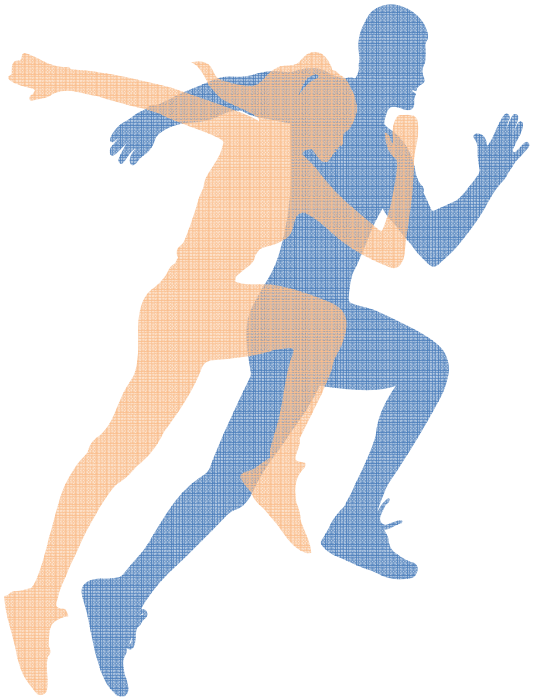
TAMILNADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY

CHENNAI- 600 127



SYLLABUS

B.Sc., EXERCISE PHYSIOLOGY AND NUTRITION

(REGULAR-2023-2024)

DEPARTMENT OF EXERCISE PHYSIOLOGY AND NUTRITION

CHENNAI - 600 127

DESCRIPTION OF THE DEPARTMENT

The Department of Exercise Physiology and Nutrition (EPN) examines the physiological responses and adaptations of the human organism to physical activity. Considerable emphasis is given toward understanding how the body functions during exercise and adapts to long-term training. Subjects related to bioenergetics, musculoskeletal physiology, cardiorespiratory physiology, neuroendocrinology, basic nutrition, clinical nutrition and sports nutrition will be taught. In addition, the physiological effects of factors such as age, gender, body composition, and the environment on human performance will be imparted, along with various strength and conditioning training. Opportunities for research and applied, practical experiences are the core of the instructional methods for graduate students.

MISSION OF THE DEPARTMENT

The Department of Exercise Physiology and Nutrition seeks to promote the health of individuals and communities through research, teaching, and service activities in exercise physiology, human nutrition and the application of these sciences in academic, Sports, clinical, public health, and industry settings

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REGULATIONS

The Choice Based Credit System (CBCS) and Learning Outcomes Based Curriculum Framework (LOCF) for three years B.Sc. Degree programme in Exercise Physiology and Nutrition will be implemented from the academic year 2023-2024.

1. ELIGIBITLITY FOR ADMISSION

1.1 A candidate shall be admitted to the degree B.Sc. in Exercise Physiology and Nutrition Only if he/she produces satisfactory evidence to the effect that he/she has successfully completed Plus Two (XII Std any Science Group), under SB/CBSE/CSE recognized by the syndicate of TNPESU.

1.2 Reservation as per university / State Government rules, from time to time at par with the UGC norms and regulations of the Government of Tamilnadu. The total number of seats for UG is 30 (Thirty). Period of completion is not more than **six years** from the date of first admission.

2. COURSE OF STUDY

2.1 The normal duration of the B.Sc., Exercise Physiology and Nutrition Programme shall be six semester (THREE years).

2.2 There shall be two semester's in an academic year, the ODD and EVEN semesters. Odd semesters shall be from July to November and Even Semesters shall be from December to May.

2.3 Each semester will have a minimum of 90 working days and each day will have five working hours. Teaching is organized into a modular pattern of credit courses. Credit is normally related to the number of hours a teacher teaches a particular subject.

3. CHOICE BASED CREDIT SYSTEM (CBCS) - LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)

The Tamil Nadu Physical Education and Sports University follows the Choice Based Credit System (CBCS) and Learning Outcomes Based Curriculum Framework (LOCF). One credit is equal to one teaching hour per week during the semester. The CBCS in B.Sc., Exercise Physiology and Nutrition Degree Programme would have five components and the total credit requirements for all components in three years is 140 credits.

3.1 **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching or two hours of practical work.

3.2 **Core course:** Are course that are basic to the subject of the degree. This is a course which is to be compulsorily studied by a student as a core requirement to the completion of the program.

3.3 **Elective Courses:** This is a course that is supportive to the discipline of study, provides an expanded scope, enables exposure to some other domains or nurtures proficiency/skills. Elective papers can be of two types: Discipline Specific Elective (DSE) and Generic Elective (GE).

3.4 **Discipline Specific Elective (DSE):** These courses are inter disciplinary in nature and considered similar to core course. And, the students have to choose one course from the option provided for them.

3.5 **Generic Elective (GE):** These courses add generic proficiency to the students. Students have to choose generic elective courses in consultation with the head of the department from the Generic Elective courses offered by other Division of study in Sports Science or from other Departments in university.

3.6 **Skill Enhancement Courses (SEC)** (minimum 4 for regular courses): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge and should contain both theory and lab/hands-on/training/field work. The main

purpose of these courses is to provide students life-skills in hands-on mode so as to increase their employability.

3.7 **Ability Enhancement Courses (AEC):** The Ability Enhancement (AE) Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; i. Environmental Science and ii. English/Hindi/MIL Communication. These are mandatory for all disciplines. SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

3.8 **Ability Enhancement Compulsory Courses (AECC):** Environmental Science, English Communication/Hindi Communication/MIL Communication.

CREDIT ABSTRACT

Course Components	Type of Courses	Semester						Total Credits
		I	II	III	IV	V	VI	
		Credits						
Part – I	Language / Special English/Hindi	1	1	1	1	-	-	**12**
Part – II	English	1	1	1	1	-	-	**12**
Part – III	Core Courses	2	2	2	2	4	2	**56**
	Core Elective Courses	1	1	1	1	2	2	**24**
	Summer Internship	-	-	-	-	1	-	**2**
	Project work	-	-	-	-	-	1	**4**
Part – IV	Skill Enhancement Courses (Non-Major Electives)	2	2	1	2	-	-	**14**
	Skill Enhancement Courses (Entrepreneurial Skill)	-	-	1	-	-	-	**1**
	Ability Enhancement Courses	1	1	1	1	-	-	**8**
Part – V	Value Education	-	-	-	-	1	-	**2**
	Environmental Studies	-	-	-	1	-	-	**2**
	Extension Activity	-	-	-	-	-	1	**1**
	Professional Competency Skill	-	-	-	-	-	1	**2**
	Grant Total	**8**	**8**	**8**	**9**	**8**	**7**	**140**

4. COURSE WEIGHT

4.1 Courses have been designed with weightage of one, two, three /four credits, depending upon the content, duration and specialization. All courses need not carry the same weight. A course may comprise lectures / tutorials / laboratory/ field work / outreach activities / project work / vocational training / viva / seminars etc. or a combination of some of these.

4.2 It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching or two hours of practical work.

5. CREDIT DISTRIBUTION

The Credit distribution for the six semesters are given below:

SEMESTER	CREDITS	TOTAL MARKS
I	23	**800**
II	23	**800**
III	22	**800**
IV	25	**900**
V	26	**800**
VI	21	**600**
		4700

6. ASSESSMENT AND EVALUATION

6.1 Each course will be assessed on the basis of 100 marks. The marks would be divided between internal and external assessment.

6.2 There shall be one end semester external examination for each course in every semester consisting of 75% (75 marks) weight in theory and 75% (75 marks) in practical courses.

6.3 Each Theory course shall have internal assessment of 25% weightage on the following:

Components of Internal Evaluation of Theory	Marks
Test Paper – I & Test Paper – II	**10**
Seminars	**3**
Assignments	**2**
Model Examination	**10**
Total	**25**

6.4 Each Practical Course shall have internal assessment of 25% weightage on the following:

Components of Internal Evaluation of Practicum	Marks
Internal Viva	**10**
Lab Record	**5**
Lab Performance	**10**
Total	**25**

6.5 The minimum passing standard will be 40% for the external and internal component of each theory course, i.e. 30 marks out of 75 (External - 40% of 75 marks) and 10 marks out of 25. In practical minimum passing standard will be 40% for the external exam and internal assessment for each practical course.

7. ATTENDANCE

7.1 Every teaching faculty handling a course shall be responsible for the maintenance of attendance register for candidates who have registered for the course.

7.2 Students must have 75% of attendance in each course for appearing in the examination.

7.3 Students who have 74% to 70% of attendance shall apply for condonation in the prescribed form with the prescribed fee.

7.4 Students who have 69% to 65% of attendance shall apply for condonation in prescribed form with the prescribed fee along with the Medical Certificate.

7.5 Students who have below 64% to 60% of attendance are not eligible to appear for the examination. It is furthered clarified that the students, Carry over to the next semester.

7.6 Students who have below 60% of attendance are not eligible to appear for the examination. It is furthered clarified that the students, Re do the course

8. END SEMESTER EXAMINAITION (ESE)

8.1 The ESE will consist of à written examination of three hours duration for a maximum score of 75. The following procedure will be followed for evaluation.

8.2 A candidate who has secured a minimum of 40 marks in all courses prescribed in the programme and earned a minimum of the credits will be considered to have passed the Bachelor's Degree Programme.

Pattern	Total No. of Question	Number of Question to be Answered	Marks for each Question	Total Marks
MCQ	10	10	1	**10**
Short Answer	5	5	2	**10**
Short Essay / Problem Type	10	5	5	**25**
Essay / Problem Type	5	3	10	**30**
Total				**75**

8.3 Distribution of 25 Marks for Semester End Practical Examination weightage on the following:

Components of External Evaluation of practicum	Marks
Lab Experiment / Field Experiment	10
Lab Performance / Demonstration	5
Viva-voce	5
Lab Record	5
.Total	25

8.4 A Student will be issued, hall ticket only if one produces "**No Dues**" certificates from the concerned department, the laboratory, the Registrar's Office, the Library and Hostel.

9. GRADING SYSTEM

A ten point rating is used for the evaluation of the performance of the student to provide a letter grade for each course and overall grade for the Bachelors Programme. The letter grade assigned is given below:

Letter	Grade	Grade Point	Range of Marks
O	Outstanding	10	90 Above
A+	Excellent	9	80-89
A	Very Good	8	70-79
B+	Good	7	60-69
B	Above Average	6	50-59
C	Pass	5	40-49
RA	Reappear	0	0-39

9. INTERNSHIP AND FIELD TRAINING

Internship and field training is an important component of Exercise Physiology and Nutrition that provides students with the opportunity to gain applied practical experience in the field of Exercise Physiology and Nutrition. It allows a student to employ what is learned in class in a supervised environment, which is critical in order to further develop professional skills and assure quality practice. The students will undergo Internship training /Field training/ Clinical practice in TNPESU campus/ Sports Development Authority of TamilNadu (SDAT) coaching Centres / Sports Authority of India (Various coaching Centres of SAI) / Government Medical College/ other sporting centers shall be evaluated through internal assessment only. At the end of Internship/field training, the student shall submit a certificate from the organization where he /she has undergone training and a brief report. The evaluation will be made based on this report and a Viva-Voce Examination, conducted internally.

PROGRAMME OUTCOMES (POs):

After successful completion of three year degree program in Exercise Physiology and Nutrition/ Sports Biomechanics should be able to:

PO1	Demonstrate and an understanding of major concepts in all disciplines of Exercise Physiology and Nutrition
PO2	Solve the problem and also think methodically, independently and draw a logical conclusion. Employ critical thinking and the scientific knowledge to design, carry out, record, demonstrate, plan, and analyze.
PO3	The graduates will display professional and ethical behavior. The graduates will be able to communicate professionally.
PO4	Create an awareness of the impact of Exercise Physiology and Nutrition on the environment, society, and development outside the scientific community.
PO5	After completion of graduation, they would be able to apply the acquired concepts and principles to study different branches of Exercise Physiology and Nutrition in their future career. When a student pursues for postgraduate studies, he or she can make use of all the applications, field or laboratory which he or she has gained knowledge. This B.Sc. Programme will also help students to enhance their employability for jobs in different sectors.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1	Identify and list out common structure and functions of various systems of human body, macro and micro nutrition and assessments.
PSO2	Explain various physical and physiological changes in our bodies.
PSO3	Understand various life style management
PSO4	Explain the role and impact of different environment, exercise, fitness, strength and conditioning and weight loss programs.
PSO5	Identify different nutrients beneficial to humans
PSO6	Identify various potential risk factors to health of humans.
PSO7	Explain the importance of sports Nutrition, clinical nutrition and general nutrition.
PSO8	Use tools of information technology for all activities related to Exercise Physiology and Nutrition.

SEMESTER- I

Parts	Course Code	Course	Hours / Week)		Marks		
			L/T/P	C	CIA	ESE	Total
Part-I	23UC1LT101	Tamil I / Special English I	3	3	25	75	100
Part-II	23UC1LE101	English I	3	3	25	75	100
Part-III	23UC1CT101	Human anatomy and Physiology - I	4	4	25	75	100
	23UC1CT102	Fundamentals of Food Science	4	4	25	75	100
	23UC1CE101	Health Education	4	3	25	75	100
	23UC1SE101	Human anatomy and Physiology - Practicum-I	4	2	25	75	100
	23UC1SE102	Fundamentals of Food Science - Practicum-II	4	2	25	75	100
Part-IV	23UC1AE101	Soft Skills –I (Presentation Skills)	2	2	50	50	100
		Library	2	-	-	-	-
			30	**23**	**225**	**575**	**800**
Remark :Soft skill I - 2 hours handled by English: Totally 3+2=5							

SEMESTER- II

Parts	Course Code	Course	Hours / Week)		Marks		
			L/T/P	C	CIA	ESE	Total
Part-I	23UC1LT201	Tamil II / Special English II	3	3	25	75	100
Part-II	23UC1LE201	English II	3	3	25	75	100
Part-III	23UC1CT201	Human Anatomy and Physiology – II	4	4	25	75	100
	23UC1CT202	Human Nutrition	4	4	25	75	100
	23UC1CE201	Clinical Exercise Testing Procedures and Assessment	4	3	25	75	100
	23UC1SE201	Human Nutrition - Practicum-II	4	2	25	75	100
	23UC1SE202	Clinical Exercise Testing Procedures and Assessment -III	4	2	25	75	100
Part-IV	23UC1AE201	Naan Mudhalvan – Medical Coding for Employability	4	2	50	50	100
			30	**23**	**200**	**600**	**800**

Note:

1. *Naan Muthalvan - Skill course - external 50 marks will be assessed by industry and internal will be conducted by the respective course teacher.

SEMESTER- III

Parts	Course Code	Course	Hours / Week)		Marks		
			L/T/P	C	CIA	ESE	Total
Part-I	23UC1LT301	Tamil III / Special English III	3	3	25	75	100
Part-II	23UC1LE301	English III	3	3	25	75	100
Part-III	23UC1CT301	Kinesiology	4	4	25	75	100
	23UC1CT302	Fundamentals of Sport and Exercise Biochemistry	4	4	25	75	100
	23UC1CE301	Training and Performance	4	3	25	75	100
	23UC1SE301	Kinesiology Practicum -I	4	2	25	75	100
	23UC1SE302	Training and Performance Practicum -II	4	1	25	75	100
Part-IV	23UC1AE301	Soft Skills –II (Written Skills)	4	2	25	75	100
			30	**22**	**200**	**600**	**800**

SEMESTER- IV

Parts	Course Code	Course	Hours / Week)		Marks		
			L/T/P	C	CIA	ESE	Total
Part-I	23UC1LT401	Tamil IV / Special English IV	3	3	25	75	100
Part-II	23UC1LE401	English IV	3	3	25	75	100
Part-III	23UC1CT401	Clinical Nutrition and Dietetics	4	4	25	75	100
	23UC1CT402	Sports Biomechanics	4	4	25	75	100
	23UC1CE401	Weight Management	3	3	25	75	100
	23UC1SE401	Weight Management - Practicum - I	4	2	25	75	100
	23UC1SE402	Sports Biomechanics - Practicum - II	4	2	25	75	100
Part-IV	23UC1AE401	* Naan Mudhalvan – Digital Skills for Employability - Office Fundamentals (SEC-VII) http://kb.naanmudhalvan.in/Special:Filepath/Microsoft_Course_Details.xlsx	3	2	50	50	100
	23UC1ES401	Environmental studies	2	2	25	75	100
			30	**25**	**250**	**650**	**900**

Note:

1. *Naan Muthalvan - Skill course - external 50 marks will be assessed by industry and internal will be conducted by the respective course teacher.
2. A minimum of four weeks Internship will be carried out during the summer vacation after the **second year.** Viva Voce will be conducted by the internal examiners of the Department and marks shall be sent to the COE of University for its inclusion in the **Fifth Semester Marks Statement.**

SEMESTER- V

Parts	Course Code	Course	Hours / Week)		Marks		
			L/TP	C	CIA	ESE	Total
Part-III	23UC1CT501	Sports Nutrition	4	4	25	75	100
	23UC1CT502	Strength Training and Conditioning for Fitness	4	4	25	75	100
	23UC1CT503	Research Methodology and Statistic	4	4	25	75	100
	23UC1CT504	Ergogenic Aids	4	4	25	75	100
	23UC1CE501	Nutrition Through Lifecycle	3	3	25	75	100
	23UC1CE502	Sports and Exercise Psychology	3	3	25	75	100
Part-IV	23UC1CI501	# Fitness Training Internship Report and Viva	4	2	100	-	100
Part-V	23UC1VE501	Value Education	4	2	25	75	100
			30	**26**	**200**	**600**	**800**

Note:

1. # Only Continuous Internal Assessment (CIA).
2. A Group of five members work on a Project and submit the report for assessment.

SEMESTER- VI

Parts	Course Code	Course	Hours / Week)		Marks		
			L/TP	C	CIA	ESE	Total
Part-III	23UC1CT601	Applied Exercise Physiology	4	4	25	75	100
	23UC1CT602	Clinical Exercise Physiology	4	4	25	75	100
	23UC1CE601	Nutrition for Health, Fitness and Sports	3	3	25	75	100
	23UC1CE602	Introduction to Sports Injury and Rehabilitation	3	3	25	75	100
	23UC1CP601	Project with Viva voce	4	4	25	75	100
Part-IV	23UC1PC602	Professional Competency (Aptitude and reasoning skills for competitive Examinations)	4	2	50	50	100
Part-V	23UC1AE601	@ Extension Activity (NCC/NSS/Red Cross, etc)	-	1	-	-	-
			30	**21**	**175**	**425**	**600**

***L (Lecture), T (Tutorial), P (Practical), C (Credits), CIA (Continuous Internal Assessment), ESE (End Semester Exam)**

Note:

1. @ No University Examinations. Only Continuous Internal Assessment (CIA)

SEMESTER- I

COURSE CODE – 23UC1CT101
HUMAN ANATOMY AND PHYSIOLOGY – I

Learning Objectives

1. To impart knowledge on structure and functions of different organs
2. Learn the integrated functioning of cells, tissues, organs and systems
3. To introduce the interrelationship between nutritional science and physiological functions

UNIT-I Cell Biology: Introduction to human anatomy, Anatomical terms, language of anatomy, levels of organization, various organ systems. Cell: Definition, structure and function. Cell division: Mitosis and Meiosis. Tissues: Definition, classification and function- Epithelial tissue, Connective tissue, Muscle tissue and Nervous tissue-Body Membranes.

UNIT-II- Blood: Definition and Functions- Composition of blood – Types and Functions of blood cell –Red Blood Cells (RBC) -Hemoglobin, White Blood Cells (WBC)- Types of White Blood Cells – platelets and Plasma. Blood Grouping and Typing. Blood Clotting - Definition and Mechanism.

UNIT-III –Bones: Histology and Physiology of Bones -A brief introduction to bones, joints, ligaments and muscles of the body-Structure and Functions of Skeletal System- anataomical terms of bones - axial skeleton, appendicular skeleton. Bones of the upper limb, Bones of the lower limb, the vertebral column, the sternum, ribs and the skull. Types of Bones- Sex Differences in the Skeleton.

UNIT-IV Cardiovascular System: Position, Structure and Function of the heart. - Types of Blood Vessels: Arteries, Capillaries and Veins. Cardiac Cycle and Heart Sounds. Blood Flow - Arterial Pulse and Blood pressure – Definition, Procedure to measure and its values. Types of circulation: Systemic, Pulmonary, Coronary and Portal circulation. Lymphatic system- structure and function.

UNIT-V Respiratory system: Structure and Functions of Upper and Lower Respiratory System. Mechanism of breath inspiration and Expiration. Mechanism and Control of respiration., Gaseous exchange in lungs and tissues, Transport of oxygen and carbon dioxide.

Reference Books:

1. Jason LaPres, Beth Kersten and Yong Tang, (2016),Gunstream's Anatomy & Physiology: With Integrated Study Guide, Sixth Edition, McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
2. Cinnamon L. VanPutte, Jennifer L. Regan & Andrew F. Russo, (2017), Seeley's Anatomy & Physiology, Eleventh Edition, McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
3. Sembulingam. K and Prema Sembulinga,(2012), Essentials of Medical Physiology, Sixth Edition, Jaypee Brothers Medical Publishers (P) Ltd, 4838/24, Ansari Road, Daryaganj,New Delhi 110 002, India.
4. SurrinderH.singh, Krishna Garg, (2008), "Anatomy & Physiology for Nurses & Allied Health Sciences". CBS.
5. Clancy, John & Andrew J.McVicar (1995), "Physiology & Anatomy – A Homestatic Approach", London: Edward Arnold, A Division of holder head line PLC.
6. Guyton, A.C. (1979) Physiology of the Human Body. 5th ed. Saunders College ofPublishing, Philadelphia.

E-Learning resources

1. https://www.youtube.com/watch?v=iUc0qZX5z4M&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI.
2. https://www.youtube.com/watch?v=jFKCXL-iNxA&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI&index=11
3. https://www.youtube.com/watch?v=9KOZ2pr7yTE&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI&index=3
4. https://www.youtube.com/watch?v=EFGvb6_tuoA&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI&index=5.
5. https://www.youtube.com/watch?v=hXNtcxfdd3E&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI&index=17
6. https://www.youtube.com/watch?v=R_8lx3Nt0OM&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI&index=16
7. https://www.youtube.com/watch?v=OsrrNDid7XU&list=PLyj7LvLOVR9pnvfF2TmRLXZ5NkyzlE8tI&index=19

Course Outcomes

CO No	Course outcomes
CO 1	Identify the major levels of organization, major components of each organ and define the relationship between anatomy and physiology
CO 2	Describe the composition of different blood groups and their role in the body.
CO 3	Identify the classification of bones and joint movements
CO 4	Identify the structure and label the parts of respiratory system. Lung volumes and capacities
CO 5	Illustrate the Structure and Function of the heart.

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- I

COURSE CODE – 23UC1CT102
FUNDAMENTALS OF FOOD SCIENCE

Course Objectives

After studying this paper, the student should be able to:

1. To impart knowledge on the classification of food groups, composition and nutritive value of different food ingredients.
2. Understand the science of food and factors that affect its quality, Nutritive value
3. Understand the physical, biological and chemical characteristics of various foods and their uses.
4. Apply knowledge of foods in planning diets and preparing meals that are safe, nutritious and palatable.

UNIT – I Nutrient content of foods and Cooking Methods: Definition of Food - Components of food - Nutrition, Nutrients - History of Nutrition- Food groups for balanced diets - Physiological functions of food - **Cooking Methods:** Moist Heat Methods-Boiling-Simmering- Stewing-Steaming-Pressure cooking Merits-Demerits -Dry Heat Methods- Air as medium of cooking- Fat as medium of cooking-Combination of Cooking Methods-Merits and Demerits -Solar cooking – Microwave cooking – Food safety – Food preservation – Benefits of sprouting and fermentation.

UNIT - II Cereals, Millets, Pulses, Legumes and Nuts: Classification of Cereals, Structure, nutrient composition, storage, processing, milling, parboiling, scientific methods of preparation and cooking, acceptability and palatability of rice, wheat, maize and millets Cooking of starches- Dextrinization and gelatinization, retrogradation and resistant starch. **Pulses and legumes** - Types, nutritive value, methods of cooking, effect of soaking and germination, judicious combination of cereals and pulses-complementary effect, soya beans, fava beans and kesari dhal- methods to inactivate /remove toxins; storage. **Nuts** - types, composition, market forms, roasting, steaming of nuts, nuts butters; uses in sweets, baking, and confectionery; Storage.

UNIT – III Vegetables and Fruits: Classification, nutritive value, effect of cooking on colour, texture, flavour, appearance and nutritive value, Purchase - storage and preservation. **Fruits:** Classification, nutritive value, changes during ripening, enzymatic browning, uses, preservation. **Nuts and Oil Seeds:** Nutritive Value of Nuts-Specific Nuts and Oil Seeds-Role of Nuts in Cookery Phytonutrients and polyphenols.

UNIT – IV Milk and Milk Products: Nutritive value, kinds of milk, pasteurization, and homogenization, coagulation of milk, fermentation of milk; milk products - whole and skimmed milk, milk powders and yogurt, ghee, butter, cheese. Storage and preservation. **Meats** - structure, nutritive value, selection of meat, postmortem changes in meat, ageing, factors affecting tenderness of meat, methods of cooking and storage**. Egg**- structure, composition, nutritive value, storage, deterioration during storage - Physical and Chemical changes. Egg cookery- effect of heat, sugar, salt, acid, and starch on egg protein; Evaluation of egg quality; Role of egg in cookery. **Fish**- Classification, composition, nutritive value, selection, changes during cooking and spoilage of fish.

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UNIT- V- Fats and oils, sugars: Types, sources-animal fats and vegetable fats, functions, processing- difference between cold pressed and regular cooking oils, hydrogenated fat, emulsification, rancidity, smoking point. Factors affecting absorption of oils while frying foods, harmful effects of reheated oils. **Sugars:** Types and market forms of sugars; stages of sugar cookery, crystallization, factors affecting crystallization, uses in confectionery.

Reference Books:

1. Srilakshmi B (2015), 'Nutrition Science' Fourth Edition, New Age International Publishers, New Delhi.
2. Manay S and Shadaksharaswamy M, (1997), 'Food Facts and Principles' New Age International Publishers, New Delhi.
3. Srilakshmi B (2019) Food Science, (7th Ed.) New Age International Publishers.
4. Thangam E.Philip, Modern Cookery for Teaching and the Trade Volume - 1&2 (6th Revised Edition), Orient Black.
5. Vaclavik, V.A. and Elizabeth, W.C. (2013) Essentials of Food Science.2nd ed. Springer Publication, New Delhi.

E-Learning resources

1. https://egyankosh.ac.in/handle/123456789/329473
2. http://epgp.inflibnet.ac.in/Home/Download

Course Outcomes

CO 1	Identify, Define and classify different food groups, nutrients, and different pre-preparation and cooking methods adopting best practices of health and safety.
CO 2	Describe the composition and nutritive value of different food groups and their role in cookery from current literature.
CO 3	Define and explain the physical and chemical changes occurring in the nutritive and non-nutritive constituents of different foods during various cooking processes.
CO 4	Apply the current understanding of food science to describe the various sustainable food practices like energy and nutrient conservation methods
CO 5	Analyze and understand the principles in cooking and its effect on sensory attributes and nutrients.

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – I

COURSE CODE – 23UC1CE101

HEALTH EDUCATION

Learning Objectives:

After studying this paper, the student should be able to:

1. It builds students' knowledge, skills, and positive attitudes about health.
2. The health education program motivates students to improve and maintain their health, prevent disease, and reduce risky behaviors.
3. Students will gain the knowledge and skills to remain healthy throughout their lives.

UNIT-I Health Education - Health Education: Meaning, Concept and Principles - Health – Importance, Components, Health Promoting Behaviours - Role of Personal Hygiene, Mental Hygiene, Sleep Hygiene, Occupational Hygiene in physical education and sports - Role of Different Agencies in Promoting Health (WHO, UNICEF, Local Bodies).

UNIT – II Health hazards of modernization-pollution, effect of population explosion on health hazards, family and community life - Communicable and non-communicable diseases - role of host agent and environment in the spread and control of communicable diseases - body defenses - immunity-natural and acquired - importance of regular medical check-up in preventing the diseases - immunization schedule and importance of booster doses - Morbidity and mortality in India - National Health Programmes - Primary health care, meaning and scope - Health care set-up in rural and urban areas.

UNIT – III Importance of international health - International health measures to check spread of communicable diseases form one country to another - quarantine measures - World Health Organization-its functions and activies - UNICEF functions and activities - Significance of World Health Day.

UNIT – IV Approved systems of medicine being practiced in India - Prescription and non-prescription drugs - habit-forming drugs - dangers of self-medication and going to a quack- Health set-up at the village, town, district, state and country levels - voluntary agencies working in the field of health and health education.

UNIT – V Awareness of HIV and AIDS - harmful effects of alcohol and tobacco - Evils associated with promiscuity - child and drug abuse - Adolescence education and sex-education – Birth Control Measures. Mental and Emotional Health: Hormones and Neurotransmitters - Common Stressors and Conditions – Bullying - Depression and Suicide - Eating Disorders.

Reference Books:

1. Donatelle, R. (2009). *Health: The basics*. 8th edition. San Francisco, CA: Pearson Education, Inc.
2. Joint Committee on Terminology. (2001). Report of the 2000 Joint Committee on Health Education and Promotion Terminology. *American Journal of Health Education*.
3. McKenzie, J., Neiger, B., Thackeray, R. (2009). *Planning, Implementing, & Evaluating Health Promotion Programs*. 5th edition. San Francisco, CA: Pearson Education, Inc.
4. Simons-Morton, B. G., Greene, W. H., & Gottlieb, N. H... (2005). *Introduction to Health Education and Health Promotion*. 2nd edition. Waveland Press.
5. Nash T.N. (2006). Health and physical education. Hyderabad: Nilkamal Publishers.
6. DandonPublication.Chandra, S., Sothi, &Krishnan.P. (2005). Health education and physical education. Delhi: Surject Publications. ·
7. Mangal, S. K. (2005). Health and physical education. Ludhiana: Tandon Publication book market.

Course Outcomes

CO 1	Understand Role of Personal Hygiene and Importance of Health
CO 2	Describe the effect of population explosion on health hazards, family and community life.
CO 3	Explain the International health measures to check spread of communicable diseases form one country to another
CO 4	To understand Approved systems of medicine being practiced in India
CO 5	Analyze and understand the Awareness of HIV and AIDS

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SKILL ENHANCEMENT COURSE SEC-I (NME)

23UC1SE101	HUMAN ANATOMY AND PHYSIOLOGY CORE PRACTICUM-I

1. Recording of Radial Pulse
2. Recording of Carotid Pulse
3. Recording of Respiratory Rate (RR)
4. Recording of Pulmonary Volumes and Capacities

Practical Demonstration:

1. Human Skeletal system identification
2. Human Heart using models/charts
3. Brain using models/charts
3. Eye, Eye and Ear using models/charts
4 Liver, Pancreas, Stomach using model /charts
5. Reproductive System
6. Charts & Instruments – Spotters
7. Identify different body organs and systems on the human model/chart.
8. Identify different muscles and bones of the human model/chart.
9. Estimation of Hemoglobin, total Red Blood Cells and total White Blood Cells (demonstration only).

A practical observation note book of these experiments must be maintained by the student.

SKILL ENHANCEMENT – II (FOUNDATION COURSE)

23UC1SE102	FUNDAMENTALS OF FOOD SCIENCE– PRACTICUM-II

1. Food group- Grouping of foods, discussion on nutritive value.
2. Preparation of one dish each applying the different cooking methods: Moist heat methods - boiling, simmering, steaming and pressure cooking. Dry heat methods - baking.
3. Vegetables Experimental cookery using vegetables of different colours and textures. Preparation of soups and salads. Common preparation with vegetables.
4. Study of the smoking temperature of Fats.
5. Milk and milk products Experimental cookery – cream of tomato soup, cheese curry and cooking vegetables in milk. Common preparation with milk, cheese and curd.
6. Beverages Preparation of hot beverages - coffee, tea. Preparation of cold beverages- fruit drinks and milk shake.
7. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg.

SEMESTER- II

COURSE CODE – 23UC1CT201
HUMAN ANATOMY AND PHYSIOLOGY – II

Learning Objectives:

The main objective of including

1. By learning the subject the students will be aware of the various anatomical structures present in Human body.
2. The students after learning will gain knowledge about the normal functioning of various organs in Human body.
3. Only after knowing about normal functioning of the human body the students will the students will know about effect of exercise on various system.

UNIT-I- Digestive system - Mouth and its parts. Teeth - Classification, types and function. Salivary Glands – Position, types and function. Gastro Intestinal Tract - Esophagus, Stomach, Small intestine, Large intestine and Anus - Structure and function. Pancreas structure and Digestive function. Liver - structure and function. Secretion of Enzymes for Digestion in Gastro Intestinal Tract.

UNIT-II- Endocrine systems- Definition and classification. Anterior Pituitary hormones and their functions - Posterior Pituitary hormones and their actions - Thyroid hormones, Biosynthesis and functions - Parathyroid hormones, functions, Adrenal cortex hormones and their functions. Adrenal medullary hormones and their actions, Pancreas, Thymus Gland, Ovary and Testis.

UNIT-III- Nervous System-Definition and Classification. Neuron –Definition and types. Central Nervous Systems - Structure and Function of Cerebrum, Cerebellum, Pons, Hypothalamus, Medulla Oblongata and Spinal Cord. Peripheral Nervous Systems-Sensory and Motor nerves and impulses. Autonomic Nervous Systems- Sympathetic and Parasympathetic nervous systems. Cranial Nerves-Types and functions. Reflex action-Definition, Explanation and example.

UNIT-IV- Male and Female Reproductive Organs- Structure and Function of External genitalia, Ovary, Uterus and Fallopian tubes. Ovum – Definition and Structure. Male Reproductive Organs- Structure and Function of External genitalia, Epididymis, Vasdeferans, Prostate gland and Testis. Sperm - Definition and Structure.

UNIT-V Excretory system - Kidney- Structure and functions. Nephron - structure and functions. Mechanism of Urine formation. Skin- Structure and functions. Eye - Structure and functions. Ear -Structure and functions.

Reference Book:

1. Jason LaPres, Beth Kersten and Yong Tang, (2016), Gunstream's Anatomy & Physiology: With Integrated Study Guide, Sixth Edition,McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
2. Cinnamon L. VanPutte, Jennifer L. Regan & Andrew F. Russo, (2017), Seeley's Anatomy & Physiology, Eleventh Edition, McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
3. Sembulingam. K and PremaSembulinga,(2012), Essentials of Medical Physiology, Sixth Edition, Jaypee Brothers Medical Publishers (P) Ltd, 4838/24, Ansari Road, Daryaganj, New Delhi 110 002, India.
4. SurrinderH.singh, Krishna Garg, (2008), "Anatomy & Physiology for Nurses & Allied Health Sciences". CBS.
5. Clancy, John & Andrew J.McVicar (1995), "Physiology & Anatomy – A Homestatic Approach", London: Edward Arnold, A Division of holder head line PLC.

Course Outcomes

CO 1	Describe the structure and functions of Digestive system in the body
CO 2	Evaluate the role of the endocrine system in regulating the activities of other systems.
CO 3	Evaluate the role of the nervous system in regulating the activities of other systems.
CO 4	Describe the structure and functions of reproductive system in the body.
CO 5	Identify the microscopic structure, label the parts of primary organs in the body such as Kidney, Skin, eye and ear.

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- II

PAPER CODE - 23UC1CT202
HUMAN NUTRITION

Learning Objectives

After studying this paper, the student should be able to:

1. Provide an integrated overview of dietary sources, physiological role, requirements of macro and micro nutrients.
2. Gain basic knowledge of the different nutrients and their role in maintaining health of the community
3. To gain information and knowledge regarding metabolism of major nutrients.

UNIT I – Carbohydrate - An Ideal Source of Energy: Meaning and Definition and classification of COH- Physiological significance of Monosaccharide (Glucose, Fructose, Galactose) - Disaccharides (Maltose, Lactose, Sucrose) - Oligosaccharides - Polysaccharides (Starch, Glycogen, Cellulose) - Requirements and Functions of carbohydrates in the body - Food sources - Digestion, absorption and metabolism - Glycemic Index, Glycemic load of Foods, and factors affecting it, Hormonal control of Blood sugar. **Dietary fibre**: Soluble and Insoluble fibres, sources of fibre, Physiological effects of dietary fibre - prebiotic - probiotic - Role of fibre in human nutrition, sources and requirements.

UNIT II - Fat (Lipids): Meaning and Definition of fat, Classification: Simple Lipid- Compound Lipid and Derived Lipids - Requirements and functions, Essential fatty acids, Omega 3, 6, 9 - deficiency, food sources and functions, Healthy and Unhealthy Fats in the diets, Dietary lipids and its relation to cardiovascular diseases.

UNIT III – Protein the Basis of Body Structure: Meaning and Definition of protein Amino acids - Indispensable and dispensable amino acids. Classification, Sources, Requirements and functions of protein. Mutual supplementation of proteins. Protein deficiency – Protein Energy Malnutrition Kwashiorkor and Marasmus - etiology, clinical features, treatment and prevention Evaluation of protein quality - PER, BV, NPU and NPR, chemical score. Protein Supplements and Novel Protein sources- Benefits and Health Concerns.

UNIT IV - Vitamins Organic Micronutrients: Fat Soluble Vitamins: Functions, Food sources, Requirements, Effects of deficiency or Toxicity (wherever applicable). **Water Soluble Vitamins:** Functions, Food sources, Requirements, Effects of deficiency. Antioxidant role of certain Vitamins in Health promotion.

UNIT V- Minerals- Inorganic Micronutrients: Macro minerals: Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride- Distribution in the body, functions, food sources, requirements, effects of deficiency and toxicity. **Micro/Trace minerals:** Iron, Zinc, Iodine,

Selenium, Manganese, Chromium, Fluoride and Copper Distribution in the body; functions, effects of deficiency, food sources and requirements, Role of Antioxidant minerals. **Water:** As a nutrient, functions, sources, requirements. Distribution of water in the body, exchange of water in the body, composition of body fluids. Water balance, factors regulating it, dehydration, water intoxication.

Reference Books:

1. Heather Hedrick fink, Lisa A. Burgoon, Alan E. Mikesy, (2006), Practical Application in sports Nutrition", Jones and Barlett.
2. McArdle William D. et.al., (2005) "Exercise Physiology, Nutrition and Human performance", Philadelphia, lea and Febiger.
3. Mcardle , William D., Katch, Frank I and Katch, Victor L (2005) "Exercise Physiology", Philadelphia, lea and Febiger.
4. Srilakshmi B (2015), 'Nutrition Science' Fourth Edition, New Age International Publishers, New Delhi.
5. Janice Thompson, Melinda Manore, (2005),"Nutrition: An applied approach", Pearson.
6. Robert E. C. Wildman, Barry S. Miller, (2004), "Sports and Fitness Nutrition", Thompson.

E-Learning Resources:

1. http://www.merck.com/mmhe/seciz/ch155/ch155a.html
2. http://www.whereincity/medical/vitamins

COURSE OUTCOMES

CO 1	List/ define key terms related to macro nutrients, micronutrients sources, losses during processing, deficiency and RDA
CO 2	Classify micronutrients and examine/ discuss their functions, metabolism and deficiencies.
CO 3	Define and explain the relationship between nutrients and nutrient metabolism
CO4	Identify and analyze the distribution, functions, metabolism, deficiency of micronutrients
CO5	Explain and analyze the role of water and electrolytes in human health

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- II

COURSE CODE – 23UC1CE201

CLINICAL EXERCISE TESTING PROCEDURES AND METHODS OF ASSESSMENT

Learning Objectives:

1. Students will know about screening, assessing fitness parameters in clinical adult popular.
2. On completion of this instruction students will be able to accurately screen, assess.
3. Students should be able to utilize laboratory testing that measures VO_2Max, Blood pressure and endurance, Range of Motion and Posture.

UNIT- I Introduction to Exercise Physiology

Definition of Terms Exercise Physiology and Sports Physiology - Focus of Exercise and Sport Physiology - Acute and Chronic Responses to Exercise - Historical Aspects of Exercise Physiology- Evolution of Exercise Physiology Tools and Techniques- Ergometers- Treadmills - Cycle Ergometers - Women in Exercise Physiology- Exercise Physiology Beyond Earth's Boundaries.

UNIT- II Assessing Cardiorespiratory Fitness

Definition of Terms cardiorespiratory Endurance – Maximum oxygen uptake (VO_2max) - General Guidelines for Exercise Testing - Procedures for Administering a Graded Exercise Test - Treadmill Maximal Exercise Tests: Balke Treadmill Protocol - Bruce Treadmill Protocol. Cycle Ergometer Maximal Exercise: Astrand Cycle Ergometer Maximal Test Protocol- Fox Cycle Ergometer Maximal Test Protocol.

UNIT- III Submaximal Exercise Test Protocols

Treadmill Submaximal Exercise Tests: Multistage Model, Single-Stage Model- Astrand-Ryhming Cycle Ergometer Submaximal Exercise Test Protocol- YMCA Cycle Ergometer Submaximal Exercise Test Protocol- Astrand-Ryhming Step Test Protocol - Queens College Step Test Protocol-9 or 12 Min Run/ walk Tests - 1.5-Mile Run/Walk Test- 1.0 -Mile Jogging Test - Rockport 1-Mile Walk Test Procedures.

UNIT- IV Blood Pressure Measurements

Blood pressure (BP) - systolic blood pressure (SBP) - diastolic blood pressure (DBP) - Blood Pressure Responses to Exercise- Accurate Blood Pressure Checks- Effects of Body Position on BP- Resting BP- Effects of Dynamic Exercise on BP- Submaximal Exercise BP- Effects of Isometric Contractions on BP- Upper-Body Isometric Exercise BP- Lower-Body Isometric

Exercise BP

UNIT V Postural Analysis and Body Alignment Assessments

Definition of Terms Posture - Range of Motion - Static and Dynamic Posture- Posture Screening and Assessment Process - Joint Range of Motion Assessments: Neck, Spine, Shoulder, Hip, Knee and Foot.

Reference Books

1. Vivian H. Heyward, Ann L. Gibson, (2014), Advanced fitness assessment and exercise prescription - Seventh edition. Human Kinetics, United States: P.O. Box 5076, Champaign.
2. Madeline P. Bayles, Ann M. Swank. (2018), ACSM's exercise testing and prescription, First edition. | Philadelphia: Wolters Kluwer.
3. Gregory B. Dwyer, Facsm Shala E. Davis, (2008), ACSM's Health-Related Physical Fitness Assessment Manual-Second Edition, United States of America, 530 Walnut Street Philadelphia, Wolters Kluwer, LIppincott Williams & Wilkins Health Philadelphia.
4. W. Larry Kenney, Jack H. Wilmore, David L. Costill, (2012), Physiology of sport and exercise - 5th ed. Human Kinetics, United States: P.O. Box 5076, Champaign.

Course Outcomes

CO 1	To understand the concepts of Exercise Physiology and Sports Physiology
CO 2	To understand the concepts of the Cardiorespiratory Fitness assessment
CO 3	To understand the application of Submaximal Exercise Test Protocols
CO4	To understand the concepts of Blood Pressure Measurements and interpretation
CO5	To understand the role of Postural Analysis and Body Alignment Assessments

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SKILL ENHANCEMENT COURSE SEC-II (NME)

23UC1SE201	HUMAN NUTRITION PRACTICUM-I

1. Estimation of calorific value of food using the Bomb Calorimeter- Demonstration
2. Estimation of moisture content of food using Infrared moisture balance- Demonstration
3. Estimation of Iron in food Estimation of calcium in food
4. Estimation of Glycemic Index
5. Estimation of RDA of Macronutrients
6. Estimation of Vitamin C by Titrimetric method
7. Estimation of glucose in blood (colorimetric estimation and use of glucometer)
8. Estimation of haemoglobin in blood
9. Determination of plasma cholesterol, Triglycerides, HDL and LDL cholesterol (with the use of the semi auto analyser)
10. Estimation of acid value in oil/fat
11. Visit to a food analytical lab

SKILL ENHANCEMENT COURSE SEC-III

23UC1SE202	**CLINICAL EXERCISE TESTING PROCEDURES AND METHODS OF ASSESSMENT PRACTICUM-II**

Estimation of maximum oxygen uptake (VO_2max) by Laboratory and field method

1. Heart Rate: Resting, Exercise, and Recovery
2. Methods for Prescribing Training Intensity
    i. HR Reserve (HRR) Method
    ii. Target heart rate (THR) Method
    iii. Ratings of Perceived Exertion Method
    iv. Talk Test Method
3. Estimation of Queens College Step Test Protocol.
4. 9 or 12 Min Run/ walk Tests
5. 1.5-Mile Run/Walk Test
6. 1.0 -Mile Jogging Test
7. Rockport 1-Mile Walk Test Procedures.
8. Åstrand-Ryhming Cycle Ergometer Test
9. YMCA Cycle Ergometer Test
10. Leg Strength Testing Procedures
11. Back Strength Testing Procedures
12. Posture Screening and Assessment Process
13. Joint Range of Motion Assessments
14. Estimation of Blood pressure
15. Estimation of Upper-Body Isometric Exercise BP
16. Estimation of Lower-Body Isometric Exercise BP

SEMESTER – III

COURSE CODE –23UC1CT301
KINESIOLOGY

Learning Objectives:

1. List and describe five career options available in the field of kinesiology.
2. Describe and critically analyze the role of physical activity and its impact on health, society and quality of life.
3. Discuss the history and broad content within the discipline of kinesiology and develop skills to enable the synthesis of concepts across disciplines.
4. Identify the skeletal and muscular structures of the human body.

UNIT I Kinesiology: Kinesiology: Meaning and Definition of kinesiology– Need and importance of kinesiology - Terminology of types of Joints movements: Flexion, extension, abduction, adduction, rotation, and circumduction. Planes: Sagittal plane, Frontal plane, transverse plane. Axis: Sagittal axis, Lateral axis, vertical axis.

UNIT II Kinematics - Planes of Motion: Sagittal plane, Frontal plane, transverse plane. Axis of Rotation, Degrees of freedom, Anatomical movements of human body, Movements at Specific Joints-Shoulder and Shoulder Girdle - Elbow and Forearm-Wrist and Hand-Trunk and Spine-Hip -Knee-Ankle Movement.

UNIT III Muscles: Structural Classification – Functions – Types of Muscle Fibres – Functional Classification – structural classification - Location, origin, insertion and action of the following muscles: Supraspinatus, Infraspinatus, Teres minor, Subscapularis, Teres major, Serratus anterior, Pectoralis major, Pectoralis minor, Deltoid, Latissimus dorsi, Biceps brachii, Coraco Brachialis, Triceps brachii

UNIT IV Muscles: Structural Classification – Functions – Types of Muscle Fibres – Functional Classification – structural classification - Location, origin, insertion and action of the following muscles: Lower Limb - iliacus, psoas major, Sartorius – vastus lateralis, vastus intermedius, vastus medialis, and rectus femoris. adductor longus, adductor brevis, adductor magnus, and gracillis semitendinosus, semimembranosus, and long and short heads of the biceps Trunk : Muscles of the Abdomen rectus abdominis, pyramidalis, external abdominal oblique, internal abdominal oblique and transversus abdominis.

UNIT V Posture – definition – static and dynamic posture – importance and benefits of good posture - causes of poor posture poor posture, compensatory posture. Vertebral alignment – development of postural curves - Standing posture – lateral view, anterior view, and posterior view. Fundamentals of gait - Meaning of gait, gait cycle divisions, Rancho Los Amigos gait terminology.

Reference book

1. Bruce Abernethy. (2005). The Biophysical Foundation of Human Movement. Human Kinetics
2. Nancy Hamilton. (2002). Kinesiology - Scientific Basis of Human Motion. New York: McGraw - Hill Companies, Inc.
3. NichdasStergiou. (2004). Innovative Analysis of Human Movement. USA: Human Kinetics.
4. Shirl, J, Hoffman. (2005). Introduction to Kinesiology. USA: Human Kinetics.
5. Thomas. (2001). Manual of Structural Kinesiology. New York: Me Graw - Hill cornparues.
6. Uppal A. (2004). Kinesiology in Physical Education and Exercise Science. Delhi: Friends publications.

Course Outcomes

After successful completion of the course the student will be able to

CO1	Analyze the Classification of Joints Based on Movement Potential
CO2.	Understand the Anatomical movements of human body
CO3.	To understand the Types of bones, Bone growth and development
CO4.	To understand the Upper and Lower body muscles Location, origin, insertion and action
CO5.	To understand the posture and common postural abnormalities

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- III

COURSE CODE – 23UC1CT302

FUNDAMENTALS OF SPORT AND EXERCISE BIOCHEMISTRY

Learning **Objective:**

The learners will be able to

1. Understand the role of enzymes in metabolism and clinical conditions.
2. Interpret the significance of macronutrient metabolism, and thereby understand the implications of disorders resulting from these.
3. Acquire knowledge about different metabolism.

UNIT – I Biochemistry: Definition and Importance. **Organization of matter** - Matter and elements - Atoms and atomic structure - Atomic number and mass number - Atomic mass - Ions, molecules, compounds and macronutrients. **Chemical bonding** - Ionic bonds - Covalent bonds - Molecular formulae and structures - Functional groups. **Chemical reactions** - ATP and energy - Energy – ATP - Units of energy - Types of chemical reactions. **Water** - General functions of water - Water as a solvent. Metabolism – Anabolism & Catabolism.

UNIT – II Carbohydrates: Relevance of carbohydrates for sport and exercise - Types and structure of carbohydrates: Monosaccharaides, Disaccharides and polysaccharides - Metabolism of carbohydrates – Glycogenolysis – Glycolysis - Lactate metabolism - The TCA (or Krebs) cycle - Electron transport chain - Oxidative phosphorylation - Calculation of ATP generated in glucose oxidation - Fructose metabolism - Gluconeogenesis – Glycogenesis.

UNIT – III Proteins: Protein function - Amino acids - Protein structure: Primary structure - Secondary structure - Tertiary structure - Quaternary structure - Proteins as enzymes - Mechanisms of enzyme action - Classification of enzymes - Protein turnover - Amino acid metabolism - Free amino acid pool - Transamination – Deamination - Branched chain amino acids - Glucose-alanine cycle – Glutamine - The urea cycle.

UNIT – IV Lipids: Relevance of lipids for sport and exercise - Structure of lipids - Classification of lipids - Compound lipids - Derived lipids - Metabolism of lipids - Lipolysis - β-oxidation - Ketone body formation - Formation of fatty acids - Triglyceride synthesis – Cholesterol metabolism. **Water** - General functions of water - Water as a solvent. **Acid-base balance** - Acids, bases and salts - pH Scale – Buffers – Acidosis – Alkalosis.

UNIT – V Energy sources for muscular activity: Adenosine triphosphate: the energy currency - Energy continuum - Energy supply for muscle contraction - Energy systems and running speed - Energy sources and muscle. Mechanisms of fatigue - Reduced ATP - Reduced PCr - Increased P*i* - Lactate and H+. Energy production during high-intensity exercise - Energy sources used in HIE - Metabolic regulation during high-intensity exercise - Energy systems utilized in HIIT exercise - Metabolic regulation in HIIT exercise - Energy production in endurance exercise - metabolic regulation in endurance exercise

References

1. Biochemistry for Sport and Exercise Metabolism, First Edition. Don MacLaren and James Morton, 2012 John Wiley & Sons, Ltd. Published 2012 by John Wiley & Sons, Ltd.
2. The Cell: A Molecular Approach (2009) 5th ed., Cooper, G.M. and Hausman, R.E., ASM Press & Sunderland (Washington DC), Sinauer Associates, MA, ISBN: 978-0-87893- 300.
3. Molecular Biology of the Cell (2008) 5th ed., Alberts, B., Johnson, A., Lewis, J., and Enlarge, M., Garland Science (Princeton), ISBN: 0-8153-1619-4 / ISBN: 0-8153-1620-8.
4. Physical Biochemistry (2009) 2nd ed., Sheehan, D., Wiley-Blackwell (West Sussex), ISBN: 9780470856024 / ISBN: 9780470856031

Course Outcome

After successful completion of the course the students will be able to

CO1	Describe the role of enzymes and co enzymes in biological oxidation.
CO2.	Explain metabolism and regulation of carbohydrate, lipids and proteins
CO3.	Analyze the integration of carbohydrate, lipid and protein metabolism
CO4.	Comprehend the significance of recent biochemical concepts namely xenobiotics, recombinant DNA technology and Nutrigenomics.
CO5.	Discuss the structure and functions of nucleic acids

Mapping with Programme Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- III

COURSE CODE – 23UC1CE301

TRAINING AND PERFORMANCE

OBJECTIVES:

Provide opportunities to the graduates to learn the methods of training for performance.

LEARNING OUTCOMES:

1. To work with higher efficiency as Exercise Physiologist or Exercise Trainers.
2. To constructively apply the acquired scientific findings and methodological repertoire in practical training under various conditions.
3. To recognize the tendencies of development in their sport and consider them in their training process.

UNIT – I Definition of training, Sports performance, aerobic training, aerobic system , volume, Intensity, Steps to find intensity (MHR, RHR, HRR, Training Intensity Zone) , frequency- FITT Principle – Factors affect sports performance Training principles – over load , specificity , reversibility – influence of Gender, Initial fitness level and Genetics – components of work session – warm up , work out and cool down - Training to improve aerobic power - Interval training – long slow distance – High Intensity Continuous exercise - Training intensity and improvement in VO2 max- Endurance Training and VO2 max.

UNIT – II Definition of Anaerobic exercise, Anaerobic training , anaerobic system – Anaerobic power and capacity– Training to improve anaerobic system - - ATP – Pc System (Phosphogen system) – Anaerobic Glycolysis– Oxidative system - Methods of Anaerobic training – Explosive training, Speed training , Interval training and various methods of Resistance training - Modes of Anaerobic training – sprinting , Plyometrics , Stair Climbing , Resistance training and weight lifting – Effects of training on Anaerobic system - muscular adaptation – muscle adaptation to anaerobic training - adaptation in a Lactate Threshold.

UNIT – III Definition of strength, Hypertrophy, 1 RM (One Repetition maximum) muscular fitness, muscular strength, muscular endurance, resistance training – classification of strength training – Isometric – Isotonic – Isokinetic – factors involved in muscular adaptation – principles of resistance training- physiological effects of strength training – neural and muscular adaptation to resistance training.

UNIT – IV Definition of Optimum Training, Overtraining , Over reaching – types of overreaching (Functional and Nonfunctional overreaching - Symptoms of overtraining – effect of overtraining – Risk of overtraining syndrome – Negative effect of Over training - predicting the overtraining syndrome – Prevention of Over Training Syndrome - treating the overtraining syndrome – tapering for peak performance**.**

UNIT – V Definition of Retraining , Detraining - muscular strength, power, muscular endurance, speed, agility, flexibility and cardio respiratory endurance – Benefits of muscular strength and muscular endurance- Difference between muscular strength and Muscular endurance – Components muscular strength work - speed, Training to improve speed, agility, flexibility and cardio respiratory endurance.

Reference Books:

1. Scott K. Powers Edward T. Howley (2004) “Exercise Physiology- Theory and application to fitness and performance”, Brown and Benchmark.
2. Diek, Frank W. (1978) “Sports training principles “, London: Lepus books.
3. E.L.Fox(1979) “Sports Physiology halt: CBS College publishing.
4. Nieman , David C, ”The Exercise Health Connection” champaign L: Human kinetics.
5. .Jack. H Wilmore and David L. Costill (2004) “Physiology of Sports and Exercise”, Human kinetics.

Course Outcomes

After successful completion of the course the student will be able to

CO1	Define, meaning and Understand the basic concepts of Training and performance and training to improve aerobic power.
CO2.	Define and Understand the essentials of Anaerobic power and system.
CO3.	Define, meaning and Application of strength training and its adaptation.
CO4.	Define, meaning and Analyse the symptoms and syndrome of overtraining.
CO5.	Understand acquire deep insight into retraining.

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SKILL ENHANCEMENT COURSE –V

23UC1SE301	KINESIOLOGY- PRACTICUM-I

1. Recording of Location, origin, insertion Upper Limb Muscles
2. Recording of Location, origin, insertion Lower Limb Muscles
3. Recording of Muscles of Trunk

Practical Demonstration:

1. Demonstration of Flexion/Extension, Movements.
   i. Dorsiflexion.
   ii. Plantar flexion.
   iii. Knee flexion.
   iv. Knee extension.
   v. Hip flexion: Femoralon-pelvic rotation.
   vi. Hip flexion: Pelvicon-femoral rotation.
   vii. Hip extension.
   viii. Spinal flexion.
   ix. Spinal extension.
   x. Elbow flexion.
   xi. Elbow extension.
   xii. Shoulder flexion.
   xiii. Shoulder extension.
   xiv. Cervical flexion.
   xv. Cervical extension.
2. Demonstration of Adduction and abduction movements.
   i. Eversion.
   ii. Inversion.
   iii. Hip abduction.
   iv. Hip adduction.
   v. Lateral flexion.
   vi. Shoulder abduction.
   vii. Shoulder adduction.
   viii. Cervical lateral flexion.
3. Determination of Planes
5. Charts & Instruments - Spotters

A practical observation note book of these experiments must be maintained by the student.

SKILL ENHANCEMENT COURSE SEC- IV (ENTREPRENEURIAL SKILL)

23UC1SE302	TRAINING AND PERFORMANCE PRACTICUM-I

1. Assessment of Muscular Strength
    i. 1-Repetition Maximum (RM) Bench Press Test
    ii. 1-Repetition Maximum (RM) Leg Press Test
    iii. Maximal Handgrip Strength Test
2. Assessment of Muscular Endurance
    i. Pull-Up Tests
    ii. Push-Up Tests
    iii. Partial Curl-up Test
    iv. Prone bridge (or plank).
    v. Half-squat (or wall-sit).
3. Assessment of Muscular Power
    i. Standing Long Jump Test
    ii. Vertical Jump Test
    iii. Single-Leg Triple Hop Test
    iv. Forward Overhead Medicine Ball Throw Test
4. Assessment of Flexibility
    i. Sit and Reach Test (Trunk Flexion).
    ii. Back-Scratch Test
5. Assessment of Agility
    i. T-Test
    ii. Hexagon Test
    iii. 5-10-5 Test (Pro agility or 20-yard shuttle run)
    iv. Y-Shaped Reactive Agility Test
6. Assessment of Speed
    i. Straight-Line Sprint
    ii. Repeated Sprint Ability Test

SEMESTER – IV

COURSE CODE –23UC1CT401

CLINICAL NUTRITION AND DIETETICS

Learning Objectives

The main objectives of this course are to:

1. Obtain knowledge on role of diet in disease conditions.
2. Gain experience in planning, preparing and serving therapeutic diet.

UNIT – I Objectives of Diet Therapy: Objectives of diet therapy - Role of a dietician. Principles of diet preparation and counseling. Normal diet in the hospitals –, liquid, semi liquid, light, soft diet, bland diet and regular diet Different types of Feeding - Basic concepts of oral feeding, tube feeding, IV feeding, gastrostomy feeding.

UNIT – II Therapeutic Diets: Therapeutic diets for the following disorders- Underweight - definition, etiology, treatment Obesity - definition, etiology, treatment. Diseases of the gastro intestinal tract- ulcer, Constipation and diarrhoea. Diverticular Diseases, Crohn's Disease and Ulcerative Colitis.

UNIT – III Disease of Liver, Gall Bladder and Heart: Diseases of the liver and gall bladder (risk factors and diet therapy) jaundice, hepatitis, cirrhosis, fatty liver and Diet Therapy Diseases of the cardiovascular system (risk factors and diet therapy), atherosclerosis, arteriosclerosis, hypertension and congestive heart Failure.

UNIT – IV Diabetes Mellitus: Diabetes mellitus – Types, causes, symptoms, bio-chemical changes, insulin, hypo- glycemic drugs, types only, food exchange list, dietary management Diseases of the kidney and urinary tract - Acute and chronic nephritis, Nephrotic syndrome, Renal failure, Urinary calculi Causes and dietary treatment of kidney diseases and dialysis.

UNIT – V Diet in Allergy, Febrile Conditions, Stress & Cancer and AIDS: Diet in Allergy - Definition, classification, common food allergy, test of allergy, diet therapy. Diet in febrile conditions - Short duration -Typhoid, Long duration- Tuberculosis. Metabolic stress and cancer - Metabolic and clinical aberrations, diagnosis, complications, treatment, MNT and dietary counselling in Metabolic Stress -Surgery, Burns, Sepsis and Trauma Critical care, Cancer- General and Specific cancers, Effect of Cancer therapy on MNT, Diet in AIDS.

Reference Books:

1. Srilakshmi, B (2002) Dietetics, IVth Edition. New Age International (P) Limited, Publishers, New Delhi.
2. Joshi, S.J. (2002) Nutrition and dietetics, Tata McGraw- Hill publishing company limited, New Delhi.
3. Srilakshmi (2017) Nutrition science, New age international (P) limited, New Delhi.
4. Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders Company, Philadelphia, London.
5. Davidson S Passmore R, Brock JP (1999) Human Nutrition and Dietetics-, 10th Edition, ELBS and Churchill, Livingstone.
6. ICMR (2010) Nutrient Requirements and recommended dietary allowances for Indians.
7. Antia FP (1987) Clinical Dietetics and Nutrition, Oxford University Press, New Delhi.
8. https://www.rdehospital.nhs.uk/docs/trust/foi/foi_responses/2015/december/Enteral_feed ing_guideline~version_Jan_201411.pdf
9. https://www.kidney.org/sites/default/files/11-50-0114_docsnutrikidfail_stage1-4.pdf

Course Outcomes

After successful completion of the course the student will be able to

CO1	Gain knowledge about principles of diets therapy and different therapeutic diets.
CO2.	Develop aptitude for taking up dietetics as a profession
CO3.	Understand the pathology of diseases and apply nutritional principles to discuss dietary management.
CO4.	Gain knowledge on the etiological factor and treatment and dietary modification of obesity, underweight, disease of liver and gall bladder.
CO5.	Learn about the causes, types, biochemical changes, glycemic index o diabetes and disease of kidney.

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**S**	**M**	**S**	**M**
CO 2	**S**	**S**	**L**	**S**	**M**
CO 3	**S**	**S**	**M**	**S**	**S**
CO 4	**S**	**S**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – IV

COURSE CODE – 23UC1CT402
SPORTS BIOMECHANICS

COURSE OUTCOMES:

1. To enable the students to learn the basic concept of biomechanics.
2. Explain the basic mechanical concepts and will be able to interpret its relation to human body movements
3. To make the students to understand kinematic and kinetic concept of human movement.
4. Apply and analyze the factors of mechanical laws involved in human movement.
5. Explain the principles of movement analysis
6. To equip the students to learn the principle of aerodynamic and hydrodynamics.
7. Analyze the mechanical principles of motor skills and sports related skills along with their proper techniques and corrective measures.
8. To enable the students to acquire the skills of qualitative and quantitative of human movement.

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UNIT I Introduction Meaning, Importance and scope of Sports Biomechanics - Static and Dynamics – Kinematics and Kinetics - Vectors and Scalars - Historical development of Sports Biomechanics - branches of biomechanics - Definition and Meaning of terms: Distance, Displacement, Speed, Velocity, Acceleration, Mass, Weight. Momentum, Impulse, Torque, Newton's Law of Universal Gravity. Linear and angular kinematics – Linear and angular kinetics.

UNIT II Levers; types of levers, anatomical and mechanical levers and Mechanical Advantage – Human body levers - application of levers in sports. Equilibrium - types of equilibrium. Gravity – Definition, centre of gravity and location of centre of gravity, influence of gravity, location of human body centre of gravity - Factor affecting Center of Gravity - stability and balance.

UNIT III Motion and Force Meaning and definition of Motion. Types of Motion: Linear motion, angular motion, uniform and non-uniform motion. Principles of Newton law of Motion -Law of Inertia, Law of acceleration and Law of action and reaction. Meaning and definition of force, Sources of force -Force components, Centripetal force - Centrifugal force. Force applied at an angle –Buoyancy – Friction: static friction, kinetic friction. Aerodynamics: Water resistance - Air resistance. Mechanical loads on the human body; compression, tension and shear force.

UNIT IV Projectile and Lever Freely falling bodies - Projectiles -Equation of projectiles - factors affecting projectile trajectory; influence of air resistance - projection angle, projection speed, relative height of release. Meaning of work, power, energy, kinetic energy and potential energy. Meaning of Spin, Types of Spin, Effect of Spin on angle of rebound, Application of Spin in the Sports, Magnus Effect: Meaning and its application in sports.

UNIT V Posture – definition – static and dynamic posture – importance and benefits of good posture - causes of poor posture poor posture, compensatory posture. Vertebral alignment – development of postural curves - Standing posture – lateral view, anterior view, and posterior view. Fundamentals of gait - Meaning of gait, gait cycle divisions, Rancho Los Amigos gait terminology.

Kinematic concepts for analysing human movement - Kinematics; linear and angular kinematics distance, displacement, speed, velocity and acceleration-forms of motion, linear motion, angular motion and general motion.

References:

1. Paul Grimshaw et al. Sports & Exercise Biomechanics, Taylor & Francis Group, (2007).
2. Susan J. Hall, Basic Biomechanics, McGraw Hill Education, 2004.
3. Peter McGinnis Biomechanics of Sport 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. Roger Bartlett. Introduction to Sports Biomechanics, Spon Press, 1997
7. Knudson Duane V. Fundamentals of biomechanics, Springer, 2007.
8. Tomothy et al. Applied anatomy and biomechanics in sport (2nd edition), Human Kinetics, 2009
9. Steven T. McCaw. Biomechanics for dummies, John Wiley, 2014.
10. Anthony J. Blazevich. Sports Biomechanics (2nd edition), Bloomsbury, 2012

Course Outcomes

After successful completion of the course the student will be able to

CO1	To enable the students to learn the basic concept of biomechanics
CO2.	To make the students to understand kinematic and kinetic concept of human movement.
CO3.	Apply and analyze the factors of mechanical laws involved in human movement.
CO4.	Analyze the mechanical principles of motor skills and sports related skills along with their proper techniques and corrective measures.
CO5.	To enable the students to acquire the skills of qualitative and quantitative o human movement.

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – IV

COURSE CODE – 23UC1CT401

WEIGHT MANAGEMENT

Learning Objectives:

1. A systematic understanding of the care of patients in obesity and weight management.
2. A critical awareness of current issues affecting the care of patients undertaking weight and obesity management treatments.
3. An advanced knowledge of obesity and weight management that will facilitate decision-making in unpredictable and/or complex situations.

Unit - I Health Consequences of Physical inactivity and Sedentary Behavior

Definition of Physical Inactivity- Deconditioning- Prevalence of inactivity - Exercise is Medicine- Sedentary behaviors - Health Effects of Sedentary Behavior. Weight Management: Meaning, Concept of Weight Management in the Modern Era – Factors affecting Weight Management and Values of Weight Management - Maintaining a Healthy Life Style - Barriers to Lifestyle Changes - Body Mass Index (BMI)

UNIT – II Weight-Management Strategies for Overweight and Obese Individuals: Meaning and Definition of Overweight and Obese – Types – Causes and Solution for overcoming Obesity. Myths of Spot Reduction and Weight Loss – Principles of Lifestyle Modification – Behavioral Modification - Dietary Recommendations for Weight Loss- Exercise and Weight Loss.

UNIT - III Assessing Calorie Intake and Energy Expenditure: Energy Intake- Energy Expenditure-Impact of Diet on Food Intake- Impact of Exercise and Exercise Training on Food Intake - Resting or Basal Metabolism - Metabolism and Weight loss: Factors that Influence Metabolism - Basal Metabolic Rate and Methods for Measuring BMR - How Metabolism Affects Weight - How to Increase the Metabolism - Relationship between Metabolism and Caloric Intake

UNIT - IV Planning of Weight Management: Determination of Desirable Body Weight – Daily Caloric Intake and Expenditure – Balanced Diet for Indian School Children – Weight Management Programme for Sporty Children – Role of Diet and Exercise in Weight Management – Diet Plan and Exercise Schedule for Weight Gain and Loss. Weight Management for Special Populations - Pregnant and Postpartum Women - Weight Management for seniors - Weight Management for Persons with Disabilities

UNIT – V Human Body composition: Meaning and Definition of Body composition - Essential and Storage Fat - Assessment of Underwater weighing - Assessment of Dual-energy X-ray absorptiometry (DEXA) - Assessment of Bioelectrical Impedance Analysis- Assessment of Near infrared reactance (NIR) - Air Displacement Plethysmography- Measurement of Skinfolds Thickness. Assessment of Free Mass and Lean body mass - Ideal Body Weight - Assessment of Waist-to-hip ratio.

Reference Book

1. John P. Porcari, Cedric X. Bryant, Fabio Comana,(2015), Exercise physiology, F. A. Davis Company, 1915 Arch Street, Philadelphia.
2. Wadden TA, Stunkard AJ (Eds.). Handbook of obesity treatment. New York: The Guilford Press, 2004.
3. Fairburn CG, Brownell KD (Eds.). Eating disorders and obesity: A comprehensive handbook (2nd ed). New York: The Guilford Press, 2002.
4. Hill JO. Understanding and addressing the epidemic of obesity: An energy balance perspective. Endocrine Reviews 2006; 27(7):750-761.
5. Wardlaw, Smith. Contemporary Nutrition: A Functional Approach. 2nd ed: 2012. McGraw Hill. Williams, Melvin. Nutrition for health, fitness and sports. 2004. McGraw Hill
6. Joshi, A.S. Nutrition and Dietetics. 2010. Tata McGraw Hill.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the Health Consequences of Physical inactivity and Sedentary Behavior
CO2.	Apply the Weight-Management Strategies for Overweight and Obese individual
CO3.	Analyze the appropriate dietary guidelines for Assessing Calorie Intake and Energy Expenditure
CO4.	Develop indigenous, value added Planning for Weight Management
CO5.	Demonstrate the skills to assess the body composition by various methods

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SKILL ENHANCEMENT COURSE - VI

23UC1SE401	CLINICAL NUTRITION AND DIETETICS PRACTICUM-I

1. Collection of blood and separation of plasma and serum
2. Estimation of blood glucose
3. Estimation of total protein
4. Estimation of serum urea
5. Estimation of serum creatinine
6. Estimation of cholesterol
7. Estimation of Hemoglobin
8. Estimation of Urine Albumin
9. Estimation of Urine sugar
10. Planning, Calculation of nutrient content, Preparation and Service of diets for:
    i. Obesity
    ii. Diabetes Mellitus
    iii. Arteriosclerosis,
    iv. Hypertension and
    v. Congestive heart Failure
    vi. AIDS

SKILL ENHANCEMENT COURSE - VII

23UC1SE402	WEIGHT MANAGEMENT PRACTICUM-II

1. Assessment of Basal Metabolic Rate
2. Assessment of Resting Metabolic Rate
3. Assessment of Body mass (Weight)
4. Assessment of Stature (Height)
5. Assessment of Body mass index (BMI)
6. Assessment of Free Mass
7. Assessment of Fat free Mass
8. Assessment of Lean body mass
9. Calculation of Ideal Body Weight
10. Assessment of Waist-to-hip ratio
11. Measurement of Skinfolds Thickness of various sites
    i. Triceps
    ii. Biceps
    iii. Subscapular
    iv. Iliac crest
    v. Supraspinale
    vi. Abdominal
    vii. Front thigh
    viii. Medial calf
    ix. Cheek
    x. Chin
    xi. Mid-axillary
    xii. Chest
12. Assessment of Percentage Body Fat
13. Assessment of body composition through bioelectrical impedance

SEMESTER – V

COURSE CODE – 23UC1CT501

SPORTS NUTRITION

Learning Objectives:

1. It explores nutrition in the enhancement of health and fitness.
2. Demonstrate knowledge of a healthy diet for physical performance.
3. Provide individual advice and guidance in the area of sports nutrition.
4. Design and run a group consultation for athletes about sports nutrition.
5. Develop knowledge on sports nutrition.

UNIT I Science of sports nutrition : Definition of sports nutrition- Need and Importance of sports nutrition- Balanced Diet-Planning Balanced Diets-Recommended Dietary Allowances (RDAs) - Dietary Reference Intakes (DRIs) – Estimated Average Requirement (EAR), Adequate Intake (AI)-Dietary Guidelines- Reference Man and Reference women-Dietary Guidelines - Food guide pyramid - MyPlate- Food Labels.

UNIT II Energy Yielding Nutrition: Carbohydrates utilized during exercise-Carbohydrates consumed before exercise-Carbohydrates consumed during exercise-Carbohydrates consumed after exercise- Fats consumed before exercise-Fats consumed during exercise-Fats consumed after exercise-Protein consumed before exercise-Protein consumed during exercise-Protein consumed after exercise- Carbohydrates loading.

UNIT III Energy Metabolism : Definition of Energy and Metabolism – Anabolic process and Catabolic process- Basal Metabolic Rate (BMR) -Resting Metabolic Rate (RMR)-Factors affecting Basal Metabolic Rate (BMR) -Energy Cost of Physical Activities-Thermic Effect of Food- Estimation of Total Energy Needs-Calculating Total Energy Requirements-Energy balance- Human body's source of chemical energy: ATP-CP System- Lactic Acid system- Aerobic system.

UNIT IV Energy Needs for Athletes: Energy needs different for team sport athletes-Daily energy needs calculation for team sport athletes-Carbohydrate needs for team sport athletes-Protein needs for team sport athletes- Fat needs for team sport athletes-Vitamin and Mineral needs for team sport athletes-Fluid recommendations for team sport athletes-Foods recommended for athletes while traveling.

UNIT V Choosing A Performance Diet Weight Management- Regulation of body weight and composition: Genetic influences-Hormonal influences-Positive energy balance-Negative energy balance-Weight loss methods for athletes-Athletes Gain Weight

Healthfully- Vegetarian Diets-Vegetarian Diets and Health-Vegetarian Diets and Athletic Performance-Other Special Eating Plans: Paleo Diet-Raw Food Diet-Detox Diet-Other Diets – LCHF (Low Carbohydrate and High Fat diet).

Reference Books:

1. Natalie Digate Muth,(2015), Sports Nutrition for Health Professionals, F. A. Davis Company, 1915 Arch Street, Philadelphia,USA.
2. Heather Hedrick fink, Lisa A. Burgoon, Alan E. Mikesy, (2006), Practical Application in sports Nutrition", Jones and Barlett.
3. Robert E.C.Wildman, Barry S. Miller, (2004), "Sports and Fitness Nutrition", Thomson.
4. Deakin , Burke(2006), 3rd, Clinical Sports Nutrition, McGraw- Hill Austria.
5. Bean, Anitha (2006), 5thed, Sports Nutrition.
6. Bourns, Fred (ed), Essentials of Sports Nutrition, 2nd Ed (2002), John and Wiley.
7. Benardot, Don (2000), Advanced Sports Nutrition, Human Kinetics.
8. Burke, Louise (2007), Practical Sports Nutrition, Human Kinetics.
9. Gleeson, Jeukendrup (2004), Sports Nutrition: an introduction to energy production and performance, Human Kinetics.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the Need and Importance of sports nutrition
CO2.	Identify the energy yielding nutrition and their requirement before, during and after training.
CO3.	Analyzing and calculating energy requirement
CO4.	Apply the nutritional knowledge for preparing diet planning for various sports
CO5.	Demonstrate skills to plan and prepare appropriate and sustainable diets for body composition and weight management.

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – V

COURSE CODE – 23UC1CT502

STRENGTH TRAINING AND CONDITIONING FOR FITNESS

Learning Objectives:

1. This is designed to give opportunity to participate in many different activities to learn the immediate and long term benefits of physical activity
2. To develop personal strength training programme.
3. To Interpret and apply scientific knowledge and literature relating to strength training.
4. Understand the importance of organizations admin distraction and leadership and their importance in the development of a safe and effective training programs.

UNIT – I- Meaning and Definition of Strength training and conditioning-Benefits of resistance training-Principles of Resistance Training: Progressive overload- Specificity-Variation-Individualization and Detraining-Resistance Training Program Design: Exercise Selection-Exercise order and Workout Structure-Intensity-Training Volume-Rest Intervals-Repetition Velocity-Frequency.

UNIT – II- Competitive forms of Resistance Training- Resistance Training Modalities: Body Weight-Manual or Partner Resistance-Free Weights: Advantages-Disadvantages - Machines: Advantages-Disadvantages - Free Weights versus Machines-Medicine Balls, Stability Balls, Bosu Balls, and Other Balance Devices-Elastic Bands, Tubing, Chains, and springs.

UNIT – III- The SAID Principle: Mechanical specificity-Neuromuscular specificity-Metabolic specificity-Progressive Adaptations from Resistance Training: Stabilization-Muscular endurance-Muscular hypertrophy-Strength-Power-Resistance Training Systems: The Single-Set System-The Multiple-Set System-The Pyramid System-The Superset System-Drop-Sets-The Circuit-Training System-The Peripheral Heart Action System-The Split-Routine System-Vertical Loading and Horizontal Loading.

UNIT - IV Cardiorespiratory Fitness: Benefits of Cardiorespiratory Fitness-Cardiorespiratory Fitness Training: Warm-Up Phase-Conditioning phase-Cool-down phase-General Guidelines for Cardiorespiratory Training: Frequency-Intensity-Time-Type-Methods for Prescribing Exercise Intensity.

UNIT – V Warm-up and cool-down- Physiology of Warming Up- Flexibility- Flexibility and Injury Prevention- Factors Affecting Flexibility- Types of Stretching: Static Stretching- Dynamic Stretching- Proprioceptive Neuromuscular Facilitation Stretching - Flexibility Training Guidelines - The Cool down

Reference Book

1. Micheal A. Clark, Scott C. Lucett, and Brian G. Sutton,(2012), NASM Essentials of Personal Fitness Training, Fourth Edition, Lippincott Williams & Wilkins, a Wolters Kluwer business, Two Commerce Square, 2001Market Street, Philadelphia, PA 19103 USA.
2. Nicholas Ratamess, (2012), ACSM's Foundations of Strength Training and Conditioning, Lippincott Williams & Wilkins.
3. Thomas R. Baechle, and Roger W. Earl, (2008), Essentials of Strength Training and Conditioning, Human Kinetics, P.O. Box 5076, Champaign, USA.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the benefits of strength training
CO2.	identify the different modalities of weight training to prepare for competition
CO3.	Analyze the neuromuscular adaptation to strength training
CO4.	To understand the effect of strength training on Cardiorespiratory Fitness
CO5.	To understand the Physiology of Warming Up and cool down

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- V

COURSE CODE – 23UC1CT503
RESEARCH METHODOLOGY AND STATISTICS

LEARNING OBJECTIVES

After completing this subject we will be able to understand about

- Learning research methodology will be able to understand and comprehend the basics in research and applying them in Exercise Physiology and Nutrition
- Need of Statistics for analyzing the data
- How to analysis the problem using statistics tools and to interpretation the result.

Unit I-Introduction

Definition of research – Meaning, Need, Important of research in Exercise Physiology and Nutrition, Qualities of good research, classification of research – Basic Research, Action Research, Applied Research, Philosophical Research, and Historical Research**.**

Unit II-Methods of Research

Experimental Research – Comparative and Analytical Research – Descriptive Research Methods–Need,Importance and Tools of Survey, Case Study, Interview Technique.

Sampling - Need For Sampling; Advantages – Disadvantages; Sampling Method, Probaility and Non-Probability Sampling Method,Random Sampling Design- Simple Random Sampling; Stratified Sampling-Proportionate Sampling-Cluster Sampling-MultistageSampling, Systematic Sampling, Sequential Sampling.

Unit III – Basic Definitions

Meaning and definition of Statistics , Raw Score , Attribute, Variable – Type of Variable , Data – Type of Data , Population , sample, Parameter , Statistic , Frequency distribution , Construction of frequency distribution.

Unit IV – Measures of Central tendency and Variability

Meaning, Types of Central tendency – Mean, Median, Mode – Calculation, Merits and Demerits of Central tendency. Meaning, Types of Variability – Range, Mean deviation, Quartile deviation and Standard deviation – Calculation .Merits and demerits of Variability.

Unit V– Graphs and Testing of Hypothesis

Graphical representation in Statistics Line diagram, Bar diagram, Histogram, Frequency curve, Frequency Polygon, Pie diagram. Advantages of graphs. Meaning of Correlation ,

Pearson product moment correlation , Rank order correlation , Chi – square test , Independent of attribute , Equal Occurance test , Test of significance – Hypothesis , Types of Error , Acceptance region , Rejection region , Level of Significance , 't' test – Independent and Dependent 't' test.

TEXT BOOK

1. Conover, W.J. Practical Nonparametric statistics, 2nd edition. New York; John wiley& sons, 1980.
2. Gibbons,J.D., and Chakraborti. S., Nonparametric Statistical Inference, 3d ed., New York, Marcel Dekker. 1992.
3. Kraft, Charles H. and Van Eeden. Constance A Nonparametric Introduction to Statistics. New York: Macmillian, 1968.
4. Author's Guide: "Research Methods Applied to Health Physical Education and Recreation", Washington, D.C., 1991.
5. Best J.W., "Research in Education", Prentice Hall, New Delhi 1982.
6. Clarke H. David, "Research Processes in Physical Education, Recreation and Health", Prentice Hall Inc, Englewood Cliffs, New Jersey, 1985.
7. Kamlesh M.L., "Methodology of Research in Physical Education and Recreation", AHPER, Washington D.C., 1973

REFERENCE BOOK

1. Owen, D.B. Handbook of Statiscal Tables. Reading, Mass; Addison- Wesley, 1962.
2. Siegel, Sidney. Nonparametric statistics for the behavioral Sciences. New York : McGraw-Hill, 1956.
3. VarmaJ.Prakash ; Sports Statistics Copyright 2000 by Venus Publication.

SEMESTER – V

COURSE CODE – 23UC1CT504

ERGOGENIC AIDS

Learning Objectives:

1. Provide students to the basics of sports nutrition and the efficacy of nutritional ergogenics.
2. Gain in depth knowledge on one nutritional ergogenic aids.
3. To evaluate an athlete's diet and make valuable nutritional recommendations that will impact his/ her sports performance.

UNIT – I Introduction to Ergogenic aids

Definition of Ergogenic aids – Types of Ergogenic aids - Dietary supplements – Weight-Loss Supplements - Health Supplements - Herbal Supplements - Antioxidants – self management education – Phytochemical rich foods – Anthocyanidins – ascorbic acid – Beta carotene – ellagic acid – Flavonols – Flavanones – Flavones – Isoflavons – Lutein – Lycopene – Organosulfur compounds .

UNIT –II Common Performance enhancing Substances

Potential Benefits, Risks, and Side Effects of Amino Acids, Beta-alanine, Beta-Hydroxy Beta-Methyl butyrate (HMB) – Creatine – Multivitamins - Omega-3 Fatty Acids – Protein - Ribose – L-Carnitine – Chromium - Sodium bicarbonate - Amino Acids- Whey and Casein-Glutamine - Coenzyme Q_{10} - Ginseng and Ephedrine – Diuretics- caffeine

UNIT – III Regulation of anti-doping in sport: WADA-IOC- Doping agency – History of the anti-doping movement – Definition of Doping - Purpose, Scope of the World Anti-Doping Program and the Code - Blood Doping in sports - Effects of Blood Doping - Erythropoietin - Effect of Exogenous administration of erythropoietin - Oxygen Supplementation.

UNIT - IV Illegal Performance enhancing Substances: Potential Benefits, Risks, and Side Effects of Anabolic steroids – Dehydroepiandrosterone (DHEA) – Androstenedione - Human growth hormone (HGH). Amphetamines – β-Blockers- Stimulants- Signs and Symptoms of Ergogenic Aid Abuse. 19 – nonandrostenedione and 19 norandrostenediol – – Corticotrophins- Beta-2 agonists.

UNIT- V Gene doping: History of gene doping in sport- Action and use of gene doping in sport- Narcotics - action and use of narcotics in sport – Cannabinoids: Cannabinoids in sport- Glucocorticoids: Clinical uses, side effects and mode of action- Physiological and pharmacological effects- Alcohol- Alcohol use in sport.

Reference Book

1. Bell, D., Jacobs, I., and Zameenik J. (1998), effects of caffeine, ephedrine and their combination on time to exhaustion during high intensity exercise. Europeon Journal of Applied Physiology, 427-433.
2. Website http / www. Webmd.com/ fitness-exercise/human-growth-hormone hgh.
3. Jerry E. Graham and Lawrence L. Sprite (1996), Caffeine and Exercise performance. Gastorade Sports science Institute,9(i) Retrieved from http./www.gssiweb.org/Articles /Sse-60-caffeine and exercise performance.
4. Pharmochological ergogenic aids (n.d.) Retrieved Nov.30, 2015 from http/www.getfit.net/body/ physiology/ ergogenic/ pharmachological.htm.
5. Whitney.E. and Rolfes, S. 2013. Supplements as Ergogenic aids, understanding nutrition (14thed), Belmont, CA; Thomson/ Wadsworth.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the various types of Ergogenic aids
CO2.	Identify nutrition-related Common Performance-enhancing Substances
CO3.	To understand the Regulation of anti-doping in sport
CO4.	To understand the concepts of Illegal Performance-enhancing Substances
CO5.	To understand the concepts of gene doping in sport

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – V

COURSE CODE – 23UC1CE501
NUTRITION THROUGH LIFECYCLE

Learning Objectives

The learners will be able to

1. Understand the role of nutrition in the growth and development through the lifecycle
2. Gain insight into the principles of effective meal planning.
3. Understand the nutritional needs of various age groups.
4. Acquire skills to plan diets for various age groups across the lifecycle.

Unit-I- Introduction to meal planning - Balanced diet, food groups, Food Guide Pyramid (ICMR), Food plate, RDA, factors affecting RDA. Principles of meal planning – steps involved in planning a diet. **Nutrition for Adult -** Food and nutrient requirements for adult man and women, RDA, nutritional guidelines, changes in consumption pattern- physical, mental and social changes influencing meal pattern.

Unit-II Nutrition during pregnancy- Physiological changes in pregnancy, RDA, nutritional guidelines, nutritional needs, effect of nutritional status on pregnancy outcome, optimal weight gain and its components, nutrition related problems in pregnancy and ways to control them, complications in pregnancy. **Nutrition during lactation-** Physiology of lactation, RDA and nutritional needs of a nursing mother, nutritional guidelines, composition of breast milk and advantages, disadvantages of bottle feeding

Unit-III Nutrition during infancy- Growth and development, growth standards, food and nutrient requirements, breast feeding, comparison of human milk with cow's milk, weaning and supplementary foods, weaning problems and complications. Characteristics of low birth weight infant, small for date babies, pre-term babies- Feeding of preterm infants.

Unit-IV Nutrition for Pre-schoolers and School Age Children: Nutrition in preschool age – Growth and development, nutritional requirements, factors affecting nutritional status, nutrition and cognitive development, food requirement, low cost supplementary foods, nutrition related problems among the preschool children, meal planning for the preschool child. **Nutrition in the school age children** – Growth pattern in school children, nutritional and food requirement, packed lunch – factors to be considered, nutritional problems, meal plan for the school children.

Unit-V Nutrition in Adolescence and Elderly: Nutrition in adolescence - growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and meal plan. Eating disorders-Binge eating, anorexia nervosa, bulimia nervosa. **Nutrition in elderly:** definition of geriatrics, changes in body composition, physiological changes, theories of aging, psychological and socio- economic factors in relation to food intake, menopausal and post-menopausal women- hormonal changes, nutritional requirement, food modification in old age. Nutrition related problems.

Reference Book:

1. Srilakshmi B. (2011) Dietetics, sixth edition, New age Publishing Press, New Delhi.
2. Gopalan,C., Ramanathan, P.V. Balasubramanian, S.C. (2001) Nutritive value of Indian foods, NIN, Hyderabad.
3. Longvah T, Ananthan R, Bhaskar K, Venkaiah K. (2017) Indian Food Composition Tables, National Institute of Nutrition.
4. Abraham S, Nutrition through Lifecycle. (2016) 1st edition, New age international publishers, New Delhi.
5. Stacy N, William's Basic Nutrition and Diet Therapy. (2005) 12th edition, Elseivier publications, United Kingdom.
6. Whitney EN and Rolfes SR, Understanding Nutrition. (2002) 9th edition West/Wordsworth, London.
7. Groff JL, Gropper SS, Advanced Nutrition and Human Metabolism.(2000) 3rd edition, West / Wadsworth, United Kingdom.
8. Cataldo, DeBruyne and Whitney, Nutrition and Diet therapy– Principles and Practice.(1999) 5th edition, West/ Wadsworth, London.
9. Swaminathan, M., (2012), Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore.
10. Shubhangini, A., Joshi (2002): Nutrition and Dietetics, 2nd edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.
11. Krishnasamy, K. and Sesikeran, B., (2013), Dietary Guidelines for Indians, National Institute of Nutrition, ICMR, Hyderabad.

E-Learning Resources

1. http://vikaspedia.in/health/nutrition/dietary-guidelines-1/dietary-guideline-1
2. https://www.nhp.gov.in/healthlyliving/healthy-diet
3. https://motherchildnutrition.org/india/complementary-feeding-guidelines.html
4. http://vikaspedia.in/health/nutrition/dietary-guidelines-1/diet-for-children-and-adolescents
5. https://motherchildnutrition.org/india/complementary-feeding-guidelines.html
6. https://sol.du.ac.in/mod/book/view.php?id=1422&chapterid=1288

Course Outcomes

After successful completion of the course the student will be able to

CO1	Explain the physiological basis for nutritional needs through the human lifecycle
CO2.	Identify nutrition related concerns and deficiency disorders at every stage of lifecycle
CO3.	Discuss appropriate dietary guidelines for various age groups
CO4.	Develop indigenous, value added and low cost complementary feeds
CO5.	Demonstrate skills to plan and prepare appropriate and sustainable diets for deficiency diseases

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – V

COURSE CODE – 23UC1CE502
SPORTS AND EXERCISE PSYCHOLOGY

Learning Objective:

This paper aims at imparting and understanding about sports psychology and its relation to different sports

1. Historical development and scope
2. Understanding personality, motivation, emotion and its relationship with performance

UNIT 1: Basics of Sport & Exercise Psychology

Introduction (Meaning, Definition, Historical Development need and scope of Exercise and sports psychology, History of Sports Psychology in India) - Relationship of Sports Psychology with other Sports Sciences. Methods of Psychology (Introspection method, Observation method, Experimental method, Case study method. Questionnaire method, Interview method, Survey method)- Importance of Sport Psychology for Athletes, Coaches and other related to Sport Setting

UNIT II: Personality and Performance

Personality and Performance (Meaning, Definition and Structure of Personality)-Personality theories [Psychoanalysis, Humanistic, Trait Theories and models] - Constitutional theories (Sheldon, Trait) and Social Learning (Bandura) - Personality and Performance in Sports (Ice Berg Profile by Morgan)

UNIT III: Motivation and Performance

Motivation & Goal Setting (Meaning, Definition and Structure of Motivation [Need, Drive, Motive and Motivation Types] - Theories of motivation [Abraham Maslow, Need Achievement by McClelland] Self-Determination model - Techniques for Developing Motivation, Goal Setting –Locke GST. Motivation-Performance Relationship.

UNIT IV: Emotion and Performance

Meaning and Definition of Emotion - Meaning, Definition of Anxiety, Types of Anxiety-Meaning, Definition and Nature of Arousal and Stress, Theories [Drive theory, Inverted – U theory & IZOF]-Emotion Performance Relationship.

UNIT V: Motor Learning and Motor **control:**

Meaning and Definition of Motor Learning and Motor control – Neuroanatomy: cerebellum, basal ganglia, supplementary motor cortex, premotor cortex, and motor cortex. Peripheral Motor System- General Motor Control Theories: Closed-loop Theory- Open-loop Theory.

Reference Book

1. Ciccarelli, S. K & Meyer, G.E (2008*). Psychology (South Asian Edition).* New Delhi: Pearson
2. Glassman,W.E.(2000).*Approaches to Psychology(3rd Ed.)* Buckingham: Open University Press.
3. Passer, M.W., Smith, R.E., Holt, N. and Bremner, A. (2008). *Psychology: The Science of Mind and Behaviour.*McGraw-Hill Education.UK
4. Weinberg, R. S., & Gould, D. (1995). *Foundations of sport and exercise psychology* (Vol. 4). Champaign, IL: Human Kinetics.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the concepts of Basics of Sport & Exercise Psychology
CO2.	Analyze the Personality traits of sports Performance enhancement
CO3.	Analyze the Motivation for sports Performance enhancement
CO4.	Gain knowledge on Emotion and sports Performance enhancement
CO5.	To understand the concepts of Motor Learning and Motor control

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – V

COURSE CODE – 23UC1VE501

VALUE EDUCATION

Course Objectives

1. To incorporate human values in educational system.
2. To imbibe deeper understanding of the need and importance of value-based living.
3. To develop an honourable character.
4. To make the students understand how values lead to success.
5. To make the student realize that all the problems can be solved by one's innate goodness

Unit I: Truth Doesn't Change with Time

1. Universal and Ethical Values
2. Integrity
3. Honesty

Unit II: Living with Values Leads to Success

1. Ethics – Conscience and Loyalty
2. Characteristic Features of an Honourable Person
3. If by Rudyard Kipling

Unit III: Development of Character

1. Character – a Learnt Behaviour
2. Reputation and Character
3. Honourable Character Building

Unit IV: Effect of Thought on Character

1. Man is the Master of Thought
2. Thoughts Crystallize into Habits
3. Good Thoughts and Actions Produce Good Results

Unit V: How to conquer your Problem

1. God is with you to Solve Your Problems
2. You are Greater Than Your Problem
3. Every Human Being has the Built-in Potential to Solve All his Problems

Course Outcomes

1. The students understand the importance of value-based living.
2. Students become aware of the Universal Value System.
3. Students learn how success is directly value based
4. Students develop an honorable character.
5. Students learn to face all the problems courageously

Text Books:

1. Khera, Shiv, Living with Honour, Macmillan Publishers India limited, Chennai, 2003. (Chapters1: Principles of Honour, Chapter 2: Foundation for Success, Chapter 4: Character and Reputation)
2. Peale, Norman Vincent, The Positive way to Change Your Life, Cedar Books (Chapters 3: The Concept That Conquers problems)
3. Alen, James, As a Man Thinketh , Finger print Publishing , 2017 (Chapter 1: Thought and Character, Chapter 2: Effect of Thought on Circumstances).

Supplementary Readings

1. Nagarajan. A Text Book on Professional Ethics and Human Values. New Age International limited Publishers, 2006.
2. Kalam, Abdul. My journey –Transforming Dreams into Actions. Rupa Publications, 2013

SEMESTER – VI

COURSE CODE – 23UC1CT601

APPLIED EXERCISE PHYSIOLOGY

Learning Objectives:

1. To develop the knowledge, understanding on the functioning of different systems of the body and to have in depth knowledge on the effect of different training modalities on these systems

UNIT –I Cardiovascular System – Structure and functions of heart- Heart rate stroke volume – cardiac output- blood pressure – system of circulation - cardiac muscle – Arterial - Venous Oxygen Difference (a-v O_2 diff) –- blood flow—Availability of nutrients – Acute Response to Cardiovascular Exercise- chronic adaptations to Cardiovascular Exercise.

UNIT –II Respiratory system – structure and functions of Respiratory system – Mechanics of Breathing – Pulmonary Ventilation- Lung Volumes and Capacities- Diffusion of Gases– Respiratory muscles – homeostasis – PH – oxygen Debt – Oxygen Deficit - acute and chronic effect of training on Respiratory system.

UNIT –III- Muscular system – types of muscle – Microscopic Structure of Skeletal Muscle - types of muscle fibre – Sliding-Filament Theory of Muscle Contraction Definition of – Hyperplasia -Hypertrophy - muscle tone - MET – Posture – Body coordination –muscle spindle – Golgi tendon - Skeletal Muscle Characteristics and Adaptations.

UNIT –IV- Nervous System – Structure and functions of Neuron – sympathetic and parasympathetic nervous system – Action Potentials –All-or-None -Law- Depolarization - Repolarization – Refractory Period – Reflexes- spinal card – brain - Motor Control Functions of the Brain- motor unit – Neural Adaptations to Training.

UNIT –V- Neuroendocrinology- Hormones: Regulation and Action of Hypothalamus and the Pituitary Gland - Thyroid Gland, Parathyroid Gland, Adrenal Gland, Pancreas and Testes and Ovaries – Exercise and hormones.

Reference Books:

1. William D. Mcardle, Frank I. Katch, Victor L. Katch, (2005), “Essentials of exercise physiology “, Lippincott Williams and Wilkins.
2. Victor L. Katch, Frank. I. Katch, William D. Mcardle, (2003), “Essentials of exercise physiology “, Williams and Wilkins.
3. Lorry G. Shaver, (1981) “Essentials of exercise physiology” Delhi: Surjeeth Publications.
4. William E.Garrett J.R., Donald T. Kirendall, (2000), Exercise and sports science”, Lippincott Williams and Wilkins.
5. McArdle William D. (1998), “Essentials of exercise physiology” Malveern, Pennsylvania: Lea and Febiger.
6. Roger M. Enoka, (2002), “Neuromechanics of human movement”, Human Kinetics.
7. Fox, Edward L. and Mathews Donald K. (1981), The Physiological basis for Exercise and Sports”, Kerper Boulevard, Dubuue: Wm. C. Brown Communications, Inc.
8. Amrit Kumar R. Moses, (1995), “Introduction to Exercise Physiology”, poompugarpathipagam.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the acute response to Cardiovascular Exercise and chronic adaptations to Cardiovascular Exercise
CO2.	Identify the acute and chronic effects of training on the Respiratory
CO3.	Gain knowledge on Skeletal Muscle Characteristics and Adaptations due to various training.
CO4.	Gain knowledge on Neural Adaptations due to various training.
CO5.	To understand the training effects on hormone

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER- VI

COURSE CODE – 23UC1CT602
CLINICAL EXERCISE PHYSIOLOGY

Learning Objectives:

1. To understand the relationship between exercise and Overweight versus Obesity
2. To understand knowledge of various factors that must be considered in planning and implementing detailed exercise programme on diseased populations.
3. Students will be able to define terminology related to exercise for special populations.
4. Will be able to explain general principles of exercise prescription for special populations.
5. Able to identify the important differences between children and adult.

UNIT - I- Overweight versus Obesity- Estimation of Body Fatness Using Body Mass Index-Use of Body Mass Index in the Clinical Setting - **Fat Cell Size and Number:** Hypertrophy versus Hyperplasia - Specific Health Risks of Excessive Body Fat- Importance of Body-Fat Distribution Pattern- Influence of Genetics Versus Environmental Factors.

UNIT-II- Meaning and Definition of Exercise and ageing- Theories of ageing: Biological theories-Psychological theories-Sociological theories- Impact of Ageing on Major Physiological Systems and Performance: Cardiovascular and respiratory systems-Musculoskeletal system-Nervous system-Endocrine system -Exercise guidelines for older people.

UNIT-III- Meaning and Definition of Arthritis- Types of Arthritis: osteoarthritis and rheumatoid arthritis- Epidemiology-Pathophysiology-Exercise for Osteoarthritis and Rheumatoid Arthritis: Aerobic activity-Flexibility exercise-Proprioceptive exercise-Strength training for osteoarthritis and rheumatoid arthritis.

UNIT – IV- Meaning and Definition of Osteoporosis and Osteopenia- Risk factors for osteoporosis and osteopenia-Assessment of osteoporosis-Physical Activity and Bone Health: Exercise guidelines -Jumping-Walking-Resistance training- Asthma-Diagnosis and Causes- Prevention of Asthma- Exercise-Induced Asthma.

UNIT – V- Relative Energy Diet (RED-S) - Physiology of the Exercising Female: Definition of menstrual cycles-Regulation of Menstrual Cycle – Menstrual disorders for female athletes. The menopause-Cause for Menopause-Physical activity guidelines for the

postmenopausal female- Pregnancy-Changes in Physiological Systems-Physical activity guidelines for the pregnant female-Special Considerations.

Reference Books:

1. John P. Buckley, (2008), Exercise Physiology in Special Populations, Advances in Sport and Exercise Science, Churchill Livingstone/Elsevier.
2. Sembulingam. K and Prema Sembulingam, (2012), Essentials of Medical Physiology, Jaypee Brothers Medical Publishers (P) Ltd, Ansari Road, Daryaganj, New Delhi.
3. Longenbaker, Susannah Nelson, (2017), Mader's Understanding, Human Anatomy & Physiology, McGraw-Hill Education, 2 Penn Plaza, New York.
4. Scott J. Power and Edward Howley, (2009), Exercise Physiology Theory and Application to Fitness and Performance, McGraw-Hill Higher Education, Boston Burr Ridge, IL Dubuque, IA New York.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To understand the physiology of Overweight and Obesity
CO2.	To understand the aging in the body system and Exercise guidelines for older people.
CO3.	Gain knowledge of Strength training for osteoarthritis and rheumatoid
CO4.	Gain knowledge of Strength training for Osteoporosis and Osteopenia.
CO5.	To understand Menstrual disorders for female athletes

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – VI

COURSE CODE –23UC1CE60I

NUTRITION FOR HEALTH, FITNESS AND SPORT

Learning Objective:

1. To enable the students to understand the nutritional problems of the community and gain skills in planning, executing and evaluating community nutrition services and planning.
2. The students will be proficient in planning menus with macro and micronutrients for various sports.

Unit I Meal Planning and Preparation: Principles of meal planning-Planning and preparation of nutritionally adequate diets for Adult man - Adult woman- Adolescent - School going child - Preschooler- Nutrition for Active Pregnant woman and Lactating woman- Special Nutritional Concerns: Vegetarian diets-The types of vegetarian:Flexitarian-Lacto-Ovo-Vegetarian-Lacto-Vegetarian-Ovo-Vegetarian-Vegan-Other Styles (Fruitarians)-Nutrition Challenges for Vegetarians.

Unit II Energy and Sports Performance: Dietary Carbohydrate and Sports Performance-Dietary Fat and Sports Performance-Dietary Protein and Sports Performance-Vitamins and Sports Performance-Minerals and Sports Performance-The Pre-competition Meal-Liquid Meals-Planning and preparation of Energy dense recipes- High fibre recipes- Low fat recipes- Low sodium recipes- Antioxidants, Exercise and free radicals, Role of antioxidants in preventing damage and recovery time.

Unit III Current Trends in Nutrition: Nutrigenetics – Nutrigenomics - Immunonutrition Nutrition - Immunity Interactions - Antioxidants and Immune Function - Physiological Regulation of Feeding. Appetite and Satiety - Psychology and Nutrition - Nutrition and Sleep - Update on Nutritional Objectives and Recommended Intakes - New Evidence on the Mediterranean Diet

Unit IV - Water Balance and imbalance: Euhydration, Hypohydration, and Hyperhydration-Thermoregulation-Hyponatremia-Dehydration-Rehydration- Fluid balance in sports and exercise, importance, symptoms and prevention of dehydration-Age-Related Fluid Needs -Sports Drink – Hypotonic, Isotonic and Hypertonic drink for hydration/ energy and recovery drink-Other Types of Drinks: Energy Drinks-Oral Rehydration Solutions (ORS)-Sports Waters-Vitamin Waters-Coconut Water-Alcohol-Tea, Coffee and Cola.

Unit V- Paralympic sports: Classification of disabilities - Physiology and metabolism-Physiological responses to exercise-Energy expenditure-Thermoregulation-Body

composition-Bone density-Dietary issues for athletes with disabilities: Current dietary intakes-Fiber, timing of food intake and bowel control-Fluid intake-Body composition management-Nutritional supplements-Eating difficulties and behaviors observed in some athletes with disabilities

Reference Books

1. Louise Burke and Vicki Deakin, (2010), Clinical Sports Nutrition, the McGraw-Hill Companies, Sydney New York.
2. Glenn Cardwell, (2012), Gold Medal Nutrition, Fifth Edition, Human Kinetics, 57A Price Avenue, Lower Mitcham, Australia.
3. Natalie DigateMuth, (2015), Sports Nutrition for Health Professionals, F. A. Davis Company, 1915 Arch Street, Philadelphia, USA.
4. Corinne H. Robinson, Emma S. Weigley Donna H. Mueller, Basic Nutrition and Diet Therapy 7 ed, Macmillon Publishing Company
5. L. Anderson Dibble P. R. Turkki H. S. Michael H. J. Ryribergen J. B, Nutrition in Health and Disease 17th ed , Lippincott Company, Philadelphia
6. Sumati R. Mudambi and M. V. Rajagopal , Fundamentals of Food & Nutrition, New Age International (P) Ltd. Bombay.

Course Outcomes

After successful completion of the course the student will be able to

CO1	Explain the physiological basis for nutritional needs through the human lifecycle
CO2.	Identify nutrition related concerns and deficiency disorders at every stage of lifecycle
CO3.	Discuss appropriate dietary guidelines for various age groups
CO4.	Develop indigenous, value added and low cost complementary feeds
CO5.	Demonstrate skills to plan and prepare appropriate and sustainable diets for deficiency diseases

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**L**	**M**	**S**	**M**
CO 2	**S**	**M**	**L**	**S**	**M**
CO 3	**S**	**M**	**M**	**S**	**S**
CO 4	**S**	**M**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – VI

COURSE CODE–23UC1CE602

INTRODUCTION TO SPORTS INJURY AND REHABILITATION

Learning Objectives:

1. Develop a complete regime of treatment for athletic injuries including prevention, immediate and ongoing care, and follow-up.
2. Learn a rehabilitation plan, which will incorporate principles of coaching, protective equipment design and modification, conditioning techniques.
3. Determine and organize the therapy supplies required for a team during training, home competition, and travel.
4. Recognize trends/injury patterns within a team situation and on an individual basis.
5. Deal with emergency situationsKnow the limits of basic first aid

UNIT – I Meaning and definition and importance of Sports injury – Prevention of sports injuries – classification of injuries. Open injuries: Abrasion, Laceration, Incision, Puncture, Avulsion. Closed injuries: Sprain, strain, Subluxation, dislocation, fracture, contusion, Muscle cramp; its first aid and treatments.

UNIT – II Principles of injury prevention – warm – up & cool down – stretching – static, dynamic, ballistic, PNF stretching – protective equipments & shoes. Principles of rehabilitation – muscle conditioning – flexibility – proprioceptive sports skills – cardiovascular fitness – progression & stages of rehabilitation – return to sports.

Unit – III Introduction to First Aid- Definition and meaning First Aid– Principles – First aid Kit. First Aid for Bleeding, Epilepsy, Shock, Drowning, Heart attack, Heat stroke, Snake bite. Types of Dressing and bandages- Cardio Pulmonary Resuscitation. Electric shock, burning, blisters

UNIT – IV Definition and Principles of therapeutic exercises. Coordination exercise, Balance training exercise, Strengthening exercise, Mobilization exercise, Gait training, Gym ball exercise. Injuries: acute, sub-acute, and chronic. Advantages and Disadvantages of PRICER therapy, Aquatic therapy.

UNIT – V Physiotherapy: Definition and Guiding principles. Hydrotherapy: Cryotherapy, Ice pack, Ice wrap, Ice massage, Ice towel. Thermo therapy: - Hot bag, Contrast bath,

Whirlpool bath. Electro therapy: Short wave diathermy, Infrared therapy, Ultrasound therapy. Wax therapy, Traction Unit.

Reference Book

1. Christopher M. (1993). Norris Sports Injuries Diagnosis and Management for Physiotherapists, East Kilbride: Thomson Litho Ltd.
2. ClearеMaxwell.,& Hudson. (1998). The Complete Book of Massage. London: Dorling Kindersley Ltd.
3. James, A. Gould.,& George J. Davies. (1985). Physical Therapy. Toronto: C.V. Mosby Company.
4. Morris, B. Mellin (1989). Sports Injuries and Athletic Problems. New Delhi: Surjeet Publication.
5. Steven Roy., & Richard Irvin. (1983). Sports Medicine. New Jersey: Prentice - Hall Inc.
6. The Encyclopedia of Sports Medicine. (1998). The Olympic Book of Sports Medicine. Australia: Tittel Blackwell scientific publications.

Course Outcomes

After successful completion of the course the student will be able to

CO1	To know and understand the science, methods, techniques and instruments on which physiotherapy is based.
CO2.	To know and understand the methods, procedures and actions expected in clinical contexts, as well as to employ physiotherapy as an educational tool for promoting and maintaining health.
CO3.	To participate in the areas of the promotion, prevention, protection and recovery of health.
CO4.	To learn in the development of physiotherapy protocols based on scientific evidence that promotes research in physiotherapy.
CO5.	To understand the importance of upgrading knowledge, skills and attitudes Familiarise themselves with First Aid regulations of 2002

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	**S**	**S**	**M**	**S**	**M**
CO 2	**S**	**S**	**L**	**S**	**M**
CO 3	**S**	**S**	**M**	**S**	**S**
CO 4	**S**	**S**	**M**	**S**	**M**
CO 5	**S**	**S**	**M**	**S**	**S**

***S-Strong 3 ; M-Medium 2 ; L-Low 1**

SEMESTER – VI

COURSE CODE – 23UC1CP601
PROJECT: THESIS (P)

Scope: This project report deals with the interpretation of data collected for the research work. The topic which was selected by the student in 5th semester will be concluded in 6th semester. Each group of minimum 5 students formed in 5th semester will be presenting a thesis along with PPTs.

Each group will be under the supervision of a faculty allotted to them and under their guidance they will complete their research work, which will be submitted in the form of thesis.

Project: Based on their field experience and data/information collected, each group of minimum 5 students will jointly analyze quantitative and qualitative aspects from different sports related arenas for data collection.

The students will master the art of writing the theory part of the project Report under the following chapters:

1. Title Page
2. Acknowledgement
3. Abstract
4. Table of Contents
5. Introduction
6. Review of related literature
7. Procedure and methodology
8. Results & discussion
9. Discussions, summary and conclusions
10. Bibliography / References.

Examination: The examiner will give marks on the basis of documentation/presentation of research work, data analysis technique, explanation and understanding of results and conclusions, future recommendations.