SPORTS AUTHORITY OF INDIA

NETAJI SUBHAS NATIONAL INSTITUTE OF SPORTS

OLD MOTI BAGH: PATIALA-147001

Post Graduate Diploma in Exercise Physiology (One Year)

Session 2023 – 24 Onwards

2024-25

ORDINANCES

One Year
Post Graduate Diploma in Exercise Physiology
(semester system)
Course Code- **EXPD1PUP**

1. The examination for the degree of *Post Graduate Diploma in Exercise Physiology (One Year)* be held in one academic year to be called *Post Graduate Diploma in Exercise Physiology (One Year)* shall consist of two Semesters viz. Semester 1st and 2nd.The examination of the Semester 1st and 2nd shall be held as per the Academic calendar of Punjabi University, Patiala.
2. Eligibility: Must Possess Any One of The Following Qualifications with atleast 50% Marks in The Aggregate

- Bachelor's degree in Physical Education/Physical Education & Sports
- Bachelor's degree in Human Physiology
- Bachelor's degree in Physiology
- Bachelor's degree in Exercise Physiology
- Bachelor's degree in Life Sciences
- Bachelor's degree in Sports Sciences
- Bachelor's degree in Sports Physiology
- Bachelor's degree in Sports Nutrition & Physiology
- Bachelor's degree in Strength & Conditioning
- Bachelor's degree in Para-Medical Sciences
- Bachelor's degree in Medical Sciences,

1. Submission of migration certificate at the time of submission is compulsory.
    a) The Assessment in each semester will **be 30% internal and 70%** external for each theory paper. The result of the Internal Assessment shall be conveyed to the examination branch of Punjabi University, Patiala by the Academic wing of NSNIS.
    b) The internal assessment of (theory) (Total marks 30) will be based on all or some of the Following:
        - Worksheets/Assignment/Seminar – 40%
        - Quiz 40%
        - Attendance 20%
    c) The internal assessment for Practical components (Total marks 30) will be based on all or some of the Following:
        - Demonstration – 20%
        - Attendance – 20%
        - File – 20%
        - Assignments/reports/Seminar - 40%
    d) The internal assessment for Project (Total marks 30) will be based on all or some of the Following:
        - Punctuality and Discipline 50%
        - Presentation and Report 50%

Note: If a case comes to notice of the Senior Executive Director or Director Academics, where the marks awarded by the Teacher are on a very Higher/Lower side, the award will be moderated by the following committee.

I. Director Academics of the NSNIS
II. Course Coordinator / COE
III. Head of the Department concerned
IV. A member as nominee of Senior Executive Director NSNIS

3. The student who fails in the theory paper(s) in the external exam, the internal assessment will remain the same, and the said student will have to appear and pass the external exam only.
4. Minimum number of marks required to pass each semester examination will be 40% for each paper and 40% in the aggregate of the semester examination; 40% in practical papers.
5. The syllabus for the session shall be as prescribed by the NSNIS and passed by members of Board of Studies of Punjabi University, Patiala.
6. *Post Graduate Diploma in Exercise Physiology (One Year)* examination is open only to candidate who satisfies the following requirements:
    a) Has been on the rolls of the NSNIS throughout the Semester term proceeding the examination.
    b) of having good moral character.
    c) of having attended not less than 75% lectures delivered to that class in each Paper as well as 75%of the laboratory work, seminars etc. separately. Provided that a deficiency in attendances may be condoned for special reasons, as per the College rules.
7. The medium of instruction shall be English.
8. The medium of examination will be English
9. Subject to completion of attendance requirement, there will be condition of appear or passing in papers for promotion from first semester to second semester in an academic Session. A candidate placed under reappear in any paper, will be allowed two chances to clear the reappear, which should be availed within consecutive two years/chances i.e., to pass in a paper the candidate will have a total of three chances, one as regular student and two as reappear candidate.
10. The examination of reappear papers of odd semester will be held with regular examination of the odd semester and reappear examination of the even semester will be held with regular examination of even semester. But if a candidate is placed under reappear in the last semester of the course, the candidate will be provided a chance to pass the reappear with the examination of the next semester, provided their reappear of lower semester does not go beyond next semester. In case a candidate fails within the prescribed period, as aforesaid, the candidate shall be declared fail. Such a candidate may, however, seek fresh admission to the first semester on merit with the new applicants. It is understood that a 'reappear' or' failed' candidate/s shall be allowed to take the examination in papers not cleared by them according to the date sheets of the semester examinations in which such papers may be adjusted.
11. If a student gets 'F' grade in a subject he/she will appear for End Semester Examination Only and his/her internal marks obtained during regular semester will be consider and carried forward.
12. If a student gets 'D' grade (Detained) in a subject then he/she will have to appear in End Semester Examination as well as Internal Examination. However, Internal Examination in this case will carry maximum marks equal to the total Internal Marks. E.g. If Internal Weightage is 30% of total 100 marks for a paper then this special Internal Test will be 'of 30 Marks. Candidate will submit application to Head of Department for this Purpose.
13. Only the Candidates who Need to reappear only in External Examination and marks of Internal will be carried forward.
14. The End -Semester examination -3 hours duration. The question paper will consist of three sections, SECTION A, B, and C. SECTION A and B will have four questions each from the respective sections of the syllabus. Each question will carry 12 marks, which may be segregated into sub-parts. Section C will be compulsory with 11 short- answer type questions of 03 marks each, which will cover the entire syllabus.

will be compulsory with 11 short- answer type questions of 03 marks each, which will cover the entire syllabus.

15. Viva Voce/ Practical examination shall be conducted by a Committee consisting of the following:
    a) One external examiner.
    b) One internal examiner.
16. As soon as possible after the completion of each semester, the Registrar shall publish a list of successful candidates showing their result. Each candidate shall be supplied with a card containing his/her details of marks. Priory, the list of successful candidates on the competition of *Post Graduate Diploma in Exercise Physiology* course shall be arranged in three divisions as follows Successful candidates who obtain 60% or more of the aggregate number of Marks in Semester 1st and Semester 2nd examinations taken together, shall be Placed in first division, those who obtain 40% marks or more but less than 60% shall be placed in the second division and those who obtain less than 40% and more than 40% shall be placed in the third division. Successful candidates who obtain 75% or more marks in the aggregate will be placed in the "First Division with Distinction". In the adopted "Choice Based Credit system" pattern the above-mentioned pass % criterion has been revised to that of letter grade as given in the table, highlighted below. Each letter grade indicates the level of performance in the course and has a grade point for the purpose of computing the" Cumulative Grade Point Average" (CGPA) as given below.

Letter Grade Marks Grade points

- O: Outstanding 91-100
- A+: Excellent 81-90
- A: very Good 71-80
- B+: Good 61-70
- B: Above Average 51-60
- C: Average 41-50
- P: Fair 35-40
- F: Fail 0
- D: Detained: 0

17. *A candidate who has passed *Post Graduate Diploma in Exercise Physiology* examination from NSNIS shall have one chance, within a period of two years, after passing the examination, to improve his division in a maximum of 1/3 of total theory papers offered in both *Post Graduate Diploma in Exercise Physiology* I & II semester examinations. The candidates shall also entitle to grace marks as admissible under the ordinance relating to grace marks.

18. *Post Graduate Diploma in Exercise Physiology* course consists of a number of courses. The term 'course' is applied to indicate a logical part of the subject matter of the program and is invariably equivalent to the subject matter of a "paper" in the conventional sense.
    a) The candidates are required to give their preference order for specialization, if any.
    b) Specialization will be choice based.

A minimum of passing marks will be given to candidates who have reappear for the purpose of calculation of their merit.

*Note: Out of papers taken up the candidate will be given the benefit of increase in marks, where the marks have increased in Paper/Papers.

Syllabus

Post Graduate Diploma in Exercise Physiology

(Semester system)

Program Code- EXPD1PUP

Program Description:

The course is primarily designed to understand how the body reacts and adapts to the regular structured exercise, which play a key role to improving health and athletic performance. This course is designed to equip healthcare and Physiologist professionals with key insights into the science behind exercise. This course can facilitate knowledge in Exercise Prescription programs for Sports Persons /General clients. Over the course, students will understand the impact of exercise and physical activity on Human Body, and how Physiology can be a part of the Process of High-performance in the Sports Ecosystem.

Course Name: Post Graduate Diploma in Exercise Physiology (One Year)

Program Aim is to:

To train the graduates as "Professionally Qualified Exercise Physiologists" who are able to Assess, Prescribe and Evaluate Physiological adaptations of the Body. And able to provide Physiological support to an Athletic or General population.

Program Objectives:

1. Integrate knowledge on evidence-based training optimization & performance enhancement
2. Apply appropriate assessment methods to evaluate the Physiological Performance Indicators of the athletes during training and competition.
3. Identify issues and challenges of athletic training, environmental conditions and address the needs through appropriate methods.
4. To design appropriate Scientific Evaluation & Exercise Prescription to the Elite Players & General Populations

Program Outcomes:

1. Demonstrate knowledge of Basic Understanding of Physiology and other relevant Sports Sciences in the Sports Ecosystem.
2. Physiologist able Demonstrate knowledge of physiological implications associated with different exercises.
3. To Gain proficiency in performing appropriate laboratory techniques and subsequent analysis of data in correlation with other departmental scientific data at Human Performance Laboratory.
4. To Demonstrate knowledge of safety, injury prevention, and emergency procedures associated with laboratory activities and in general exercise.
5. Able to design different exercise prescriptions and fitness programs according to clients
6. Demonstrate knowledge of providing the Scientific back-up on Key Performance Indicators in the process of High-performance.

Scheme / Credit Structure

Semester: 1 (Credits 20)

Theory									
S. No.	**Paper code**	**Subject Description**	**Total credits**	**L**	**T**	**P**	**Allocation of Marks**		**Total Marks**
							Internal	**External**	
1	EXPD-1101T	Systemic Physiology-I	3	2	1	0	30	70	100
2	EXPD-1102T	Systemic Physiology-II	3	2	1	0	30	70	100
3	EXPD-1103T	Sports Nutrition & Biochemistry	3	2	1	0	30	70	100
4	EXPD-1104T	Strength and Conditioning	3	2	1	0	30	70	100
Practicum									
5	EXPD-1105P	Integrated Nutrition Biochemistry	2	0	0	2	15	35	50
6	EXPD-1106P	Strength and Conditioning	2	0	0	2	15	35	50
7	EXPD-1107P	Project	4	0	0	0	30	70	100
		Total	**20**	**8**	**5**	**4**			**600**

Part-I Semester-2: (Credits 23)

	Theory								
S. No.	**Paper code**	**Subject Description**	**Total credits**	**L**	**T**	**P**	**Allocation of Marks**		**Total Marks**
							Internal	**External**	
8	EXPD-1201T	Physiological aspects of Health & Fitness and Biostatistics	3	2	1	0	30	70	100
9	EXPD-1202T	Physiological Assessment & Principles of Exercise Prescription	5	4	1	0	30	70	100
10	EXPD-1203T	Implementation of Exercise Prescription	4	3	1	0	30	70	100
11	EXPD-1204T	Environmental Physiology	2	2	0	0	30	70	100
Practicum									
12	EXPD-1205P	Field & Lab Practical Physiology-I	1	0	0	2	15	35	50
13	EXPD-1206P	Field & Lab Practical Physiology-II	1	0	0	2	15	35	50
14	EXPD-1207P	Internship	6	0	0	0	30	70	100
		Total	**23**	**9**	**4**	**4**			**600**

Post Graduate Diploma in Exercise Physiology
(One Year)

PART- 1 SEMESTER-1

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1101T

Part:	**Part-1**	**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Theory paper**	**Paper Name:**	**Systemic Physiology-I**	
External marks:	**70**		**Teaching Hours**	**45**
Internal marks:	**30**		**Credit**	**3**
Total marks:	**100**		**Min. Pass marks**	**40%**
Exam Time Duration:	**3hrs**			

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section - A

1. The Cell

1. Cell Membrane & Cytoskeleton
2. ECF Vs ICF, Transport of Substances Across The Cell Membrane
3. Excitable Tissue
4. Genesis of the membrane potential, concepts of action potential & propagation

3. Bioenergetics

1. Fuels for Exercise (ATP-CP, Carbs, Fats & Proteins)
2. Anaerobic ATP Production
3. Aerobic ATP Production

3.**Brief History of Exercise Physiology**

1. European Heritage
2. Harvard Fatigue Laboratory

Section - B

4. Cardiovascular system

1. Functional Anatomy of heart and blood vessels; Conduction system in heart; Normal electrocardiogram; Systemic, Coronary and Pulmonary circulation; Heart as a pump; Cardiac cycle; Cardiac output and Blood Pressure.
2. Hemodynamics: Circulation and its control, Determinants of blood flow, Cardiovascular regulation
3. Changes in Oxygen Delivery to Muscle during Exercise; Changes in Cardiac Output during Exercise, Changes in Arterial-Mixed Venous O2 Content during Exercise & Regulation of Local Blood Flow during Exercise
4. Long term and short term cardiovascular Adaptation to regular training.

5. Respiratory System

1. Functional Anatomy of respiratory system
2. Pulmonary and alveolar ventilation; diffusion of oxygen and carbon-di-oxide from respiratory membrane;
3. Lung Volumes & Capacities (Elite vs Non-Elite population), Spirometry
4. Transport of oxygen and carbon-di-oxide & respiratory acidosis and alkalosis
5. Regulation of respiration
6. Ventilatory and Blood–Gas Responses to Exercise
7. Respiratory Adaptations to regular exercise

Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books
b. End semester assessment – Written exam

References

c. Ganong's review of Medical Physiology (Latest Edition)
d. Guyton, Textbook of Medical Physiology (Latest Edition)

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1102T

Part:	**Part-1**		**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Systemic Physiology-II**	
External marks:	**70**			**Teaching Hours**	**45**
Internal marks:	**30**			**Credit**	**3**
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**3hrs**				

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section – A

1. **Neuromuscular system**
    1. Structural and contractile unit of Muscle Fibers
    2. Neuromuscular junction
    3. Process of muscle contraction
    4. Types of muscles and muscle fibres
    5. Motor unit recruitment and Stretch reflex, proprioceptors, Golgi tendon organ (GTO), muscle spindles
    6. Effect of training on muscle and muscle fibers (Fast & Slow)
    7. Types of muscle actions (e.g., eccentric, concentric, isometric)
    8. Physiology of Fatigue and recovery
2. **Nervous System**
    1. Functional anatomy & Classification of nervous system
    2. Brief Motor Functions of the Spinal Cord

3. Training related implications in the Autonomic Nerve system.
4. Brief on Descending motor tracts,
5. Functions of Cerebellum role in motor learning in sports
6. General Functions of the Cortical Nuclei & Neo-cortex

Section - B

3. Digestive system

1. Functional Organization of Digestive system, Enzymes, Digestion & Absorption (outlines)

4. Special Senses

1. Vestibular Apparatus; role in balance and equilibrium in sports population

5. Renal & Excretory System

1. Functional organization of Renal & Reproductive systems
2. Regulation of Acid-Base balance by Kidney in resting and during activity.

6. Endocrine System

1. Different endocrine glands and their hormones; Major functions; Mode of action mechanism and regulation, Functions & abnormalities, Details of Growth, Stress Hormones & Sex Hormones
2. Hormonal Control of Substrate Mobilization during Exercise; Muscle-Glycogen Utilization, Blood Glucose Homeostasis during Exercise

II. Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

III. Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books
b. End semester assessment – Written exam

IV. References

1. Physiology of sports and Exercise. Wilmore JH, Costill DL. HumanKinetics publishers

2. Physiology of Sport and Exercise, 5E, by

3. Exercise Physiology: Theory and application to Fitness and performance.Scott K Powers, Edward T. Howley. Mc Graw Hill.

3. Physiological Basis for Exercise and Sport. Edward L Fox. Mc Graw Hill.

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1103T

Part:	**Part-1**		**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Sports Nutrition & Biochemistry**	
External marks:	**70**			**Teaching Hours**	**45**
Internal marks:	**30**			**Credit**	**3**
Total marks:	**100**			**Max. Pass marks**	**40%**
Exam Time Duration:	**3hrs**				

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section - A

1. Basics of Macro & Micro Elements

1.1. Carbohydrates Types of carbohydrates Digestion and absorption of carbohydrates Sources of carbohydrates and their role in sports Requirement of carbohydrates based on training load Requirement for pre during and post competition

1.2. Proteins Dietary proteins and their role in sports Digestion and absorption of proteins Amino acids and their role in sports Requirement of Proteins for different sports Requirement of proteins for recovery post training/competition

1.3. Fats Types of fatty acids, sources and their role in sports Digestion and absorption of Fats Requirement of fats for different sports

1.4. Minerals Iron: Food sources and role in sports Calcium: Food sources and role in sports Other minerals: Food sources and role in sports

1.5. Vitamins Fat and water -soluble vitamins - Introduction Digestion and absorption of vitamins Role of different vitamins in sports and their food sources

Section - B

2. Basic understanding of Biochemistry

2.1. Storage of fuels in the body, relevance of carbohydrates and lipids for sports and Exercise.
2.2. Factors affecting fuel utilization during the exercise.
2.3. Proteins that transport/store oxygen: Haemoglobin and Myoglobin
2.4. Anaemia: Definition, prevalence and types (Iron deficiency anaemia, and sports anaemia)

3. Biochemical & Nutritional monitoring of athletes during Sports training:

3.1. Nutritional markers, Muscle damage markers Bone health markers Metabolic markers Hormonal markers Inflammatory markers
3.2. Overtraining and biochemical markers of overtraining
3.3. Vitamin D and its effects on skeletal muscle and athletic performance
3.4. Iron profiling

II. Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

III. Assessment

a. Estimation of blood Lactate
b. Estimation of blood Haemoglobin
c. Case Study

IV. References

1. Principles of Exercise Biochemistry Editor(s): Poortmans J.R. (Brussels) Karger Publishers
2. Sport Nutrition 3rd Edition by Asker Jeukendrup, Michael Gleeson, Human Kinetics, 2018
3. Nutrition for Sport, Exercise, and Health by Marie Spano, Laura Kruskall, D. Travis Thomas, Human Kinetics.
4. Principles of Biochemistry- Lehninger Nilson and Cox W.H. Freeman
5. Principles of Biochemistry- Donald Voet, CW Pratt, JG Voet (2012) Wiley

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1104T

Part:	**Part-1**		**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Strength & Conditioning**	
External marks:	**70**			**Teaching Hours**	**45**
Internal marks:	**30**			**Credit**	**3**
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**3hrs**				

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section - A

1. Introduction to strength training and conditioning

1.1. Concept of training load, factors of load, functions of load, load monitoring, recovery and overtraining,

1.2. Training principles (overload, individualization, progression, specificity, variations, diminishing return and reversibility)

2. Periodization

2.1. General concepts related to periodization, definition, types, training periods, periodization models

Section B

3. Strength Training modalities

3.1. Definition of strength, types of strength, benefits of strength training, strength training modalities (body weight, partner, machines, free weights etc), its advantages and disadvantages

3.2. Exercise techniques for alternative modes and non-traditional implement training

4. Programme design for aerobic endurance training

4.1. Endurance Definition, types and importance, factors related to aerobic endurance performance, Modalities for aerobic endurance, designing aerobic training programme,

4.2. Periodization of aerobic endurance.

5. Programme design for speed, agility, quickness and balance

5.1. Speed definition, importance, factors affecting speed. Programme designing for speed, Periodization of speed

5.2. Meaning and definition of Agility, quickness and balance, importance and programme designing

II. Pedagogical intervention

Blended learning approach attending lectures, hand-on practical, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

III. Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books

b. End semester assessment – Written exam

IV. References

3. Haff, G. Gregory, Triplett, N. Travis. Essentials of strength training and conditioning. 4th Edition, Human Kinetics.
4. Nicholas A. Ratamess. ACSM's Foundations of Strength Training andConditioning.Wolters Kluwer Health/Lippincott Williams & Wilkins, 2011
5. Fleck, Steven J., Kraemer, William. Designing Resistance Training Programs.4thEdition. Human Kinetics
6. Vladimir M. Zatsiorsky, William J. Kraemer. Science and Practice ofStrengthTraining. 3rd Edition. Human Kinetics
7. K.P Manilal. Science of strength training. Sports Publications, New Delhi2007
8. K.P Manilal. Scientific Aspects of Flexibility Training. Friends Publications,New Delhi, 2012
9. Jay Dawes, Mark Roozen. Developing Agility and Quickness-HumanKinetics (Sports Performance) NSCA -National Strength & ConditioningAssociation, -(2011)
10. Ian Jeffreys. Developing speed-Human Kinetics (Sport performance series)National Strength & Conditioning Association (U.S.) - (2013)

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1105P

Part:	**Part-1**		**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Practical**		**Paper Name:**	**Integrated Nutrition & Biochemistry**	
External marks:	**35**			**Teaching Hours**	**30**
Internal marks:	**15**			**Credit**	**1**
Total marks:	**50**			**Min. Pass marks**	**40%**
Exam Time Duration:	**2hrs**				

1. PFI testing
2. Submaximal Testing & Assessment
3. Estimation of Hb, CBC, LFT, RFT, Hormones (Testosterone, cortisol & other essential Hormones)
4. Use of food composition tables: Reading and calculations
5. Athlete food plate: Uses and practical applications
6. Assessment of hydration status, Calculation of sweat rate and percent dehydration, preparation of sports drink

References

6. Principles of Exercise Biochemistry Editor(s): Poortmans J.R. (Brussels) Karger Publishers
7. Sport Nutrition 3rd Edition by Asker Jeukendrup, Michael Gleeson, Human Kinetics, 2018
8. Nutrition for Sport, Exercise, and Health by Marie Spano, Laura Kruskall, D. Travis Thomas, Human Kinetics.
9. Principles of Biochemistry- Lehninger Nilson and Cox W.H. Freeman
10. Principles of Biochemistry- Donald Voet, CW Pratt, JG Voet (2012) Wiley

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1106P

Part:	**Part-1**		**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Practical**		**Paper Name:**	**Strength & Conditioning**	
External marks:	**35**			**Teaching Hours**	**30**
Internal marks:	**15**			**Credit**	**1**
Total marks:	**50**			**Min. Pass marks**	**40%**
Exam Time Duration:	**2hrs**				

1. Medicine ball exercises
2. Dumbbell exercises
3. Free weight strengthening exercises
4. Non-traditional strengthening exercises (tyres, ropes etc.)
5. Endurance training protocols (continuous, interval methods etc.)
6. Speed, agility drills, exercises for quickness, balance and coordination
7. Flexibility training (different methods of stretching
8. Motor ability tests

References

9. Haff, G. Gregory, Triplett, N. Travis. Essentials of strength training and conditioning. 4th Edition, Human Kinetics.
10. Nicholas A. Ratamess. ACSM's Foundations of Strength Training andConditioning.Wolters Kluwer Health/Lippincott Williams & Wilkins, 2011
11. Fleck, Steven J., Kraemer, William. Designing Resistance Training Programs.4thEdition. Human Kinetics
12. Vladimir M. Zatsiorsky, William J. Kraemer. Science and Practice ofStrengthTraining. 3rd Edition. Human Kinetics
13. K.P Manilal. Science of strength training. Sports Publications, New Delhi2007
14. K.P Manilal. Scientific Aspects of Flexibility Training. Friends Publications,New Delhi, 2012
15. Jay Dawes, Mark Roozen. Developing Agility and Quickness-HumanKinetics (Sports Performance) NSCA -National Strength & ConditioningAssociation, -(2011)
16. Ian Jeffreys. Developing speed-Human Kinetics (Sport performance series)National Strength & Conditioning Association (U.S.) - (2013)

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1107P

Part:	**Part-1**		**Semester Name:**	**Part-I Semester-1**	
Theory/ Practical:	**Project**		**Paper Name:**	**Project**	
External marks:	**70**			**Teaching Hours**	**90**
Internal marks:	**30**			**Credit**	4
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**3 Hr**				

A total of 6 credit hours project work to be assigned to the student near the end of the first semester. a student has to select the topic of interest which is to be relevant to Diploma Exercise Physiology. the following faculty will be guiding the students: Dr. Subra C, Dr. S Adhikari, Mr. Tambi Medabala & Dr. Neha. Student has to present the detailed project proposal to the said faculty before proceeding for approvals. and aims and objectives to be completed by the student before the first week of April 2024. Final project will be assessed by the above faculty and evaluated as per the guidelines of ***Project Assessment Criteria (PGDEP)*** laid in this Ordinance.

Project Assessment Criteria (PGDEP)

Total marks: 100

Assessment areas

Sr. No.	Assessment Area	Marks allotted	
		Internal	External
1	Punctuality and discipline • Regularity • Punctuality • Discipline • Originality • Innovation	05	--
4	Viva • Comprehension • Critical thinking • Confidence • Communication • Spontaneity and mannerism	--	35
5	Presentation and report • Content • Report writing • Powerpoint presentation • Language and delivery • Audience interaction	25	35

Post Graduate Diploma in Exercise Physiology
(One Year)

PART- 1 SEMESTER-II

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1201T

Part:	**Part-2**		**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Physiological aspects of Health & Fitness and Biostatistics**	
External marks:	**70**			**Teaching Hours**	**45**
Internal marks:	**30**			**Credit**	**3**
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**3hrs**				

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section - A

1. Preparticipation screening

1.1. WHO guidelines to evaluate status of Health & Fitness

1.2. Understanding of basic Anthropometric Terminology (Body Composition, Fat, LBM, Somatotypes)

1.3. Understanding risk factors of Pulmonary, Metabolic, Musculoskeletal systems

1.4. Current blood pressure guideline (WHO)

1.5. Key components included in informed consent and health/medical history

Section – B

3. *Biostatistics*

1. Basic concepts- Importance of research in clinical practice. Problem identification, Ethical issues in research, Literature review, meta-analysis.
2. Types of Research-Qualitative and Quantitative. Descriptive & Experimental, Longitudinal & Cross-Sectional. Survey Research.

3. Sample Designs- types of sampling, Reliability, Validity, Variables, Sample size
4. Processing and analysis of Data- Central tendency, Dispersion, Correlation, regression analysis, multiple correlation and regression.
5. Sampling and testing of hypothesis- Concept of probability, Standard deviation, confidence intervals, null and alternate hypothesis, level of significance, correlation coefficients, ANOVA,
6. Nonparametric Tests- Fisher Irwin test, Mc Nemar test, Wilcoxon Mali test, Mann Whitney test, Kruskal Wallis test, Spearman's rank correlation.

I. Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

II. Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books
b. End semester assessment – Written exam

III. References

1. WHO Guideline
2. Guidelines of ACSM Certified Exercise Physiologist (Updated)
3. ACSM's Health-related Physical Fitness Assessment Manual: Shala E. Davis, American College of Sports Medicine

4. Mohsin SM; Research Methods in Behavioural Sciences: Orient Publications.

5. Colton: Statistics in medicine, Little Brown Company. Boston.
6. Mahajan: Methods in Biostatistics, Jay Pee Brothers.

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1202T

Part:	**Part-2**		**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Physiological Assessment & Principles of Exercise Prescription**	
External marks:	**70**			**Teaching Hours**	**75**
Internal marks:	**30**			**Credit**	**5**
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**3hrs**				

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section – A

1. **Physiological Assessments :**
   - 1.1. Techniques of measuring Blood pressure response and heart rate response to exercise.
   - 1.2. Physiological basis of Load, RPE before, during and after Lab/Field testing
   - 1.3. Physiological basis of Lactate Dynamics (Resting, Peak & Recovery)
   - 1.4. Physiological basis of PFT (Spirometry)
   - 1.5. Physiological basis of VO_{2max}
   - 1.6. Methods of Assessing VO_{2max} (Field & Lab, For Elite players)
   - 1.7. Physiological basis of Running Economy, Ventilatory Threshold , Ventilation, Breathing Reserve & Respiratory Frequency During Cardiopulmonary evaluation.
   - 1.8. Anaerobic Power/capacity Assessment (Field & Lab)

1.9. Methods of Fiber typing (Field & Lab)

1.10. Physiology of EMG, and its Applications on elite players

1.11. Lab based assessment of REE & Softwares used in energy expenditure calculation during exercise

Section - B

2. Concepts of Safe and effective exercise programs to achieve desired outcomes and goals

2.1. Concepts of FITT principle (Frequency, Intensity, Time, Type)

2.2. Physiological principles related to warm-up and cool-down

2.3. The components of physical fitness (flexibility, muscular fitness [strength, endurance, power] and neuromotor skills [balance, agility, proprioception])

2.4. Physiological Response during dynamics exercise/Testing (e.g., heart rate, stroke volume, cardiac output, ventilation, ventilatory threshold or Lactate threshold)

2.5. Game specific Biofuels contributions & Adaptations

2.6. Psychological and physiological signs and symptoms of overtraining

2.7. Acute training variables (e.g., load, volume, sets, repetitions, rest periods, order of exercises)

2.8. Chronic training variables (e.g., periodization)

I. Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

II. Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books

b. End semester assessment – Written exam

III. References

11 Guidelines of ACSM Certified Exercise Physiologist

12 Exercise Physiology 8th Edition - Nutrition, Energy and Human Performance by William McArdle

13 Sport and exercise physiology testing guidelines : the British Association of Sport and Exercise

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1203T

Part:	**Part-2**		**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Implementation of Exercise Prescription**	
External marks:	**70**			**Teaching Hours**	**60**
Internal marks:	**30**			**Credit**	**4**
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**3hrs**				

Instructions for Paper Setter

The question paper will consist of three sections i.e. A, B, and C. The questions shall be covered each. Section A and B will have four questions each from respective sections of syllabus and will carry 12(12X4=48) marks each. Out of which students have to attempt two questions each from section A and B. Section C will consist of 11 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 22 marks in all.

Instructions for the Candidates

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory consist of 11 short answer type questions of 2 marks each.

Section - A

1. Exercise prescriptions for components in High Performance

1.1. Minimal threshold of physical activity required for Enhancement of Sports Performance, health benefits and fitness development
1.2. Implementing Sports Specific FITT principles (Anaerobic, Aerobic & Intermittent Games/ Sports)
1.3. Effective exercises designs to enhance strength of muscle groups a Players (Game Specific)
1.4. Effective exercises designs to enhance endurance of muscle groups for Elite a Players (Game Specific)
1.5. Effective exercises designs to enhance speed, agility, quickness, flexibility, and balance for Elite a Players (Game Specific)
1.6. Exercise Prescription for Para-Athletes, elderaley , Children & Females

Section –B

2. Implement a general weight management & Prescription for Special Population

2.1. Exercise prescriptions for achieving weight-related goals, including weight gain, weight loss and weight maintenance (Detailed Guidelines)

2.2. Energy balance and basic nutritional guidelines

2.3. Fad diets for modifying body composition including dietary pattern, exercise and behavior modification

2.4. Recommendation maintaining normal hydration before, during and after exercise

I. Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

II. Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books

b. End semester assessment – Written exam

III. References

1.Guidelines of ACSM Certified Exercise Physiologist

2. Principles of Exercise Prescription :by Milind V Bhutkar

3. Advanced Fitness Assessment and Exercise Prescription 7th Edition, Heyward, Vivian H., Gibson, Ann

4. Exercise Testing and Exercise Prescription for Special Cases by James S. Skinner

5. Strength and conditioning for team sports: sport-specific physical preparation for high performance by Paul Gamble

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1204T

Part:	**Part-2**		**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Theory paper**		**Paper Name:**	**Environmental Physiology**	
External marks:	**70**			**Teaching Hours**	**30**
Internal marks:	**30**			**Credit**	**2**
Total marks:	**100**			**Min. Pass marks**	**40%**
Exam Time Duration:	**2hrs**				

Section –A

1.1. Environment and exercise Thermoregulation, exercise in cold - physiological responses to exercise in cold, health risks during exercise in cold, effect of cold on human performance. Pressure, O2 , CO2 , Temperature and Relative humidity

1.2. Physiological changes in desert, heat illness, heat stroke Exercise in hot environment-physiological responses to exercise in heat, health risks during exercise in heat, Desert and Human Adaptation

Section –B

1.3. High Altitude Physiology, Adverse effects & Benefits for Elite Players

1.4. Concepts of underwater physiology and its application in exercise science. Micro- gravity physiology and its implication on exercise physiology

I. Pedagogical intervention

Blended learning approach attending lectures, seminars, workshops, problem solving tasks, small group discussion and presentations and self-directed studies

II. Assessment

a. Internal Assessment – attendance, internal test, Presentations, written assignment, case studies, placement log books
b. End semester assessment – Written exam

III. References

l. ACSM'S Guidelines for Exercise Testing and Prescription.
2. Wilmore, J., Costill, D. and Kenney. W. Physiology of Sport and Exercise. 4" ed , Human Kinetics. 2008
3. McArdle. W. Katch, F., and Katch, V. Exercise Physiology: Energy, Nutrition, and Human Performance, Lippincott Williams & Wilkins.

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1205P

Part:	**Part-2**		**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Practical**		**Paper Name:**	**Field & Lab Practical Physiology-I**	
External marks:	**35**			**Teaching Hours**	**30**
Internal marks:	**15**			**Credit**	**1**
Total marks:	**50**			**Min. Pass marks**	**40%**
Exam Time Duration:	**2hrs**				

1. Determining the energy cost,
2. Absolute and relative oxygen costs (VO2) and MET levels, V@VO2, VT,
3. Lactate Dynamics,
4. PFT
5. Wingate test
6. HR monitoring
7. Spirometry
8. Hypoxic Training
9. Detailed preparation of Physiology Testing reports with recommendations for Elite players

References

1. Guidelines of ACSM Certified Exercise Physiologist
2. Exercise Physiology 8th Edition - Nutrition, Energy and Human Performance by William McArdle
3. Sport and exercise physiology testing guidelines : the British Association of Sport and Exercise

PUNJABI UNIVERSITY, PATIALA

Post Graduate Diploma in Exercise Physiology (One Year) Course Code: EXPD1PUP

Paper code: EXPD-1206P

Part:	**Part-2**		**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Practical**		**Paper Name:**	**Field & Lab Practical Physiology-II**	
External marks:	**35**			**Teaching Hours**	**30**
Internal marks:	**15**			**Credit**	**1**
Total marks:	**50**			**Min. Pass marks**	**40%**
Exam Time Duration:	**2hrs**				

1. RPE
2. Maintaining a safe exercise environment (e.g., equipment operation and regular maintenance schedules, safety and scheduled maintenance of exercise areas, overall facility maintenance, proper sanitation, proper signage)
3. Initial management and first-aid procedures for exercise-related injuries (e.g., bleeding, strains/sprains, fractures, shortness of breath, palpitations, hypoglycemia, allergic reactions, fainting/syncope)

References

1. Guidelines of ACSM Certified Exercise Physiologist
2. Exercise Physiology 8th Edition - Nutrition, Energy and Human Performance by William McArdle
3. Sport and exercise physiology testing guidelines : the British Association of Sport and Exercise

PUNJABI UNIVERSITY, PATIALA

(One Year Post Graduate Diploma in Exercise Physiology) Course Code: EXPD1PUP

Paper code: EXPD-1207P

Part:	**Part-2**	**Semester Name:**	**Part-I Semester-2**	
Theory/ Practical:	**Internship**	**Paper Name:**	**Internship**	
External marks:	**70**		**Teaching Hours**	**90**
Internal marks:	**30**		**Credit**	**6**
Total marks:	**100**		**Min. Pass marks**	**40%**
Exam Time Duration:	–			

Internship Assessment Criteria

Duration:	4 Weeks
Credits:	6
Total Marks:	100 (30+70)
Places of Internship:	23 NCOES SAI centres across India The internship centres will be allotted based on the choice given by the candidate (as per merit order in 1st semester) and the availability of seats at a particular centre
Mentor/ Supervisor:	SO/HPA/PA (Physiology) in-charge of the particular centre
	Boarding and Lodging: The boarding and lodging facility can be provided at the centres, if available. The expenditure of the boarding and lodging will be borne by the candidate of their own. At the centres, where boarding and lodging facilities are not available, candidates will have to arrange the boarding and lodging of their own.
Stipend:	No stipend will be paid to the candidates for the internship

Assessment areas

Sr. No.	Assessment Area	Assessment Criteria	Remarks
1	Ethics, punctuality and discipline	I. Discipline II. Punctuality III. Commitment towards training IV. Dynamism	
2	Physiological Laboratory based Assessment	I. Game wise Physiological basis II. Various Physiological Lab based assessment protocols III. Protocol calculations and marker variables identification IV. Data recording / Data entry	
3	Physiological Field based Assessment	I. Game wise Physiological basis and protocol selection I. Various Physiological Field based assessment protocols II. Protocol calculations and analysis III. Data recording / Data entry	
4	Physiological data analysis and interpretation	I. Data presentation/ Data plotting II. Interpretation and analysis of results III. Intervariable correlation study and game wise profile creating IV. Standard norm wise result checking and finalization	
5	Monitoring and Intervention planning	I. Physiology result dependent intervention planning and training modification suggestions II. Heart rate and Blood Lactate Monitoring III. Quality control activities and Follow ups	
6	Report writing, discussion and case study	I. Communication skills II. Report writing and report discussion with coaches and athletes III. Case study presentation IV. Overall work report	

At the end of the internship, the Mentor/ Supervisor of the respective centre need to provide the remarks of the candidates in the given format.