy

UYO22AE101 - CLASSICAL YOGA– I

Program Objectives:

- To know about the Essential of Yoga Practices
- To know about the Loosening Exercise
- To understand the Basics of Asanas.
- To know about the Pranayama & Kriyas.
- To know about the concept of Bandas, Mudras and Relaxation Techniques.

UNIT - I

Essentials of Yogic Practices - cleanliness and food, bath, time, sun, closing eyes, place, breathing, awareness, age limitations, sequence, blanket, clothes, position, emptying the bowels and stomach counter pose, contra-indications, duration, straining, special provisions for women and patients, fitness, posture, side effects.

UNIT - II

Loosening Exercise (sithalikarmavyayama) and Surya Namaskar (Bihar school of yoga 12 Steps) -Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, and Benefits.

UNIT – III

Asana

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every asana.

Standing:

Ardhachakrasana, Padhahastasana, Trikonasana, Ekapadasana.

Sitting:

Padmasana, vajrasana, Ustrasana, Patchimotasana.

Supine:

Utthanapadasana, Arthahalasana, Savasana.

Prone:

Bhujangasana, Ardha shalabasana, Makrasana.

UNIT - IV

Pranayamaand Kriyas

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Pranayama- Surya nadi, Chandra nadi, suryabhedhana, Chandra bhedhana, Nadisudhi.
Kriya – Kapalapathi, Vamana dhauti.

UNIT – V

Bandha, Mudra and Relaxation Technique

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Bandha

Jalandira Bandha, Moola Bandha.

Mudras

Chin mudra, chinmaya mudra, adi mudra, Brahma mudra, Bhairava mudra, Bhairavi mudra.

Relaxation Techniqe:

Instant Relaxation Technique, Quick Relaxation Technique.

Program Outcomes:

- Student can get the basic knowledge about Essential of Yogic Practices.

- They will get the full idea about the Asanas.
- Student can get full knowledge about Pranayama and Kriyas.
- They can get full knowledge about Mudras and Bandhas
- Finally, the student will get full theoritical Knowledge about Relaxation Technique.

References:

1. Iyengar B. K. S (1976) Light on yoga, London, Unwin paper packs.
2. Sivananda Saraswathi swami (1934) Yoga Asanas Madras: My magazine of India.
3. Satyendra Saraswathi swami (2008) Asana, Pranayama, Mudra, Bandha, Munger: Yoga publications trust.
4. Iyengar B.K.S (2008) Light on pranayama, New Delhi: Haper Collins publishers India.
5. Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York Pocket Books.
6. Chandrasekaran K (1999) sound health through yoga Sevdvfdapatti: Prem Kalyan Publications.
7. Yogeshwaranandsaraswathi swami (1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
8. Coulter, H David (2001) Anatomy and Hatha yoga, USA:Body and Breath Inc.
9. Kirk Martin (2006) Hatha Yoga Illustrated Champaign: Humenkinetics.
10. Gharote (2004) Applied yoga, Lonvla: Kaivalyadhama.
11. Kathy Lee Kapppmeier and Diane M. Ambrosini (2006) Instructing Hatha Yoga, Champaign: Human Kinetics.

UYO22EC101 - Visiting Yoga Center /Health Club

Duration : Five Days

Semester : I

Mode of Evaluation : Internal Assessment

Maximum Marks : 100

Subject : Yoga

Nature of Programme : To bring awareness to gain knowledge, to teach and train people

UYO22CT203 - BASIC TEXTS IN YOGA

Program Objectives:

- To know about the origin and History of Vedas and Upanishads.
- To know about the Bhagavad Gita.
- To understand the Yoga Vasista.
- To know about the yoga perspective in Hatha Yogic Texts.
- To know about the concept of Ancient Texts.

Unit I

Vedas
Upanishads
Ishasyopanishad, kena, katha, Mundaka, Mandukya, Aitareya, Taittiriya, chandogya, Brihadaryanaka Upanishads

Bhagavad Gita
Yoga in Bhagavad Gita (Chapter-II), Karma Yoga (Chapter-III), Yoga in Chapter -VI, Bhakthi Yoga (Chapter XII), Yogic diet (Chapter XIV & XVII), Moksha(Chapter-XVIII)

Yoga Vasishtha
Highlights and concepts of Freedom, gunas, meditation and ailments Prasthanatrayee, Purushartha Chatushtaya, Narada Bhakthi Series

Unit II
Goraksataka, Hatha Yoga Pradipika, Gheranda Samhitha, Siva Samhitha,Hatha Ratnavali, Siddha Siddhanta Paddihati.

Unit III
Asanas in Hatha text: Definition, pre requisites, Special features

Unit IV
Pranayama in Hatha text:
Concept, phases& Stages, pre requisites, Benefits, precautions,Contraindications.

Unit V
Bandha, Mudra & other practices:
Concept, Definition, Benefits, precautions & contra-indications, stages.

Program Outcomes:

- Student can get the basic knowledge about Yoga in Bhagavad Gita.
- They will get the full idea about the Yoga Vasista.
- Student can get full knowledge in Indian Ancient Texts.
- They can get the very valuables thoughts in the Hatha Yogic Texts.
- Finally, the student will get full Knowledge about Vedas and Upanishads.

References:

1. Iyenger B.K.S (1976) Light on yoga, London, Unwin paper packs

2. Sivananda Sarawathi swami (1934) Yoga Asanas Madras My magazine of India.
3. Satyanadasarawan swami (2008) Asana, Pranayama. Mudra, Bandha, munger: Yoga publications trust
4. Iyenger B.K.S (2008) Light on pranayama. New Delhi: Haper Collins
5. publishers India.
6. Chandrasekaran k (1999) Sound Health Through Yoga, Sedapatti: Prem kalyan Publications
7. Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books.
8. Yogeshwaranandseraswathi swami (1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
9. Coulter, David (2001) Anatomy and Hatha yoga, USA Body and Breath Inc
10. Kirk Martin (2006) Hatha Yoha Illustrated Champaign. Humen kinetics
11. Gharote (2004) Applied yoga, Lonvla. Kaivalyadhama
12. Gharote (2004) Applied yoga, LonvlaKarvaiyadhama.
13. Kathy Lee Kappmeier and Diane M. Ambrosini (2006) Instructing Hatha Yoga, Champaign: Human Kinetics.
14. Satyanandasararwati Swami (2007) Meditations from thitantrasMurgar: yoga publications Trust.

UYO22CT204 - CLASSICAL YOGA– II

Program Objectives:

- To know about the Essential of Yoga Practices
- To know about the Loosening Exercise
- To understand the Basics of Asanas.
- To know about the Pranayama & Kriyas.

- To know about the concept of Bandas, Mudras and Relaxation Techniques

Unit-I

Essentials of yogic practices, cleanliness and food, bath, time, sun, closing eyes, place, mirror, breathing, awareness, age limitations, sequence, blanket, clothes, position, emotying the bowels and stomach counter pose, contra-indications, duration, straining, special provisions for women and patients, fitness, posture, side effects.

Unit-II

Loosening Exercise (sukshmavyama) and Surya Namaskar (Bihar school of yoga 24 Steps) -Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, and Benefits.

Unit – III

Asana
Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every asana.
Standing:
Ardhakatichakrasana, Triyangathadasana, Parivarthatrikonasana, Veerabadhrasana-1.
Sitting:
Uttitapadmasana, Vakrasana, Komukasana, Janu sirasana.
Supine:
Chakrasana, Pavanamukthasana,Sedhubandasana.
Prone:
Dhanurasana, Shalabasana,Triyangabujangasana, Makrasana.
Unit - IV

Pranayamaand Kriyas
Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Pranayama- Anulomaviloma, Savithri pranayama,ujjayipranayama,bastrika.
Kriya – Trataka, Neti.

Unit V

Bandha, Mudra, Relaxation Technique and Meditation
Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one
Bandha
JalandiraBandha,Udiyana Bandha, Moola Bandha.
Mudras
Pritivi Mudra, Vayu mudra, Varuna Mudra, Prana mudra, Akasha mudra, Bhairava mudra, Bhairavi mudra.
Relaxation Techniqe:

Quick Relaxation Technique.

Meditation

Yoga nidra, Om Meditation.

Program Outcomes:

- Student can get the basic knowledge about Essential of Yogic Practices.
- They will get the full idea about the Asanas.
- Student can get full knowledge about Pranayama and Kriyas.
- They can get full knowledge about Mudras and Bandhas
- Finally, the student will get full theoratical Knowledge about Relaxation Technique.

References:

* Iyenger B.K.S (1976) Light on yoga, London, Unwin paperpacks.

* Sivananda Sarawathi swami (1934) Yoga Asanas Madras: My magazine ofindia.

• Satyanadasarawari swami (2008) Asana, Pranayama, Mudra, Bandha, munger:Yoga publications trust.

*Iyenger B.K.S (2008) Light on pranayama. New Delhi. Haper Collinspublishers India.

*Chandrasekaran k (1999) Sound Health Through Yoga, Sedapatti: Prem kalyan Publications

*Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books.

*Yogeshwaranand saraswathi swami (1975) First steps to higher yoga, Gangothari. Yoga niketan trust.

*Coulter, H David (2001) Anatomy and Hatha yoga, USA: Body and Breath Inc.

*Kirk Martin (2006) Hatha Yoga Illustrated Champaign: Humenkinetics,

*Gharote (2004) Applied yoga, Lonvla. Kaivalyadhama.

*Gharote (2004) Applied yoga. Lonvla: Kaivalyadhama.

*Kathy Lce Kappmeier and Diane M.Ambrosini (2006) Instructing Hatha Yoga,Champaign: Human Kinetics.

*Satyanandasararwati Swami (2007) Meditations from thitantrasMurgar yoga publications Trust.

UYO22CL201 - CLASSICAL YOGIC PRACTICES – II (PRACTICAL)

Program Objectives:

- To know about the Essential of Yoga Practices
- To know about the Loosening Exercise
- To understand the Basics of Asanas.
- To know about the Pranayama & Kriyas.
- To know about the concept of Bandas, Mudras and Relaxation Techniques.

Unit-I

Essentials of yogic practices, cleanliness and food, bath, time, sun, closing eyes, place, mirror, breathing, awareness, age limitations, sequence, blanket, clothes, position, emptying the bowels and stomach counter pose, contra-indications, duration, straining, special provisions for women and patients, fitness, posture, side effects.

Unit-II

Loosening Exercise (sukshmavyama) and Surya Namaskar (Bihar school of yoga 24 Steps) -Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, and Benefits.

Unit – III

Asana

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every asana.

Standing:

Ardhakatichakrasana, Triyangathadasana, Parivarthatrikonasana, Veerabadhrasana-1.

Sitting:
Uttitapadmasana, Vakrasana, Komukasana, Janu sirasana.
Supine:
Chakrasana, Pavanamukthasana,Sedhubandasana.
Prone:
Dhanurasana, Shalabasana,Triyangabujangasana, Makrasana.
Unit - IV

Pranayamaand Kriyas
Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Pranayama- Anulomaviloma, Savithri pranayama,ujjayipranayama,bastrika.
Kriya – Trataka, Neti.

Unit V

Bandha, Mudra, Relaxation Technique and Meditation
Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one
Bandha
JalandiraBandha,Udiyana Bandha, Moola Bandha.
Mudras
Pritivi Mudra, Vayu mudra, Varuna Mudra, Prana mudra, Akasha mudra, Bhairava mudra, Bhairavi mudra.
Relaxation Techniqe:
Quick Relaxation Technique.
Meditation
Yoga nidra, Om Meditation.

Program Outcomes:

- Student can get the basic knowledge about Essential of Yogic Practices.
- They will get the full idea about the Asanas.
- Student can get full knowledge about Pranayama and Kriyas.
- They can get full knowledge about Mudras and Bandhas
- Finally, the student will get full practical Knowledge about Relaxation Technique.

References:

* Iyenger B.K.S (1976) Light on yoga, London, Unwin paperpacks.

* Sivananda Sarawathi swami (1934) Yoga Asanas Madras: My magazine of India.

• Satyanadasarawari swami (2008) Asana, Pranayama, Mudra, Bandha, munger:Yoga publications trust.

*Iyenger B.K.S (2008) Light on pranayama. New Delhi. Haper Collinspublishers India.

*Chandrasekaran k (1999) Sound Health Through Yoga, Sedapatti: Prem kalyan Publications

*Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books.

*Yogeshwaranand saraswathi swami (1975) First steps to higher yoga, Gangothari. Yoga niketan trust.

*Coulter, H David (2001) Anatomy and Hatha yoga, USA: Body and Breath Inc.

*Kirk Martin (2006) Hatha Yoga Illustrated Champaign: Humenkinetics,

*Gharote (2004) Applied yoga, Lonvla. Kaivalyadhama.

*Gharote (2004) Applied yoga. Lonvla: Kaivalyadhama.

*Kathy Lce Kappmeier and Diane M.Ambrosini (2006) Instructing Hatha Yoga,Champaign: Human Kinetics.

*Satyanandasararwati Swami (2007) Meditations from thitantrasMurgar yoga publications Trust.

UYO22AE201 - COMMUNICATION SKILLS

Program Objectives:

- To know about the Importance of Communication.
- To know about the types of communication.
- To understand the Agenda preparation.
- To know about the soft skills.
- To know about the Group Discussion.

Unit 1:

Communication: Meaning, definitions, goals, need, scope- Basics of communication-Characteristics of Communication - one to one-one to group – Real Communication - Role of Communication in the present scenario

Unit II:

Barriers to Communication - Do's and Dont's of Communication skills - Types of Communication

Verbal Communication: Reading listening, writing, speaking skills, telephonic Communication, face to face interactions, Non-verbal Communication: Gestures, Body posture, facial expression, eye contact, poise, body movements, dress.

Unit III:

Letter writing-Report writing - Memo's - Note Making - Agenda preparation

Unit IV:

Soft skills-Interview skills - preparing for an interview - presentation skills - Body language - speaking - pronounication - voice - Modulation of speech - structure of presentation

Unit V:

Group discussion - art of listening and expressing - Role of Yoga on Communication skills

Program Outcomes:

- Student can get the basic knowledge about communication.
- They will get the full idea about the Important of Communication in any field in day-to-day life.
- Student can get full knowledge in Agenda Preparation.
- They can get the idea about Soft skills.
- Finally, the student will get Interview skills.

References:

1) 'Soft Skills', University of Madras, Chennai

2) 'Communication Skills', University of Madras, Chennai

UYO22CT304 - METHODALOGY OF TEACHING YOGA

Program Objectives:

- To know about the Yoga Education
- To know about the Methods in Yoga Teaching
- To understand the lesson plan
- To know about the usage of yogic Props
- To know about the concept of Yoga competitions

Unit 1:

Education
Yoga Education, Goal, Scope and importance, Principles of Teaching Yoga- Yogic, psychological, Physiological, Pedagogical, sociological.
Meaning of methodology of teaching - factors influencing Methodology, Presentation technique.
Role of language, Voice, fluency, clarity and body language in Teaching.
Factors of Yoga Education: Teacher, Student and Teaching-Guru-Shishya Parampara
Types of students and teachers-promotion of leadership qualities.

Unit II:

Methods in Yoga Teaching
Lecture method

Response to instruction method (method)

Individualized Instructional Method

Group discussion Method

Directed Practice Method

Project method

Demonstration Method

Lecture cum Demonstration Method

Imitation Method

Dramatization Method

Unit III:

Teaching aids:
Audiovisual aids
Visual aids
Audio aids
Models.
Props

Wooden brick and foot rest belt, ropes, slanting plank, chair, stool, bench, Box, the heart rate, ladder stool and drum, bolster and pillow, bandage, weight, the horse, big and small.

Unit IV:

Preparing lesson plan-
Essentials of a good lesson plan

Advantages of preparing a lesson plan

Contents of a lesson plan

Class management-formation of the class

Conducting yoga practical lessons: Precautions and contra-indications of practices

Lesson plan:
Assembly and roll call

Relaxation & prayer

Loosening the joints

Introduction of practice

Demonstration

Individual practice

Group practice

Yoga game (if time permits)

Question and answer session

Relaxation.

End prayer

Unit V:

Organizing yoga class, Yoga camp, workshops in yoga, Yoga tours. Yoga games are competitions, classification of age groups for competitions
Evaluation
Advantages
Devices of evaluation

Program Outcomes:

- Student can get the basic knowledge about Principles of Teaching Yoga
- They will get the full idea about the Methods in Yoga Teaching
- Student can get full knowledge in Teaching aids
- They can get the very valuables thoughts in the Preparing lesson plan
- Finally, the student will get full blue print about methodology of teaching yoga.

References

1. Gharote M.L. and Ganguly SK (2001) Teaching Methods for yogic practices Lonavla: Kaivalyadhama.
2. Sivananda Yoga teachers training Manual, val morin: Sivananda Ashram Yoga Camp.
3. Anandamitra (1991) Teachers' Manual Calcutta: Ananda Marga ProcarakaSamgha.
4. Thirunarayanan and Hariharan (1975) Methods in Physical Education, Karaikudi.
5. Basavaraddi Ishwar (2010) Yoga Teacher's Manual for school teachers, New Delhi: Morarji Desai National Institute of Yoga.

YO22CL301 - TEACHING PRACTICES (PRACTICAL)

I. PRACTICE OF TEACHING IN YOGA

a. Illustration of the need for a lesson plan.
b. Illustration of the need for a content plan.
c. Demonstration of types of teaching methods.
d. Demonstration of optimum use of teaching aids viz. audio-visual aids.
e. Practical training on class management.
f. Practical demonstration of critical observation, active supervision and interaction.
g. Method of preparing for an ideal setting based on the specific requirement of the class.

h. Demonstration on use and importance of body language, communication skills and personal conduct in an ideal class.

i. Evaluation methods of an ideal Yoga class.

j. Methods of customizing Yoga class to meet individual needs.

The student will have demonstrations and training in the above-mentioned aspects of teaching methods.

Each candidate is expected to complete 5 hours of individual class, 5 classes for a small group, 5 classes for a large group demonstrating the use of essential requirements for an ideal class. (e.g.: One on Shat Karma, One on Asana, one on Pranayama, one on Bandha /Mudra, and one lesson on Meditation) under the supervision of their Yoga Practical Teacher. Each student will also have to prepare and give at least one Lecture cum Demonstration on different topics of Yoga. The record of each of these classes must be maintained in the „Practical Record" format for evaluation.

The practice teaching lessons and a Lecture cum Demonstration assignment should be observed / examined by the Yoga Practical Teacher. These marks shall be considered as the Practicle Class Tests (internal assessment) of this practical paper.

II. VIVA-VOCE

Viva-voce shall be on Methods of Yoga Teaching and Presentations of Lesson/s

UYO22EC301 - Teaching Practices Only in Govt. School

Duration	:	Five Days
Semester	:	III
Mode of Evaluation	:	Internal Assessment
Maximum Marks	:	100
Subject	:	Yoga
Nature of Programme	:	To bring awareness to gain knowledge, to teach and train people

UYO22CT403 - PATANJALI YOGA SUTRAS - II

Program Objectives:

- To know about the Concept of Chaturvyuhavada
- To know about the conception of Ashtanga Yoga
- To understand the Dhayana
- To know about the siddhis
- To know about the concept of Karmas

Unit-1

Nature of dhukha, Concept of Chaturvyuhavada, Drishyanirupanam, Drasthanirupanam, Prakriti-Purusha Samyoga**.**

Unit-2

Brief Introduction to Ashtanga Yoga; Yama- Niyama; Concept of Vitarka&Mahavrata; Asana, Pranayama, Pratyahara and their siddhis.

Unit-3

Introduction of Dharana, Dhyana and Samadhi.Nature of Sanyama; Concept of Chitta samskara, Parinamatraya and vibhutis.

Unit – 4

Five means of Siddhis, concept of Nirman Chitta, Importance of siddhis achieved through Samadhi.

Unit-5

Four types of Karmas; Concept of Vasana; Dharmamegh Samadhi and its result, Viveka Khyati Nirupanam, Kaivalya Nirvachana.

Program Outcomes:

- Student can get the basic knowledge about Siddhis
- They will get the full idea about the Ashtanga Yoga
- Student can get full knowledge in Dhayana & Samadhi
- They can get idea about the Types of karma
- Finally, the student will get full blue print about Pathanjali Yoga Sutra.

References

- Certification of Yoga Professional official Guide Book, Ministry of AYUSH, Government of India.
- Patanjali Yoga Sutras by swami Vivekananda.
- The Yoga Sutra of Patanjali.

UYO22CT404 - TRADITIONAL INDIAN SYSTEMS OF MEDICINE AND THERAPIES

Program Objectives:

- To know about the origin and History of Yoga Therapy
- To know about the Ayurveda
- To understand the Therapeutic applications fordiesase
- To know about the Therapeutic applications for stress
- To know about the Therapeutic applications forpregnancy- Pre and post natal care

Unit I:

History of yoga therapy- Essence and Principles of Yoga therapy-Physiology and pathology in the yoga- Shatra- koshas- doshas- Panchaprana¬Application of Yoga and its types — Methodology in Yoga Therapy — Factors (Heyam, Hetu, Hanam and Upayam) — Methods (Darsanam, Sparsanam, Prasanam, NadiPariksa) Examination of Vertebra, joints, muscles, Abdomen and Nervous system and therapeutic yoga practices- Modification of yogic practices — Yogic diet- Yogic diet for Human systems— Nadis and chakras.

Unit II:

Application of traditional Indian medical systems and therapies: Ayurveda — Doshas, Dinacarya, Ayurvedic diet, Panchakarma therapy.

Siddha — Five elements theory, physical constituents, pathology (Kayakalpa, Kitchen, Herbal and other types of medicine) Varmam and Thokkanam, Exercise therapy, Cryo therapy, Acupressure, Acupuncture, Chromo therapy, Magnet therapy, Music therapy, Pranic healing, Magentotherapy, Naturopathy, Modalities of Naturopathy

Unit III:

Therapeutic applications for High blood pressure, Obesity, Diabetes Mellitus, Asthma, Sinusitis, Migraine, Arthritis, Back pain, Thyroid problems, constipation, impotency, infertility, stroke, Epilepsy, Parkinson's disease, sleep disorders, skin diseases, insomnia, Anaemia

Unit IV:

Therapeutic applications for psychological disorders:

Neurosis: stress, depression, eating disorders, suicide, hysteria

Psychosis: Schizophrenia, autism, Bipolar disorders, dementia

Personality disorders: Paranoid, histrionic, drug addicts- Smoking, Alcoholism, Gambling — Anti social activities.

Unit V:

Therapeutic applications for the problems of women- Amenorrhea, Dysmenorrhea, menorrhagia, metrorrhagia, Hypomenorrhoea, oligomenorrhoea, polymenorrhoea, leucorrhoea, uterus related problems, miscarriage, pregnancy- Pre and post natal care, PCOD.

Program Outcomes:

- Student can get the basic knowledge about YogaTherapy
- They will get the full idea about the Traditional Indian medical systems and therapies
- Student can get full knowledge in Therapeutic applications for disorders
- They can get the very valuables thoughts in Therapeutic applications for psychological disorders

- Finally, the student will get full idea about theTherapeutic applications for the problems of women

References:

1. BalkrishnaAcharya (2006) Ayurveda its principles anfPhilophies, Hardwar: DivyaPrakashan

2. Atharale V.B. (1980) basic principles of Ayurveda, Bombay: Pediatric clinics

3. Frawley David (2000) Yoga and Ayurveda Delhi: Motilalbanarsidass Publishers Pvt Ltd,

4. BalkrishnaAcharya (2012) A practical approach to the Science of Ayurveda, Haridwar: DivyaPrakashan

5. Frawley David and Sandra Summerfield kozak (2011) Yoga for your type New Delhi: New Age Books,

6. VasantDattatray Lad (2007) Secrets of the pulse The Ancient art of Ayurvedic Pulse Diagnosis Delhi: MotilalBanarsidass Publishers Pvt.Ltd

7. Ashwini yogi (2011) SanatanKriya. The Ageless Dimension, New Delhi: Dhyan Foundation

8. Stiles Mukunda (2009): Ayurvedic yoga therapy New Delhi: New age books

9. Sivananda Swami (2006): Practice of Ayurveda Shivanandanagar: The Divine Life Society

10. Atreya (2000) Ayurvedic Healing for women, Delhi, MotilalBeharsidass11.Joshi Rajani (2007) Health tips from the Vedas Haridwar: ShriVedmataGayathri trust

12. Thirunarayanam (2012) Introduction to Siddha Medicine, Chennai: centre for Traditional Medicine and Research

13. Bakhru (2011) The complete Hand book of Nature cure, Mumbai: Jaico publishing House

14. Gala DR, Dhiren Gala and Sanjay gala (2008) Nature cure for common diseases, Ahmadabad: Navneet publications (India) Ltd.,

15. Murthy Chidananda (2010) yogic and naturopathic treatment for common ailments, New Delhi: Central council for research in Yoga and Naturopathy

16. BasavaraddiIshwar (2012) Important therapeutic modalities used in Naturopathy, New Delhi. Central council for Research in Yoga &Natruopathy

UYO22CL401 - CLASICAL YOGIC PRACTICES - III

Program Objectives:

- To know about the Essentials of Yogic practices.
- To know about the Basics of Loosening Exercise.
- To understand the Asanas.
- To know about the pranayama.
- To know about the concept of Bandhas and Relaxation Techniques.

Unit I:

Essentials of Yogic Practices - cleanliness and food, bath, time, sun, closing eyes, place, breathing, awareness, age limitations, sequence, blanket, clothes, position, emptying the bowels and stomach counter pose, contra-indications, duration, straining, special provisions for women and patients, fitness, posture, side effects.

Unit II:

Loosening Exercise (Pawanamuktasana series 1) and Surya Namaskar (Vinyasa Suryanamaskar) -Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, and Benefits.

Unit III:

Asana

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every asana.

Standing:

Tadasana, UtthitaParshvakonasana, Malasana, Moordhasana, veerabadhrasana 2.

Sitting:

Triyangajanusirsasana, Bharadvajasana, Badhakonasana, Ardhamatchendra asana, simhasana.

Supine:

Chakrasana, Sarvangasana, Sedhubandhasarvangasana, Matsyasana, Savasana.

Prone:

Poorna dhanurasana, Poorvabhujangasana, Makrasana.

Unit IV:

Pranayamaand Kriyas

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Pranayama- Vyaghra Pranayama, Sectional Breathing, Yogic Breathing, Bhramari Pranayama, Shitali Pranayama.

Kriya – Nauli, Basthi.

Unit V:

Bandha, Mudra and Relaxation Technique

Name, Meaning, Definition, Guidelines, Procedure, Breathing technique, Awareness, Contra-indication, Benefits, Type and Category of each and every one

Bandha

Jalandira Bandha, Moola Bandha, Uddiyana Bandha, Maha Bandha.

Mudras

Shambavi mudra, Shangu mudra, Linga mudra, Shanmuki mudra, Anjali mudra, Lotus mudra.

Relaxation Techniqe:

Deep Relaxation Technique.

Meditation

Chakra Meditation, Japa Meditation, Vipasana Meditation.

Program Outcomes:

- Student can get the basic knowledge about Essential of Yoga practices.

- They will get the full idea about the Loosening practices.
- Student can get full knowledge about kriyas.
- They can get the knowledge about pranayama.
- Finally, the student will get the knowledge of Mudra, Bandha and Relaxation Techniques.

References:

1. Iyenger B.K.S (1976) Light on yoga, London, Unwin paperpacks
2. Sivananda Sarawathi swami (1934) Yoga Asanas Madras: My magazine of india.
3. Satyanadasarawari swami (2008) Asana, Pranayama, Mudra, Bandha, munger: Yoga publications trust.
4. Iyenger B.K.S (2008) Light on pranayama, New Delhi Haper Collins publishers India.
5. Chandrasekaran k (1999) Sound Health Through Yoga, Sodapatti: Prem kalyan Publications
6. Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books.
7. Yogeshwaranandsaraswathi swami (1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
8. Coulter, David (2001) Anatomy and Hatha yoga, US
9. A: Body and Breath Inc.
10. Kirk Martin (2006) Hatha Yoha Illustrated Champaign: Humenkinetic
11. Gharote (2004) Applied yoga, Lonvla: Kaivalyadhama.
12. Gharote (2004) Applied yoga. Lonvla: Kaivalyadhama.
13. Kathy Lee Kappmeier and Diane M.Ambrosini (2006) Instructing Hatha Yoga, Champaign: Human Kinetics
14. Satyanandasararwati Swami (2007) Meditations from thitantrasMurgar: yoga publications Trust.

UYO22CL402 - YOGA THERAPY TECHNIQUES (PRATICAL)

Program Objectives:

- To know about the common ailments
- To know about the Yogic Management ofChronic Bronchitis
- To understand the Yogic Management of
- To know about the Yogic Management of
- To know about the Yogic Management of

UNIT-1:

INTRODUCTION TO COMMON AILMENTS

I. Physiology of stress II . Psychosomatic ailments

UNIT-2:

RESPIRATORY DISORDERS AND CARDIOVASCULAR DISORDERS

Respiratory Disorders

Yogic Management of Chronic Bronchitis, Emphysema

Infectious Disorders

Yogic Management of Tuberculosis

Yogic Management of Pneumonia

a. Yogic Management of Interstitial Lung Disease / Idiopathic pulmonary fibrosis

(B)Cardiovascular disorders

a. Yogic Management of Heart disease – Angina pectoris / Myocardial Infarction/ Post CABG rehab
b. Yogic Management of Cardiac asthma

Unit-3: Gastro-Intestinal Disorders and Excretory System

Yogic Management of Gastrointestinal disorders

a. Yogic Management of Ulcerative colitis

b.Yogic Management of Crohn's diseases

(B) Excretory system

a. Yogic Management ofIrritable bladder
b. Yogic Management of Stress incontinence
c. Yogic Management of End stage renal disease

Unit-4:

Musculo-Skeletal Disorders

a. Yogic Management of Rheumatoid Arthritis

b. Yogic Management of Psoriatic Arthritis
c. Yogic Management of Gout

Unit-5:

Gynecological disorders and obstetrics

Yogic Management of

Premenstrual Syndrome,Infertility – male and female,PCOS,

Antenatal care and post-natal care

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

Recommended books:

1. Yoga for Bronchial Asthma – Dr. H R Nagendra, R Nagaratna, SVYP
2. Yoga for Hypertension and Heart Diseases – Dr. H R Nagendra, R Nagaratna, SVYP
3. Yoga for Diabetes – Dr H R Nagendra, R Nagaratna, SVYP
4. Yoga for Obesity – Dr H R Nagendra, R Nagaratna, SVYP
5. The integrated approach of yoga therapy for positive health-Dr. R Nagaratha, Dr. H R Nagendra

Reference book:

1. Yoga for common disorders- Swami KoormanandaSaraswati.

UYO22SE401 - ENVIRONMENTAL STUDIES (SEC)

Program Objectives:

- To know about the environment
- To know about the conception of Food Energy
- To understand the Air pollution
- To know about the social issues and the environment

UNIT I
Scope and Importance-Need for Public awareness

UNIT II
Natural Resources - Water-Forest-Minerals-Food Energy-land.

UNIT III
Environmental Pollution- Definition - Causes- Effects and control measure ofAir pollution-Water-Soil-Noise-Nuclear.

UNITIV
Social issues and the environment - Urban problems related to energy - Waterconservation - Rainwater harvesting - Water shed management -Environmentalethics-Climate change-Global warming-Acid rain-Ozone layer deletion.

UNIT V
Human population and the environment - Population growth variation among nation population explosion - Family welfare program - Environment - and human wealth.

Program Outcomes:

- Student can get the basic knowledge about environment studies
- Student can get full knowledge causes of pollution.
- They can get the social problems related to energy
- Finally, the student will get full blue print about environmental studies.

Reference:

C. Environmental Education centre, Chennai: Environmental studies for undergraduate students. K.hainaraswamy, Environmental studies A text book for all under graduate courses, Bharathidasan University, Tiruchirapalli

UYO22EC401 - INTERNSHIP (Hospital)

Duration	:	Five Days
Semester	:	IV
Mode of Evaluation	:	Internal Assessment
Maximum Marks	:	100
Subject	:	Yoga
Nature of Programme	:	To bring awareness to gain knowledge, to teach and train people

UYO22CT502 - Hatha Yoga Text – 1

Program Objectives:

- To know about the origin and History of Yoga

- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

Unit-1

Introduction to Hatha Yoga.Aim &objectives,misconceptions about Hathayoga, prerequisites of Hathayoga (dashayama and dasha niyama),Sadhaka and Badhaka tattvas in Hathayoga; Concept of Ghata, Ghatashuddhi.

Unit -2

Concept and importance of Shodhana kriyas in Hathayoga; Importance of Shodhana kriyas in health and disease; Concept of Matha, Mitaahara, Rules & Regulations to be followed by Hatha Yoga Sadhakas.

Unit-3

Introduction to Hatha texts- Yoga Beeja, Goraksha Samhita, Vashishtha Samhita, Shiva Samhita, Siddhasiddhantapaddhati, Hatha Pradeepika, Gheranda Samhita and Hatha Ratnavali.

Unit-4

Concept of Prana and Pranayama; Pranayama-its phases and stages; Prerequisites of Pranayama in Hathayoga Sadhana.

Unit-5

Relationship between Hatha Yoga and Raja Yoga; Goal of Hatha Yoga.Relevance of Hatha Yoga in contemporary times.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References

- Certification of Yoga Professional official Guide Book, Ministry of AYUSH, Government of India.
- Hatha Yoga Pradipika By Swami Muktibodhanda, Bihar School of Yoga.
- Gheranda Samhita Sri Satguru Publications.
- HathaRatnavali the Lonavla Yoga Institute.
- Siva Samhita the Panini office, Bahadurganj

UYO22CT503 – CLASSICAL YOGA WITH PROPS-IV

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedanticapproac

Unit 1:

Essentials of Yogic Practices

Loosening Exercies - Pawanmuktasanaseries.-3

Suryanamaskar: Sivananda model, Chandranamaskar.

Usage of props like wooden brick and foot rest, Belts, Ropes, Slanting planks, Chair, Stool, Bench & box, The heart rack, Ladder stool and drum, Bolsters and pillows, Bandage, Weights, Horse (big & small)

Unit 2:

Asanas&Pranayama

Virabhadrasana, Parsvottanasana, UtthitaTrikonasana, Adhomukha Svanasana, Karnapitasana, Kandharasana, Tittibhasana, Padma Sarvangasana, SalambaSirshasana, Gomukhasana, Setu Bandhasana, Chakrasana, TriangaMukhaikapadaPachimottanasana, Marichyasana, Virasana, Svastikasana, Shashangasana, Garudasana, Mayurasana, Padma mayurasana, Bhadrasana, Simhasana, AkarnaDhanurasana, Parsvakonasana, Savasana .

Usage of props like wooden brick and foot rest, Belts, Ropes, Slanting planks, Chair, Stool, Bench & box, The heart rack, Ladder stool and drum, Bolsters and pillows, Bandage, Weights, Horse (big & small)

Pranayama

Moorchapranayama

Anuloma viloma

Sadanta Pranayama

Pranayama with Kumbhaka and bandhas

Unit 3:

Kriya, Bandha and Mudra

Shat Kriya (Kapalapathi, Trataka, Neti, Dauti, Nauli, Basti.)

Bandha: Uddiyana bandha, Molabandha

Mudras: Yoni mudra, Lotus mudra, Dhyani mudra, Sakthi mudra, Shambavi mudra, Pashinee mudra, Maha Bheda mudra, Ksepana mudra.

Unit 4:Relaxation Techniqe&Meditation

QRT (QuickRelaxationTechniqe)

Meditation:walking meditation, Vipasana meditation, nine centred meditation, yogic sukshmavyayama, Sudharshana kriya, Zen meditation, Savita ki dhyan Dharana, Mind Sound Resonance technique

Unit 5:

Physiological, Psychological effects on asana, pranayama and meditation.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:

- Iyenger BKS (1976) Light on yoga, London, Unwin paperpacks.
- Sivananda Sarawathi swami (1934) Yoga Asanas Madras: My magazine of India.
- Satyanadasatawaniwami (2008) Asana, Pranayama, Mutra, Bandha, Munger Yoga publications trust.

- Iyenger BKS (2008) Light on pranayam, New Delhi: Haper Collins publishers India.
- Chandrasekaran (1999) Sound Health Through Yoga, Sodapatti, Prem kalyan Publications.
- Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books
- Yogeshwaranandsaraswathi swami (1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
- Coulter, H David (2001) Anatomy and Hatha yoga, USA. Body and Breath Inc.
- Kirk Martin (2006) Hatha Yoga Illustrated Champaign: Hamenkinetics.
- Gharote (2004) Applied yoga, Lonvla: Kaivalyadhama.
- Kathy lee Kappmeier and Diane M.Ambrosini (2006) Instructing Hatha Yoga. Champaign: Human Kinetics.
- Satyanadasaraswati Swami (2007) Meditations from thitantras. Murgar: Yoga publications trust.

UYO22CL501 - CLASSICAL YOGIC PRACTICES WITH PROPS (PRATICAL)

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

Unit 1:

Essentials of Yogic Practices

Loosening Exercies - Pawanmuktasanaseries.-3

Suryanamaskar: Sivananda model, Chandranamaskar.

Usage of props like wooden brick and foot rest, Belts, Ropes, Slanting planks, Chair, Stool, Bench & box, The heart rack, Ladder stool and drum, Bolsters and pillows, Bandage, Weights, Horse (big & small)

Unit 2:

Asanas&Pranayama

Virabhadrasana, Parsvottanasana, UtthitaTrikonasana, Adhomukha Svanasana, Karnapitasana, Kandharasana, Tittibhasana, Padma Sarvangasana, SalambaSirshasana, Gomukhasana, Setu Bandhasana, Chakrasana, TriangaMukhaikapadaPachimottanasana, Marichyasana, Virasana, Svastikasana, Shashangasana, Garudasana, Mayurasana, Padma mayurasana, Bhadrasana, Simhasana, AkarnaDhanurasana, Parsvakonasana, Savasana .

Usage of props like wooden brick and foot rest, Belts, Ropes, Slanting planks, Chair, Stool, Bench & box, The heart rack, Ladder stool and

drum, Bolsters and pillows, Bandage, Weights, Horse (big & small)

Pranayama

Moorchapranayama

Anuloma viloma

Sadanta Pranayama

Pranayama with Kumbhaka and bandhas

Unit 3:

Kriya

Shat Kriya (Kapalapathi, Trataka, Neti, Dauti, Nauli, Basti.)

Unit 4: Bandha and Mudra,RelaxationTechniqe

Bandha: Uddiyana bandha, Molabandha

Mudras: Yoni mudra, Lotus mudra, Dhyani mudra, Sakthi mudra, Shambavi mudra, Pashinee mudra, Maha Bheda mudra, Ksepana mudra.

QRT (QuickRelaxationTechniqe)

Unit 5:

Meditation

walking meditation, Vipasana meditation, nine centred meditation, yogic sukshmavyayama, Sudharshana kriya, Zen meditation, Savita ki dhyan Dharana, Mind Sound Resonance technique.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:

- Iyenger BKS (1976) Light on yoga, London, Unwin paperpacks.
- Sivananda Sarawathi swami (1934) Yoga Asanas Madras: My magazine of India.

- Satyanadasatawaniwami (2008) Asana, Pranayama, Mutra, Bandha, Munger Yoga publications trust.
- Iyenger BKS (2008) Light on pranayam, New Delhi: Haper Collins publishers India.
- Chandrasekaran (1999) Sound Health Through Yoga, Sodapatti, Prem kalyan Publications.
- Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books
- Yogeshwaranandsaraswathi swami (1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
- Coulter, H David (2001) Anatomy and Hatha yoga, USA. Body and Breath Inc.
- Kirk Martin (2006) Hatha Yoga Illustrated Champaign: Hamenkinetics.
- Gharote (2004) Applied yoga, Lonvla: Kaivalyadhama.
- Kathy lee Kappmeier and Diane M.Ambrosini (2006) Instructing Hatha Yoga. Champaign: Human Kinetics.
- Satyanadasaraswati Swami (2007) Meditations from thitantras. Murgar: Yoga publications trust.

UYO22DE501 - YOGA FOR CHALLENGED PEOPLE (DSEC)

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

Unit I:

Introduction to disabilities - Types of disabilities - Causes of disabilities - Concepts of disabilities

Unit II:

Health: Goals of life- Adhi and Vyadhi, Kleshas, Koshas, Doshas, factors affecting health Panchamahabhudas, stages of development of disease- Mental and emotional ill-health Yogic rules for good health, Dimensions of health, causes of ill-health, pillars of health. Role of yogic positive attitudes (Maitri, Karuna, Mudita and Upeksha) for healthy living, conept of Bhavas and Bhavanas with its relevance in Health and well-being.

Unit III:

Fitness for disabled: Fitness: Meaning, Definition, components and scope of fitness, yogic practices for promoting the components of fitness: Endurance, strength, speed, flexibility, agility and balance - Natural fitness –Allround fitness - Benefits of fitness

Disability Management.

Unit IV:

Developmental programs for challenged people - Yoga and other forms of exercises

Unit V:

Diet for disabled

Nutrition: Macronutrients, micro nutrients, carbohydrates, fats, proteins, vitamins, minerals, water, balanced diet, benefits of vegetarian diet, gluten free and lactose free diet - composition of the meal (Grains, dairy products, vegetables and fruits nut, pulses, oil and fat), Meditarrenian diet, Vegan diet, Low glycemic diet, DASH diet, yogic diet, principles of yogic diet, characteristics of sattvic, rajasic and tamasic diet, diet for challenged people and Yogic practitioners.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:

1) Hoger (1990) Fitness and wellness, Colorado: Morton Publishing company.
2) GirijaShyamsundar (2007) Nutrition perspectives Chennai: University of Madras
3) Swami Sivananda (2007) Health and Hygiene Sivanandanagar: The Divine life society
4) Lily Pritam Telu Ram (1981) Health and Hygiene, Delhi: Vikas publishing House pvt ltd
5) Raghavan (1965) Hand book of health educstionkaraikudi: Meenal enterprises
6) Sunitha Pant Bansal (2008) Diet in diseases Delhi: Pustak Mahal
7) Yoga charyaSundaram (2004) diet and digestion Coimbatore: The yoga publishing house
8) Syd Hoare (1986) Keep fit, Hodder and Stoughton: Teach yourself books
9) Swami Sivananda (2011) Health and diet, Shivananda Nagar: The divine life society
10) AnandaBalayogiBhavanani (2007) A yogic approach to stress, Puduchery: Vivekananda Yoga Research foundation
11) Nagendra and Nagratha (2008) New perspectives in Stress Management, Bangalore: Vivekananda Yoga Research foundation
12) Arvindjanar (2004) yoga diet, Bangalore: Sai towers
13) Kathy Phillips ( ) The Spirit of Yoga London Cassell & Co

14) (2016) Guidebook for QCI, Delhi, AYUSH

15) Krishna Raman (1998) A Matter of Health, Chennai: East West books (Madras) Pvt. Ltd

16) Elangovan (2018) Yoga Psychology, Chennai: Ashwin Publications

17) Elangovan (2016) Fundamentals of Yoga, Chennai: Ashwin Publications.

UYO22SE501 - BASIC BIOMECHANICS

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

Unit-I

Biomechanics — meaning, definition, need and importance biomechanics in yoga.Branches of biomechanics — statics, dynamics, kinematics and kinetics. Motion- types of motion, linear, angular and general motion- Finishiology: Anatomical, physiological (bones, tissues, muscles and nerves).

Unit-II

Kinematics - Linear and angular kinematics. Distance, displacement, speed, velocity and acceleration in linear and angular motion.Linear and angular momentum- Scalars and vectors.Impulse, Work, power and energy, conservation of mechanical energy.Principles of projectile motion.

Unit-III

Kinetics - Force — Inertia, internal force, external force, torque, gravitational force, centripetal force, centrifugal force, ground reaction force, friction, types of friction, pressure, characteristics of force. Lever — types of lever, centre of gravity, line of gravity, balance, stability and equilibrium, types of equilibrium, factors affecting equilibrium. Newton laws of motion. Impulse momentum relationship.

Unit-IV

Planes and axis. Skeletal muscle structure, characteristics, muscle spindle, golgi tendon organ, types of muscle contraction, structural and functional classification of muscles, internal loads on the human body. Bones- types, joints, types, effects of physical activity and inactivity on bone. Origin, insertion and action of major muscles of human body.

Unit-V

Analysis of basic yogic postures — Cartesian coordinate system, visual observation, video analysis —qualitative and quantitative analysis.Electromyography- anatomical landmarks for fixing EMG sensors, EMG data interpretation.Human body posture and gait analysis.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:

1. Susan J. Hall, **Basic Biomechanics**, McGraw Hill Education, 2004.
2. Kathryn Lutgens et al. **Kinesiology (Scientific Basis of Human Motion)**, Brown and Bench mark, 1992.
3. Knudson, Duane V. **Fundamentals of biomechanics**, Springer, 2007.
4. Jacquilin Perry**. Gait analysis-Normal and pathological function,** Slack, 1992.
5. Robert Frost. **Applied kinesiology**.North Atlantic Books, 2002.

UYO22CT602 - PRINCIPLES OF YOGA THERAPY

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

UNIT - I

History of yoga therapy- Essence and Principles of Yoga therapy
Principles of ViniYoga

- Definition of ViniYoga
- Srsti Karma
- Siksana Krama
- Rakshana Krama
- Cikitsa mode of application

UNIT – II

Fundamental Principles of Yoga therapy

- Definition of Cikitsa
- Medical System vs Health Management
- Its exact role in health management
- The focus of Cikitsa
-
- Relationship
- Acharya

UNIT – III

Basic Concepts of Yoga therapy

- Physiology and Pathology in the Yoga – Shastra
- Ahimsa
- Union
- Work with the mind
- Important of breath
- Body – the power tool
- Technique vs effect

UNIT – IV

Progression and Individual focus in Yoga therapy

- Starting Point
- Fixing the goal

- Progression
- Coming out of practice
- Yogam and Ksemam
- Kala, Desa, Vaya, Vrtti, Sakti
- The nature of ailment
- Isvarapranidhana

UNIT – V

Physiology and pathology in the yoga- Shatra- koshas- doshas- Pancha prana- Application of Yoga and its types - Methodology in Yoga Therapy - Factors (Heyam, Hetu, Hanam and Upayam).

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:

1. Translated by TKV Desikarchar, 'Nathamuni`s Yoga Rahasya' 1998, Chennai, KYM publications
2. Translated by TkvDesikachar, 'Patanjali`s Yoga Sutra'.1987, Chennai, KYM publications
3. TKV Desikarchar with KausthubDesikachar and Frans Moors, 'The Viniyoga of Yoga' 2001, Chennai, KYM Publications.
4. Gopi Warrier and Deepika Gunawant, 'The complete Illustrated guide to Ayurveda' 2000, Elemetn Books Ltd.

5. TKV Desikachar, 'The Heart of Yoga'. 200, USA, Inner Traditions

UYO22CT603 - BASIC RESEARCH IN YOGA

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

Unit 1:

Research- Meaning, Definition, Need, Nature and scope of Research in Yoga, Types of research-Basic- Applied- Action- Qualities of a researcher-Criteria in locating and selecting a research problem

Unit II:

Preparation of Research Proposal- Mechanism of research proposal - Formulation of hypothesis- Variables and its types.

Unit III:

Types of Research Design, Descriptive Research- Survey method, Case study method, Experimental method- Categories: Longitudinal design, Quasi Experimental design, cross sectional design, Double blind placebo design Experimental Design Types: Single group design, Reverse group design, Repeated Measures design, Static group comparison design, Rotated group design, Random group design, Equated group design, Factorial design –

Unit IV:

Data- Population- Sample- Subject- Sampling: Characteristics, principles, steps, determining the sample size, criteria in selection, Types of sampling: probability sampling methods- Random and complex, Non-probability sampling methods

Unit V:

Methods of Research: Experimental, Descriptive, Historical, Qualitative and Quantitative methods.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

Reference:

1) Clarke David II and Clarke ,Hamison (1984) Research processes in Physical Education, New Jersey: Prentice Hall Inc.

2) Bea, John W. and Kalm James, V. (1980) Research in Education, New Delhi: Prentice Hall of India.

3) Clarke, H. Hanison and Clarke David H. (1972) Advanced Statistics, New Jerycy Prentice Hall Inc.

4) Garvet Heary E and Woodworth R.S (1958) Statistics in Psychology and Education, Bombay:Allied publication pvt L.

5) Thirumalaisamy (1998) Statistics in Physical Education, Karaikudi Semhilkumar publishers

6) Thomson AL (1986) The Art of Using Computers, Boyd & Frasher Baston Publishing Co.

7) Jerry R Thomas And Jack K Nelson 2000) Research Methods in Physical i Activities, Illaosis: Humas Kinetics,

8) Craig Willians and Chris Wragg 2006) -Data Analysis and research for sport and exercise science, London Routledge Press

9) Paul Kinnear and Colin D Gray (2006)-SPSS 14 Made Simple, New York: Psychology Press.

10) Kothari CR (1985) Research Methodology, New De: Wiley Eastems Limited

11) Stangeven R (2016) Research forouerses yoga chema: publications

UYO22CL601 - THERAPEUTIC YOGA

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

UNIT - I

Therapeutic yoga approach forMusculo-skeletal disorders

Yoga practice module for Musculo skeletal disorders: Precautions and Contraindications of Yogic practices.

Back Pain (Lumbago, sciatica, disc herniation; Intervertebral disc prolapse (IVDP), Arthistis, Lumbo sacral strain), Neck pain (Cervical Spondylosis).

UNIT -2

Yogic Concept for Management on Respiratory disorders

Yoga practice module for Respiratory disorders, Precautions and Contraindications of Yogic practices

Bronchial Asthma, Bronchitis, Emphysema, Allergic Rhinitis, Sleep apnea, Sinusitis

UNIT – 3

Therapeutic yogic management on Gastro intestinal and Excretory Disorders :-
Dyspepsia, Hyperacidity, Peptic Ulcers, Constipation, Irritable Bowel Syndrome (IBS), Renal stones and hemorrhoids.

UNIT -4

Yogic management on Endocrine & Metabolic Disorders
Diabetes Mellitus, Thyroid Disorders, Obesity and Metabolic Syndrome. Yoga practice module for Endocrine &Metabolic disorders; Precautions and Contra-indications of Yogic practices

UNIT - 5

Therapeutic yoga approach for Menstrual Disorder&Psychological Disorder

Menstrual cramp, dysmenorrhea, pre-menstrual syndrome, Polycystic Ovarian Syndrome PCOS/PCOD.
Stress, insomnia, Depression, Anxiety, Mental retardation

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

Reference book:

1. Yoga for Bronchial Asthma – Dr. H R Nagendra, R Nagaratna, SVYP
2. Yoga for Hypertension and Heart Diseases – Dr. H R Nagendra, R Nagaratna, SVYP

3. Yoga for Diabetes – Dr H R Nagendra, R Nagaratna, SVYP
4. Yoga for Obesity – Dr H R Nagendra, R Nagaratna, SVYP
5. The integrated approach of yoga therapy for positive health-Dr. R Nagaratha, Dr. H R Nagendra
6. Yoga for common disorders- Swami KoormanandaSaraswati.

UYO22CL602 - ADVANCED YOGIC PRACTICE (PRACTICAL)

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

UNIT: I

Loosening the joints.

Pavanmuktasana Series.

Suryanamaskar: kriya Suryanamaskar, Advance Suryanamaskar,

UNIT: II

Asana: Ardha baddhapadmottaanasana. Utthita Hasta Padangusthasana. Vatayanasana.Hanumasana.Padangushthasana. Padma Sarvangasana, kranaPidasana, Vrischikasana, poornaBhujangasana, poornasalabhasana, poornaDhanurasana, poornamatsyendrasana, Eakpada Sirsasana, Koormasana, Padma Sirshasana, Ardha BaddhaPachimottanasana, Paryangasana, Bhekasana, Baddha Padmasana, Vamadevasana, ParivrittiJanusirshasana, Savasana.

UNIT: III

Pranayama: Kewali Pranayama (Soham), Plawini Pranayama, Kumbhaka and Bandhas with ratios.

UNIT: IV

Kriyas: Ghrta Neti, Dugdha Neti, Basti (Enema), Dhanda dauti, Agnishar kriya

Bandhas : Maha Bandha.

Mudras: Kaki Mudra, Bhujangini Mudra, Vipareeta Karani Mudra, Kundalini Mudra, Mahavedha Mudra, Vajroli/Sahajili Mudra, Manduki Mudra, Ashwini Mudra,

UNIT:V

Meditation: Transcendental, Cyclic (S-VYASA), Guided Meditation, Dynamic Meditation, Tibetan Meditation.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:-

1. Iyengar B.KS (1976) Light on yoga, London, Unwin Paperpacks.
2. Sivananda saraswathi swami (1934) Yoga Asanas Madras; my magazine of India.
3. Satyanandasaraswati swami (2008) ASANA Pranayama, Mudra, Bandha, munger: Yoga publications lrust.
4. Iyenger .B.K.S (2008) Light on Pranayama, New Delhi: HAPER Collins publishers India.
5. Vishnu Devananda Swami (1972) The complete Illustrated book of yoga, New York: Pocket Books.
6. Chandarasekaran K (1999) Sound health through yoga sedapatti:prem Kalyan Publications.
7. Yogaeswaranandsaraswathi swami(1975) First steps to higher yoga, Gangothari: Yoga niketan trust.
8. Coulter, H.D avid (2001) Anatomy and Hatha Yoga, USA Body and Breath inc.
9. Kirk Martin(2006)Hatha Yoga Illustrated Champaign:Humenkinetics.
10. Gharote (2004)Applied yoga, Lonvla: Kaivalyadhama.
11. Kathy Lee Kappmeier and Diane M. ambrosini(2006) Instructing Hatha yoga, Champaing:Human**Kinetics**.
12. Satyanandasararawati swami (2007) Meditations from thitantras. Mungar: yoga publications Trust.

UYO22DE601 - PERSONALITTY DEVELOPMENT (DSEC)

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga
- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

UNIT-I

Personality: Personality in psychology – Meaning, Definition, concept, need, nature and scope of personality development- structure of personality.

UNIT-II

Stage of human development- determinants of human development of personality- developmental processes: physical, mental, moral, social, emotional and spiritual.

UNIT-III

Guidelines on personality – values and spirituality- developing good personality based on yoga- anger and stress management- role of diet on personality.

UNIT-IV

Personality development with special emphasis on pancha kosha- Ashtanga yoga- Factors of personality- Theories of personality- Attitude- Self-esteem - Memory-Concentration-creativity-intelligence- Assessment of personality.

UNIT-V

Leadership- Qualities of leaders-Positive thinking- powers and effects of thoughts- career planning –career rules- Better human relations- time management.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

References:

- Kamlesh M.L(1988) Psychology in physical education and sports, New Delhi, Metropolitan,
- Elangovan R.(2001) Udarkalvi , Ulaviyal, Thirunelveli: Aswin Publications
- Gita Mathew (1997) Sports Psychology Shejin and shiju brothers, Karaikudi.
- Gidr, et, al, (1989) psychology Glenview scottforesman and company
- Bringle Robert etal (1981) understanding psychology New York, Random House School Division New York.
- Rishi Vivekananda (2006) practical yoga psychology Munger. Publication trust.
- Abhedananda swami (2002) yoga psychology kolkatta:Ramakrishna Vedanta Math.
- Mangal S.K(1991) Psychological foundations of education, ludiana: prakash brothers.
- Elangovan R(2018) Yoga Psychology, Chennai: Ashwin publications.

UYO22SE601 - Professional Preparation for NET/ SLET / QCI /YCB (SEC)

Program Objectives:

- To know about the origin and History of Yoga
- To know about the conception of Yoga
- To understand the philosophy of Yoga

- To know about the yoga perspective in Books & Epics
- To know about the concept of Yoga in vedantic approach

UNIT-1

Teaching and Research Aptitude: Concept, Objectives, Levels of teaching (Memory, Understanding and Reflective), Characteristics and basic requirements. Learner's characteristics: Characteristics of ado•. Steps of Research adolescent and adult learners (Academic, Social, Emotional and Cognitive), Individual differences.

UNIT-2

Communication: Communication: Meaning, types and characteristics ofcommunication.Effective communication: Verbal and Non-verbal, Inter-Cultural and group communications, Classroom communication.

Information and Communication Technology: ICT: General abbreviations andterminology.Basics of Internet, Intranet, E-mail, Audio andVideo-conferencing.Digital initiatives in highereducation.

UNIT-3

Mathematical and Logical Reasoning:

Types ofreasoning: Number series, Letter series, Codes andRelationships. Understanding the structure of arguments: argument forms, structure of categorical propositions, Mood and Figure, Formal and Informal fallacies, Uses of language, Connotations and denotations of terms, Classical square ofopposition.

UNIT-4

Yoga and Health

Role of Yoga in preventive health care – Yoga as a way of life, Heyamdukhamanagatam; Potential causes of Ill-health: Tapatrayas and Kleshas, Physical and Physiological manifestation of Disease: Vyadhi, Alasya, Angamejayatva and Ssvasa-prashvasa.

UNIT -5

Applications of Yoga

Applied Philosophy: Yoga as Applied philosophy; Meaning, definition and nature of consciousness as described in Vedas,, Upanishads, Bhagwad Gita, Yogasutra and Yogavashishtha; Spiritual and scientific approach to human consciousness. Yogic Method of elevation of human consciousness: Bhaktiyoga, Jnanyoga, Karmayoga, Mantrayoga, Ashtangayoga, Hathayoga.

Program Outcomes:

- Student can get the basic knowledge about Yoga
- They will get the full idea about the Etymology and Principles of Yoga
- Student can get full knowledge in Indian Philosophy
- They can get the very valuables thoughts in the most popular books and epics
- Finally, the student will get full blue print about Yoga.

தமிழ்நாடு உடற்கல்வியியல் மற்றும் விளையாட்டுப் பல்கலைக்கழகம்
TAMILNADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY
Accredited with "B" Grade by NAAC
India's First State University in Physical Education and Sports

TAMILNADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY

CHENNAI-600127

BSc.,SPORTSBIOMECHANICSANDKINESIOLOGY

CBCSCURRICULUM-2019-2020

DEPARTMENT OF EXERCISE PHYSIOLOGY AND BIOMECHANICS

TAMILNADUPHYSICALEDUCATIONANDSPORTSUNIVERSITY

MELAKKOTTAIYUR POST

CHENNAI-600127

DEPT. OF EXERCISE PHYSIOLOGY AND BIOMECHNANICS

B.Sc.,SPORTS BIOMECHANICS AND KINESIOLOGY

(Three years RegularProgramme)

CHOICEBASEDCREDITSYSTEM(CBCS)

ObjectivesofBScSportsBiomechanicsandKinesiology UnderGraduateProgramme:

1. Togainknowledgeonanatomyandphysiology,kinesiology,biomechanics,motorskills,techniques of human movement and sports skills, research and statistics, andbiomechanicalinstrumentationandmeasurementin2D and3Dwithinverse dynamics.
2. To apply the principles of mechanics on the human movement and sports skills to enhance theperformance andreducethe riskofinjury.
3. Toanalysisthesportsskill technique/performancequalitatively andquantitatively usingthebiomechanicalinstrumentationandmeasurement.
4. Togainknowledgeintheareaofgaitanalysisandanalysisthenormalgaitandpathologicalgait.
5. Toassessthehumanbodypostureandprescribecorrectiveexercisetocorrectposturaldeviations.
6. To create a platform for students to engage in sports biomechanics research and pursue higherresearchdegrees.
7. To produce an efficient sports biomechanist to work in research laboratories, sports academies,nationalteams,andfacultyinacademicinstitutions.
8. To produce sports performance analyst to work with sports teams/sports clubs/research labs assportsperformanceanalyst.

REGULATIONS:

B.Sc. **Sports Biomechanics and Kinesiology** (Three Years) Undergraduate Regular Degree programmeunderCBCSsystem isimplementedfromthe academicyear2019-2020onwards.

1. ELIGIBITLITYFORADMISSION:

A Candidate shall be admitted to the degree of **Bachelor of Science in Sports Biomechanics andKinesiology**onlyifhe/sheproducessatisfactoryevidencetotheeffectthathe/shehassuccessfullycompleted Higher Secondary examinations with Maths / Physics / Biology / Computer Science / Chemistry /Statistics or its equivalent approved by the syndicate of the Tamil Nadu Physical Education and SportsUniversity.SportsparticipationatDistrict/Divisional/State/National(School/Open)levelisdesirable.

Maximumnumber ofseatsis40.

2. COURSEOFSTUDY:

B Sc.**SportsBiomechanicsandKinesiology**isathreeacademicyear'sregulardegreeprogrammecomprisingofsixsemesters.Themaximumduration ofthecourseis 6yearsfromthe dateofjoining.

3. SEMESTERS:

Anacademic yearisapportioned intotwosemesters.

Odd Semester - July to NovemberEvenSemester - DecembertoApril

In each semester, the courses are taught for 18 weeks with each week having 5 working days and 6 hoursa day (30 hours a week). For Co-curricular activities and Project, the candidates will be working extra hoursinlab,libraryandpertainingfieldofstudy.

4. CHOICEBASEDCREDITSYSTEM(CBCS)

The CBCS in **B Sc**. **Sports Biomechanics and Kinesiology** programme would have the followingcomponentsand theminimumcreditrequirementsfor eachcomponenttobecompleted inthreeyearsare:

	CoreCGPA	Creditsdetails		TotalCredits
PARTI	1.Languages	8papers	4credits	**32credits**
PART-II	2.CoreTheory	12papers	4credits	**48credits**
	3.DisciplineSpecificElectives	6papers	4credits	**24credits**
	4.Corepractical	12practical	2credits	**24credits**
Non-CGPA				
PART-III	5.AbilityEnhancementCourse(AEC)	1papers	4credits	**04credits**
	6.SkillEnhancementCourse(SEC)	2papers	4credits	**08credits**
	7.Co–CurricularActivities	6activities	2credits	**12credits**
TotalCredits				**152credits**

CGPA- CUMULATIVE GRADE POINT AVERAGE:A CGPA credit course has been classified into fourcomponents enlisted in part I and part II. The marks earned in the CGPA courses will be calculated for overallpercentage ofmarks.

NON- CGPA: The students can earn additional credits by the way of choosing Non- CGPA compulsorycredit course such as ability enhancement courses, skill enhancement courses and co-curricular activities. Themarksscoredinthe NON-CGPAcourseswillnotbe accountedinoverallpercentage calculation.

SEMESTERWISECREDITDISTRIBUTION

Semester	Language	CoreTheory	DSE	CorePractical	AEC	SEC	Co-curricular activities	TotalCredits	Total Marks
I	8 Credits	12 Credits (3*4)	-	4 Credits	-	-	02 credits	**26**	**700**

	(2*4)			(2*2)					
II	8 Credits(2*4)	12 Credits (3*4)	-	4 Credits (2*2)	04 Credits	-	02 credits	**30**	**800**
III	8 Credits(2*4)	12 Credits (3*4)	-	4 Credits (2*2)	-	-	02 credits	**26**	**700**
IV	8 Credits(2*4)	12 Credits (3*4)	-	4 Credits (2*2)	-	02 Credits	02 credits	**28**	**800**
V	-	-	12 Credits (3*4)	4 Credits (2*2)	-	04 Credits (1*4)	02 credits	**22**	**600**
VI	-	-	12 Credits (3*4)	4 Credits (2*2)	-	02 Credits (1*4)	02 credits	**20**	**600**
Total	**32**	**48**	**24**	**24**	**04**	**08**	**12**	**152**	**4200**

5. COURSEWEIGHT:

Coursesaredesignedwithweightageoffour/twocredits,dependinguponthecontent,durationandspecialization.

Theory: Eachtheoryhourper week isconsideredas1credit.

Practical: Eachtwopracticalhoursper weekisconsideredas1credit.

6. CREDITDISTRIBUTION:

B.Sc.,SPORTSBIOMECHANICSANDKINESIOLOGY(ThreeAcademicYears)undergraduatedegree programme semesterwise creditdistributionasfollow.

Semester-I							
Part-I	**CourseCode**	**NameoftheCourse**	**Lecture**	**Credit**	**Internal**	**External**	**Total**
Language	USBK19CT101	Tamil–I/Hindi-I	4	4	25	75	100
	USBK19CT102	English-I	4	4	25	75	100
CoreTheory	USBK19CT103	Introductionto HumanAnatomyand Physiology	4	4	25	75	100
	USBK19CT104	BasicBiomechanics	4	4	25	75	100

	USBK19CT105	MathematicsinBiomechanics	4	4	25	75	100
Part–IICorePractical	USBK19CP101	AnatomyandPhysiology	4	2	25	75	100
	USBK19CP102	Biomechanics	4	2	25	75	100
Total				**24C**			**700**
	NONCGPA						
Part–IIIA	Ability Enhancement Course(AEC)	-	-	-	-	-	-
PaperCode							
USBK19CP101							
USBK19CP102							

PARTIIIB	SkillEnhancement Course(SEC)	-	-	-	-	-	-
PARTIIIC	Co-curricularActivities	NSS/SwachhBharat/MOOC/ Sportsparticipation/ VPP /Workshop /Conference/MatchScouting	-	2	-	-	-
GrandTotal			**28**	**26C**			**700**

Semester-II							
Part-I	**CourseCode**	**NameoftheCourse**	**Lecture**	**Credit**	**Internal**	**External**	**Total**
Language	USBK19CT201	Tamil– II/ HindiII	4	4	25	75	100
	USBK19CT202	English-II	4	4	25	75	100
CoreTheory	USBK19CT203	AppliedAnatomyandPhysiology	4	4	25	75	100
	USBK19CT204	IntroductiontoKinesiology	4	4	25	75	100
	USBK19CT205	PhysiologyofExercise	4	4	25	75	100
Part – IICoreP ractical	USBK19CP201	AppliedAnatomyandPhysiology	4	2	25	75	100
	USBK19CP202	Kinesiology	4	2	25	75	100
Total				**24C**			**700**
	NONCGPA						
Part–IIIA	Ability Enhancement Course(AEC)	Environmentalstudies	4	4	25	75	100
PARTIIIB	SkillEnhance ment Course(SEC)	-	-	-	-		-
PARTIIIC	Co-curricular Activities (CCA)	NSS/SwachhBharat/MOOC/Sports participation / VPP / Workshop /Conference/ MatchScouting	-	2	-	-	-
GrandTotal			**28**	**30C**			**800**

PaperCode	**PRACTICAL**	**CONTENT**
USBK19CP201	**AppliedAn atomy&Ph ysiology**	Identificationofbones inspine, Shoulder,Elbow,Wrist,Anatomical Landmarks and Identification of Muscles,PathologicalConditionsofSpine ,Shoulder,Pelvis

USBK19CP202	**Kinesiology**	Movement Terminology, Joint Functions and Measuring JointRangeofFunction,AnalysisofFundamentalMovements, GaitandPosture

Semester-III							
Part-I	**CourseCode**	**NameoftheCourse**	**Lecture**	**Credit**	**Internal**	**External**	**Total**
Language	USBK19CT301	Tamil–III/HindiIII	4	4	25	75	100
	USBK19CT302	English-III	4	4	25	75	100
CoreTheory	USBK19CT303	AppliedBiomechanics	4	4	25	75	100
	USBK19CT304	MotorLearning	4	4	25	75	100
	USBK19CT305	Kinanthropometry	4	4	25	75	100
Part–IICorePractical	USBK19CP301	AppliedBiomechanics	4	2	25	75	100
	USBK19CP302	Kinanthropometry	4	2	25	75	100
Total				**24C**			**700**
	NONCGPA						
Part–IIIA	AbilityEnhancement Course(SEC)	-	-	-	-	-	-
PARTIIIB	Skill Enhancement Course(SEC)	-	-	-	-	-	-
PARTIIIC	Co-curricularActivities	NSS/SwachhBharat/MOOC/Sports participation/VPP/Workshop /Conference/MatchScouting	-	2	-	-	-
GrandTotal			**28**	**26C**			**700**

PaperCode	PRACTICAL	CONTENT

USBK19CP301	**AppliedBiomechanics**	1. Motionanalysisusingvideo-equipmentconsiderations-videocameras,picturequality,frame rate,shutterspeed, 2. Motionanalysisusingonlinesystems 3. Forceandpressure measurement 4. Surfaceelectromyography 5. Isokineticdynamometry-Applications
USBK19CP302	**Kinanthropometry**	1. MeasurementofBodyMassIndex, 2. PalpationTechniques, 3. Anthropometricmeasurements, 4. Somatotyping, 5. Somatographing.

Semester-IV							
Part-I	**CourseCode**	**NameoftheCourse**	**Lecture**	**Credit**	**Internal**	**External**	**Total**
Language	USBK19CT401	Tamil– IV / HindiIV	4	4	25	75	100
	USBK19CT402	English-IV	4	4	25	75	100
CoreTheory	USBK19CT403	IntroductiontoHumanGaitand Posture	4	4	25	75	100
	USBK19CT404	BiomechanicsofTrack events	4	4	25	75	100
	USBK19CT405	Biomechanicsoffieldevents	4	4	25	75	100
Part–IICorePractical	USBK19CP401	BiomechanicsofTrackandfield events	4	2	25	75	100
	USBK19CP402	HumanGaitand Posture	4	2	25	75	100
Total				**24C**			**700**
NONCGPA							
Part–IIIA	Ability Enhancement Course(SEC)	-	-	-	-	-	-
PARTIIIB	SkillEnhancement Course(SEC)	Internship	-	2	25	75	100
PARTIIIC	Co-curricularActivities	NSS/SwachhBharat/MOOC/Sportsparticipation/VPP/Workshop /Conference/MatchScouting	-	2	-	-	-
GrandTotal			**28**	**28C**			**800**

PaperCode	Practical	Content

USBK19CP401	**Trackandfield events**	**1. RunningEvents** Sprint(100m,200mand400m),MiddleandLongdistance running. **2. JumpingEvents** LongJump,HighJump,tripleJump,PoleVault.
USBK19CP402	**HumanGaitandPosture**	1. Analysis of fundamental movements, gait andposture 2. GaitCycle,RunningGait,PathologicalGait 3. Posture,poorPosture,TypeofPoorPosture 4. CorrectiveExerciseforpoorPosture.

Semester-V

Part-I	**CourseCode**	**NameoftheCourse**	**Lecture**	**Credit**	**Internal**	**External**	**Total**
CoreTheory	USBK19CT501 USBK19CT502 USBK19CT503 USBK19CT504 USBK19CT505	A student can choose any one of thedisciplinespecificelectivessubjecten listed in the odd semester and evensemesteraccordingtohis/herchoice.	4	4	25	75	100
			4	4	25	75	100
			4	4	25	75	100
Part–IICorePractical		Biomechanicsofsportsand gamesI	4	2	25	75	100
	USBK19CP502	Biomechanicsofsportsand gamesII	4	2	25	75	100
Total				**16C**			**500**
NONCGPA							
Part–IIIA	Ability Enhancement Course(SEC)	-	-	-	-	-	-
PARTIIIB	SkillEnhancement Course(SEC)	ComputerApplicationsinBiomechanicsandKinesiology	4	4	25	75	100
PARTIIIC	Co-curricularActivities	NSS/SwachhBharat/MOOC/Sports participation/VPP/Workshop /Conference/MatchScouting	-	2	-	-	-
GrandTotal			**24**	**22C**			**600**

DisciplineSpecificElectivesSubjects	
Coursecode	**Coursename**
USBK19CT501	BiomechanicsofsportsandgamesI
USBK19CT502	BiomechanicsofsportsandgamesII
USBK19CT503	FundamentalsofResearchandStatisticsinBiomechanicsandKinesiology
USBK19CT504	SoftwareApplicationsinBiomechanicsand Kinesiology
USBK19CT505	SportsTechnology

PaperCode	Practical	Content
USBK19CP501	**BiomechanicsofSports&Games– I**	Hockey, Football, Cricket, Boxing,Fencing,Gymnastics,Golf&Cycling
USBK19CP502	**BiomechanicsofSports&Games –II**	Basketball,Handball,Volleyball, Kabaddi, Tennis, Table Tennis,Badminton,Squash,Swimming

Semester-VI

Part-I	CourseCode	NameoftheCourse	Lecture	Credit	Internal	External	Total
CoreTheory	USBK19CT601 USBK19CT602 USBK19CT603 USBK19CT604 USBK19CT605	A student can choose any one of thedisciplinespecificelectivessubjecten listed in the odd semester and evensemesteraccordingtohis/herchoice.	4	4	25	75	100
			4	4	25	75	100
			4	4	25	75	100
Part–IICorePractical	USBK19CP601	SportsPerformanceAnalysis	4	2	25	75	100
	USBK19CP602	IntroductiontoSportsPrograming Skills	4	2	25	75	100
Total				**16C**			**500**
	NONCGPA						
Part–IIIA	AbilityEnhancement Course(AEC)	-	-	-	-	-	-

PARTIIIB	Skill Enhancement Course(SEC)	GroupProject	4	2	25	75	100
PARTIIIC	Co-curricularActivities	NSS/SwachhBharat/MOOC/Sportsparticipation/VPP/Workshop /Conference/MatchScouting	-	2	-	-	-
GrandTotal			**24**	**20C**			**600**

DisciplineSpecificElectivesSubjects	
Coursecode	**Coursename**
USBK19CT601	IntroductiontoSportsPerformanceAnalysis
USBK19CT602	FoundationsofSportsTraining, Measurement&Evaluation
USBK19CT603	IntroductiontoMat labinBiomechanicsandKinesiology
USBK19CT604	IntroductiontoPythoninBiomechanicsandKinesiology
USBK19CT605	Introductiontoopensim inBiomechanicsandKinesiology

PaperCode	**Practical**	**Content**
USBK19CP601	**SportsPerformanceAnalysis**	
USBK19CP602	**MATLAB/ Python/Opensim**	

7. <u>CREDITREQUIREMENTFORTHREEYEARSB.Sc.,PROGRAMME:</u>

Core(CGPA)	**Credits**		**Marks**
Languages	8*4=32	32 Credits	800
Coresubjects	12*4=48	48 Credits	1200
CorePractical	12*2=24	24 Credits	1200
DSE	6*4=24	24 Credits	600
	Total=	**128 credits**	
MandatoryNONCGPA(Compulsory)			

AEC	1*4=04	04 Credits	100
SEC	2*2=04 1*4=04	08 Credits	300
Co-curricularActivities	6*2=12	12 Credits	
		Total= 24credits	
	Total	**152Credits**	**4200**

8. ***ASSESSMEN***

T:Theory

Assessment of the student's attainment will consist of Continuous Internal Assessment (CIA) and EndSemesterExamination(ESE).The ratiobetweenCIAandESEwillnormallybe 25-75.

ContinuousInternalAssessment(CIA)

a) TheCIAmarksshallbeawardedbased onthefollowing:

BestScoresoftwotestsoutofthreetests	- 15
Seminar/Assignment /GroupDiscussion	- 6
Attendance	- 4
	25

b) TheAttendanceiscalculatedfromthe dateofcommencementofprogrammeineachsemester Thecandidateswhosecure80%ofattendanceandabovewillbepermittedtowritetherespectivesemester exam.Thecandidateswhofailto secure80%ofattendancewillhavetoredothecourse.

9. ENDSEMESTEREXAMINATION(ESE):

Exceptinthecaseofandexclusivelypractical/project/fieldplacementcourses,theESEwillconsistofa writtenexaminationofthreehoursdurationforamaximumscoreof75fortheorypapers.

Practicalexamwillbeassessedfor amaximumof75marksexternallyand25marksinternally.

10. EVALUATION:

Thefollowingprocedurewillbe followed forevaluation

a) Theanswer scriptsareevaluatedbyeitherinternalorexternalexaminers(Singlevaluation)
b) Ifthereis10%differencebetweenthetwoexaminers,athirdrevaluationisconducted,whichwillbefinal.
c) TheQuestionpaper patternfollowedasper theCBCSpattern.

Part-A (Questionsnumbered as1-10)	10questions	10*2= 20Marks
Part-B (Questionsnumbered as11-15)	Question11(a)or question11(b)	5*5=25 Marks
Part-C (Questionsnumbered as16-20)	Threequestionoutoffive	3*10=30 Marks

Forapassineachpaper,thecandidateisrequiredtosecureatleast50%intheendsemesterExaminations(i.e.)12in Internaland38inExternalcompulsory.

11. THEAWARDOFGRADESISAS FOLLOW

RawScores	Grade	Description	GradePoints

90and above	S	Superior	9.0–10.0
80to89	A	VeryGood	8.0–8.9
70to79	B	Good	7.0–7.9
60to69	C	VeryFair	6.0–6.9
50to59	D	Satisfactory	5.0- 5.9
Lessthan50	F	Failure	<5.0

If a studenthas any grievance relating tohis/herCIA,he/shemay,within three working days of thedeclaration of the Scores/thereof, prefer an appeal through his/her class Advisor to the appeal committee,which will consists of the HOD, class advisor and course teacher.The Appeal committee will review/perusethe student's record work. Any appeal shouldbe made along with an appeal fee as per university norms.The decisionofthe appeals committeeshallbefinal.

Single valuation system will be adopted for ESE valuation and therefore revaluation is permitted bypayingafeeofRs.300/-perpaper.

12. <u>COCURRICULARACTIVITIES:</u>

Thenumber ofcreditsallottedfor eachCo-curricularactivities istwo.

1. NSS

A student has to enroll in NSS first year and serve in NSS for at the start of period of two years(120 hourseach year)and productionofregularcertificate; he/she willbeawarded twocredits.

2. SWACHHBHARAT

A student has to serve for 15 days in village and produce a report signed by village administrationofficertoacquirethetwocredits.

3. WORKSHOP/CONFERENCE

AstudenthastoenrollanyrelevantWorkshop/Conferenceandsubmittheparticipationcertificatetothe departmenttoacquirethe twocredits.

4. INTERNSHIP

A student has to attend the internship programme for a period of two weeks in the summervacation of second year.He/she will be visiting the established sports biomechanics laboratories to gainhands on experience and submit the internship report in the department at the start of third semester toacquire twocredits.

5. *Sportsparticipation*

AStudentwillacquire2credits ifhe/sherepresentsinteruniversityteam.

6. *VPP*

A student has to attend the village placement programme for a period of three days. He/she will bevisiting the nearby village and analyzing the health status of peoples and report in the department toacquire twocredits.

7. *MatchScouting*

AStudentwilldoanotationalanalysisinagameinatournamentandsubmitareport.OnSubmissionofreporthe/shewill acquire2credits.

SEMESTER-I

PAPER CODE -
USBK19CT101(B)HINDI I (B)

UNIT-I

Prose:SabhayataKaRashasya byPremchand
Business&AdministrativeTerminology–TranslationfromHinditoEnglishBusinessLetters–Enquires,OrdersandComplaints

UNIT–II

Prose:MitrathabyAacharyaRamchandraShukla
Business& AdministrativeTerminology –Translation fromHindito EnglishLettersto theEditor forSocialcause

UNIT–III

Prose:NayasamajbyHariKrishna"Premi"Offi
cialLetters:Memorandum, Circular

UNIT– IV

Prose:BadtheshoreKaGehrataSankat
byRavendraKumarAppliedGrammar:Changethe Tense
OfficialLetters:Reminder,Notice,OfficeOrder

UNITV

Prose:TootiHuyiZindagibySriRajjanTrivediA
pplied Grammar: CorrectionofSentence
Letters of Application: Leave Letter & Banking Letters – Opening an account closing an account, issue ofchequebook

ReferenceBooks:

1. Prose (Detailed Study) : HINDI GADHYA MALA ByDr. Syed Rahamathullah

Pub:PoornimaPrakashanNo 4/7B,Begum3rdStreet,Royapettah,Chennai –600014.

2. AppliedGrammer:HINDIGRAMMERBySastri&ApteDakshinBharatHindiPracharSabhaT.Nagar,Chennai–600017.
3. Functional Hindi & LetterWriting : PRAYOJAN MOOLAK HINDIBy Prof .Dr. Syed RahamathullahDr.ChittiAnnapoornaPub: PoornimaPrakashanNo 4/7B, Begum 3rd StreetRoyapettah, Chennai –600014.

SEMESTER-I

PAPER CODE – USBK19CT102ENGLISHI

OBJECTIVES:

1. Tomakestudentsinvolved inListeningandwriting fordevelopingBasicLearningSkills.
2. Tomakeacademicpresentationsprecisely,logicallyandeffectively

LEARNINGOUTCOMES:

1. Studentscanlearntheme,ideasandinformationfromListeningfromapoem, prose,shortstoryetc…
2. Thisenhancestudentstoknowhowtowriteinbasiclevel,
3. Studentscangainknowledgeonbothusesand usageofgrammarsection.

LISTENING & SPEAKINGUNIT-I

A) Greetingpeople&respondingtogreetings
B) Introducingoneself&OtherPeople
C) AskingforandgivingpersonalDetails(Name,Occupation,etc.,)

UNIT-II

A) UsingtheTelephone- exchanginginformation&takingmessages
B) Describingavisualclipping

WRITING UNIT-III

A) Completingformswithpersonaldetailsbio-data&curriculumvitae
B) Paragraphwritingconvertingnotemakingtoparagraph.
C) Interpretingadvertisements

UNIT-IV

A) GrammarinUsage
B) Descriptivewriting- describeascene/aperson/asituation
C) Translate50 words

UNIT-V

A) Cabuliwallah-RabindranathTagore
B) ThelastLeaf- O.Hentry
C) UpperdivisionLove-ManoharMalgnkar

REFFERENCE:

1. Thelastleafandothersstories byAnandkumarRaju(BlackieBooks)
2. GreatIndian"TwentiethCenturywritersandtheirworks"byEmeraldPublications.
3. Ramachandran,T.N.,trans. TheHymnsofKaaraikkaalAmmaiyaar.Dharmapuram:InternationalInstituteofSaviaSiddhantaResearch,
4. EnglishGrammerinusebyRaymondMurphy,Cambridgepublication3rdedition.
5. BasicEnglishGrammer byBetty.S.Azar andStacyA.HagenPearsonPublication4thedition.

SEMESTER-I

PAPER CODE-
USBK19CT103INTRODUCTIONTOHUMANANATOMY&PHYSIOLOGY

Learningobjectives:

1. Tomakethestudentsto learnthefundamentalconceptsand terminologyofanatomyand physiology.
2. To equip thestudentstolearn(emphasisonMusculo-skeletalsystem)systemofthebody.
3. To help themto understand thestructureand thefunctionsofthebody.
4. To make themacquirea strongfoundationinanatomywhichwillfacilitate thestudyofbiomechanics

Unit-I

Organization ofhumanbody

Anatomyandphysiology-differentlevelsofanatomyandphysiology-Structuralandfunctionalorganization- six levels of organization- Characteristics of life-six characteristics-Organ systems of thebody, Terminology; anatomical position, supine, prone, directional terminology – body parts and region-body planes. Body cavities-Serous membranes- Cells; structure of cell- Tissues; types of tissues; epithelialtissue,connective tissue,musculartissue,nervoustissue-membranes.

Unit-II

skeletal system gross anatomy; axial skeleton; skull, hyoid bone, vertebral column and thoracic cage-appendiclularskeleton;pectoralgirdle andupperlimb,pelvicgirdle andlowerlimb.

Skeletal system; functions of skeletal system-cartilage-bone histology; bone matrix, bone cells, woven andlamellar bone, cancellous and compact bone- bone anatomy; bone shapes, structure of long, flat, short,irregular bones-bone development; intramembranous ossification, endochondral ossification- bone growth;growthinbonelengthandwidth,growthatarticularcartilage,factorsaffectingbonegrowth-boneremodelling-bonerepair-effects ofagingonskeletalsystem-

Unit-III

Articulationsandmovement

Joints, classification of joints; fibrous joints and its types, cartilaginous joints and its types, synovial joints-structure, bursa and tendon and their functions, types of synovial joints-types of movements; glidingmovements, angular movements, circular movements and special movements- structure of shoulder joint,elbowjoint,hipjoint,kneejoint,andanklejointandarchesofthefoot

Unit-IV

Muscularsystem(HistologyandPhysiology)

Functions of muscular, properties system of muscle and types of muscle tissue- structure of skeletalmuscle; connective tissue covering of the muscle, nerves and blood vessels, muscle fibers-physiology ofskeletalmusclefibers,**MuscularSystemGrossAnatomy**-Terminology,origin,insertion,agonist,antagonist, synergist, prime mover and fixate- muscle shapes. muscles of head and neck, trunk muscles-muscles movingvertebral column, thoracicmuscles, abdominal wall, pelvicfloor and perineum-upperlimbmuscles;

Unit-V

Functionalorganization ofnervoustissue

Functions of nervous system-divisions of nervous system; CNSand PNS- cells of nervous system,neurons and types of neurons- organisation of nervous tissue- electric signals- spinal cord and spinalnerves-structure-reflexes- brain and cranial nerves-development of CNS- structure and functions of brain-integrationofnervous systemfunctions.

Reference:

1. *Richard L.Drakeet al.* ***Gray'sAnatomyforstudents(3rdEdition),****Elsevier,2015.*

2. *SeeleyStephensTate.**Anatomy&Physiology(8th Edition),** McGrawHill,2008.*
3. *ValerieC.ScanlonandTinaSanders.**Essentialsof anatomyandphysiology,**F.A.DavisCompany,2015.*
4. *FrancescaGould.**Anatomy,PhysiologyandPathology(3rdedition),**Nelson Thornes,2012*
5. *KathrynLutgenset al.**Kinesiology(ScientificBasisof Human Motion)**,Brown andBenchmark,1992.*
6. *DonaldC.Rizzo.**Fundamentalsof anatomyandphysiology**,Delmer,2001.*
7. *ClareE.Milner.**Functionalanatomyforsportsand exercise**,Routledge,2008.*
8. *Martiniet al.**FundamentalsofanatomyandPhysiology(9thEdition),**2012.*
9. *Robert.S.Behnke. **Kineticanatomy(3rdedition),**HumanKinetics,2006.*
10. *ChristyCael. **Functionalanatomy,**Lippincott.2010.*
11. *ByasDeb Ghosh.**Human anatomyforstudents(2ndedition),**JaypeeBrother,2013*

E-resource

www.alison.comhttps://opentextbc.ca/anatomyandphysiologyteachmeanatomy.info

http://anatomyatlases.org/atlasofanatomy/plate01/01skullfront.shtmlhttp://www.innerbody.com/image/musfov.html

SEMESTER-I

PAPER CODE - USBK19CT104BASIC BIOMECHANICS

Learningobjectives:

1. Toenablethestudentstolearnthebasicconceptofbiomechanics.
2. Tomakethestudentstounderstandkinematicandkineticconceptofhumanmovement.
3. Toequipthestudentstolearntheprincipleofaerodynamicandhydrodynamics.
4. Toenablethestudentstoacquiretheskillsofqualitativeand quantitativeofhumanmovement.

Unit-I

Biomechanics – Sports Biomechanics- branches of biomechanics; statics, dynamics, kinematics, kinetics- Definition - Meaning - Scope - Need and importance of Biomechanics - Historical development of SportsBiomechanics.

UnitII

Equilibrium and human movement - Torque, momentarm, couple, resultantjoint torque, levers; typesoflevers,anatomicalandmechanicallevers-equationsofstaticequilibrium-equationsofdynamicequilibrium, centre of gravity and location of centre of gravity, influence of gravity, location of humanbodycentreofgravity;reactionboard,segmentalmethod-stabilityandbalance.

Unit-III

Newton laws; Law of inertia, law of acceleration and law of acceleration- law of gravitation- mechanicalbehaviour of bodies in contact; friction, static friction, kinetic friction, influence of air

resistance- factorsaffecting projectile trajectory; projection angle,projection speed,relativeheightof release,optimumprojectionconditions,analysingprojectilemotion,equationsofconstantacceleration.

UnitIV

Kinematic concepts for analyzing human movement-Kinematics; linear and angular kinematics-distance, displacement, speed, velocity and acceleration-forms of motion, linear motion, angular motionand general motion- tools for measuring kinematic quantities- common units of kinematic quantities.Angular kinematics- measuring angles-relative and absolute angle-tools for measuring body angles- instantcentre of rotation- angular kinematic relationship-; angular distance and displacement, angular speed andvelocity,angularacceleration

Unit-V

Kinetic concepts for analyzing human movement- Inertia, mass, force, net force, centre of gravity,weight, pressure, volume, density, specific weight, torque, impulse- common units of kinetic quantities-mechanicalloadsonthehumanbody;compression,tensionandshearforce-mechanicalstress'torsion,bendingandcombinedloads-scalar,vector,compositionandresolution,graphicsolutionsofvectorproblems-trigonometricsolutionsofvectorproblems-toolsformeasuring kineticquantities.

Reference:

1. *PaulGrimshawet al.**Sports&Exercise Biomechanics,**Taylor&FrancisGroup,(2007).*
2. *SusanJ.Hall,**BasicBiomechanics**,McGrawHillEducation,2004.*
3. *PeterMcGinnis**BiomechanicsofSport and Exercise**,Human Kinetics,2005.*
4. *Kathryn Lutgens et al. **Kinesiology (Scientific Basis of Human Motion)**, Brown and Bench mark,1992.*
5. *Roger Bartlett. **Introduction to Sports Biomechanics Analyzing Human Movement Patterns**,Routledge,2007.*
6. *RogerBartlett.**IntroductiontoSportsBiomechanics,**SponPress, 1997*
7. *KnudsonDuaneV.**Fundamentalsofbiomechanics**,Springer,2007.*
8. *Tomothyetal.**Applied anatomyandbiomechanicsin sport (2nd edition)**,Human Kinetics,2009*
9. *StevenT.McCaw.**Biomechanicsfordummies,**JohnWiley, 2014.*
10. *AnthonyJ.Blazevich.**SportsBiomechanics(2nd edition),**Bloomsbury,2012.*

Weblinks:

1. *http://www.sportsbiomech.com/aboutsportsbiomech.php*
2. *www.isb.com*
3. *www.clinbiomech.com*

SEMESTER-I

PAPER CODE -
USBK19CT105MATHEMATICSINBIO MECHANICS

Learningobjectives:

1. Toenablethestudentstolearnthebasicmathematicsrelatedtobiomechanics.
2. Tomakethestudentstoapplymathematicalconceptsandprinciplestoperformcomputationsinbiomechanics.
3. Toenablethestudentstoapplymathematicstosolveproblemrelatedtobiomechanics.
4. Toequipthestudentstoacquireastrongmathematicfoundationwhichfacilitateinlearning MATLAB and simulationandmodelling.

Unit-I

Algebra

- Introductionandbasicoperation
- Solvingequations
- Formulasandliteralequations
- Appliedproblems
- Vectoralgebrabasicoperations

Unit-II

Matrix

- Introductionandbasicoperations
- Matrixmultiplication
- Algebraicpropertiesofmatrixoperations
- Invertiblematrices
- Specialmatrices;Triangular,Symmetric,Diagonal
- Elementarymatricesformatrices
- Systemofequationsanintroduction
- Systemoflinearequations(Gaussianelimination)
- Systemoflinear equation(twoandthreevariables)
- Introductiontodeterminants
- Eigenvaluesand Eigenvectors

- DiagnolisationofMatrices

Unit-III

Trigonometry

- Introduction
- Unitsofmeasurementsofangle
- Relation betweentheLengthofanarcofa Circleand theCircularmeasureofitsCentralangle
- GeneralAngle(ConterminalAngle)
- AngleintheStandardPosition
- TrigonometricFunction
- TrigonometricFunctionofanyAngle
- FundamentalIdentities

Signsand valuesoftheTrigonometricfunction

Unit-IV

Calculus(Differentiation)

- Functionsofsinglevariables
- Conceptoflimit,continuity,anddifferentiability
- Definitionofderivative
- Usingthedefinitiontocomputederivatives
- Techniquesofdifferentiation
- Derivativesoftrigonometricfunction
- Taylor'sseries
- Functionsoftwovariables,limit,continuity,partialderivatives
- Conceptofmaximaandminima
- Powerseries,Fourierseries

Calculus(Integration)

- Fundamentalandmeanvalue–theoremsofintegralcalculus
- Evaluationofdefiniteandimproperintegrals
- Integrationbyparts
- Integration byrationalnumbers
- Substitution
- Trigonometricsubstitution

- Theareaproblemand thedefiniteintegral

Unit-V

Ordinarydifferentialsequations

- Firstorderequation(linear andnon-linear)
- Secondorderdifferentialequationswithvariables coefficients
- Variationofparametersmethods
- Higherorderlineardifferentialequationswithconstantcoefficients

Partialdifferentialequations

- Separationsofvariables
- Laplaceequation
- Solutionofonedimensionalheatandwaveequations

Reference:

1. *PeterH.Selby&Steve Slavin.**PracticalAlgebra:ASelf-TeachingGuide**,2ndEdition*
2. *Jiri Nedoma, Jiri Stehlík, Ivan Hlavacek, Josef Danek, TatjanaDostalova, Petra Preckova.**Mathematical and Computational Methods in Biomechanics of Human Skeletal Systems:** AnIntroduction,2011.*
3. *Jiri Nedoma&Jiri Stehlik.**Mathematicaland Computational MethodsandAlgorithmsinBiomechanics:**HumanSkeletalSystems,Wiley,2011.*
4. *MarvinBittinger.**BasicCollegeMathematics**,GlobalEdition,12thEdition,Pearson, 2014.KnudsonDuaneV.**Fundamentalsofbiomechanics**,Springer,2007*

Semester II

Content

SEMESTER- II-

PAPER CODE -
USBK19CT201(B)HINDIII(B)

PAPER – II: ONE ACTPLAY, SHORT STORY AND TRNSLATION

PRACTICEUNIT-I

Detailed Study:Deep DanbyDr. RamKumarVerma

Non–DetailedStudy:MukthiDhanbyPremchand

UNIT–II

DetailedStudy:DusHazar byUdayShankar Bhatt

Non– DetailedStudy:TayeebyVishambharNathSharmaKaushik

UNIT–III

DetailedStudy:YehMeriJanmaBhoomiHaibyHariKrishna"Premi"MeraVatanbyVishnuPrabhakar

UNIT–IV

DetailedStudy:MaiBhiManavHunbyVishnuPrabhakarTranslationPra
ctice:EnglishtoHindi

UNIT–V

Non - Detailed Study :AadmiKaBaccha by
YashpalTranslationPractice:HinditoEnglish

ReferenceBooks:

1. OneActPlay(DetailedStudy):EKANKIRATNAKARByDr.SridharSinghVaniPrakashan21-A,DariyaGanjNewDelhi– 110 002.
2. ShortStory(Non-DetailedStudy):KATHAMADHURIByChittiAnnapoornaRajeswariPublications21/3, MotilalStreetT.Nagar, Chennai– 600 017
3.TranslationPractice:PRAYOJANMOOLAKHINDIByProf.Dr.SyedRahamathullahDr.ChittiAnnapoornaPub: PoornimaPrakashanNo 4/7B, Begum 3rd StreetRoyapettah, Chennai – 600014.

SEMESTERII

PAPER CODE-USBK19CT202

ENGLISH-IIDEVELOPINGTHE LANGUAGESKILL

OBJECTIVES:

- ToDeveloptheLanguageSkillsthroughtheskillofListeningandSpeaking.

LEARNINGOUT COMES:

1. Studentscanparticipatevarious speakingactivatestoimprovetheirskillofspeakingsuchasstorytelling,Conversation, dialoguecompleting,debateetc…
2. Thesepractices makestudentsinterestingonspeakingEnglishandtheycanspeakwithouthesitationbeforepeer group andothers.
3. When students know about Features and necessaries of Listening and speaking skill they caninvolvevoluntarytoparticipateinactivitiesofspeaking andlistening.

LISTENING AND

SPEAKINGUNIT-I

A) Askingfor&givingpermission

B) Invitingaperson–acceptingand/declining

UNIT-II

A) Grammarinusage
B) Translation-idioms&phrases
C) Fillingupforms-BankChelan's/PayinSlips/DemandDraft,RailwayReservation/Cancellation

UNIT-III

A) Welcomingaforeignvisitor&describingregion&country
B) Letterwriting
C) Descriptivewriting

UNIT-IV

A) Odetothewestwind-P.B.Shelley

B) TheGiftofIndia–SarojiniNoidu.

UNIT-V

A) TheManwhocould workMiracle- H.G.Wells

B) TheVerger-SamersetMaugham

REFFERENCE:

1. TheLastleaf&OtherstoriesbyAnandkumarFaju(BlackieBooks)

2. TheSilentSong-K.M.Tharangan(macmillans)

3. English:GrammerinusebyRaymondMurphy, Cambridgepublication3rdedition.

4. BasicEnglishGrammerbyBetty.S.Azarand StacyA.HagenPearsonPublication4th edition

SEMESTER II

PAPER CODE-USBK19CT203

APPLIEDANATOMYANDPHYSIOLOGY

Learningobjectives:

1. Tomakethestudentstolearnthefundamentalconceptsandterminologyofanatomyandphysiology.
2. To equip the studentstolearn(emphasisonMusculo-skeletalsystem)systemofthebody.
3. Tohelp themto understand thestructureand thefunctionsofthebody.
4. Tomakethemacquireastrongfoundationinanatomywhichwillfacilitatethestudyofbiomechanics

UNIT-I

Structure and Articulation of the Spinal Column-Articulations of the Vertebral Bodies-Ligamentousreinforcement-Articulations of the vertebral arches-arches-articulation-atlanto-axial articulation-Atypicalcontours-Movementofthespineasawhole-Individualmovements-Summaryofspinalmovements-Regional classification of spinal movements factors influencing stability and mobility ofspine-muscles operating the spinal column- Location-Characteristics and functions of individual spinalmuscles-MuscularanalysisofFundamentalmovementsoftheheadandspine.

UNIT-II

Spine-Cervical region-Thoracic and lumbar, Sacrum and Coccyx-Structure and articulations of thethorax-Movementsof thethorax-Enlargementofthethoraxininhalation-Phasesof respiration-Muscles of respiration-Characteristics of individual muscles with primary function in respiration-characteristics of individual muscles with secondary function in Respiration-Muscular analysis ofrespiration-Common athletic Injuries of the Neck, back, and thorax- Exercise program to stretch andstrengthenthemuscles ofspinalcolumn.

UNIT- III

The shoulder joint-structure-Ligamentous and muscular reinforcements-movements- Muscles of theshoulder joint-location-characteristics and functions-the shoulder girdle structure of acromioclavicularArticulation-structureofsternoclaviculararticulation-Musclesoftheshouldergirdle-location-characteristics and functions-Joint and muscular analysis of fundamental movements-Movements infrontal plane-movements in Sagittal plane- Movements in horizontal plane-Diagonal movements- -CommonathleticInjuriesacromioclavicularSprain-Fractureoftheclavicle-

DislocationoftheShoulder-Chronic dislocation of the shoulder-Rotator cuff strains-Exercise program to stretch andstrengthentheShouldermuscles.

UNIT-IV

The elbow joint-structure –movements-the radio-ulnar joints-structure of proximal radio-ulnar jointstructure of distal radio-ulnar joint-movements-Muscles of the elbow and radio-ulnar joints-location-characteristics and functions of individual muscles-Muscular analysis of fundamental movements ofthe forearm-thewristandhand-structureofthewristjoint.

UNIT-V

Structure and movement of the midcarpal and intercarpal joints-structure of the Carpometacarpal andintermetacarpaljoints-movementsofthecarpometacarpaljointsofthethumb-MovementsoftheCarpometacartpalandintermetacarpaljointsofthefingers-structureofthemetacarpophalangealjoints-Movements of the metacarpophalangeal joints of the four fingers-movements of the metacarpophalangealofthethumb-Theinter-phalangealjointsmusclesofthewristandhandlocation-characteristicsandfunctionsofmuscles-Muscular analysisofthefundamentalmovementsofthewrist,fingers, and thumb-Cooperative actions of the wrist and digits-Length of long fingermuscles relativeto range of motion in wrist and fingers-Examples of using the hand for grasping-Common athleticinjuries-Elbowdislocation-Elbowfracturedislocation-sprainedorstrainedwrist-carpaltunnelsyndrome-Avulsionfracture-TennisElbow-Exerciseprogramtostretchandstrengthenthemusclesoftheelbowandwrist.

Reference:

1. *PaulGrimshawet.al,**Sports&ExerciseBiomechanics,**Taylor&FrancisGroup,(2007).*
2. *SusanJ.Hall, **Basic Biomechanics**,McGrawHillEducation,2004.*
3. ***Biomechanics of Sport and Exercise**, Peter M.McGinnis, Human Kinetics, 2005.(ISBN-0-7360-5101-5)www.HumanKinetics.com*
4. *Kathryn Lutgens et al. **Kinesiology (Scientific Basis of Human Motion)**, Brown andBenchmark,1992.*
5. *Roger Bartlett, **Introduction to Sports Biomechanics Analyzing Human MovementPatterns**,Routledge,2007.*

6. *Knudson, DuaneV.* ***Fundamentalsofbiomechanics****, Springer, 2007.*

SEMESTER II

PAPER CODE -USBK19CT204

INTRODUCTIONTOKINESIOLOGY

Learningobjectives:

1. Toequipthestudentswithfoundationsofkinesiology.
2. Tofamiliarizethestudentswithmuscleorigin,insertionandaction.
3. Toequipthestudentsongaitanalysis.
4. Toenablethestudentstolearnpostureanalysis.

Unit-I

Kinesiology:Meaning,history,scopeandimportance.Anatomicalreferenceposition-referenceplanes-reference axis- sagittal plane movement- frontal plane movement- transverse plane movement.Directional terms – joints movement terminology.**Muscle** – functions - structure- fiber architecture-structural classification of muscle- types of muscle fiber. Behavioural properties of muscle- types ofcontraction- role of muscles-uni joint- two joint and multi joint muscles. Factors affecting musculartforce generation-forcevelocity relationship,length tension relationship,andshortstretch cycle-electromechanical delay- - common muscle injuries. **Bone**: composition and structure of bone tissue -function- types of bone- axial and appendicularskeleton-**Joints**-classification of joints- articularcartilage-articularfibrocartilage-articularconnectivetissue--commonboneinjuries.

Unit-II

Structure of shoulder joint and shoulder girdle- origin, insertion and action of shoulder joint musclesandshouldergirdlemuscles-commoninjuriesofshoulderjointandshouldergirdle-exerciseprogramme to stretch and strengthen the shoulder joint muscles.Structure of elbow and wrist joint –origin,insertion and action of elbow and wristjointmuscles- common injuries of elbow and wristjoint- exercise programme to stretch and strengthen the elbow and wrist joint muscles.Structure ofspinal column-origin,insertion andaction of spinal columnmuscle-commoninjuries of spinalcolumn-stretchingand strengtheningexercise programmetospinalcolumn muscle.

Unit-III

Structure of pelvic girdle and hip joint- origin, insertion and action of pelvic girdle and hip joint- common injuries of hip joint- exercise programme to stretch and strengthen the pelvic girdle and hipjoint muscles.Structure of knee and ankle joint- origin, insertion and action of knee and ankle jointmuscles- common injuries of knee and ankle – exercise programme to stretch and strengthen the kneeandanklejointmuscles.

Unit-IV

Gait - Meaning, phases of gait cycle- stance phase, swing phase. Temporal variables- stance time,single limb and double limb support time- swing time, stride and step time cadence, speed. Spatialvariables stride length, step length, and width, degree of toe out. Abnormal gait: structural impairment-increasedQ-angle.increasedpronationandsupinationofthefoot-Functionalimpairment-Parkinson's gait, calcaneal gait, gluteus medius gait, gluteus maximus gait, antalgic gait, scissors gait,footdropgait.

Unit-V

Posture - Definition – static and dynamic posture- poor posture and compensatory posture. Muscleanalysis of standing posture- posterior view- pelvic position- tilting and rotation, buttock region-lineof neck and shoulder- Anterior view- pelvic tilt, abdominal wall , facial and head alignment- Lateralview – head position. Analysis of standing posture- sagittal plane alignment and analysis-,lordosis andkyphosis.Frontalplanealignmentanalysis-pesplanus,pescavus,genuvalgum,genuvarum,scoliosis.

Reference:

1. *LevangiePK,NorkinCC;**JointStructure&Function-AComprehensiveAnalysis;** Jaypeebrothers,NewDelhi;2006.*
2. *KapandjiIA;**ThePhysiologyofJoints;**ChurchillLivingstone,Edinburgh;1998.*
3. *MageeJD.**orthopedicphysical assessment**.W.B.saundersompany.*
4. *GrisaffiD.**Postureandcoreconditioning**Published byDavidGrisaffiand Personal*
5. *FitnessDevelopmentintheUnitedStatesofAmerica.*
6. *Kendall,F.P.,Mccreary,E.K.,&Provance, P.G.(1993).**MusclesTestingand***
7. ***Function**(4thEd).Baltimore:Williams&Wilkins.*
8. *FrankCC.,**Lardnerassessment and treatment ofmuscleimbalance**,humankinetics.*

USBK19DSE1PHY
SIOLOGYOFEXERCISE

Learningobjectives:

1. Tounderstandbasicsportsphysiologyandthephysiologicalfactorsaffectinghealth,fitnes sandperformance.
2. Tofamiliarisewithknowledgeofhealthand skillrelatedcomponentsofphysicalfitness.
3. Toexplorehowthebodyadaptssports&exerciseactivities.
4. Toidentifyexerciseneedsofaperson/teamanddesignappropriateexerciseinterv entions.

UnitI

Exercise physiology- definition, need and importance. Energy, work and power - Forms of energy- chemical, kinetic and potential- **ATP -** role, breakdown, re-synthesis of ATP- The principle of coupledreactions; exothermic and endothermic reactions- **ATP resynthesis:** three energy systems – ATP/PC(alactic) – The lactic acid system – The aerobic system - Detail required to include the type of reaction(aerobic or anaerobic), the chemical or food fuel used, the specific site of the reaction, the controllingenzyme,energyyield,specific stageswithina system,andthe by-productsproduced

UnitII

Energycontinuum

The type of exercise (duration and intensity) – the onset of blood lactate accumulation/OBLA) - Theeffect of the level of fitness, availability of oxygen and food fuels, and enzyme control on the energysystem used - **The recovery process:** returning the body to its pre-exercise state - The oxygen debt /excess post exercise oxygen consumption (EPOC) - The alactacid and lactacid debt components,including the processes that occur and the duration of each component -Replenishment of myoglobinstores and fuel stores, and the removal of carbon dioxide - implications of recovery process to beconsideredwhenplanningtrainingsessions,for exampletrainingintensities,work/reliefratios.

UnitIII

Principlesoftraining: Specificity,progression,overloads(FIT),reversibility,moderation,andvariance - The physiological implications of a warm up and cool down (for example, reduce thedelayed onset of muscular soreness – DOMS) - periodisation of training to include the macro, mesoand micro cycle- Awareness of the implications of the principles when applied to the candidate's owntraining.

UnitIV

Componentsoffitness

Aerobiccapacity-Definition–factorsaffecting-training,ageandsex-Methodsofevaluatingaerobiccapacity (forexample,multi-stagefitnesstest,PWC170test)–Assessmentof thecandidate'sownVO2max.,matchingtheirresultagainsttheaerobicdemandoftheirchosenactivity-Typesoftraining-continuousrunning,repetitionrunning,fartlekandintervaltraining--Energysystemandfood/chemicalfuelsusedduringaerobicwork-Physiologicaladaptationsafteraerobictraining-**Strength**-Definition-typesofstrength–Strengthendurance–maximum strength–Explosive/elasticstrength–Staticanddynamicstrength-Factorsaffectingstrength-,-Typesof trainingusedtodevelopstrength–Therepetition,setsandresistanceguidelinesusedtoimproveeachtypeofstrength-Useofmultigym,weights,plyometricsandcircuit/interval training(workintensity,workduration,reliefinterval,numberofwork/reliefintervals)-Energysystemandfood/chemicalfuels-physiologicaladaptations after training, including neural and physiological changes to skeletal muscle- physiologicaladaptation to flexibility , Body composition, Balance, coordination, Reaction time and speed training.**UnitV**

Erogenic aids - An awareness of current methods of performance enhancement - The effects of eachaid - Which athletes would benefit from each aid - Nutritional aids: – Carbohydrate loading – Pre/postcompetition meals – Food/fluidintake during exercise : Use of creatine supplements -Blood dopingand recombinant erythropoietin (Rh EPO) -Effects of caffeine - Effects of alcohol - Anabolic steroids(e.g.Nandralone)-Humangrowthhormone(HGH).

Reference:

1. CleggC,**ExercisePhysiologyandFunctionalAnatomy**, FelthamPress,1995.
2. McArdle Wetal.**EssentialsofExercise Physiology**,LippincottWilliamsandWilkins,2005.
3. WilmoreJandCostillD,**PhysiologyofSportandExercise,**HumanKinetics, 2004.
4. JohnPorcarieetal.**ExercisePhysiology**.F.A.Daviscompany,2015.
5. K.Birch, D.MacLaren. &K. George.**Sports&ExercisePhysiology**.2005

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)SEMESTERII-

PAPER CODE-USBK19AEC201ENVIRONMENTALSTUDIES(FOUNDATIONCOURSE)

UnitI:

Definition, types and elements of environment - Atmosphere, Troposphere, Hydrosphere, Lithosphere,Biosphere- Scopeandimportance-Needforpublicawareness.

UnitII:

NaturalResources -water-forest-minerals -FoodEnergy-land.

UnitIII:

Environmental pollution - Definition- causes - effects and control measure of Air pollution – water - soil - Noise- Nuclear.

UnitIV:

Social issues and the environment - Urban problems related to energy - water conservation - Rainwaterharvesting-Watershedmanagement-Environmentalethics-Climatechange-globalwarning -acidrain - ozonelayerdeletion.

UnitV:

HumanPopulationandtheenvironment -Populationgrowthvariationamongnation-populationexplosion - Familywelfareprogramme-Environmentandhumanwealth.

REFERENCEBOOKS:

1. C.P.REnvironmentalEducationcentre,(2004),"Environmentalstudiesforundergraduatestudents",Chennai.

2. K.Kumaraswamy,(2004),EnvironmentalstudiesAtextBookforallundergraduatecourses,Bharat

hidasanUniversity,Tiruchirapalli.

Semester IIIContent

SEMESTERIIIPAP
ERCODE-USBK19CT301
HINDIIII (B)

OLDPOETRY,
HISTORYOFHINDILITERATUR
E[UPTOREETHI KAAL]

UnitI: OldPoetry:Kabir Das–Saakhi

HistoryofHindiLiterature:AadiKaal–KaalvibhajanvaNamkaranKiSamsaya,AadiKaleenPravrithiya&Repersentative Poets–AmerKhurso&Chandvardaya.

UnitII: OldPoetry:SurDas–BharamarGeetha

HistoryofHindiLiterature:BhakthiKaal–NirgunBhakthiSathya-Visheshatayen&RepresentativePoets-Kabir,Jayasee.

UnitIII: OldPoetry:Tulsidas–KevatPrasang

HistoryofHindiLiterature:BhakthiKaal–NirgunBhakthiSathya-Visheshatayen&RepresentativePoets-Tulsi,Surdas.

UnitIV: OldPoetry:MeeraBai–Padh

HistoryofHindiLiterature:ReethiKaal –ReethikaaleenPavirithiya&Visheshatayen.

UnitV: OldPoetry:Rahim–Padh, Tiruvalluvar

History of Hindi Literature: ReethiKaal- ReethBadh, ReethiSidhKavya&ReethiMukthKavya,Representative Poets-Biharilal&Ghananandh.

ReferenceBook:

1. OldPoetry:Poetryselection – 2001 UniversityPublication,UniversityofMadras
2. HistoryofHindiLiterature:
[a] HindiSathiyaYugaurPravrithiyabySivakumarsharma, AshokPrakashan,NayiSadak, NewDelhi-6
[b] HindiSahithyaKaVivechanatmakIthihasByRAjNAthSharma,VinodPustakMandir,Agra

SEMESTERIIIPAP
ERCODE-USBK19CT302

ENGLISH- IIIPROGRESSIVELANGUAGESKILL

OBJECTIVES:

1. Tohelpstudentsimprovetheirthinkinginasystematicwaybyfamiliarizingthemwiththemajorbasicmental operationsandskillsthroughthenamesassociatedwiththem
2. Toimparteffectivereadingskillsbygivingextensivepracticeinreadingcomprehensionexercises
3. Topreparestudentstomastertheartofcondensation,andcomposeaneffectiveletterandasuccessfulrésumé
4. Toimparteffectivetraininginthelogicalmechanismofwritinganessay
5. ToacquaintthelearnerswiththemechanicsofPowerPointPresentations

LISTENING&SPEAKING

UNIT-I

A) Discussioninterests&leisureactivities
B) Checkingin&out ofa hotel
C) Complaint&apology

UNIT–II

A) Comprehension
B) Developinghinds

UNIT–III

A) DescriptiveWriting
B) Translation–Sentences–EnglishtoTamil

UNIT-IV

A) NissimEzekiel:"Poet,Lover,Birdwatcher"
B) A.K.Ramanujan:"OfMothers,AmongOtherThings"

UNIT-V

A) Drama -ArthurMiller:DeathofaSalesman
B) Short Story-EdgarAllenPoe:The Fallofthe HouseofUsher

REFERENCES:

1. Narasimhaiah,C.D."AnAnthologyofCommonwealthPoetry"India:Macmillan,1990.
2. Ramanan, Mohan(Ed) FourCenturiesofAmericanPoetry:AnAnthology.
3. Chennai:Macmillan.AnAnthologyofPoemsinEnglish.Chennai:Longman

SEMESTERIIIPAPERCODE-USBK19CT303

AppliedBiomechanics

Learningobjectives:

1. Tofamiliarizethestudentswithbasicelectronicdevices.
2. Tointroducethestudentsthebasicpropertiesofhighspeedcamerasand calibrations.
3. Toenhancetheirabilitytoassesandanalysehumanlocomotion.
4. Toprovidestudentswithastrongmechanicalfoundationtoacquiretheprofessionalcompetence,knowledgeandskills.
5. Tostudyelectromyographyandforceplatformused for kineticquantitymeasurement
6. To provideknowledge aboutadvancedequipmentand theirsignificantpracticalapplicationsinbiomechanics.

Unit-I

Spots and exercise biomechanist- role and functions- research, scientific support services, education,consultancy-Analysisservices; qualitativeanalysis,quantitativeanalysis-Procedures; ethics,preanalysispreparation,detailedreporting.

Unit-II

Motion analysis using video- equipment considerations- video cameras, picture quality, frame rate,shutter speed, manual iris and low light sensitivity, gen lock capability, recording medium, recordingand storage device, specification of computer, capture software, video playback system, coordinatedigitizer-datacollectionprocedures-twodimensionalandthreedimensionalvideorecording-reportingavideomotionanalysis study.

Unit-III

Motionanalysisusingonlinesystems-Equipmentconsiderations-datacollectionprocedures-processing, analysing and presenting motion analysis data- reporting a motion analysis study.**Forceand pressure measurement** - Force platform- construction and operation- technical specification-calibration-applications- Pressure distribution measurements- reporting a force or pressure analysisstudy.

Unit-IV

Surfaceelectromyography-equipmentconsiderations-datacollectionprocedures;electrodeconfiguration, location and orientation, skin preparation, cross talk- sampling- processing, analysingandpresentingEMG-reportinganEMGstudy.

Unit-V

Isokineticdynamometry-Applicationsofisokineticdynamometry-mechanicalbasisofisokineticdynamometry measurements- isokinetic equipment considerations- isokinetic experimental and datacollection procedures- processing, analysing and presenting isokinetic data- reporting an isokineticstudy.

Reference:

1. *PaulGrimshawet al.**Sports&ExerciseBiomechanics,**Taylor&FrancisGroup,2007.*
2. *Susan J.Hall.**BasicBiomechanics**,McGrawHillEducation,2004.*
3. *PeterMcGinnis.**BiomechanicsofSport andExercise**,Human Kinetics,2005.*
4. *Kathryn Lutgens et al. **Kinesiology (Scientific Basis of Human Motion)**, Brown and Benchmark,1992.*
5. *Roger Bartlett. **Introduction to Sports Biomechanics Analyzing Human Movement Patterns**,Routledge,2007.*
6. *Knudson, DuaneV**. Fundamentalsofbiomechanics**, Springer, 2007.*
7. *Vladimir,Medved.**Measurementofhumanlocomotion,**CRCPress,2001*
8. *JohnMcLester,&PeterSt.Pierre,**Appliedbiomechanics,**Thompson, 2008.*
9. *Carl J. Payton & Roger M. Bartlett, **Biomechanical evaluation of movement in sports andexercise**,Routledge,2008.*
10. *RogerBartlett.**IntroductiontoSportsBiomechanics,**SponPress, 1997*

SEMESTERIIIPAP
ERCODE-USBK19CT304

MOTORLEARNING

Learningobjectives:

1. Toequipthestudentstounderstandthebasicofskillsacquisitionsofsportsperformance.
2. Tomakethemunderstandthebasicofskillsand selectedsportsmovementpattern
3. Toenablethemtounderstandthelinkbetweenmotorskills, ability,learningandperformance
4. Tofamiliarizethestudentswithvarioustheoriesimprovingandaffectingthesportsskillsperformance.

UnitI

Motor skill development -motor skills- fundamental motor skills- sports specific sills- **Theoriesrelatedto the learningofmotor skills**-Description of thestimulus-response(S/R)bondandapplication of related theories - Associationist theories: operant conditioning – shaping behaviour, theuse of reinforcement, link to trial and error, linking of the S/R bond - Cognitive theory: work of theGestaltists – wholeness and insight learning - Observational learning: the work of Bandura – the fourelements(attention,retention,motorreproduction,motivation).

UnitII

Characteristics of a skillful performance - learned - Efficient - Goal directed - Technical model - Fluent -Aesthetically pleasing- **Motor and perceptual skills- Classification of skills** - Gross and fine- Open and closed - Discrete, serial and continuous- External and internally paced - Simple or complex - High andloworganization-**Definitionandcharacteristicsofabilities**-characteristics:innate,underlyingandenduringtraits-grossmotorandpsychomotorabilities.

Unit III

Reinforcement: Definition and examples of positive reinforcement,negativereinforcementandpunishment, as methods of strengthening or weakening the S/R bond - Ways of strengthening the S/Rbondthroughrepetition,satisfaction/annoyance,andthroughphysicalandmentalpreparedness-**Theoriesrelatedtomotorandexecutiveprogrammes**-

Definitionasageneralisedseriesofmovements:creationofprogrammesinthelongtermmemory;awarenessof themajorprogrammes/sub-routines of a range of motor skills - Open loop control: retrieval of programmes bymaking one decision, used in quick movements where there is no time for feedback, with examples -Closed loop control: detection and correction of movements during the performance through the use offeedback, with examples - Schema theory: a way of modifying the motor programme by the use ofschema or rules of information- Schmidt's sources of information as recall and recognition schema -Four rules of schema (knowledge of initial conditions, knowledge of response specifications, sensoryconsequences, movement outcomes) - Examples of the application of the schema theory in teachingandcoaching.

UnitIV

Theoryofinformationprocessingintheperformanceofmotorskills

Basic models of information processing: display, sensory information, sense organs, perception,decision making, effector mechanism response and feedback- **Memory:** basic model of the memoryprocess: selectiveattention,shorttermsensorystore,shorttermmemory,longtermmemory.

Reaction time : definitions of reaction time, movement time and response time - importance of a shortreaction time -factors affecting reaction time, including psychological refractory period, in a range ofsporting activities - **Feedback -** importance and functions of feedback - types of feedback to include:intrinsicandextrinsic,terminalandconcurrent,positiveandnegative,knowledgeofperformance,

knowledge of results-use of practical examples to show how feedback can be used effectively toimprove performance.

UnitV

Phasesoflearningmovementskills-Cognitive,associative,autonomousphasesoflearning-characteristics of each phase and their practical implications- **Transfer of learning -** definition oftransfer of learning – types – Positive transfer – Negative transfer – Proactive and retroactive –Bilateral transfer- **Motivation -** definition of motivation -extrinsic andintrinsicmotivation - -effectof extrinsic rewards on intrinsic motivation- **Theories related to arousal levels -** drive theory -invertedUtheory-drivereductiontheory

Reference:

1. *HoneybourneJ.**AcquiringSkillinSport,**Routledge, 2006.*
2. *McMorrisT.**AcquisitionandPerformanceofSportsSkills,**Wiley, 2004.*
3. *MagillR.**MotorLearning,ConceptsandApplication,**McGrawHill,2004.*
4. *SharpB.**Acquiring SkillinSport**,SportsDynamics,1992.*
5. *WilliamsHandHodgesN.**Skill Acquisitionin Sport**,Routledge,2004.*
6. *PaulE.Robinson.**Foundationsof ScientificCoaching.**Routledge.2010.*
7. *DonGordon.**CoachingScience**.LearningMatters.2009.*

SEMESTERIIIPAP
ERCODE-USBK19CT305
KINANTHROPOMETRY

Learning objectives:

Unit-I

Anthropometry – history, need, scope and importance- preliminary considerations- subject-datacollection-anthropometryequipment.Anthropometryprofile-humanbodycomposition-densiometry;underwaterweighing,dualenergyXrayabsorptiometry,skinfoldmethod,bioelectrical impedance.Anthropometricmodel-adipose tissue,muscle,bone.

Unit-II

Anthropometric land marks – definitions, vertex-supra sternale, epigastrale, thelion, acromiale,radiale, stlion, dactylion, iliocristale, iliospinale, trochanterion, tibialmediale and laterale. Heathcarter somatotype method - anthropometric and photoscopic somatotype methods-endomorphy-mesomorphy- ectomorphy-Anthropometric landmarks- reference land marks- marked land marks-basic measurements. Skinfold measurement – locations of skinfold sites - cheek-chin-pectoral,axilla, abdomen iliac crest, supraspinale, subscapular, triceps, biceps, patella-mid thigh, proximalcalf,medialcalf.Waisthipratio-bodymassindex-fatfreeindex.

Unit-III

Anthropometricmeasurement– length and breadth measurement– technique and procedures-**Length** - Acromiale-Radiale length (arm), Radiale-Stylion length (forearm), Mid-stylion-Dactylionlength (hand), Iliospinale Height (obtained height plus box height), Trochanterion Height (obtainedheightplus box height), Trochanterion-TibialeLateralelength (thigh), TibialeLaterale Height(leg),TibialeMediale-SphyrionTibiale (tibialength),Footlength.

Unit-IV

Anthropometric measurement **Breadths** - Biacromial breadth, Biiliocristal breadth, TransverseChest breadth, Anterior-Posterior Chest Depth, BiepicondylarHumerus breadth, Wrist breadth,Handbreadth,BiepicondylarFemurbreadth,Ankle breadth,andFootbreadth.

Unit-V

Anthropometric measurement - **Girth**- Head Girth, Neck Girth, Arm Girth (relaxed), Arm Girth(flexedandtensed),Forearm Girth,WristGirth,ChestGirth,WaistGirth,Omphalion Girth(abdominal), Gluteal Girth (hip), Thigh Girth (upper), Mid-Thigh Girth, Calf Girth, and AnkleGirth.Heathcartersomatotyping,testingandclassificationprocedure-reportgenerationtechnique.

Reference:

1. *BernhardReichert. (2015).**Palpationtechnique**(2nd Edition),ThiemePublishers,Delhi.*
2. *RogerEston,**KinanthropometryandExercisePhysiologyLaboratoryManual:Tests,Procedu resand Data:**Volume One:Anthropometry (Volume 1)3rdEdition.*
3. *ISAKKinanthropometrymanual*

Weblink:https://www.isak.global/WhatIsIsak/#GoToKina

Semester - IVContent

SEMESTERIV

PAPER CODE - USBK19CT401
(B)HINDIIV(b)

PAPERIV:MODERNPOETRY,HISTORYOFHINDILITERATURE(ADHUNIKKAAL ONLY)

UNIT-I

Modern Poetry: ApnaSansar by MithiliSharanGupt, Chinta by Jeya Shankar Prasad. History of HindiLiterature:BharatenduYag-VisheshatayenArunPravithiyanRepresentationPoet–Bharatendu

UNIT–II

Modern Poetry: MurjhayaHuaPhool by MahadeviVerma. History of Hindi Literature: DwivediYug-VisheshatayenArunPravithiyan,RepresentationPoet-DwivediYug.

UNIT–III

Modern Poetry: SnehShapath by Bhavani Prasad Mishra. History of Hindi Literature: Chayaavad-VisheshatayenArunPravithiyan, Representation PoetJeya Shankar Prasad, SuryakanthTripathiNirala,SumithraNandhanPanth,MahadeviVarma.

UNIT–IV

ModernPoetry:NimnaMadhyaVarghbyPrabhaharMacheve.HistoryofHindiLiterature:NayiKavitha - VisheshatayenArunPravithiyan, Representation Poet – PrabhakarMachve&BharathBhooshanAharwal.

UNIT–V

Modern poetry: Anewaalone se eksavaal by BharathBhooshanAharwal.HistoryHindiLiterature:Upayans,KahaniArunNayak(UdbhauaurVikkas)

REFERENCEBOOKS:

1. ModernPoetry: PoetrySelection-2001 UniversityPublicationsUniversityofMadras.
2. History of Literature: Hindi SathyayugaurPravirthiyan by Siva Kumar Sharma AshokPrakashanNayiSadik,NewDhelhi –6
3. HindiSahithyaKaVivechanatmakIthihasByRajNathSharmaVinodPustakMandir,Agra.

SEMESTERIVPAP
ERCODE-USBK19CT402

ENGLISHIV- CARREERLISTENINGANDSPEAKING

OBJECTIVES

1. Toimpartadvancedtraining instandardpronunciation,wordstressand intonation
2. TotrainstudentsinthecorrectuseofEnglish inaformalway
3. Toimprovethelearners'vocabularybyfamiliarizing themwiththewaysofwordformation
4. Todevelopcommunicationskillsbyprovidingtheoreticalknowledgeofthemechanismofeffectivecommunication

UNIT-I

A) Groupdiscussion–predictinganddescribingfuturepossibilities
1. Globalization
2. Feminism
3. Currentevent

B) Interview-focus inpersonalitydevelopmentandbodylanguage

WRITINGUNIT-II

A) Reportwriting
B) Notemaking

UNIT-III

A) Howtowrite ane-mail
B) Descriptivewriting–writingwithpurpose

UNIT-IV

B) Song onMayMorning-JohnMilton
C) LeavethisChanting-RabindranathTagore

UNIT-V

A) TinternAbbey-WilliamWordsworth
B) SheStoopstoConquer-Oliver Goldsmith

REFERENCE:

1. A.K.RamanBhushanam"HumanvaluesthroughEnglishprose"(Blackie)
2. EnglishGrammarinusebyRaymondMurphy,Cambridgepublication3rdedition.
3. BasicEnglishGrammar byBetty.S.Azar andStacyA.HagenPearsonPublication4thedition.

SEMESTERIVPAP
ERCODE-USBK19CT403
INTRODUCTIONTOHUMANGAIT&POSTURE

Learningobjectives:

1. Knowthebasicparametersofhumangait
2. Characterizenormalhumangait
3. Knowthemethodsofgaitanalysis andassessment
4. Sketchthenormalrangesofmotionofthevariousjointsduringagaitcycle.
5. Describevarioustypesofpathologicalgait.
6. Identifycausesandcompensationmechanismsforpathologicalgait.
7. Describemeasurementsusedinanalysisofhumanmovement.
8. Reviewjournalpapers inthis field.

Unit-I

Fundamentals of gait - Meaning of gait, gait cycle divisions, Rancho Los Amigos gait terminology.**Gait parameters** - Temporal variables - stance time, single limb and double support time, swing time,stride and step time, cadence, speed. Spatial variables- stride length, step length and width, degree oftoe out. Joint motion – Sagittal, frontal and Transverse plane joint angles. **Functional sub divisions ofgait cycle** - Passenger unit, locomotor unit. Locomotor functions – Propulsion, stance stability, shockabsorption,energyconservation.

Unit-II

Normal gait – Ankle foot complex – motion, muscle control and functional interpretation. Knee - motion, muscle control and functional interpretation. Hip - motion, muscle control and functionalinterpretation. Head, trunk, and pelvis - motion, muscle control and functional interpretation. Arm -motion, muscle control and functional interpretation. Total limb function-initial contact, loadingresponse,mid stance,terminalstance,pre-swing,initialswing,mid swing,terminalswing.

Unit-III

Pathological gait-Pathological mechanisms–deformity,muscleweakness,sensory loss,pain,spasticity.Abnormalgait-Structuralimpairment-leglengthdiscrepancy,increasedQ-

angle,increased tibial torsion,increased pronation and supination of the foot. Functional impairment-Parkinson's gait, calcaneal gait, gluteus medius gait, gluteus maximus gait, antalgic gait, arthrogenicgait, ataxic gait, hemiplegic gait, scissors gait, foot drop gait, stiff knee gait, psoatic limp gait. Walkingaids,types,prescriptionandindication.

Unit-IV

Posture–definition–staticanddynamicposture–importanceandbenefitsofgoodposture-causesof poor posture poor posture, compensatory posture. Vertebral alignment – development of posturalcurves - Standing posture – lateral view, anterior view, and posterior view.Sitting posture, goodlying/sleeping posture.Postural synergies – fixed support synergies – ankle synergy, hip synergy,steppingsynergy–changeinsupportstrategies–headstabilizingstrategies.

Unit–V

Analysis of Standing Posture – Plumb line - Sagittal plane alignment and analysis - Deviations fromOptimal Alignment in the Sagittal plane - Claw toes, Hammer toes, Flexed knee posture, Hyperextended knee posture (Genu Recurvatum), Excessive anterior pelvic tilt, Lordosis and Kyphosis,Forward Head Posture - Frontal plane optimal alignment and analysis - Deviations from optimalalignment in the frontal plane - PesPlanus (Flat Foot), PesCavus, Genu valgum (knock knee), Genuvarum(bowleg),Squintingorcross-eyedpatella,Grasshopper-eyespatella,patellaalta, Scoliosis.

Reference:

1. *NihatOzkay&MargaretaNordin.**FundamentalsofBiomechanics:Equilibrium,MotionandDeformation,**Springer InternationalPublisher,2017.*
2. *MargaretaNordin&VictorHirschFrankel.**BasicBiomechanicsoftheMusculoskeletalSystem,**LippincottWilliams&Wilkins,2001.*
3. *ArthurE.Chapman.**BiomechanicalAnalysisofFundamentalHumanMovement**.HumanKinetics,2008.*
4. *DavidA.winter.**BiomechanicsandMotorControlofHumanMovement(4th edition).**johnWiley&sons,2009*
5. *JacquelinPerry.**GaitAnalysis;NormalandPathologicalfunctions**(2nd edition).SLACKincorporated,2010.*
6. *MichaelWhittle.**GaitAnalysis;AnIntroduction,**Butterworth-Heinemann, 2007.*
7. *GrisaffiD.**Postureandcoreconditioning**PublishedbyDavidGrisaffiandPersonalFitnessDevelopmentintheUnitedStates ofAmerica.*
8. *Kendall,F.P.,Mccreary,E.K.,&Provance,P.G.(1993).**MusclesTestingandFunction**(4thEd).Baltimore:Williams&Wilkins.*

SEMESTERIVPAPER
CODE-USBK19CT404

BiomechanicsofTrackEvents

Learningobjectives:

1. Toequip thestudentstolearn fundamentalskillsand techniquesoftrack events.
2. Tofamiliarizewithmechanicalprinciples involvedinskillsandtechniquetrackevents.
3. Tounderstandandconductthequalitativeandquantitativeanalysis intrackevents.
4. Toacquiretheskillsofreviewingthecurrentresearchstudies.

Unit-I

Trackevents(Sprint-100m)

History, legends, world record, skills, technique, application of biomechanical principles, analysis ofrelated research reviews, and analysis of currentworld and Olympic record holder'sperformance.Types of Crouch Start – Bunch start-Medium start-Elongated start - Running – Stride length - Take-offdistance - Flight distance - Landing Distance - Stride Frequency - Action of leg - Supporting phase-Driving phase - Recovery phase - Action of arms -Action of trunk - Finish - Types of Finish - Start -Running–Finish-Spikes–Types ofspikes-Startingblock

Unit-II(Sprint200m&400m)

History, legends, world record, skills, technique, application of biomechanical principles, analysis ofrelated research reviews, and analysis of currentworld and Olympic record holder'sperformance.Types of Crouch Start – Bunch start-Medium start-Elongated start - Running – Stride length - Take-offdistance - Flight distance - Landing Distance - Stride Frequency - Action of leg - Supporting phase-Driving phase - Recovery phase - Action of arms -Action of trunk - Finish - Types of Finish - Start -Running–Finish-Spikes–Types ofspikes-Startingblock

Unit-III-Hurdles(100m,110mand)

History, legends, world record, technique, application of biomechanical principles, analysis of relatedresearch reviews, and analysis of currentworld and Olympic record holder'sperformance. Hurdles –High hurdles-Approach-take-off-Flight-Landing- Running between hurdles-Intermediate hurdles-Lowhurdles

Unit–IVHurdles400m

History, legends, world record, technique, application of biomechanical principles, analysis of relatedresearch reviews, and analysis of currentworld and Olympic record holder'sperformance.

Hurdles –High hurdles-Approach-take-off-Flight-Landing- Running between hurdles-Intermediate hurdles-Lowhurdles

Unit-V

MiddleandLongDistanceandRelays(800m,1500m,5000m,10000m,and4x100mand4x400m)

History, legends, world record, technique, application of biomechanical principles, analysis of relatedresearchreviews,andanalysisofcurrentworldandOlympicrecordholder's performance

Reference:

1. *Hay, J. (1993**). The Biomechanics of Sports Techniques,** Prentice-Hall,Inc.,EnglewoodCliffs,NewJersey..*
2. *Knudson, DuaneV.**Fundamentalsof biomechanics**,Springer, 2007*
3. Carr, Gerry(1997).**Mechanicsofsport**,Champaign, IL:HumanKinetics.
4. CarlJ.PaytonandRoger M.Bartlett,**Biomechanicalevaluation ofMovement insportand exercise**, The British Association of Sport and Exercise Sciences Guidelines,Routledge,2008.
5. Carr,Gerry.***SportsMechanicsforCoaches***, NewYork:HumanKinetics.2004.
6. *JohnW.Bunn,**ScientificPrinciplesof Coaching**.*
7. *Broer,**EfficientMovement***
8. *Roger Bartlett, **Introduction to Sports Biomechanics Analyzing Human MovementPatterns**,Routledge,2007.*

SEMESTERIVPAP
ERCODE-USBK19CT405
BIOMECHANICSOFFIELD EVENTS

Learningobjectives:

5. Toequipthestudentstolearnfundamentalskillsandtechniquesoffieldevents.
6. Tofamiliarizewithmechanicalprinciplesinvolvedinskillsandtechniquefieldevents.
7. Tounderstandandconductthequalitativeandquantitativeanalysisinfieldevents.
8. Toacquiretheskillsofreviewingthecurrentresearchstudies.

Unit-I

Throws (Shot-put)

History, legends, world record, technique, application of biomechanical principles, analysis of relatedresearch reviews, and analysis of currentworld and Olympic record holder'sperformance. **Shot-put** -Shot-put-O'Brienstyle-Initialstance-Glide-Delivery-Reverse-Rotationstyle-distancepriortorelease-Physique-Position-Distance after release-Height of release-Speed of release-Forces exerted -Angleofrelease–Airresistance-Advantagesand DisadvantagesofO'Brienand Rotationtechniques.

Unit-II

Hammer - History, legends, world record, technique, application of biomechanical principles, analysisof related research reviews, and analysis of currentworld and Olympic record holder'sperformance.Hammer Throw – Preliminary swing-The first turn-The second turn-The third turn-The delivery-Airresistance Speed of release-Angle of release-Height of release. **Discus -** Discus Throw – Initial stance –Preliminaryswings-Transition-Turn-Delivery-reverse-Aerodynamicfactors.

Unit-III

Javelin- History, legends, world record, technique, application of biomechanical principles, analysis ofrelated research reviews, and analysis of currentworld and Olympic record holder'sperformance.Javelin Throw - Types of Grip –Carry- Run – Transition, Throw, and Recovery-Speed, Angle, Height ofrelease-Aerodynamicfactorsinfluencingflight- AdvantagesandDisadvantagesof differentGrips-Aerodynamic Javelin.

Unit-IV

Jumps(Long jump&Triple jump)

History, legends, world record, technique, application of biomechanical principles, analysis of relatedresearch reviews, and analysis of currentworld and Olympic record holder'sperformance.**LongJump**-Hang style - Hitch Kick style - Approach run – Take-off -Flight in the Air - Landing – Take-offdistance-Flightdistance-Speed,angle,height of take off-air resistance-Advantages and Disadvantagesof different styles. **Triple Jump -** Hop - Step and Jump- Approach Run – Take-off - Flight in the Air –Landing.

Unit-V

Highjump-History,legends,worldrecord,technique,applicationofbiomechanicalprinciples,analysis of relatedresearch reviews,andanalysis of currentworldandOlympic recordholder'sperformance. straddle-fosbury flop- run up- take off- bar clearance-landing- height of take –off-physique – body composition at take off- flight height- vertical velocity at take off- clearance height-body position at peak- **pole vault**-carry- take off- clearance- landing- take off- swing height- clearanceheight- kinetic energy at take off- strain energy at take off- work done during ascent- mechanical energylosses-kineticenergy-usageand advantageoffiberglass-analysisofrecentworldpolevaulters.

Reference:

1. ***TheSportsBook*** *(3rd Edition). D.Kpublishers.*
2. *WillFreeman.**Track&FieldCoachingEssentials.**HumanKinetics. 2014.*
3. *Joseph.L.Rogers.**USATrack &Field Coachingmanual.**HumanKinetics.2000.*
4. *Ed House Wright.**Winningtrack&fieldforgirls.**MountainLion.2010.*
5. *TomEcker.**BasicTrack &Field Biomechanics(4th edition).**2015*
6. ***The Olympic and World Records book**, Imagine Publishing, 2016.JamesG. Hay,**BiomechanicsofSportsTechnique,**Prentice-Hall, 1993.*

Semester - VContent

SEMESTERV

PAPERCODE -USBK19CT
501BIOMECHANICSSPORTSANDGAMES-I

LearningObjectives:

1. Toenablethestudentstolearnthebasicskillsand techniquesofsportsand games.
2. To learnand applythemechanicalprincipleonthetechniqueofsportsskill.
3. Tounderstandthetechniqueofqualitativeandquantitativeanalysis.
4. Toequipthestudentstocarryout3Danalysisonsportsskillsandgenerateavalidreport.

Unit-I

Hockeyandfootball

History of the game, legends, skills and technique, application of biomechanical principles, analysis ofrelatedresearchreviews-**Hockey**-QualitativeandQuantitativeanalysis–Dribbling-Pushing–Scooping-slap shot-Drag push and Dragflick- Hockey Sticks- Types of sticks- Playing surfaces -**Football**-Qualitative and Quantitative analysis - Kicking –instep kick-inside of the foot kick- passing-inside ofthe footpass-Receiving-Throwin-Dribbling–Heading-Volley.

Unit-IICricket

History of the game, legends, skills and technique, application of biomechanical principles, analysis ofrelated research reviews - Cricket- Qualitative and Quantitative analysis - batting: forward defense,backward defense, drives, cut, pull, and sweep - Bowling: Pace bowling, types and technique; mediumpace, Spin bowling: types, leg spin, off spin and their improvisation – Fielding: catching, groundfielding,close anddeepfielding-Wicketkeeping.

Unit-III

Boxingand fencing

History, legends, skills and technique, application of biomechanical principles, analysis of relatedresearch reviews - **Boxing**-Qualitative and Quantitative analysis- Foot work- a) Stand-up base

b)Cross footwork c) Circling; Punches - a)Jab b)Cross c) Hook d) Uppercut; Blocks, parries andevasive techniques - a) Catch b) Side parry c) High frontcover d) Low frontcover e) Hook / sidecover f) Shoulder roll g) Slip h) Ducki) Bob and weave - **Fencing**- Qualitative and Quantitativeanalysis- Lunge(attacking)- flunge(saberfencing)-Passattasotto(movementwithatwist) -Parry(defensivemove)-Counterattack(attack) -Riposte(counterattack)-Remise (seriesofattack) - Beat(attack)–Feint.

Unit-IVGymnastics

History, legends, skills and technique, application of biomechanical principles, analysis of relatedresearch reviews - **Men -** Qualitative and Quantitative analysis -Floor exercise, parallel bar, horizontalbar, vaulting table.pommel horse and Roman rings – **Women -** Qualitative and Quantitative analysis -Unevenbars,Floorexercise,Balance beamandVaultingtable

Unit-V

Golfandcycling

History, legends, skills and technique, application of biomechanical principles, analysis of relatedresearch reviews - **Golf** - Qualitative and Quantitative analysis - carry-speed of release-Direction ofRelease-Height of release-Air resistance- The run-Putting-Techniques-Grip-Stance-The swing-backswing-Down swing-Impact-Follow through - **Cycling**- analysis of velodrome and outdoor cyclingevents.

Reference:

1. *Hay,J.(1993).**TheBiomechanicsofSportsTechniques,**BenjaminCummings.*
2. MartinToms.**RoutledgeInternationalbookofgoldscience**, Taylor&Francis, 2018.
3. *EmericArius.**Biomechanicsofhumanmotion(2nd edition).**CRCPress. 2017.*
4. *ElaineCheris.**Fencingstepstosuccess**.HumanKinetics.2002.*
5. *GabiAmzaleg.**Boxingtechnique.**CreateSpaceIndependentPublishers.2018.*
6. *GaryBlower.**Boxingtechniquetacticsskills**.Crowood.2012.*
7. *RodrigoR.Bini&FelipeP.Carpes.**Biomechanicsof cycling.**Springer.2014.*
8. *Robertson .E Gordon D et al. **Research Methods in Biomechanics.** New York: Human Kinetics.2004.*

SEMESTERV

PAPERCODE -USBK19CT
502BIOMECHANICSSPORTSANDGAMES–
II

Learningobjectives:

1. Toprovidetheacquaintanceaboutthehistoryofgames,legends, skillsandtechnique.
2. Torecognizethemechanicalprinciples involvedinvariousskillsofagame.
3. Toacquiretheskillswithconductingresearchandevaluatethedataonparticular skillandtechniqueintherelevantgame.
4. To enablethestudentsto learnto preparestandardbiomechanicalanalysisreport.

Unit-I

BasketballandHandball

History of the game, legends, skills and technique, application of biomechanical principles, analysis ofrelatedresearch reviews-**Basketball**-Qualitative andQuantitative analysis-Dribbling,typesofpasses - Chest pass - Overhead pass - Bounce pass - Baseball pass, Types of shooting-Set shot-JumpShot-Layup shot. **Handball** - Dribbling-Passing-types of passing- Overhead pass- Types of shot –Jumpshot-Playingsurfaces-Types

Unit-II

VolleyballandKabaddi

History of the game, legends, skills and technique, application of biomechanical principles, analysis ofrelated research reviews- **Volleyball**- Qualitative and Quantitative analysis- Serve, Types, ForearmpassSetting, Attack,Block,Floordefense- **Kabaddi**-offensiveanddefensiveskills-matchanalysis.

Unit-III

Tennisand Tabletennis

History of the game, legends, skills and technique, application of biomechanical principles, analysis ofrelated research reviews -**Tennis**- Qualitative and Quantitative analysis- Service, types of service-Rally – fore hand rally-Back hand rally-offensive and defensive techniques – Tennis Rackets –Types-Playingsurfaces-**Tabletennis**-QualitativeandQuantitativeanalysis-

Grip,Stance,Footwork,Forehanddrive,Backhanddrive,Backhandpush,Forehandpush,Serve,Return of serve,Basicstrokes-Drive,Push,Block,Smash; Advance stroke–Loop,Chop,FlipandLob

Unit-IV

BadmintonandSquash

History of the game, legends, skills and technique, application of biomechanical principles, analysis ofrelated research reviews – **Badminton** - Qualitative and Quantitative analysis-grip,footwork,service and types; short, flick, high , drive - clears, drop shot, smash, drive, net play - **Squash**-Qualitative and Quantitative analysis, Racket Grip, Squash Swing (Forehand swing and back handswing)

Unit-VSwimming

History, legends, skills and technique, application of biomechanical principles, analysis of relatedresearchreviews-Swimming-QualitativeandQuantitativeanalysis– Freestyle,Frontcrawl,Butterfly,Breaststroke,andBackcrawl.

Reference:

1. Hay,J. (1993).**TheBiomechanicsofSportsTechniques,**BenjaminCummings.
2. Barth/Dietz.**Learningswimming,**Meyer&Meyer,2002.
3. Cathy McGee, **Coaching Basketball-Technical and Tactical skills**, Human Kinetics,2004.
4. KarenPalaciosJansen.**Golffitness.** Taylortradepublishers,2011.
5. Janusz Czerwinski & Frantisek Taborsky. **Basic handball**. European Handball Federation.1997.
6. Renstrom.**HandbookofSportsMedicineand ScienceTennis.**Blackwellscience.2002.
7. Philip Yarrow & Aiden Harrison. **Squash steps to success (2nd edition).** Human Kinetics.2010.
8. RichardMcAfee.**Tabletennis-Stepstosuccess.**HumanKinetics. 2009.
9. JohnEdwards.**Badminton**.Crowwood.2014.
10. Brahms. **Badminton.**Meyer&Meyer. 2009.
11. Barth/Nadman.**Learningfieldhockey.**Meyer&Meyer. 2005.
12. Robertson.EGordonDetal.**ResearchMethodsinBiomechanics.**NewYork:HumanKinetics2004

SEMESTER-V

PAPERCODE-USBK19CT503

FUNDAMENTALOFRESEARCHANDSTATISTICSINBIOMECHANICSANDKINESIOLOGY

Leaning objectives:

1. To equipstudentswithabasic conceptsofresearch.
2. Toenablethestudentsto learnthesamplingtechniques.
3. Toenablestudentstochoosethemostappropriateresearchmethod/designtoaddressaparticularresearchquestion.
4. To equipthe studentstopreparea researchproposalforgrants.
5. Toenablethestudentstopreparearesearchthesis/report/articlefor ajournal.
6. To enablethestudentsto learnthebasicconceptsofstatistics.
7. Toacquiretheskillsofparametricandnon-parametricstatisticalmethodsandapplytheappropriatetechniquefora researchdataanalysis.

UNIT-I

Fundamentals of Research- Meaning and Definition of Research, Scope of Research in sportssciences, Qualities and Characteristics of Scientific Research - Criteria for locating and selecting aresearch problem - Delimitations and Limitations of a problem- Hypothesis and its formulation -Sampling- Sampling and Population, Sampling Techniques - Characteristics of a good sample -Sampling errors- Types of Research based on purpose – Basic research, Applied research, Actionresearch– Typesofresearchbased onmethods– Descriptive research,Experimentalresearch.

UNIT–II

Variables - Independent, Dependant, Extraneous and Intervening, Experimental, Control variables.Research design – Types of Research design – Single group design, Repeated measures design,Static group comparison, Random groups design, Post-test only random group design, Relatedgroups design,Rotation group design,Quasi experimental design and Factorial design-Methodsof Data Gathering and Sampling – Survey, Questionnaire, Interview, Case study, Observation,Opinionnaire.

UNIT-III

Chapterization of Thesis / Dissertation - Front Materials, Body of thesis, Backmaterials, Methodof Writing research proposal, Thesis / Dissertation - Method of writing abstract, full paper

forpresenting in a conference, publishing in journals, Mechanics of writing Research Report, APAreferencingstyle,Plagiarism.

UNIT-IV

Introductiontostatisticstypes,classificationandbasicconceptsofstatistics–Levelsofmeasurement - Measures of central tendency – Mean Median and Mode – Measures of variability - Range,MeandeviationQuartileDeviationandstandarddeviation.IntroductiontoNormaldistribution – Normal curve – Characteristics of Normal Curve – Properties of Normal curve - TestingofHypothesis: Hypothesis– TypeI&IIerror-ParametricandNonparametricstatistics.

UNIT-V

Test of significance of a single Mean – Difference between two means for small and large sampletests – paired t – test for difference of mean.One way and two way analysis of variance – Post hoctests - Scheffe's, Newman, Duncan, Tukey – Analysis of covariance. Pearson product momentcorrelation – Rank order correlation – Bi-serial Correlation-bhi coefficient - Detrahoric correlation-PartialandMultiplecorrelation–Chisquare–contingencycoefficient-SPSSPackage– Introduction and application – creating, saving and opening a data file – Data entry and analysis ofdescriptivestatistics,dependentandindependentt-test,onewayandtwowayANOVA,ANCOVA, RepeatedMeasureandcorrelation –Namingthevariables–editingtheoutputfile.

Reference:

1. *Clarke,DavidH.Clarke,HarrisonH.**ResearchProcess inPhysicalEducation**,NewJersey:PrenticeHallInc.1984.*
2. *Jerry R. Thomas, Jack K. Nelson and Stephen J. Silverman., **Research Methods in PhysicalActivity**(5thEd),NewYork:HumanKinetics.2005.*
3. *ChrisGrattonandIanJones**.,ResearchMethodsforSportsStudies,**London:Routledge,Taylor& Francis Group,2004.*
4. *JohnW.BestandJamesV.Kahn.,**ResearchinEducation**(9thEd.,),NewDelhi:PrenticeHallofInd iaPvt. 2006.*
5. *Robertson.EGordonDetal.**ResearchMethodsinBiomechanics.**NewYork:HumanKinetics.200 4.*
6. *DarrenGeorge&Paul Mallery.**IBMSPSS Statistics23stepbystep**.Routledge.2016.*
7. *Kathleenetal.**Anintroductiontostatisticalanalysisin research.**Wiley. 2018.*

SEMESTER-V

PAPERCODE-USBK19CT504

SOFTWAREAPPLICATIONSINBIOMECHANICSANDKINESIOLOGY

UNIT–I

Computer – Meaning and definition – Components of computer – input and output devices – StorageDevices–SoftwareandHardware–Languages–LANandWAN-TypesofComputers– Microcomputer – Mini Computers, Mainframe Computers and Super Computers – Binary numbersystem – Bits and Bytes – Hardware Input – Output – The arithmetic / Logic Unit – Control Unit.Computer Memory – Auxiliary Storage. The Punched Card – Magnetic & Tape – Disk oriented dataentrysystem;Out-putdevices,ApplicationsoftwareusedinPhysicalEducationandSportsBiomechanicsandKinesiology.

UNIT-II

Introduction to MS word – Creating, saving and opening a document - Formatting and Editingfeatures – Drawing table – page setup – paragraph alignment – spelling and grammar check - printingoption–insertingpagenumber,graph,footnoteand endnotes– mailmerge -hyperlink.

UNIT-III

Introduction to MS Excel - Creating, saving and opening a spreadsheet - Formatting and Editingfeatures–creatingformulas–adjustingcolumnwidthandrowheight–understandingcharts–

Introduction to MS PowerPoint - Creating, saving and opening a ppt file - Formatting and Editingfeatures– slideshow– design–inserting slidenumber,picture,graphand table– hyperlink.

Unit-IV

Meaning and Definition of Internet and Multimedia – Application of Internet and multimedia insportsBiomechanicsandKinesiology–ComputerapplicationinsportsBiomechanicsandKinesiology. Background online designing - Scanning – Animation – slide sounds**,** Impact and non-impactprinters-mobile devices to asses physiological parameters, Internet explorer– Different typesof connections –

Modem types - Network types, types of internet communications - e.mail - Textchatting-videochattingandcalling.

Unit-V:

Role of computer in Sports Biomechanics and Kinesiology Research- Assessment of Mechanicalparameters–Latestcomputertechnology–SoftwareinvolvinginterpretingvariablesinSportsBiomechanics and Kinesiology software to boost the human Performance.**SPSS Package** Introductionand application – creating, saving and opening a data file – Data entry and analysis of descriptivestatistics, dependent and independent t-test, one way and two way **ANOVA, ANCOVA**, RepeatedMeasure andcorrelation–Namingthe variables–editingtheoutputfile.

Reference:

1. Jerry R. Thomas, Jack K. Nelson and Stephen J. Silverman., ***Research Methods in Physical Activity(5thEd)***,NewYork:HumanKinetics.2005.

2. ChrisGrattonandIanJones.,***ResearchMethodsforSportsStudies***,London:RoutledgeTaylor&FrancisGroup,2004.

3. MarkB.Andersen,JamesR.Morrow,AllenW.Jackson,JamesG.Disch,DaleP.Mood,***Measurementand EvaluationinPhysicalEducation***,USA:HumanKinetics.2005.

4. KilmanShin,***SPSSGuide***,McGraw-HillHigherEducation, 1995.

5. EricL.Einspruch,***AnintroductoryGuidetoSPSSforWindows***,SAGE,2005.

6. SunilChauhan, AkashSaxena, KratikaGupta,***FunadamentalsofComputer***, FirewallMedia,2006.

7. Abraham Silberchatz,Henry F. Korth and S.Sundarshan,(2002), "Data Z Base System concepts", 4thEdition,McGrawHill.

8. MichaelHalvorson,Michael.JYoung.MicrosoftOfficeXPInsideOut(paperback),Microsoftpress.

9. ITLEducationSolutionsLimited,(2005)," IntroductiontoInformationTechnology",PearsonEducation(India).

SEMESTER-V

PAPER CODE -
USBK19CT505SPORTS TECHNOLOGY

LearningObjectives:

1. To enablestudentstolearnthefundamentalofsportstechnology.
2. Toequip thestudentstolearnthetechnologyusedinsports.
3. Tounderstandthedifferenttypesofplayfieldsurfaces,sportsequipmentand itsAdvantages.
4. Tofamiliarisethestudentswiththelatesttechnologyinvolvedinsportsandgames.

Unit-I

Sports Technology- meaning- definition- scope-need and importance of sports technologies – historyofscienceandtechnologyinsport-timelineoftechnologyinsports-principleandpurposeofinstrumentation in sports-technological impact on sports- technologies enhancing sports: issues andcontroversies- equipment extending the body- disability and prosthetics; technology, policy and sport;inclusion/exclusion.

Unit-II

Science of Sports Materials - adhesives- nano glue, nano modeling technology, nano turf footwearproduction,factorsandapplicationinsports,constraints,foams-polyurethanepolystyrene,Styrofoam,closedcellandopencellfoams,Neoprene,foam,Smartmaterials:Shape MemoryAlloy(SMA),thermochronicfilm,highdensitymodelingfoam.

Unit-III

Surface of Playfields -modern surface for playfields, construction and installation of sports surfaces,types of materials: synthetic, wood, polyurethane. Artificial turf, modern technology in construction ofindoor and outdoor facilities– use of computers and software'sin match analysis and coaching.**Sports Design:** The body and new structures of sport, cyborg of sport. Enhancing the future of sportsperformance- sports design and innovation strategies, sports technologies and human factors, sportsinjuries andpreventions strategies.

Unit-IV

ModernEquipment-playingequipments:Balls:types,materialsandadvantages-Bat/Stick/Racquets: types,materials and advantages. Clothing and Shoes: types,materials and advantages.Measuringequipments:Running,throwingandjumpingevents– protectiveequipments:types,materials and advantages sports equipment with nano technology, advantages. **Sports and fitnessWearableEquipment**-Goniometer/Torsiometer-Dynamometer-pinchmeter-Accelerometer-Myometer-Gyroscope-Heartratemonitor-GPStracker-EMGsensor-MoovMotionTracker-Magnetometer.

Unit-V

Training Gadgets: Basketball: Ball feeder, Mechanism and advantages- Cricket: bowling machine,mechanismandadvantages-Tennis:servingmachine,mechanismandadvantages-Volleyball:serving machine, mechanism and advantages- Lighting facilities: methods of erecting flood light andmeasuringluminous-videocoverage: types,size,capacity,place and position of camerain livecoverage of sporting events- use of computer and software in match analysis and coaching-keyperformance indicators used to assess tactical and technical performance, collected data related to keyperformance indicators using notational analysis, create performance profiles and communicate dataeffectivelythroughverbalandvisualmeans.

Reference:

*1. Dr.HoshiyarSingh,**SportsTechnology,** KSKPublishers,2017.*

*2. Franz Konstanstin Fuss, AleksanderSubis, martin Strangewood, Rabindra Mehta, **RoutledeHandbookofSports TechnologyandEngineering,**Routledge,2013.*

*3. Peterculley,JohnPascoe,**SportsFacilitiesandTechnologies,**Routledge,2009.*

*4. SharonDixon,**TheScienceofEngineeringofSportsSurface:RoutledgeResearchinSportsTechnology andEngineering,**Routledge,2015.*

*5. Hambers R, Gabbett TJ, Cole MH, Beard A. **The Use of Wearable Microsensors to QuantifySport-Specific Movements**–ASystematicReview.Sports Med,2015.*

*6. Wundersitz DW, Josman C, Gupta R, Netto KJ, Gastin PB, Robertson S. **Classification ofteamsportactivitiesusingasinglewearable trackingdevice.**JBiomech,2015.*

***7.** T.Madalinski,**Sport,TechnologyandtheBody: TheNatureofPerformanceNewYork:** routledge,2009.*

*8. StevenGeorgeHayes,PraburajVenkatraman,**MaterailasandTechnologyforSportswearand Performance apparel,CRCpress:**Taylor&Francis,2016.*

*9. RobertsP. suhumaker, osmaKsolieman,hsinchunchen,**SportsDataMining,**springer,2010.*

Semester – VIContent

SEMESTER-
VIPAPERCODE-
USBK19CT601

INTRODUCTIONTOSPORTSPERFORMANCEANALYSIS

LearningObjectives:

1. Tomakethestudentstolearnthefundamentalandadvancestrategiesofperformanceanalysis.
2. Toenablethestudentstoacquirethevideocapturingtechnique.
3. Tomakethestudentstolearnandacquiretheskillsofusingsportsperformanceanalysissoftware.
4. Toenablethestudentstoacquiretheskillsofsportsperformanceanalysis.
5. Toenablethestudentstodiagnosethestrengthandweaknessofaplayer /team.
6. Tocreateaplatformforthestudentstochoosesportsperformanalysis asacareer.

Unit-I

Sports Performance analysis – meaning, need and importance of sports performance analysis, careersopportunitiesinsportsperformanceanalysis–purposeofsportsperformanceanalysis–matchanalysis,workrate analysis.Sportsperformance analysismethodsandprocedures.

Unit-II

Notational Analysis - Sport-specific notational systems; computerised notational analysis; notation inindividual sports; notationin team sports; augmentedfeedbackthrough videobasedtechnologies;modelling of competitive sport; analysis of structures of sports informing performance indicators;flowcharts and presentation models of sports performance; reliability and validity of notational data;data processing;probabilityanalysis;literature searching;criticalevaluationofliterature.

Unit-III

Analysis of Sports Technique - Observation of movement; systematic models of qualitative techniqueanalysis; deterministic models of technique analysis; principles of movement (position, orientation,velocity, acceleration, force production); quantitative analysis of performance; accepted 2D filmingprotocols;comparisontomodelproformas;assessment ofreliability; justificationofmethods.

Unit-IV

Athlete monitoring and analysis - Time-motion analysis in sport; analysis of athlete tracking systems;GPS and accelerometer analysis of training and competition; monitoring and analysis of sport-specificphysical and psychological variables; physiological monitoring; external sources of data relating tosports performance; wind gauge, photo finish, hawk eye technology, goal line technology, hot spot,reliabilityofdataandsources.

Unit-V

Softwaresinsports performanceanalysis– Dartfish,Sportscode,Quintic,Kinovea,andLongomatch.Technicalrequirements,installationprocedure,tools,featuresandreportgeneration.

Reference:

1. HughesM. andFranks, I.**Essentialsofperformanceanalysisinsport.**Routledge. 2015..
2. McGarry,T.,O'Donoghue,P.andSampioJ.**Handbookofsportsperformanceanalysis**.Routledge.2013 .
3. Peter&Lucy.**Dataanalysisin sports**.Routledge. 2015.

SEMESTER-
VIPAPERCODE-
USBK19CT602

FOUNDATIONSTOSPORTSTRAINING,MEASUREMENT&EVALUATION

Learning objectives:

1. Tomakethestudentsunderstand theconceptsoffitness
2. Toequipthestudentstolearnthetesttomeasureeachcomponentoffitness
3. Toacquiretheskillsofpreexercisescreening
4. Tolearntheprinciplesoftraining
5. Toequipthestudentstoprescribetheexercisetotheclients
6. Tounderstandthefitnessnormsandpreparefitnessreportoftheclients

UNIT-I

Fitness – health related fitness, skill related fitness-components of health related fitness - componentsskillrelatedfitness–Preactivityscreening-guidelines,questionnaire,Riskstratification– measurement of resting and exercise blood pressure and heart rate –Body composition – BMI, WHR,Skinfold,Bioelectricalimpedance,Hydrostaticweighing.

Unit-II

Muscular fitness- muscular strength– hand grip strength test, 1 RM test, Isokinetic test – Muscularendurance – curl up, push up – Flexibility – sit and reach test. Cardio respiratory fitness Maximal test -Beep test - Maximal Oxygen Consumption Test (VO_{2max}) - Walking / Running Tests - Balke 15 minutetest-Cooper12minutetest- Submaximaltests-CycleTest-AstrandRhymingBicycleErgometerTest
- Step test - Harvard Step Test - Queens College Step Test - YMCA 3 Minute Step Test - Harvard steptest-AAHPERDHealthrelatedphysicalfitness test.

Unit-III

Skill related fitness test – speed – 50m test – Reaction time – Ruler drop test - Tests of Agility-IllinoisAgility Run-Shuttle Run test (25 yards) - ZigZag Test - T Test - Hexagon test-Tests of balance - StorkStand Test-Balance Beam Test–Modified Bass Testof Dynamic Balance-Power -

MargariaKalamenAnaerobic PowerTest. Test,MeasurementandEvaluation-Criteriaforselection of astandardtest–Validity-Reliability-Objectivity–Norms.

UNIT-IV

Warmup–Cooldown-Principlesoftraining-FITTprinciple-Cardiorespiratoryexerciseprescription – Heart Rate Reserve method (HRR), Maximum Heart Rate method, RPE scale – Trainingmethods – Slow continuous method, Fast continuous method, Interval training, High Intensity Intervaltraining,Fartlektraining,Functionaltraining.

Unit-V

Resistancetraining–typesofresistancetraining,Muscularstrength,muscularpower,muscularendurance, and muscle hyper trophy – Frequency – repetitions- set – recovery – exercise to strengthenmajor muscles of the body.Flexibility – types of flexibility–active, passive, static, dynamic, ballistic –PNF-Stretchingexerciseformajormusclesofthe body.

Reference:

1. ***ACSM's Health/Fitness Facility Standards and Guidelines****, New York: Human, Kinetics,1992.*
2. ***ACSM'sHealthrelatedPhysical FitnessAssessmentmanual****, LippinCott, 2008.*
3. *MichaelBoyle.**FunctionalTrainingforSports.**HumanKinetics,2004.*
4. *Clake, H. Harrison.* ***Application of Measurement to Health and Physical Education, NewJersey:****PrenticeHallInc.1976.*
5. *Jensen, Clayne,R&CynthaC.Hirst.**MeasurementinPhysicalEducationandAthletics,** MacMillan Publishingco.,Inc NewYork,1982*
6. *JuanCarlos.**FunctionalTraining.HumanKinetics**.2016*
7. *Arnold G.Nelson&JoukoKokkonen,**Stretching anatomy**.HumanKinetics.2007.*
8. *EdmundO.Acevedo andMichaelA.Starks.**ExerciseTesting andPrescriptionlab Manual,** USA: HumanKineticsPublishers,2003.*
9. *ClaudioGil SoaresdeAraujo.**Flexi test,**USA:HumanKineticsPublishers,2004.*
10. *Thomas and Roger.* ***Essentials of strength training and conditioning,*** *3rd edition, HumanKinetics,2008.*
11. *VernGambatta.**AthleticDevelopment**. HumanKinetics,2007.*
12. *RyanGeorge.**Freeweighttraininganatomy.**UlyssesPress. 2016.*

SEMESTER-
VIPAPERCODE-
USBK19CT603

INTRODUCTIONTOMATLAB

Learningobjectives:

1. Toenablethestudentsunderstandtheprocedures,algorithms,andconceptsrequireinsolvingspecific problems.
2. Toenablethestudentstocarryoutsimplenumericalcomputationsandanalysesusing MATLAB.
3. Tofamiliarizethestudentsonthebasic MATLAB software.
4. Topreparethestudentstouse MATLAB intheirprojectworks.
5. Toequipthestudentstoutilizeexperimental,statisticalandcomputationalmethodsandtoolsnecessary for3Dmotionanalysis.

Unit-I

Quickstart

- Desktopbasics
- Matricesandarrays
- Workspacevariables
- Characterstrings
- Callingfunction
- Plotsandprogrammingscripts

Unit-II

Languagefundamentals

- Matricesandmagicsquares
- Expressions
- Enteringcommands
- Indexing
- Typesofarrays

Unit-III

Mathematics

- Linearalgebra
- Operationsonnonlinearfunctions
- Multivariatedata
- Dataanalysis

Unit-IV

Graphics

- Basicplottingfunction
- Creatingmeshandsurfaceplots
- Displayimages
- Printinggraphics
- Workingwithgraphicobjects

Unit-V

Programming

- Controlflow
- Scriptsand functions

Reference:

1. AmosGilat.MATLAB-Anintroductionwith applications.Wiley.2013

*2. BrianHahnandDanValentine,**Essential MATLABforEngineersandScientists**(FifthEdition)*

*3. Stormy Attaway, Matlab: **A Practical Introduction to Programming and Problem Solving** 4thEdition.Elsevier.2017*

*4. Jim&John.**MATLABfordummies**.Wiley.2015.*

தமிழ்நாடு உடற்கல்வியியல் மற்றும் விளையாட்டுப் பல்கலைக்கழகம்
TAMILNADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY
Accredited with "B" Grade by NAAC
India's First State University in Physical Education and Sports

SEMESTER-VI PAPER CODE

USBK19CT604

INTRODUCTION TO PYTHONIN BIOMECHANICS & KINESIOLOGY

Learning Objectives

1. Pythonisawidelyusedhigh-level,general-purpose,interpreted,dynamicprogramminglanguage.
2. Itsdesignphilosophyemphasizescodereadability,anditssyntaxallowsprogrammersto express concepts in fewer lines of code than possible in languages such as C++ orJava.
3. The language provides constructs intended to enable writing clear programs on bothsmallandlargescale.

UNITI

Introduction toPython

- Introductiontopython
- WritingSimplePrograms

UNITII

GeometryBasics

Discuss How Python Program runsTypesandOperationinpython

- Numbers
- String
- ListandTuples
- Dictionaries
- Files
- StatementsandSyntax
- Assignments,ExpressionsandPrintStatements
- ConditionalConstruct
- IterativeConstruct

UNITIII

- IntroductiontoFunctionsandLambdaForms
- FunctionsandArgumentsandScope
- ListComprehensions

- Generators

UNITIV

- UnderstandingModulesinPython
- ModulePackages
- Packageimport
- Mixedusagemodes
- IntroductiontoOO Programminginpython
- Classcodingbasic
- OOPandinheritance
- NewstylesClasses

.

UNITV

- Projects
- Query

Reference:

1. PythonTheUltimateBeginner'sGuide!*AndrewJohansen*Copyright2016
2. Python Scientific lecture notes Release 2013.2 beta (euroscipy 2013) EuroScipy tutorial teamEditors: ValentinHaenel, Emmanuelle Gouillart, GaëlVaroquauxhttp://scipy-lectures.github.comSeptember26,2015(2013.2-beta-328-g3cd80a5)
3. PythonTutorialCS/CME/BioE/Biophys/BMI279Oct. 17, 2017RishiBedi

WebResources

www.wingfotech.com
www.utkraanti.com

தமிழ்நாடு உடற்கல்வியியல் மற்றும் விளையாட்டுப் பல்கலைக்கழகம்
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TAMIL NADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY

CHENNAI – 600 127

DEPARTMENT OF SPORTS MANAGEMENT AND SPORTS PSYCHOLOGY AND SOCIOLOGY

APPROVED SYLLABUS FOR VARIOUS NEW COURSES

2018-2019 ONWARDS

PSP18DSE02 - EMOTIONAL INTELLIGENCE

Unit I - Understanding the Self a) The self-concept and self-esteem b) Facilitating self-awareness through reflective exercises, JOHARI window, personal SWOT analysis, self-awareness questionnaires/inventories

Unit 2: Emotional Intelligence; Models of Emotional Intelligence; EQ competencies: self-awareness, self-regulation, motivation, empathy, and interpersonal skills; Importance of Emotional Intelligence

Unit 3: KNOWING ONE'S AND OTHERS' EMOTIONS: Levels of emotional awareness; Recognizing emotions in oneself; the universality of emotional expression; Perceiving emotions accurately in others

Unit 4: MANAGING EMOTIONS: The relationship between emotions, thought and behaviour; Techniques to manage emotions

Unit 5: APPLICATIONS: Workplace; Relationships; Conflict Management; Effective Leadership

Readings:

Bar-On, R., & Parker, J.D.A.(Eds.) (2000). The handbook of emotional intelligence. San Francisco, California: Jossey Bros.

Goleman, D. (1995). Emotional Intelligence. New York: Bantam Book.

Goleman, D. (1998). Working with Emotional Intelligence. New York: Bantam Books.

Singh, D. (2003). Emotional intelligence at work (2 nded.) New Delhi: Response Books.

PPS18CT407: COPING WITH STRESS

UNIT 1: Learning about sources of stress and its symptoms: Nature of stress- various sources of stress environmental, social, physiological and psychological; Symptoms of stress - emotional response, physiological & behavioural response.

UNIT 2: Coping --- (a) Concept of coping: Definition and Classification. (b) Measurement of coping behaviour.

UNIT 3: Life Style and Related aspects---- (a) Stress and Personality. (b) Life Style and Health : Cardiovascular disease, Atheroceterosis, cancer. (c) Stress and substance abuse: alcohol and other drugs

UNIT 4: Developing a sense of Humour – Learning to laugh – Using humour at work – Reducing conflicts with humour

UNIT 5: Learning to manage stress effectively: Methods - yoga, meditation, Vipassana, relaxation techniques, clarifying problem, alternate actions, support (Problem focused) emotion focused constructive approach

Readings: Weiten, W. & Lloyd, M.A (2007). Psychology applied to Modern life. Thomson Detmar Learning .

Suggested Readings:

Barrett.J.E. (1979) ---Stress and Mental Disorder, American Psychopathological Association Series,New York : Rayan Press, Section A-6.

Braumsteirn, J.J. and Toister, R.P (1981)----- Medical Applications of Behaviour Science chicago:Year Books Medical publishers Inc. Section A. I:

Dohrenwend B.S. and Dohrenwend, B.P. (1974) --- Stress life events : their nature and effect, Newyork, Johan willy and sons.

Goldberger, L. and Breznitz,S. (1982) ---- Handbook of stress : theoretical and clinical as pact

Harzars, R.S. and Talkman, S. (1984) ---- Stress, Appraisal and coping, Newyork: Springer.

Selye. H.(1980) ------Selyes guide to stress research vol. I, Newyork : Van Nostrand Reinhold. ADACP -

PPY18CT402: ORGANIZATIONAL BEHAVIOUR

UNIT I:

Introduction to the field of OB – Definition of OB - Various disciplines contributing to OB – Need, Scope and Importance of OB – Foundations of Individual Behavior – Framework of Organisational Behavior Models.

UNIT II:

Motivational Process: Motivation at workplace - Kinds of Motives – Theories: Maslow's. Herzberg two factor theory, ERG theory, Theory X and Y, McClellands need theory – Goal Setting – Emotional Intelligence – Meaning and Components - Emotional Intelligence at workplace-

UNIT III:

Groups and Communication: Role of communication – Communication channels – Communication barriers – Non-verbal Communication – Upward and Downward communication . Groups : Group Dynamics – Group Behaviour – Formation – Types of Groups, Stages of Group Development.

UNIT IV:

Leadership – Meaning – Importance in Organisations – Theories – Leadership styles – Leaders V/s Managers : Conflict- Nature – Types of Conflict – Management of Conflict – Transactional Analysis.

UNIT V:

Organisational Structure and Design – Organisational Climate – Factors affecting the climate – Importance – Job Satisfaction – Organisational Development – Organisational Culture – Organisational Change – Current trends in OB>

REFERENCE:

Stephen Robbins – Organisational Behavior, Prentice Hall of India

Udai Pareek - Understanding Organisational Behavior, Oxford University Press.

L M Prasad – Organisational Behavior, Sultan Chand and Sons.

Fred Luthans - Organisational Behavior, McGraw Hill Book Company.

PPY18DSE01 - MANAGERIAL PSYCHOLOGY

Unit I: Human resource management: Nature, Function, Personnel Management vs. HRM, HRD vs. HRM, Context and issues in HRM.

Unit II: Human Resource Planning: Importance, process, Forecasting Demand, Estimating Supply, Effective HRP, Human resource accounting. Job Analysis: Uses, Process, Methods, job description & job specifications

Unit III: Recruitment: Objectives & Constraints, Sources, Methods, Selection: Process, Tests for Selection (Cognitive Ability, Motor & Physical Ability, Personality, Achievement), Interview as selection Device.

Unit IV: Job Evaluation: Uses, Methods, job evaluation and Establishing pay structure. Performance Appraisal: Comparing with Performance Management, Methods, Challenges, Legal implications

Unit V: (i) Employee compensation: Incentive Plans: Individual Employee, Team/Group, organisation-wide. Employee Benefits: Pay for time not worked, Insurance benefits, Retirement benefit, Personal & Family friendly benefits. (ii) Health & Safety: Legal Provisions, Measures, Accidents, Safety Management. Grievance & Discipline: Features & Forms, Model Grievance Procedure, Approaches to Discipline, Disciplinary Action, Essentials for a Good Disciplinary System.

References

Decenzo, D.A. & Robbins, S.P. (2004). Personnel and human resource management. New Delhi

Dessler, G. (2005). Human resource management. New Delhi: PearsonPrentice Hall.

Rao V.S.P. (2007). Human resources management: Text and cases. New Delhi: Excel Books .

Bermardin, H.J. (2007). Human resource management. New Delhi: Tata McGraw Hill.

Greenberg & Baron (2008). Behavior in organizations. 9th edition. NJ. Prentice Hall. *

PPY18DSE03 CLASSROOM PSYCHOLOGY

Unit 1: Introduction : Class room behaviour in school setting - Social interaction between teacher and child - Influence of peer group - conformity and non-conformity in schools - nature of communication - interaction analysis in communication - social learning and role models - friendship patterns in the classroom and sociometry scale.

Unit 2: Class control and management : Class control and management - defining problem behaviour - behaviour modification techniques in classroom - merits and drawbacks of behaviour modification techniques - group behaviour problems - School refusal problems - Use of punishment and reinforcement for class room management

Unit 3: Educational guidance and counseling : Educational guidance and counselling - counselling in school - The problem of confidentiality -The importance of sympathy - The Counselling process - Categorizing the child's problem - The role of the counsellor - Problems faced by the counsellor.

Unit 4: Vocational Guidance : Vocational Guidance - developmental Stages in Career Choice – Steps in career decision making – Career counselling - The role of Counsellor in Vocational guidance - sex education for moral development and appropriate social behaviour -role of teacher as an applied psychologist

Unit 5: Skill development : Skill development - study skills development - Oral presentation skills - Written communication skills - Assertiveness skill development - Goal setting skills - Positive thinking skills - Techniques of creative thinking.

REFERENCES:

Think like a Winner by Walter Doyle Staples. UBPSD, New Delhi 1996.

Psychology for Teachers by David Fontana, 3rd Ed. Palgrave: UK 1995

Modern Applied Psychology by Arnold P. Goldstein and Leonard Krasner.Pergamor Press, Inc. New York

PPY18DSE05 MARKETING AND CONSUMER BEHAVIOR

UNIT – I

Understanding Marketing Management Basic concepts of marketing — Market oriented strategic planning Corporate and Division Strategic Planning Identifying and Analyzing competitors.

UNIT – II

Developing Market Strategies Differentiating and positioning Challenges in New Product Development Market testing Customer Adoption Process. Components of Marketing Information System Marketing Intelligence System - Marketing Research Marketing Decision Support System - Marketing research program for a new product - common errors.

UNIT – III

Managing marketing communications Developing Effective Communications Developing and Managing an Advertising Program Media Decisions - Sales Promotion and Public Relations.

UNIT– IV

Understanding Consumer Behaviour Definition Influencers Building customer satisfaction Attracting and Retaining Customers - Analyzing consumer markets buying behaviour Buying Decision Process Stages in the processMarketing strategies Market segmentation- Levels and patterns of Market Segmentation.

UNIT – V

Influences on Consumer Behaviour Environmental influences: culture subcultures social class Social groups Family Personal influence and diffusion of Innovations Individual determinants of consumer behaviour Personality and self concept Motivation and Involvement Information processing Learning and memory attitudes.

REFERENCES:

Kotler, P. (2003), Marketing Management, (Eleventh Edition). Prentice Hall.

Mamoria, C.B. and Joshi, R.L. (1998), Marketing Management, Analysis, Planning, Implementation and control, (Ninth Edition) Prentice Hill.

Loudon, D.L. and Della Bitta, A.J. (2002) Consumer Behaviour (forth edition) Tata McGraw Hill. 4. Advertising Management, Aaker & Myers, Batra.

PPY18DSE06 - PSYCHOLOGY OF INTERPERSONAL RELATIONSHIP

Unit I: Concept and Types of Interpersonal Relationship: Interaction: the essence of a relationship – Theories of Social Interaction, Interpersonal Attraction, Transactional Analysis- types of relationship. '

Unit II: Romantic and Marital Relationship: Taxonomies of love- Psychometric approaches to love theories of Love- passionate and companionate Love- theoretical approaches to mating relationships. Nature of marital relationships- distinction from romantic relationships- factors associated with satisfaction- happy and unhappy marriages- distress in marital relationships, therapeutic interventions for distressed paths to divorce and separation- bereavement.

Unit III: Relationship at Work: Nature, purpose and importance of human relations at work- forces influencing behavior at work- development of human relations movement- team work and team building- social loafing- leader-follower, formal and informal relationship at work.

Unit IV: Interpersonal Communication: Basic nature and forms of communication- verbal and nonverbal communication- communication channels, process and barriers- communication through body language- improving personal communication.

Unit V: Conflicts in Relationship and Strategies for Improving Human Relationship: Self disclosure: JOHARI window- SWOT Analysis- barriers to self disclosure- improving self perception- positive strokes and relationship building. Prosocial behavior- factors involved in co- operation- selfishness and altruism- Conflict: nature and major causes of conflict in relationships- individual level conflictgroup conflict- conflict management techniques.

References

1. Berscheid, E., & Regan (2005). The Psychology of Interpersonal Relationships. Englewood Cliffs, NJ: Prentice Hall

2. Reece & Brandt (2007). Effective Human Relations. Personal and Organizational Applications. 10th Edition. New York. Houghton Mifflin Company.

3. Duck (2007). Human Relationships. 4th Edition. Thousand Oaks, CA: Sage Publications.

4. Hendrick & Hendrick (Eds) (20000). Close Relationships: A Sourcebook 2nd ed. London: Sage Publications.

PSO18CT101: FUNDAMENTALS OF SOCIOLOGY

UNIT I	**Introduction:** Emergence of sociology, Relationship of sociology with Economics, History and Anthropology
UNIT II	**Basic concepts**: Society, Group, Community, Association, Institution, Culture, Norms, and Values.
UNIT III	**Social Processes:** Associative Process (Cooperation, Accommodation, Assimilation); Dissociative process (Conflict, Competition)
UNIT IV	**Social Control**: Meaning, Purpose of Social control- Instruments of Social Control - Folkways- Mores- Laws and Morals- Agencies of Social control.
UNIT V	**Social Stratification**: Theories of social stratification, Forms of Stratification.

REFERENCE:

1. *Bierstedt, R. 1970.The Social Order, New Delhi: Tata McGraw Hill.*
2. *Fiehter, J.H. 1971. Sociology (2nd Edn). London: The University of Chicago Press.*
3. *Bottomore, T.B. 1972 Sociology- A Guide to Literature and Problems, New Delhi, Creavge Allen and Unwin.*
4. *Anderson, W.A. and Parker, F.B. 1964. Sociology: Its Organization and Operation, New York, Van Noshaind Company.*
5. *Ogburn-W.F. and Nimkoff, M.F A 1964.Hand Book Of Sociology London: Routledge and Keganpual.*
6. *Poucek, J.H, 1965. Social Control, (Second Edn.) New Delhi: Affiliated East West Press.*
7. *Inkless, Alex. 1987. What is Sociology, New Delhi: Prentice Hall.*
8. *Giddens A. 1989. Sociology, Cambridge: Polity Press.*
9. *Tumin, Melvin M. 1969.Social Stratification, New Delhi: Prentice Hall.*
10. *Harlambos J. 1988.Introduction to Sociology, New Delhi: Oxford University Press.*

PSO18CT102: INDIAN SOCIETY

UNIT I - Hindu Social Organization; Purusharthas; Varnashramas.

UNIT II - Approaches to study the Indian Society :-
- Indological / Textual perspectives : G. S. Ghurye, Louis Dumont
- Structural functional perspectives : M. N. Srinivas, S. C. Dube
- Marxian Perspectives - : D. P. Mukherjee, A. R. Desai
- Subaltern Perspectives : B.R. Ambedkar, David Hardiman.

UNIT III - Caste: Origin of caste; Recent changes in caste system; Jajmani System; Dominant caste; Caste and Class; Caste and Politics.

UNIT IV - Family: Meaning; Forms of Family; Changes in the Indian Family Structure

UNIT V - Marriage and Kinship:
- Forms of Marriage - Marriage among Hindus, Christians and Muslims in India – Kinship – meaning, terms and usages, Rules of residence, descent and inheritance.

REFERENCE:

1. *Mandelbum, D.G.1990. Society in India, Berkeley: University of California Press, Vol. I parts 24 & 4.*
2. *Singh, Yogendra. 1983. Modernization of Indian Tradition: A Systematic Study of Social Change, New Delhi:Thompson Press, 1983.*
3. *Srinivas, M.N.1962. Caste in Modern India and other Essays, Bombay: Asia Publishing House.*
4. *Dumont, Louis 1970. Homo Hierarchicus, Paladin, Granada Publishing Ltd.*
5. *Dhanagare, D.N. 1999. Themes and Perspectives in Indian Sociology, Jaipur: Rawat Publications,*
6. *Beteille, Andre.2002. Sociology: Essays on Approach and Method, New Delhi: OUP.*
7. *Deshpande, Satish. 2004. Contemporary India: Sociological Perspectives, New Delhi: Sage Publications,*
8. *Shankar Rao – Sociology of Indian Society.*

PSO18CT202: INDUSTRIAL SOCIOLOGY

UNIT I INDUSTRIAL SOCIOLOGY: Nature and Scope of Industrial Sociology - Development of Industrial Sociology.

UNIT II RISE and DEVELOPMENT OF INDUSTRY: Early Industrialism - Types of Productive Systems - The Manorial or Feudal system - The guild system - The domestic or putting-out system - and the factory system - Characteristics of the factory system - causes and Consequences of industrialization.

UNIT III INDUSTRIAL MANAGEMENT: The Managerial Structure - Line and Staff organizations - Functions of Line and Staff - Supervisors - White collar Workers - Blue collar Workers and specialists.

UNIT IV INDUSTRIAL DISPUTES: Meaning - Forms: Strike and Lock-out - Types of Strike- causes of industrial disputes (with reference to India) - Machinery of prevention - Joint consultative machinery - Works committee - Code of discipline - Standing orders - grievance procedure - Settlement of Industrial disputes - Machinery (with reference to India) - Conciliation machinery - Arbitration machinery

UNIT V LABOUR WELFARE: Scope of Labour welfare - Evolution of Labour welfare - Labour welfare in India, Government and trade unions.

REFERENCES:

1. *GISBERT PASCAL, Fundamentals of Industrial Sociology, Tata Mc. Graw Hill Publishing Co., New Delhi, 1972.*
2. *SCHNEIDER ENGENO. V, Industrial Sociology 2nd Edition, Mc. Graw Hill Publishing Co., New Delhi, 1979.*
3. *MAMORIA. C.B. and MAMORIA. S, Dynamics of Industrial Relations In India.*
4. *SINHA. G.P. and P.R.N. SINHA, Industrial Relations and Labour Legislations, New Delhi, Oxford and IBH Publishing Co., 1977.*
5. *TYAGI, B.P.,Labour Economics and Social Welfare, Jai Prakashnath and Co., Meerut, 1980.*
6. *MEHROTRA. S.N.,Labour Problems In India, 3rd Revised Edition, S. Chand and Co., New Delhi, 1981..RM 72*

PSO18CT301: CONTEMPOARARY SOCIOLOGICAL THEORIES

UNIT I Functionalism :- Parsons, Merton

UNIT II Structuralism: - Radcliffe Brown, Levis Straws.

UNIT III Conflict: - Lewis Coser, Randall Collins.

UNIT IV Symbolic Interactionism :- G. H. Mead, Blumer.

UNIT V Ethnomethodology and Phenomenology: - Alfred Schuttz, Peter Berger.

REFERENCES:

1. *Abraham, M Francis. 1988. Modern Sociological Theory, Delhi: OUP*
2. *Adams, Bert N. Sociological Theory 2001.New Delhi: Sage Publications*
3. *Calhoun, Craig, et al. (eds.) Classical Sociological Theory, Blakwell Publishers*
4. *Ritzer, George 2000. Sociological Theory, New York: McGraw Hill*
5. *The Polity Reader in Social Theory, 2002. Polity Press.*

PSO18CT303: SOCIAL DEMOGRAPHY

UNIT I Introduction to Social Demography: Definition – Scope – Sources of Demographic Data: Census, Vital Statistics.

UNIT II Demographic Perspectives: The Malthusian Perspective – Marxist Perspective – NeoMarxist Perspective – Optimum Population Theory – Demographic Transition Theory.

UNIT III Fertility Concepts and Measurements: Concept, Measuring Fertility: Crude birth rate, General fertility rate, Age-specific fertility rate, Total fertility rate, Cross reproduction rate, Net reproduction rate, Theories of fertility-Determinants of fertility, Fertility Influencing Policies.

UNIT IV Mortality Concepts and Measurements: Components of Mortality-Measuring Mortality: Crude death rate, Age-specific death rate, Determinants of Mortality, – Mortality Influencing Policies.

UNIT V Migration: Definition-Measuring migration-Types of Migration: Internal Migration & International migration- Factors for Migration- Theories of Migration- Consequences of Migration.

REFERENCES:

1 *Asha Bhende& Tara Kanitkar, Principles of Population Studies, Himalaya Publishing House, Bombay 2003.*

2. *Weeks, John R, `Population: An Introduction to Concepts and Issues', Belmont, California: Wadsworth, 1977.*
3. *Nam, Charles B, `Population and Society', Boston: Houghton Mifflin, 1968.*
4. *Hawthorn, Geoffrey, `The Sociology of Fertility', London, Collier – Macmillan, 1970.*
5. *Heer, David M., `Society and Population' Englewood Cliffs, Prentice Hall, 1975*
6. *Lassande, Louise, Coping with Population Challenges, London, Earthscan,1997.*
7. *Massey, Douglas et al., "Theories of International Migration," Population and Development Review 19:3, 1993 (available on-line through jstor)*

PSO18CT401 SOCIAL GERONTOLOGY

UNIT I **Sociology of Aging** – Definition Scope and significance of Sociology of Aging. Trends of increasing aging population in different societies.

UNIT II **Theoretical Perspectives** – Biological, Psychological and Sociological perspectives on aging

UNIT III **Aging in different societies** - Concepts of age grades and the aged in different societies e.g. tribal, traditional and modern aged people, their status and the treatment which they get in the traditional Hindu society.

UNIT IV **Problems of Aged** - Problems of elderly people - Economic, Psychological and Physical Problems of coping with aging for - retired salaried people and aged people in unorganized daily wage earning sector and farming sector

UNIT V **Government Policies** - Policies of the government with regard to aged salaried people from government and non-government sector, farming sectors and unorganized daily wage earners' sectors Support systems needed for elderly at community level, at family level and at the state level. Old Age Home

REFERENCES:

1. *Vinod Kumar (1996) (ed.); Aging Indian Perspective and Global Scenario, New Delhi: All India Institute of Medical Sciences.*
2. *Proceedings of the United Nations Round Table on the "Ageing of Asian Populations", Bangkok – 1994*
3. *Alfred de Soza; Walter Fernandes (1982) (eds.); Ageing in South Asia: Theoretical Issues and Policy Implications: New Delhi : Indian Social Institute.*
4. *Indira Jai Prakash (1991) (ed.); Quality Aging : Collected papers aranasi:Association of Gerontology.*
5. *P. K. Dhillon (1992) Psycho-Social Aspects of Ageing in India, New Delhi: Concept Publishing Company.*

PSO18CT402 – RURAL SOCIETY IN INDIA

UNIT I: INTRODUCTION

Rural sociology – Definition, Nature and scope – Rural urban differences – Rural Urban continuum – Demographic and Ecological characteristics of rural area.

UNIT II: RURAL SOCIAL STRUCTURE

Village Community – Characteristics of Village Community _ Village settlement patterns.

UNIT III: RURAL ECONOMIC INSTITUTION

Land ownership and its types – Land Reforms – Jajmani system – Agrarian class structure

UNIT IV: RURAL POLITICAL SYSTEM

Panchayat Raj system –Empowerment of woman

UNIT V: RURAL ISSUES, DEVELOPMENT AND CHANGE

Agrarian unrest and peasant movements. Patterns – Processes and factors of change in rural society – Rural development programmes.

REFERENCES:

1. Desai, A.R. 1977: Rural Sociology in India. Popular Prakasham, Bombay.
2. Berberogne, B.(Ed.) 1992: Class, State and Development in India
3. Mencher J.P. 1983: Social Anthropology of peasantry Part III, OUP.
4. Radhakrishnan, P. 1989: Peasant struggles: Land Reforms and social change in Malabar 1986 -1982 Sage Publication, New Delhi
5. Daniel, T. and Alice, T. 1962: Land and Labour in India, Asia Publication, Bombay
6. Andre Betelle, 1974: Six Essays in Comparative Sociology OUP New Delhi.
7. Dhanagare. D.N. 1988: Peasant Movements in Indian OUP New Delhi

PDSPS18G02 - PSYCHOLOGY FOR LIVING

UNIT I: Illness, health and well being: Conceptualizing illness, health and wellbeing; Models: Medical, biopsycho-social, holistic health.

UNIT II: Stress and coping: Nature and sources of stress; Personal and social mediators of stress; Effects of stress on physical and mental health; Stress management.

UNIT III: Health management: Health-enhancing behaviors: Exercise, nutrition, meditation; Health compromising behaviours: Alcoholism and smoking; Health protective behaviours: Immunization, maintaining hygiene and pollution-free environment; Illness management.

UNIT IV: Promoting human strengths: Human strengths and virtues; Cultivating inner strengths: Hope and optimism; Gainful employment and Me/We balance.

UNIT V: Health assessments and promotion: Quality of life scales, health indices checklist, lifestyle evaluation and coping scales.

Readings:

Carr, A. (2004). Positive psychology: The science of happiness and human strength.UK: Routledge. DiMatteo, M.R. & Martin, L.R. (2002). Health psychology. New Delhi: Pearson

Forshaw, M. (2003). Advanced psychology: Health psychology. London: Hodder and Stoughton. Snyder,

C.R., & Lopez, S.J.(2007). Positive psychology: The scientific and practical explorations of human strengths. Thousand Oaks, CA: Sage

WOMEN & SPORTS

UNIT I

Introduction: Status of women in India Pre- Post independence. Women's Sports participation and Historical Perspective

UNIT II

Global Status of Women in Sports: Women and sports in 21st century – Social issues in women's sport – Barriers for women in sport – Golden Age of sports reborn.

UNIT III

Women, sports and Health: Hormonal Disorders, Women Gynecologic problems – General medical conditions: Disordered eating – Osteoporosis – Anemia, Orthopedic conditions.

UNIT IV

Women, Sports and the Media: What gets covered? – Print Media (Newspapers, Newsletters) – Television: ESPN and CNN Sports – Women's sports and women athletes are treated differently by media.

UNIT V

Women, Sports and social constraints: Lack of family support – Attitude of Society towards women's participation in sports – other related problems.

REFERENCES:

1. Fred Coalter, (2007) A wider social role for sport who's keeping the score, Fred Coalter.
2. Tews, Gextrud Pfister , (2003) ' Sport and women : Social Issues in International Perspective : Routledge.
3. Marian R Broer (1971), " Individual Sports for Women ", WB Sounders.
4. Janet Wodum, (1998) Outstanding women athletes : who they are and how they influenced sports in America , Oxyx Press.
5. J.A. Mangar , " Gender , Sport, Science selected writings , Patricia Ventinisky.
6. Joe Layden , " Women in Sports : The complete Book on the world's Greatest Female Athletes.

தமிழ்நாடு உடற்கல்வியியல் மற்றும் விளையாட்டுப் பல்கலைக்கழகம்
TAMILNADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY
Accredited with "B" Grade by NAAC
India's First State University in Physical Education and Sports

TAMIL NADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY

CHENNAI – 600 127

APPROVED SYLLABUS

FOR

DEPARTMENT OF SPORTS TECHNOLOGY

2018-2019 ONWARDS

PST18CT103Research Methodology and IPR

Research Methodology and IPR

Course Outcomes:

- At the end of this course, students will be able to
- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but

tomorrow world will be ruled by ideas, concept, and creativity.

- Understanding that when IPR would take such important place in growth of individuals &

nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

Syllabus Contents:

Unit 1:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2:

Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit 3:

Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology.Patent information and databases.Geographical Indications.

Unit 6:

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc.Traditional knowledge Case Studies, IPR and IITs.

References:

•Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
•Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
•Ranjit Kumar, 2nd Edition , "Research Methodology: A Step by Step Guide for beginners"
•Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
•Mayall , "Industrial Design", McGraw Hill, 1992.
•Niebel , "Product Design", McGraw Hill, 1974.
•Asimov , "Introduction to Design", Prentice Hall, 1962.
•Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.

- T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

ST 1505 Composites and Nano Materials in Sports Application

ST 1505 Composite and Nano Materials in Sports Applications

Lecture: - 3 h/week

UNIT–I

INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites.Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II

REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT – III

Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT–IV

Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT – V

Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1.Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2.Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:

1.Hand Book of Composite Materials-ed-Lubin.
2.Composite Materials – K.K.Chawla.
3.Composite Materials Science and Applications – Deborah D.L. Chung.
4.Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

SET1501 - FUNDAMENTALS OF SPORTS TECHNOLOGY

Course Objectives:

- At the end of the course, students will be able to:
- Appreciate the different technological advances available for application in sports domain.

UNIT ISPORTS TECHNOLOGY BASIC CONCEPTS 9

History of Engineering in Sports, The relationship between sports engineering and sports science, need , scope and objectives , advantages and applications of Sports Technology, Sports Technology terminologies, carrier opportunities.

UNIT IIIMPACT OF ENGINEERING IN SPORTS 9

Concepts of human engineering , Impact of various modern technologies in Materials engineering, role of technology in equipments design and development, importance of Ergonomics in sports equipments. Recent technological advancements in various sports goods.

UNIT III COMPUTER AND INSTRUMENTATION IN SPORTS 9

Role and importance of computer and instrumentation technology in various sports, computer simulation for sports, applications and advantages, video technology, hawk-eye technology in sports.

UNIT IVVARIOUS ENGINEERING APPLICATIONS IN SPORTS 9

Aerodynamics and sports applications, Nano technology and its sports applications, sensor technology and its sports applications, software based sports performance analysis, Sport analytics, and Internet of Things.

UNIT VBUSINESS AND RESEARCH APPLICATIONS IN SPORTS ENGINEERING 9

Entrepreneurial skills and business opportunities in sports, Research opportunities in sports technological research, Recent Research trend in various sports equipment design, ball sports, tennis racket technology, and water sports, various Sports Engineering research groups, and journals in sports technology.

Course Outcomes:

Students will be able to appreciate the opportunities available in the domain of sport technology, innovation and entrepreneurship, and be able to act upon it.

Reference.

1. An overview of sports engineering: history, impact and research, ZahariTaha, MohdHasnunArif , Hassan Anwar P.P., Abdul Majeed , MohdAzri, Aris Nina, Nadia Sahim, Movement, Health & Exercise, 2, 1-14, 2013
2. Ross, S. (2012). Sports technology. Mankato, Minn: Smart Apple Media.
3. Fuss, F. K. (2014). Routledge handbook of sports technology and engineering. New York: Routledge.
4. Ciletti, D., & Chadwick, S. (2012). Sports entrepreneurship: Theory and practice. Morgantown, WV: Fitness Information Technology.

2	**COURSE OUTCOMES: Students are able to**	
	CO-1	Acquire knowledge on • Sports Science and Sports Engineering • Applications of Engineering in Sports
	CO-2	Understand engineering concepts and techniques used in different sports .
	CO-3	Understand business opportunities in sports engineering.
3	**MAPPING (CO's and PO's)**	

Course	Program Outcomes

Outcomes	1	2	3	4	5	6	7	8	9	10
1	3									
2	3	2					1		2	
3		3								1

MAPPING (CO's and PSO's)

Course Outcomes (CO)	Program Specific Outcomes (PSO)	
	1	2
1	2	
2		1
3	3	

SET1502INTELLECTUAL PROPERTIES RIGHTS

UNIT 1: **3**

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.

UNIT 2: **3**

International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT 3: **3**

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology.Patent information and databases.Geographical Indications.

UNIT 4: **3**

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc.

UNIT 5: **3**

Traditional knowledge Case Studies, IPR and IITs.

References:

1. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
2. Mayall , "Industrial Design", McGraw Hill, 1992.
3. Niebel , "Product Design", McGraw Hill, 1974.
4. Asimov , "Introduction to Design", Prentice Hall, 1962.
5. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
6. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

2	**COURSE OUTCOMES: Students are able to**	
	CO1	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
	CO2	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
	CO3	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and

		better products, and in turn brings about, economic growth and social benefits.

3 MAPPING (CO's and PO's)

Course Outcomes	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
1	3	2								
2	3	3				2				
3				2		3			2	1

MAPPING (CO's and PSO's)

Course Outcomes (CO)	Program Specific Outcomes (PSO)	
	1	2
1	2	
2		2
3	3	1

SET1503 - DESIGN OF EXPERIMENTS AND RESEARCH APPLICATIONS

Course Objectives:

• To impart knowledge about Design of Experiments, Taguchi's Methods and Robust Design.

UNIT- I: INTRODUCTION **9**

Importance of experiments, experimental strategies, Planning of Experiments- Experimental design-basic principles of Experimental design, terminology, steps in experimentation, sample size, normal probability plot, Simple linear regression models, Analysis of variance (ANOVA) – one way and two way.

UNIT- II: SINGLE FACTOR EXPERIMENTS 9

Completely randomized design, Randomized block design, Latin square design, Statistical analysis and estimation of model parameters, model adequacy checking, pair wise comparison tests.

UNIT-III: MULTIFACTOR EXPERIMENTS 9

Two and three factor full factorial experiments, Randomized block factorial design, Experiments with random factors, rules for expected mean squares, approximate F- tests. 2K factorial Experiments.

UNIT- IV: ROBUST DESIGN PROCESS 9

Classical design of Experiments- Taguchi's design of experiments –Comparison of classical and Taguchi' approach- Factor selection-variability due to noise factors- Principle of robustization, classification of quality characteristics and parameters, objective function in robust design, S/N ratios.

UNIT- V: TAGUCHI METHODS AND PRODUCT / PROCESS OPTIMIZATION 9

Orthogonal Arrays, Variable data analysis, Robust design- control and noise factors, S/N ratios, parameter design, Multi-level experiments, Inner and outer OA experiments, Optimization using S/N ratios, attribute date analysis, a critique of robust design.

Course Outcomes:

• At the end of the course students can able to apply Design of Experiments, Taguchi's Methods and Robust Design techniques in research.

Reference

1. Krishnaiah, K. and Shahabudeen, P. Applied Design of Experiments and Taguchi Methods, PHI learning private Ltd., 2012.
2. Montgomery, D.C., Design and Analysis of experiments, John Wiley and Sons, Eighth edition, 2012.
3. NicoloBelavendram, Quality by Design; Taguchi techniques for industrial experimentation, Prentice Hall, 1995.
4. Phillip J.Rose, Taguchi techniques for quality engineering, McGraw Hill, 1996.
5. Montgomery, D.C., Design and Analysis of Experiments, Minitab Manual, John Wiley and Sons, Seventh edition, 2010

MAPPING (CO's and PSO's)

2	**COURSE OUTCOMES: Students are able to**	
	CO-1	Acquire knowledge on • Design of Experiments • Taguchi's Methods and • Robust Design techniques.
	CO-2	Understand Design of Experiments, Taguchi's Methods and Robust Design techniques in research
	CO-3	Apply Design of Experiments, Taguchi's Methods and Robust Design techniques in research

3 MAPPING (CO's and PO's)

Course Outcomes	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
1	3	2								
2		2	3	3						
3				3		3			2	1

Course Outcomes (CO)	Program Specific Outcomes (PSO)	
	1	2
1	2	
2		1
3	1	2

SET1504 - INDUSTRIAL SAFETY

Lecture: - 3 h/week

Course objectives:

- To aware of the safety procedure during accident and the maintenance of the machinery and the production sit to avoid the accident.

UNIT-I: INDUSTRIAL SAFETY **9**

Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

UNIT-II: FUNDAMENTALS OF MAINTENANCE ENGINEERING **9**

Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

UNIT-III: WEAR AND CORROSION AND THEIR PREVENTION **9**

Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, workingand applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

UNIT-IV: FAULT TRACING **9**

Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

UNIT-V: PERIODIC AND PREVENTIVE MAINTENANCE **9**

Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets,

Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

Reference:

1.Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
2.Maintenance Engineering, H. P. Garg, S. Chand and Company.
3.Pump-hydraulic Co mpressors, Audels, Mcgrew Hill Publicat ion.
4.Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

MAPPING (CO's and PSO's)

2	**COURSE OUTCOMES: Students are able to**	
	CO-1	Acquire knowledge on • Industrial safety • Maintenance engineering
	CO-2	Apply safety and the maintenance to avoid the accident and injury.
	CO-3	Plant efficiency improved

3 **MAPPING (CO's and PO's)**

Course Outcomes	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
1	3						1			1
2		3						1	3	
3			3			1		1		

Course Outcomes (CO)	Program Specific Outcomes (PSO)	
	1	2
1		3

2	2	
3	3	2

23PH1CL102 Numerical Analysis Lab

LIST OF EXPERIMENTS

1- Expression and Variable command
2- Vector operation
3- Matrix operation
4- Conditional Branching
5- Interation 'for' statement Syntex
6- script and functioning
7- Plotting 2D graphs
8- user defined input and output
9- Numerical integration algorithm
10- Solving non linear equations
11- Linear equation Gaussian method
12- linear equations interactive method
13- Numerical Interpolation algorithms
14- ODEs using Euler Methods
15- ODEs Application

Reference

1. Introduction to Scilab: For Engineers and Scientists Book by Sandeep Nagar
2. IITB Spoken tutorial - https://spoken-tutorial.org/

23PH1CT202 Applications of Sensors and Transducers in Sports

Course Objectives:

• To understand the concepts of measurement technology.
• To learn the various sensors used to measure various physical parameters.
• To learn the fundamentals ofsignal conditioning, data acquisition and communication systems

UNIT I INTRODUCTION 9

Basics of Measurement – Classification of errors – Error analysis – Static and dynamic characteristics of transducers – Performance measures of sensors – Classification of sensors – Sensor calibration techniques – Sensor Output Signal Types.

UNIT II MOTION, PROXIMITY AND RANGING SENSORS 9 Motion Sensors – Potentiometers, Resolver, Encoders – Optical, Magnetic, Inductive, Capacitive, LVDT – RVDT – Synchro – Microsyn, Accelerometer.,– GPS, Bluetooth, Range Sensors – RF beacons, Ultrasonic Ranging, Reflective beacons, Laser Range Sensor (LIDAR).

UNIT III FORCE, MAGNETIC AND HEADING SENSORS 9 Strain Gage, Load Cell, Magnetic Sensors –types, principle, requirement and advantages: Magneto resistive – Hall Effect – Current sensor Heading Sensors – Compass, Gyroscope, Inclinometers.

UNIT IV OPTICAL, PRESSURE AND TEMPERATURE SENSORS 9 Photo conductive cell, photo voltaic, Photo resistive, LDR – Fiber optic sensors – Pressure – Diaphragm, Bellows, Piezoelectric – Tactile sensors, Temperature – IC, Thermistor, RTD, Thermocouple. Acoustic Sensors – flow and level measurement, Radiation Sensors - Smart Sensors - Film sensor, MEMS & Nano Sensors, LASER sensors.

UNIT V SIGNAL CONDITIONING and DAQ SYSTEMS 9

Amplification – Filtering – Sample and Hold circuits – Data Acquisition: Single channel and multi channel data acquisition – Data logging - applications - Automobile, Aerospace, Home appliances, Manufacturing, Environmental monitoring.

Total No of periods: 45

Course Outcomes:

The students will be able to Expertise in various calibration techniques and signal types for sensors.

- Apply the various sensors in the sports applications
- Study the basic principles of various smart sensors.

References

1.. Franz Konstantin Fuss, Aleksandar Subic, SadayukiUjihashi "The Impact of Technology on Sport II" Taylor and Francis 2007 . Craig J.J., " Introduction to Robotics Mechanics and Control ", Addison-Wesley, 1999. Murty, D.v.s. Transducers And Instrumentation Prentice Hall of India, 2008

23PH1CL201 Sports Performance Analysis Lab

CourseObjectives:

- Toapplymovementanalysisthroughimagecapturingthroughhighresolutioncamera and motion analysis software to evaluate andoptimize the sportsperformance.

LISTOFEXPERIMENTS

1 -Taggingusingdefaultsetup

2 -TaggingpanelcreationandAnalysisforbasketball3 - Tagging panel creation and Analysis for volleyball4-TaggingpanelcreationandAnalysisforCircket

5 -kneeangleanalysisforcyclist-Basketballshootanalysis instroMo

6 - ChuckinganalysisofthebowlerinDartfish

7 -DatagenerationandanalysisfromtheDartfish

Reference

1. Dartfishfeedbackandsupport-https://support.dartfish.tv/support/solutions/folders/27000053999

LISTOFEQUIPMENTSANDSOFTWARESREQUIRED

1.Computerswithlatest configuration30Nos.2.Power back up for the required capacity3.Colourprinter

4. Highresolutioncamera

5.MotionanalysissoftwarelikeDartfishandSportCADetc.

2	**COURSEOUTCOMES:Studentsareableto**	
	CO-1	AcquireknowledgeonAthletesmovementcapturingusinghighresolutioncameraMovementanalysissoftware
	CO-2	Captureandanalysemovementsinvarioussportsandathleticevents
	CO-3	Optimizeplayersperformance

3 MAPPING(CO'sandPO's)

CourseOutcomes	ProgramOutcomes									
	1	2	3	4	5	6	7	8	9	10
1	3				3					
2					3	3	2			
3			3						2	

MAPPING(CO'sandPSO's)

CourseOutcomes(CO)	ProgramSpecific Outcomes(PSO)	
	1	2
1		
2	1	2
3	1	3

23PH1CL202 CFDandFEMSportsSimulationandAnalysisLabCourse Objectives:

- ToimplementtheCFDandFEMsimulationfortheSportsengineeringproblems

1. Flowoverlaminarandturbulent pipe
2. Flowover acylinder and2DAirfoil
3. Flowoveracyclist
4. Flowover aGolfball
5. Crossventilationstudyatindoorstadium
6. Platewithhole
7. BikeCrankFEMsimulation
8. CantileverbeamFEManalysis
9. PlaneframeFEManalysis
10. Astep shaftinaxialteny FEManalysis.

Outcome

- IncreasingthesportsperformancethroughtheCFDand FEMsimulation
- TodesignandimplementationoftheCFDandFEMAnalysisfor sportsapparelandinfrastructure

Reference

1. EDX - A Hands-on Introduction to Engineering Simulationshttps://www.edx.org/course/a-hands-on-

LISTOFSOFTWARESREQUIRED

1.AnylatestmodellingsoftwarelikeProE,CATIA,CADetc.,2.Analysispackage suchasANSYS,MATLABetc

2	**COURSEOUTCOMES:Studentsareableto**	
	CO-1	Classifyagivenproblemonthebasisofitsdimensionalityas1-D,2-D,or3-D,time-dependenceasStaticorDynamic,LinearorNon-linear.
	CO-2	Developsystemlevelmatrixequationsfromagivenmathematicalmodel of a problem following the Galerkin weighted residual method orprinciple ofstationarypotential.
	CO-3	While demonstrating the process mentioned in 2 above, he will be able toidentify the primary and secondary variables of the problem and choose correctnodal degrees of freedom and develop suitable shape functions for an element,implementGauss-Legendreschemeofnumericalintegrationtoevaluateintegrals at element level, and assemble the element level equations to get thesystem level matrix equations. He will also be able to substitute the essentialboundaryconditionscorrectlyandobtainthesolutiontosystemlevelmatrix equations togetthevaluesofthefieldvariableattheglobalnodes.
	CO-4	state three sources of errors in implementing FEM and suggest remediestominimizethesameforagivenproblem,viz.Modelingerrors,Approximationerrors,andnumericalerrors.
	CO-5	Obtainconsistentandlumpedmassmatricesforaxialvibrationofbarsandtransversevibrationofbeamsandobtainfundamentalfrequencyofnatural vibrationusingthemethodsmentionedinthecurricula.
	CO-6	useMATLABforimplementationofFEMtoobtainelongationsatnodesofabarsubjectedtotractionandconcentratedloadsandprescribedboundaryconditions

	CO-7	use commercial software like ANSYS or ABAQUS for implementationofFEMtoobtainstressconcentrationduetoasmallholeinarectangular plate subjected to traction on edges and concentrated loads atpoints on the edges andprescribedboundary conditionsandpresenthis/her workusing the above software in a conference or publish theworkinapeerreviewedjournal3

3 **MAPPING(CO'sandPO's)**

CourseOutcomes	ProgramOutcomes									
	1	2	3	4	5	6	7	8	9	10
1	1	3								
2	2	2								
3	3		3							
4					3					
5	3		3							
6					3					
7						3	3	3	2	

MAPPING(CO'sandPSO's)

CourseOutcomes(CO)	ProgramSpecific Outcomes(PSO)	
	1	2

1		
2	2	
3		
4		2
5	1	
6	3	
7		3

23PH1DE001–ROBOTICSANDMACHINEVISIONSYSTEM

OBJECTIVES:

- Studentswill learnaboutbasicsofrobots
- programmingandMachinevisionapplicationsinrobots

UNITI BASICSOF ROBOTICS 9

Introduction- Basic components of robot-Laws of robotics- classification of robot-workspaceaccuracy-resolution–repeatabilityofrobot.Powertransmissionsystem: Rotarytorotarymotion,Rotarytolinearmotion,Harmonicsdrives

UNITII ROBOT ENDEFFECTORS 9

Robot End effectors: Introduction- types of End effectors- Mechanical gripper- types ofgrippermechanism-gripperforceanalysis- othertypesofgripper-specialpurposegrippers.

UNITIII ROBOT MECHANICS 9

Robot kinematics: Introduction- Matrix representation- rigid motion & homogeneoustransformation- forward & inverse kinematics- trajectory planning. Robot Dynamics:Introduction- Manipulatordynamics–Lagrange-Eulerformulation- Newton-Eulerformulation

UNITIVMACHINE VISIONFUNDAMENTALS 9

Machine vision: image acquisition, digital images-sampling and quantization-levels ofcomputation Feature extraction-windowing technique- segmentation- Thresholding- edgedetection-binarymorphology-greymorphology

UNITVROBOT PROGRAMMING 9

Robot programming: Robot Languages- Classification of robot language-Computer controlandrobotsoftware-ValsystemandLanguages-applicationofrobots.

OUTCOMES:

- knowledgefor thedesignofrobotics
- Uponcompletionofthiscourse,thestudentscanabletoapplythebasicengineering

TEXTBOOKS:

1.M.P.Groover,M.Weiss,R.N.Nagal,N.G.Odrey,"IndustrialRobotics-Technology,programming and Applications"Tata,McGraw-HillEducationPvtLimited,2008

REFERENCES

1. SathyaRanjanDeb, roboticsTechnology&flexibleAutomationSixthedition,TataMcgraw-HillPublication,2003.

2. GordenM.Dair,IndustrialRobotics,PHI1988.

3. K.S.Fu, R.C.Gonzalez, C.S.G.Lee, Robotics: Sensing, Vision& Intelligence, Tata Mcgraw-HillPublication,1987.

4. John.J.Craig,IntroductiontoRobotics:Mechanics&control,Secondedition-2002.

5. M.P.Groover,Industrialrobotics-Technology,programmingandApplications,McGraw-Hill,1986

23PH1DE002–DigitalImageProcessing

OBJECTIVES:

- Tobecomefamiliarwithdigitalimage fundamentals

- Togetexposedtosimple imageenhancementtechniquesinSpatialandFrequencydomain.
- Tolearnconceptsofdegradationfunctionandrestorationtechniques.
- Tostudytheimagesegmentationandrepresentationtechniques.
- Tobecomefamiliarwithimagecompressionandrecognitionmethods

UNITIDIGITAL IMAGE FUNDAMENTALS 9

Steps in Digital Image Processing – Components – Elements of Visual Perception – ImageSensingandAcquisition–ImageSamplingandQuantization–Relationshipsbetweenpixels

–ColourfundamentalsandColourmodels.

UNITIIIMAGE ENHANCEMENT 9

SpatialDomain:Basicsofintensity transformation–Histogram processing–BasicsofSpatialFiltering–SmoothingandSharpeningSpatialFiltering–FrequencyDomain:Preliminaryconcepts.

UNITIII IMAGE RESTORATION 9

Image Restoration – degradation model, properties, noise models – Mean Filters – OrderStatistics – Adaptivefilters – Band rejectFilters – Band pass Filters – Notch Filters –OptimumNotchFiltering–InverseFiltering–Wienerfiltering.

UNITIVIMAGE SEGMENTATION 9

Edge detection – Edge models and basic edge detection thresholding – Foundation, basicglobal thresholding - Region based segmentation – Region growing – Region splitting andmerging–Useofmotionsegmentation.

UNITVIMAGE COMPRESSION 9

Need for data compression, fundamentals of compression – Coding redundancy, Spatial andtemporalredundancy,irrelevantinformation,imagecompression–Basiccompressionmethods – Huffman,Coulomb,Arithmetic andRunLengthcoding.

OUTCOMES:

At theend ofthecourse,thestudentsshouldbeableto:

- Knowandunderstandthebasicsandfundamentalsofdigitalimageprocessing,suchasdigitization,sampling,quantization,and2D-transforms.
- Operateonimagesusing thetechniquesofsmoothing,sharpeningandenhancement.
- Understandtherestorationconceptsandfilteringtechniques.
- Learn the basics of segmentation, features extraction, compression and

recognitionmethodsforcolormodels.

TEXTBOOKS:

1. RafaelC.Gonzalez,RichardE.Woods,DigitalImageProcessing,Pearson,ThirdEdition,2010.
2. AnilK. Jain,FundamentalsofDigitalImageProcessingPearson, 2002.

REFERENCES:

1. KennethR. Castleman,DigitalImageProcessingPearson,2006.
2. RafaelC. Gonzalez, RichardE.Woods,StevenEddins,DigitalImageProcessingusingMATLAB PearsonEducation,Inc.,2011.
3. D,E.DudgeonandRM. Mersereau,MultidimensionalDigitalSignalProcessingPrentice HallProfessionalTechnicalReference,1990.
4. WilliamK. Pratt,DigitalImageProcessingJohnWiley, NewYork,2002
5. MilanSonkaetalImageprocessing,analysisand machinevisionBrookes/Cole,VikasPublishingHouse,2ndedition,1999

23PH1DE003–DigitalVideoProcessing

COURSEOBJECTIVE:

- Tointroducethe fundamentalsofdigitalvideorepresentation,filteringandcompression,
- Popularalgorithmsfor2-Dand3-Dmotionestimation,
- Objecttracking,framerateconversion,deinterlacing, imageenhancement,the emerginginternationalstandardsforimage

- videocompression, withsuchapplicationsasdigitalTV,web-basedmultimedia,videoconferencing,

videophoneandmobileimagecommunications.

- moreadvancedimagecompressiontechniquessuchasentropycoding,subbandcodingandobject-basedcoding.

UNITIDIGITAL VIDEOFUNDAMENTALS 9

Basics of Video – Analog video, digital video, digital video processing – Time varying imageformationmodels– Threedimensionalmotionmodels,geometricimageformation,photometricimageformation,observationnoise.

UNITIISPATIO-TEMPORAL SAMPLING 9

Sampling structures – Two dimensional rectangular sampling – Two dimensional periodicsampling– Samplingon3D structures–Reconstructionfromsamples.

UNITIIIMOTIONDETECTIONANDESTIMATION 9

Introduction – Notations and preliminaries – Motion detection methods – Hypothesis testingand MAP detection – Motion estimation – Models, estimation and search – Practical motionestimationalgorithms.

UNITIVVIDEOSEGMENTATION 9

Introduction–Changedetection–Dominantmotionsegmentation–Multiplemotionsegmentation– Simultaneousestimationandsegmentation–Semanticvideoobjectsegmentation.

UNITVVIDEOCOMPRESSION 9

Introduction–Applicationrequirements–Digitalvideosignalsandformats–Videocompressiontechniques– VideoencodingstandardsandH.261

TEXTBOOKS:

1. A.MuratTekalp,DigitalVideo Processing,PrenticeHall,SignalProcessingSeries,1995.
2. AlBovik, HandbookofImageandVideoProcessing, AcademicPress, 2000.

References:

1."MultimediaCommunicationTechnology",J.R.Ohm,SpringerPublication.
2. "VideoCoding forMobileCommunications"DavidBullet al,AcademicPress.
3. "HandbookonImageandVideoProcessing",A.I.Bovik,AcademicPress.

23PH1DE004–ComputerVision

Objectives:

- Studentswilllearnbasicprinciplesofimageformation
- imageprocessingalgorithmsanddifferent algorithmsfor3Dreconstructionandrecognition fromsingleormultipleimages(video).Thiscourse
- Emphasizesthecorevisiontasksofsceneunderstanding andrecognition.
- Applicationsto3Dmodelling,videoanalysis,videosurveillance,objectrecognitionandvisionbasedcontrolwil lbediscussed.

UNITI IMAGE FORMATION 9

Geometricprimitivesandtransformations–2Dtransformations,3Dtransformations,3Drotations,3Dto2D projections andlens distortion.

UNITIIFEATURE DETECTIONAND MATCHING 9

Pointsandpatches–Featuredetectorsanddescriptors–Edges–Detectionandlinking–Lines–Successive approximation,Houghtransformsandvanishingpoints.

UNITIIISEGMENTATION 9

Activecontours–Snakes,Scissors,levelsets–SplitandMerge–Watershed,regionsplitting,regionmerging,graph-basedsegmentation– Meanshiftingandmodefinding.

UNITIVFEATURE BASEDALIGNMENT 9

2Dand3Dfeaturebasedalignment–Alignmentusingleastsquares,Iterativealgorithms,3Dalignment–Poseestimationalgorithms– Geometricintrinsic calibration.

UNITVTRACKING 9

Simpletrackingstrategies–Trackingusing matching –TrackinglineardynamicalmodelsusingKalmanfilters–Dataassociation–Particlefiltering–Thesimplestparticlefilter.

CourseOutcome:

Afterlearningthecoursethestudentsshouldbeableto:

1. Toimplementfundamentalimageprocessingtechniquesrequired forcomputervision
2. UnderstandImageformationprocess

3. Toperformshapeanalysis
4. ExtractfeaturesformImagesanddoanalysisofImages
5. Generate3Dmodelfromimages
6. To developapplicationsusingcomputervisiontechniques
7. Understandvideoprocessing,motioncomputationand3Dvisionandgeometry

TEXTBOOKS:

1. RichardSzeliski,ComputerVision:Algorithmsandapplications,Springer,2010.
2. DavidA.Forysyth&JeanPonce,Computer Vision:AModernApproach, SecondEdition,Pearson,2012.

23PH1DE005–MobileComputing

OBJECTIVES:

- Tounderstandthebasicconceptsofmobilecomputing.
- Tolearnthebasicsofmobiletelecommunicationsystem.
- Tobefamiliar withthenetworklayer protocols andAd-Hocnetworks.
- Toknowthebasisoftransportandapplicationlayerprotocols.
- Togainknowledgeaboutdifferentmobileplatformsandapplicationdevelopment.

UNIT I INTRODUCTION 9

Introduction to Mobile Computing – Applications of Mobile Computing- Generations ofMobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols –SDMA-TDMA-FDMA-CDMA

UNITII MOBILETELECOMMUNICATIONSYSTEM 9

Introduction to Cellular Systems - GSM – Services & Architecture – Protocols – ConnectionEstablishment – Frequency Allocation – Routing – Mobility Management – Security –GPRSUMTS–Architecture–Handover-Security

UNITIII MOBILE NETWORKLAYER 9

MobileIP–DHCP –AdHoc–Proactiveprotocol-DSDV, ReactiveRoutingProtocols–DSR,

AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks(VANET)–MANETVsVANET–Security.

UNITIV MOBILE TRANSPORTAND APPLICATIONLAYER 9

Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTAArchitecture–WML

UNITV MOBILE PLATFORMSANDAPPLICATIONS 9

Mobile Device Operating Systems – Special Constraints & Requirements – CommercialMobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry,Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System –SecurityIssues

OUTCOMES:

Attheend ofthecourse,thestudentsshouldbeableto:

- Explainthebasicsofmobiletelecommunicationsystems
- Illustratethegenerationsoftelecommunicationsystems inwireless networks
- DeterminethefunctionalityofMAC,networklayer andIdentifyaroutingprotocolfor agivenAdhocnetwork
- ExplainthefunctionalityofTransportandApplicationlayers
- Developamobileapplicationusingandroid/blackberry/ios/WindowsSDK

TEXTBOOKS:

1. JochenSchiller,―MobileCommunications‖,PHI,SecondEdition,2003.

2. PrasantKumarPattnaik,RajibMall,―FundamentalsofMobileComputing‖,PHILearningPvt.Ltd,NewDelhi–2012

REFERENCES

1. DharmaPrakashAgarval, QingandAnZeng, "IntroductiontoWirelessandMobilesystems",ThomsonAsiaPvtLtd,2005.

2. UweHansmann, LotharMerk,MartinS. NicklonsandThomasStober, ―PrinciplesofMobile Computing‖,Springer,2003.

3. William.C.Y.Lee,―MobileCellularTelecommunications-AnalogandDigitalSystems‖,SecondEdition,TataMcGrawHillEdition,2006.

4. C.K.Toh,―AdHocMobileWirelessNetworks‖,First Edition,PearsonEducation,2002.

5. AndroidDevelopers:http://developer.android.com/index.html

6. AppleDeveloper:https://developer.apple.com/

7. WindowsPhoneDevCenter:http://developer.windowsphone.com

8. BlackBerryDeveloper:http://developer.blackberry.com

23PH1DE007–PolymerEngineering

UNITI Introduction 9

ImportanceofpolymersinsportstypesandClassificationofpolymers,Conceptoffunctionality, Polydispersity and Molecular weight [MW], Molecular Weight Distribution[MWD],variousmethods ofdeterminationofMWD.

UNIT II KineticsandMechanism: 9

PolymerizationKineticsFreeradicalpolymerization,MechanismofPolycondensationTechniquesofPolymerization andnanocomposites:

UNITIIITechniques ofPolymerizationandnanocomposites 9

Techniques of polymerization, bulk, emulsion, suspension, Polymer composites and nano-composites.

UNITIVPolymerProcessing **9**

Methods of spinning for additive manufacturing: Wet spinning, Dry spinning. Biopolymers,Compatibility issues with polymers. Moulding and casting of polymers, Polymer processingtechniquesandthe effectofthese processingtechniquesonpolymerstructure,

UNITV Designing ofpolymeric devicesandapplicationofpolymersforSports:9

Aspects of designing polymeric devices and polymer additives, Polymers used for sportsgoodsandequipmentmanufacturing:polyamide,PFresin,polyestersandcasestudies.

REFERENCES

1. F.W.BillmeyerJrTextbookofPolymerScience,InterscpiencePublisherJohnWileyandSons,3rdedition1999
2. GOdianPrinciplesofPolymerization,WileyInerscienceJohn WileyandSons,4th edition,2005
3. V.R.GowarikarPolymerScience, , NewAgeInt.,2002

23PH1DE009–ReverseEngineering

CourseObjective:

- Understandbasicengineeringsystems.
- Understandtheterminologiesrelatedtore-engineering,forwardengineering,andreverseengineering.
- Disassembleproductsandspecifytheinteractionsbetweenitssubsystemsandtheirfunctionality
- UnderstandReverseEngineeringmethodologies.
- UnderstandReverseengineeringofSystems, MechanicalRE,ElectronicRE, andComputerRE.

UNITI Introductiontoreverse engineering: 9

ReverseEngineering–TheGenericProcessMethodologiesandTechniquesforReverseEngineering – The Potential for Automation with 3-D Laser Scanners, What Is Not ReverseEngineering,Computer-aided(Forward)Engineering,Computer-aidedReverseEngineering.

UNITII Reverse Engineering–HardwareandSoftware: 9

Contact Methods Noncontact Methods, Destructive Method ,Computer Vision and ReverseEngineering,reverse engineeringversesforwardengineering

UNITIII SelectingaReverse EngineeringSystem: 9

The Selection Process, Some Additional Complexities, Point Capture Devices, TriangulationApproaches,"Time-of-flight"orRangingSystems,Structured-lightandStereoscopicImagingSystems,issueswithLight-basedApproaches,TrackingSystems,InternalMeasurementSystems,X-rayTomography,DestructiveSystems,SomeCommentsonAccuracy, Positioning the Probe, Post processing the Captured Data, Handling Data Points,Curveand SurfaceCreation,InspectionApplications,Manufacturing Approaches

UNITIVIntegration BetweenReverseEngineeringandAdditivemanufacturing 9

ModelingCloudDatainReverseEngineering,DataProcessingforRapidPrototyping,Integration of RE and RP for Layer-based Model Generation, he Adaptive Slicing Approachfor Cloud Data Modeling, Planar Polygon Curve Construction for a Layer, Determination ofAdaptive LayerThickness

UNITVReverseEngineeringin Sports,Medical,Automotive, Aerospacesectors: 9

Legal Aspects of Reverse Engineering: Copyright Law, Reverse Engineering, Recent CaseLaw BarrierstoAdoptingReverse Engineering,case studies.

Outcomes:

1. Thebasicunderstandingofengineeringsystems.-Understandingtheterminologiesrelatedtore-engineering,forwardengineering,andreverseengineering.
2. The Understanding of Reverse Engineering methodologies. - Understanding ofReverseengineeringofSystems,MechanicalRE,ElectronicRE,andComputerRE.

REFERENCES

1. K.OttoandK.Wood,ProductDesign:TechniquesinReverseEngineeringandNewProductDevelopment,Prentice Hall,2001.

2. ReverseEngineering:AnIndustrialPerspectivebyRajaandFernandes,Springer-Verlag2008.

23PH1DE010–IntroductiontoEmbeddedSystems

OBJECTIVES:

- To introducetheBuilding BlocksofEmbedded System
- ToEducateinVariousEmbeddedDevelopmentStrategies
- ToIntroduceBusCommunicationinprocessors,Input/outputinterfacing.

- ToimpartknowledgeinVariousprocessorschedulingalgorithms.
- TointroduceBasicsofRealtimeoperatingsystemandexampletutorialstodiscussonone
- real-timeoperatingsystemtool

UNITI INTRODUCTIONTOEMBEDDEDSYSTEMS 9

Introduction to Embedded Systems – The build process for embedded systems- Structuralunits in Embedded processor , selection of processor & memory devices- DMA – Memorymanagementmethods-TimerandCountingdevices,WatchdogTimer,RealTimeClock,Incircuitemulator,TargetHardwareDebugging.

UNITII EMBEDDEDNETWORKING 9

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communicationprotocols -RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI) –InterIntegratedCircuits (I2C)– needfordevice drivers.

UNITIIIEMBEDDED FIRMWAREDEVELOPMENTENVIRONMENT 9

Embedded Product Development Life Cycle- objectives, different phases of EDLC,Modelling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, statemachinemodel,SequentialProgramModel,concurrentModel,objectorientedModel.

UNITIV RTOSBASED EMBEDDEDSYSTEMDESIGN 9

IntroductiontobasicconceptsofRTOS-Task,process&threads,interruptroutinesinRTOS,Multiprocessingand Multitasking,Preemptiveandnon-preemptivescheduling,Taskcommunication-sharedmemory,messagepassing-,InterprocessCommunication–synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priorityinheritance,comparisonofRealtimeOperatingsystems: VxWorks,ЧC/OS-II,RTLinux.

UNITV EMBEDDED SYSTEMAPPLICATIONDEVELOPMENT 9

CaseStudyofWashingMachine- AutomotiveApplication- SmartcardSystemApplication,.

TOTAL:45

CourseOutcomes:

1. Abilitytounderstandandanalyse,linearanddigitalelectroniccircuits.
2. Applytheconceptsstudiedinsportsengineeringapplications

TEXTBOOKS:

1. Rajkamal,'EmbeddedSystem-Architecture,Programming,Design',McGrawHill,2013.

2. Peckol, "EmbeddedsystemDesign", JohnWiley&Sons,2010

3. LylaBDas,"EmbeddedSystems-AnIntegratedApproach",Pearson,2013

REFERENCES:

1. Shibu.K.V,"IntroductiontoEmbeddedSystems",TataMcgrawHill,2009.

2. EliciaWhite,"MakingEmbeddedSystems",O'ReillySeries,SPD,2011.

3. TammyNoergaard,"EmbeddedSystemsArchitecture",Elsevier,2006.

4. Han-WayHuang, "EmbeddedsystemDesignUsingC8051", CengageLearning,2009.

5. RajibMall"Real-TimesystemsTheoryandPractice"PearsonEducation, 2007

23PH1DE011–IntroductiontoInternetofThings(IOT)

Objectives

- DescribewhatIoTisandhowitworkstoday
- RecognisethefactorsthatcontributedtotheemergenceofIoT
- DesignandprogramIoTdevices

- UserealIoTprotocols forcommunication
- SecuretheelementsofanIoTdevice 6.Designan IoTdevicetowork withaCloudComputinginfrastructure.
- TransferIoTdatatothecloudandinbetweencloudproviders
- DefinetheinfrastructureforsupportingIoT deployments

UNITI INTRODUCTIONTOIoT 9

Introduction-PhysicalDesign-LogicalDesign-IoTEnablingTechnologies-IoTLevels&DeploymentTemplates-DomainSpecific IoTs-Healthandlifestyle

UNITII IoTandM2M 9

Introduction-M2M–DifferencebetweenIoTandM2M–SDNandNFVforIoT-IoTSystemManagementwithNETCONF-YANG

UNITIIIIOTPLATFORMSDESIGNMETHODOLOGY 9

Introduction- purpose and requirement specification- process, domain model, informationmodel and service specification- IoT level, functional view, operational view specification-device and component integration-application development- case study on IoT system forweathermonitoring

UNITIVLOGICAL DESIGNUSINGPYTHON 9

Installing python- python data types and data structures- control flow- function- modules –packages-filehandling-datetimeoperations-classes-pythonpackagesofinterestforIoT

UNITV IOT PHYSICALDEVICESAND ENDPOINTS 9

BuildingblocksofanIoTdevice-RasperryPi-LinuxonRaspberryPi-RaspberryPiInterfaces-ProgrammingRaspberryPiwithPython-OtherIoTPlatforms-Arduino.

OUTCOMES:

Upon completion of the course, the students will be able toIdentify and design the newmodelsformarketstrategicinteraction

- Designbusiness intelligenceandinformationsecurityforwob
- AnalyzevariousprotocolsforIoT

- Designa middlewareforIoT
- Analyzeanddesigndifferent modelsfornetworkdynamics

REFERENCES:

1. ArshdeepBahga,VijayMadisetti,"InternetofThings–Ahands-onapproach",UniversitiesPress,2015

2. DieterUckelmann,MarkHarrison,Michahelles,Florian(Eds),"ArchitectingtheInternetofThings",Springer, 2011.

3. OlivierHersent,DavidBoswarthick,OmarElloumi,"TheInternetofThings– KeyapplicationsandProtocols",Wiley,2012.

23PH1DE012–ProductDesignandDevelopment

OBJECTIVE

- Thecourseaimsatprovidingthebasicconceptsofproductdesign,productfeatures and its architecture so that student can have a basic knowledge in thecommon featuresaproducthasandhowtoincorporatethemsuitably inproduct.

UNITIINTRODUCTION 9

Modern Product development and design theories: Understanding the opportunity, Develop aconcept,Implementaconcept,Reverseengineeringandredesignmethodology.Productdevelopmentprocess tools:Productdevelopment teams,PlanningProcess,Planningandschedulingtools.

UNITII CUSTOMERNEEDSANDANALYSIS 9

Understanding customer needs: Kano diagram of customer satisfaction, Prioritising Customerneeds Establishing product function: Function analysis system technique, Function structure.Product tear down and experimentation: Tear down process, methods, applications, Postteardownreporting.

UNITIIIBENCHMARKINGAND CONCEPTGENERATION 9

Benchmarkingandestablishingengineeringspecifications:

Product Portfolios and portfolio Architecture: Portfolio architecture types and choice, Productmodularity, Clustering.Generating concepts andconceptselection: Information gathering,Brainstorming,TRIZ,MorphologicalEvaluation,ConceptselectionProcess,NumericalConceptscoring.

UNITIVCONCEPT EMBODEMENT 9

Concept embodiment: System modeling and embodiment principles. Modelling of Productmetrics:Modellingapproachesandcasestudies.

UNITVDESIGNFORENVIRONMENT 9

Design for the environment: DFE methods, Life cycle assessment, Techniques to reduceenvironmentalimpact.AnalyticalandNumericalmodelsolutions:Simulationandoptimizationtechniques.Desi gnforrobustness:RobustDesignmodelconstruction,methods.

OUTCOMES:

Oncompletion ofthecoursethestudentwillbeabletounderstandtheintegrationofcustomerrequirements inproductdesign

Applystructuralapproachtoconceptgeneration,selectionandtesting

Understandvariousaspectsofdesignsuchasindustrialdesign,designfor

manufacture,economicanalysisandproductarchitecture

REFERENCES

1. KevinN.Otto,KristinL.Wood,Product Design,PearsonEducation,2004.
2. Gahl,WBeitzJFeldhusun,K.G.Grote,EngineeringDesign,3rdEdition,Springer2007.
3. W.ErnestEder,S.Hosendl., DesignEngineering,CRCPress, 2008.
4. AliK.KamraniandEmadAbouelNasr,"EngineeringDesignandRapidPrototyping",Springer,2010

23PH1DE013–SportsandEventManagement

UNITIINTRODUCTION 9

Parameters and definition, history of sports, trends in sports paorticipation, pricing of sportsparticipation, the economic impact of sports, sports clubs. Sports club's effectiveness, issuesfacing sport, trends affecting sports. The role and importance of sport in our society, thebenefit of sports, the aim and objectgivees of sport, current issues, sports and society, sportandhealth.

UNITIITHEVOLUNTARYSECTOR ANDLEADERSHIP 9

Voluntary organizations,sports is a voluntary concept, voluntary ethos,voluntary sportsorganizations, management of sports organizations, the nature of voluntary organizations,organizsationalstructuresandpersonalities,governingbodiesvolunteerismandchange,voluntary commitmentpaidstaff dynamic,toretainvolunteers,the many roel of sportsdevelopment officer. Leadership – Transactional or transroamationa, leadership qualities insportssituation.Partnershipanaliasions,ageneciesinvolvedinsports.

UNITIIIPEOPLEANDORGANISATIONALMANAGEMENT 9

Performanceappraisal,managingpeople,whatmakesamanager,staffapp;raisal,staffmotivation,delegation,communication,gettingtherightpeople,teambuildingteamdevelopment, personel management. The role of the sports manager, general managementapproaches,qualitymanagement,strategicmanagement,measuringperformance,thecomplexity of sports management, plannint, objectives, control, organizational changers, themanagementofchange,decisionmaking.

UNITIVMANAGEMENTINPRACTICEANDCHALLENGES 9

Management process, financial management, legislation, management of safety, health andsafety at work, managing support services, administration, the management of sport as apublicservice.Challenges– citizenscharter,competition,bestvalue,financialcontrol,national standards, pressure forchange, voluntary input and management, philosophicalchallenges,investorsinpeople,leisuretrusts, ageingfacilities, performanceindication.

UNITVMARKETING,EVENTMANAGEMENT,EDUCATIONANDTRAININGANDPERSONALSKILLS 9

Marketing ethics, maketing participation, implementing the marketing process, marketingactivites,public relations,fund raising,sports spornsorship.Eventmanagement– Eventfeasibility,eventplanning,eventrequirements,characteristicsofthebestevents,eventevaluation.Education andtraining–Coachingawards,educationversus training,sportsmanagementeducation,runningsport,volunteeringinsports.PersonalSkills– Timemanagement,timemanagementactionplan,managingmeetings,meetingsinpractice,personalmanagement.

TotalNo.ofPeriods:45

Reference

1. Hans Westerbeek**,** Aaron Smith**,** Paul Turner**,** Paul Emery**,**ChristineGreen**,**LindavanLeeuwen"Managing Sport Facilities and Major Events",RoutledgeJuly2006

2. David C Watt "Sports Management and Administration", Routledge, Taylor & FrancisGroup,2003

2	**COURSEOUTCOMES: Studentsareableto**	
	CO-1	Understandvariouskindsofmanagementconcepts
	CO-2	Applyspecificleadershipstylesdifferentstate
	CO-3	Modify suitable management skills for different sports eventorganization

3 **MAPPING(CO'sandPO's)**

CourseOutcomes	ProgramOutcomes									
	1	2	3	4	5	6	7	8	9	10
1	3									
2										
3										

MAPPING(CO'sandPSO's)

CourseOutcomes(CO)	ProgramSpecific Outcomes(PSO)	
	1	2
1	3	
2		
3		3

23PH1DE014–AdditiveManufacturingProcessesandApplications

UnitI Introduction 9

Introduction to AM, AM evolution, Distinction between AM & CNC machining, Advantagesof AM, AM process chain: Conceptualization, CAD, conversion to STL, Transfer to AM,STLfilemanipulation,Machinesetup,build ,removaland cleanup,postprocessing.

UnitII ClassificationofAM processesandDesign 9

Liquidpolymersystem,discreteparticlesystem,moltenmaterialsystems,solidsheetsystem.Design for AM: Motivation, DFMA concepts and objectives, AM unique capabilities,Exploring design freedoms, Design tools for AM, Part Orientation, Removal of Supports,Hollowing out parts, Inclusion of Undercuts and Other Manufacturing Constraining Features,Interlocking Features, Reduction of Part Count in an Assembly, Identification of markings/numbersetc.

UnitIIIAM process selectionandapplications 9

Guidelines for process selection: Introduction, selection methods for a part, challenges ofselection, example system for preliminary selection, production planning and control AMApplications: Functional models, Pattern for investment and vacuum casting, Medical models,art models, Engineering analysis models, Rapid tooling, new materials development, Bi-metallicparts,Re-manufacturing.ApplicationexamplesforSports,Aerospace,defense,automobile,Bio-medicalandgeneralengineeringindustries

UnitIV:PostprocessingofAMparts 9

PostprocessingofAMparts:Supportmaterialremoval,surfacetextureimprovement,accuracy improvement, aesthetic improvement, preparation for use as a pattern, propertyenhancementsusingnon-thermalandthermaltechniques.

UnitVFutureDirections ofAM 9

FutureDirectionsofAM:Introduction,newtypesofproductsandemploymentanddigiproneurship.Currentresearchonsports products.

REFERENCES

1. ChuaCheeKai,LeongKahFai,"RapidPrototyping:Principles&Applications",WorldScientific,2003.
2. IanGibson,David WRosen,BrentStucker.,"AdditiveManufacturingTechnologies:RapidPrototypingtoDirectDigitalManufacturing", Springer,2010
3. AliK.Kamrani,EmandAbouelNasr,"RapidPrototyping:Theory&Practice",Springer,2006.
4. D.T.Pham,S.S.Dimov,RapidManufacturing:TheTechnologiesandApplicationsofRapidPrototypingandRapid

Tooling,Springer2001

23PH1DE015–CFDandFEMsimulationforSportsEngineering

Unit1.Introductiontoengineeringsimulation 9

History of engineering simulation - Why we need simulation- Experiment vs simulation -Need of Verification and validation - Problem solving through simulation - Simulationaccuracyvs Experimentalcost-challengesinsports

Unit2.CFDEquationsandProcess 9

Continuity equation, momentum equation, energy equation - Steps involved in the CFD - Equationofstate-Navierstokeequation-Boundarycondition-RANS,URANS,LES,DES

- Introduction to discretisation -structured and unstructured Grid - Grid independent study -Types of errors in CFD - Verification and validation with case study - FDM VS FEM - Guideline andbestpracticesinCFD

Unit3.FEMEquationsandProcess 9

IntroductiontoFEM -FEMgoverningequations-1DFEManalysis-linear andquadraticbar elements - beam and frame elements - 2D FEM analysis - 3, 4 & 6 node elements - Naturalcoordinationandtransformationcoordination

Unit4.HeattransferSimulation 9

IntroductiontoHeattransferSimulations-Typesofheattransfer-heattransferinfluidandrelatedCFDEquations-heat transferinsolidsandFEM1Dheat transfer problem.

Unit5.CFD andFEMapplicationinsports withcase studies 9

Sport'sengineeringCFDandFEMapplications -StadiumandathletesCFDsimulationcasestudy - Sport ball and cycle crank FEM simulation case study - athletes helmet heat transferSimulationcasestudy-Simulationdocumentation

Text Books

1. AnIntroductiontoComputationalFluidDynamics:TheFiniteVolumeMethodBookbyH.

K.VersteegandW.Malalasekera

2. TEXTBOOKOFFINITEELEMENTANALYSISTextbookbyP.SESHU

References

3. A Hands-on Introduction to Engineering Simulations -https://www.edx.org/course/a-hands-on-introduction-to-engineering-simulations

4. RoutledgeHandbookofSportsTechnologyandEngineering.
EditedByFranzKonstantinFuss,AleksandarSubic,MartinStrangwood,RabindraMehta

23PH1DE017–WindEngineeringforSports

Objectives:

- Understandingthewindimportanceandeffectinthesportsandinfrastructure
- Understandthe buildingaerodynamics
- Effectofwindinthesportsperformance

Unit1-IntroductiontoWindEngineering 9

Windscience-atmospherecompositionandlayers-windandaerodynamics-windclassification-wind atmosphereboundarylayer-groundlevel measurements.

Unit2-Windactionandeffectofstructure 9

Evolutionofsuspensionbridge,skycrapterandtower-Designwindspeed-Buildingaerodynamics-Dynamicresponsetoturbulentwind-vortexshedding -galloping -flutter

Unit3-WindmeasurementsinsportsandBoundarylayerwindtunnel 9

Measurements of wind speed in sports (100m sprint and long jump) - Effect of wind in thedifferentstadiuminrunningtrack-ultrasonicanemometer-Windtunnel-ABLWindtunnel

Unit4-Windeffectinthesports 9

Effectofwindinthe100msprint-windeffectinthefieldsports- needofindoor stadium

Unit5-WindEngineeringInfrastructureandArena 9

Building aerodynamics - wind effect on sports infrastructure (long span roof and long HighPoles) - stadium cross ventilation - wind comfort and pollution -bioclimatic city planningandarchitecture

Outcome

1. Optimizationofthesportsathletesperformancefromthewind effect
2. Applyingthewindsciencetodesigntheeffectiveandefficientsportsinfrastructure

Reference

1. WindScienceandEngineering:Origins,Developments,FundamentalsandAdvancements(SpringerTractsinCivilEngineering)writtenbyGiovanniSolari

2. MOOC:-SportsandBuildingAerodynamicsby EindhovenUniversityofTechnologyhttps://www.coursera.org/

23PH1DE019–AerodynamicsinAutomobile

Objectives

- Tounderstandthesportscar designandvehicleaerodynamicsinsportsrace.
- Tounderstandthe Aerodynamicsofdifferentvehicles

Unit1.IntroductiontoBasicconcepts 9

Introduction to aerodynamics - 1-D frictionless flow (venturi, pitot tube, orifice, nozzle andinjector) - high Reynolds number flow and turbulence- Types of drag - drag in differentshape-liftingsurface-effectofReynoldsnumberindragandlift.

Unit2.AutomobileAerodynamics 9

Ground effect, Generic automobile shape and vortix, Downflow and vehicle performance,ExpectedresultsinCFD,windtunnelandroad(measurementstechniques)

Unit3.Aerodynamicsdevicesandvehicle example 9

Variable and adaptive devices, passenger car, pickup truck, motorcycle, comparative cars andopenwheelracecars

Unit4.AutomobileAero-Acoustic 9

Introduction - sound as pressure wave - sound loudness scale - 1D linear wave equation -sound radiation, transmission, reflection, absorption - vortex sound - buffeting - sound andflow control.

Unit5Supersonic Aerodynamics-highspeedcars 9

Compressible flow - Normal shock equation- expansion and oblique shock relations - flowover a wedge and cone - Detached shock wave - supersonic nozzle - turbojet engine - thrustSSClandspeedrecord

Outcome

- Todesignapowerefficientandlessdragracecarsfor Sports.
- Todesignenvironmentalfriendlyracecar withlessEmissionand sound.

Reference

1. AutomotiveAerodynamicsBookbyJosephKatz
2. FundamentalsofAerodynamicsBookbyJohnD. Anderson
3. MeetthefastestcarsintheworId20yearsafterThrustSSC'slandspeedrecordByCraigGlenday

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https://www.guinnessworldrecords.com/news/2018/10/meet-the-fastest-cars-in-the-world-20-years-after-thrust-sscs-land-speed-record-544103

23PH1GE005 PHYSICS OFSPORTS

Objectives

- TounderstandthePhysicsbeginthesportsactionandapparels

Unit 1PhysicsFoundation

Measurements and units -fundamental and derived quantity - S.I unit system - Theory oferror-Typesoferror-errorreduction-rulesofsignificantfiguresandroundoff-Dimensionalformula-Kinematics:restandmotion-typesofmotion-Distanceanddisplacement - velocity and acceleration - Relative velocity - average acceleration - Equationofmotion undergravity:fallingobject,vertically throwingupward-Projectilemotion:Horizontalandangularprojection-Circularmotion.

Unit2lawofmotion,Work,powerandenergy

Newton's laws of motion - application of Newton law in sports - 2 body contact in horizontalsurface-Motionofconnectedbodies-Lami'stheory-conservationofmomentum-impulse

-Friction-centrifugaland centripetalforce

Unit 3PhysicsofFieldand tracksports

Physics of sprint take off and running aerodynamics - wind and altitude effect in the 100 msprint-Physicsofshotput-Physicsofhighjump

Unit4Physicsofballsports

Basic fluid flow - Reynolds number - laminar and turbulent - boundary layer - cricket ballswings - golfballdimple effect-footballbanana shot

Unit5Physicsofwaterand wintersports

Water resistance,Physicsofswimming andsailing-Physicsofskiingandicehockey

Outcome

- ApplyingthePhysicsconceptstothesportsforcoachingandAnalysis
- Increasingtheathleticperformanceusing Physics

Reference

FortheloveofPhysicsbyWalterLewin
1. AnintroductiontoPhysicsofsportsbyVassiliosMacInnes.

2. ThePhysicsOfSports

https://www.real-world-physics-problems.com/physics-of-sports.html

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