JAMIA HAMDARD, NEW DELHI - 110062
Internal Quality Assurance Cell (IQAC)

LEARNING OUTCOMES-BASED CURRICULUM

Prepared by: Dr Jyoti Ganai (P.T.)

Name of Department: Department of Physiotherapy

Name of Head of Department: Dr Nishat Quddus (P.T.)

Name of Program: Master of Physiotherapy (Cardiopulmonary)

Program Code: 516

NAME OF THE SCHOOL: SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH

NAME OF THE DEPARTMENT/CENTRE: DEPARTMENT OF PHYSIOTHERAPY

Vision Statement: To be recognized as one of the leading Physiotherapy institutes of higher learning by providing value-based education, facilitating research and health care services to rural and urban communities, keeping in view the global needs.

Mission Statements:

MS1: Develop competency in the field of Physiotherapy by Imparting and disseminating evidence-based knowledge.

MS 2: Fostering research and development in the emerging areas of Physiotherapy while adhering to the ethical standards.

MS 3: Generating awareness of physiotherapy through outreach programmes.

MS 4: To gain recognition via collaboration in the global arena by providing quality healthcare thus improving quality of Life.

MS 5: Generating opportunities for faculties and students thus keeping pace with the advances related to physiotherapy.

NAME OF THE ACADEMIC PROGRAM: MASTER OF PHYSIOTHERAPY (CARDIOPULMONARY)

QUALIFICATION DESCRIPTORS (QDs)

Upon the completion of Academic Programme (MPT Cardiopulmonary), students will be able to:

QD-1: Acquire systematic, extensive and coherent knowledge and skill in Physiotherapy assessment and management of cardiopulmonary conditions and its applications including critical understanding of established theories, principles and concepts, knowledge of advanced

and emerging issues, recent advances and research in Physiotherapy evaluation and treatment procedures pertaining to cardiopulmonary conditions.

QD-2: Demonstrate comprehensive knowledge and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data related to cardiac, pulmonary and vascular systems of the body.

QD-3: Apply knowledge and transferable skills in areas related to cardiac, pulmonary and vascular issues for identifying problems, collection of relevant quantitative and /or qualitative data, its analysis and evaluation using appropriate methodologies for formulating evidence-based solutions and inferences.

QD-4: Address self-learning needs related to evidence based practice in current and emerging areas of cardiopulmonary Physiotherapy and Rehabilitation, use research and professional material, apply knowledge to new concepts and unfamiliar areas and seek well defined solutions in real life situations.

QD-5 :Demonstrate empirical and research-based knowledge and transferable skills in the field of Cardiopulmonary Physiotherapy for patient care and presenting oneself as an employable candidate in various healthcare settings including wellness, sports and fitness centres creating employment opportunities for professional learning needs based on research and development work for the community .

Mapping Qualification Descriptors (QDs) with Mission Statements (MS)

	MS-1	**MS-2**	**MS-3**	**MS-4**	**MS-51**
QD-1	3	2	2	1	1
QD-2	3	3	3	3	2
QD-3	3	3	2	3	2
QD-4	3	3	2	2	2
QD-5	3	2	3	3	3

NAME OF THE SCHOOL / DEPARTMENT / CENTRE

NAME OF THE ACADEMIC PROGRAM: MASTER OF PHYSIOTHERAPY (CARDIOPULMONARY)

PROGRAM LEARNING OUTCOMES (PLOs)

After completing this Course, the students should be able to:

PLO-1	Physiotherapy Knowledge	To demonstrate and apply physiotherapy knowledge and skills for the physiotherapeutic management of various medical and surgical conditions in relation to Cardio-pulmonary system.
PLO-2	Communication Skills	To demonstrate and apply appropriate behavioural skills with humanitarian approach for communication with patients, relatives, co-professionals and community.
PLO-3	Problem analysis with the development of solution	To demonstrate and apply the physiotherapy evaluation skills by co relating with the clinical subjects for diagnosis of the patient problem and design an appropriate physiotherapeutic treatment strategy.
PLO-4	Evidence-based practice	To demonstrate and apply physiotherapy knowledge and skills based on empirical evidence.
PLO-5	Development of research acumen	To demonstrate ability of critical thinking, define problems, formulate hypotheses and design, execute and report the results of experiments with conclusions.
PLO-6	Individual or teamwork	Demonstrate the ability to work in an efficient manner individually as well as in diverse groups for providing best treatment strategies for the patients and community.
PLO-7	Digital literacy	To demonstrate and apply knowledge of basic computer applications for clinical and research purpose including data management, data storage and generate data bases.
PLO-8	Cross cultural integration	To acquire knowledge of attitudes, beliefs and socio-cultural values relevant to a particular society and nation with global perspectives to engage with diverse groups effectively.
PLO-9	Ethics	To demonstrate moral/ethical values in conduct, awareness of ethical issues related to patient care, work practices, refraining from malpractice, unethical Behaviour, falsification, plagiarism, misinterpretation of data, non-adherence to intellectual property rights, adhering to truthful, unbiased actions in all aspects of work without discrimination based on age, race, gender, sexual preference, disease, mental status, lifestyle, opinions or personal values.
PLO-10	Physiotherapy patient evaluation and management	To select appropriate clinical examination and investigation for common clinical conditions pertaining to cardiopulmonary system and analyze critically the findings

		along with planning appropriate rehabilitation goals and designing evidence-based management protocols.
PLO-11	Leadership skills	Students must demonstrate ability for task allocation, organization of task elements, setting direction, formulating an inspiring vision, team building, to achieve a vision, engaging, knowledge and respect individual values and opinions in order to foster harmonious working relationships with colleagues, peers, and patients.
PLO-12	Life-long learning	Students must demonstrate ability to acquire knowledge and skills through ongoing learning, participation in continuous education programs, engaging in self-paced, self- directed learning aimed at personal development, meeting social and cultural objectives, skill development, adapting to changing environment and workplace requirements and challenges.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After completing this Course, the students should be able to:

PSO-1: Demonstrate comprehensive knowledge and skills concerned with cardiopulmonary physiotherapy enabling judicious treatment related decision making while evaluating the reliability and relevance of evidence.

PSO-2 : Express thoughts and ideas effectively in writing and orally, communicate with others using appropriate media, confidently share one's views in a clear and concise manner to different groups.

PSO-3: Demonstrate a sense of inquiry and capability for asking relevant/appropriate questions; the ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data; plan, execute and report the results of an experiment or investigation.

PSO-4: Demonstrate ability to work effectively with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause.

Mapping of Program Learning Outcomes (PLOs) With Qualification Descriptors (QDs)

	QD-1	QD-2	QD-3	QD-4	QD-5

PLO-1	**3**	**3**	**2**	**3**	**3**
PLO-2	**3**	**3**	**2**	**3**	**3**
PLO-3	**2**	**2**	**3**	**3**	**3**
PLO-4	**2**	**3**	**3**	**3**	**3**
PLO-5	**2**	**3**	**3**	**3**	**3**
PLO-6	**2**	**2**	**3**	**3**	**2**
PLO-7	**3**	**3**	**3**	**3**	**3**
PLO-8	**2**	**2**	**3**	**3**	**2**
PLO-9	**3**	**3**	**3**	**3**	**3**
PLO-10	**3**	**3**	**3**	**3**	**3**
PLO-11	**3**	**3**	**2**	**2**	**3**
PLO-12	**3**	**3**	**3**	**3**	**2**

	QD-1	**QD-2**	**QD-3**	**QD-4**	**QD-5**
PSO-1	**3**	**3**	**3**	**3**	**3**
PSO-2	**3**	**3**	**3**	**3**	**3**
PSO-3	**2**	**2**	**3**	**3**	**3**
PSO-4	**2**	**2**	**3**	**3**	**3**

MASTER OF

PHYSIOTHERAPY

(Cardiopulmonary)

BYE-LAWS

ANNUAL SYSTEM

DEPARTMENT OF REHABILITATION SCIENCES
SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH
JAMIA HAMDARD
(DEEMED TO BE UNIVERSITY)

BYE-LAWS

1. OBJECTIVES

To train Physiotherapists who will be able to:

- Assume leadership roles in field of Physiotherapy.
- Assume enhanced patient care responsibilities.
- Formulate and implement educational programs.
- Analyze and undertake research.

2. THE PROGRAMME

a.	**Name**	Master of Physiotherapy (M.P.T.) Cardiopulmonary
b.	**Nature**	Regular and Full time.
c.	**Duration**	Two Years
d.	**Pattern**	Annual system
e.	**Eligibility Criteria for Admission**	Educational: A candidate seeking Admission to the M.P.T. Programme must have a Bachelor's degree in Physiotherapy with a minimum of 50% marks in aggregate.

The Bachelor's degree course should be recognized by the regulatory body and from a University recognized by Jamia Hamdard.

f.	**Commencement**	July/ August of every year.
g.	**Mode of admission**	Written entrance test (as prescribed by the University). Reservation in seats will be as per University norms
h.	**Admission of Foreign Nationals/NRI /Company Sponsored Candidates**	Eligibility same as for general candidates Selection Procedure as prescribed by Jamia Hamdard from time to time.
i.	**Total Seats**	As notified in the Jamia Hamdard Prospectus.
j.	**Span Period**	4 Years
k.	**Teaching days:**	180 days
l.	**Medium of instructions and examination**	English

3. THE CURRICULUM

Master of Physiotherapy (M.P.T.)

Total theory papers:	09
Total Practical:	03
Dissertation Viva voce:	01
Seminars	02

Mode of Curriculum delivery and execution includes classroom teaching, assignments, tests, lab work, project, case studies, participation in relevant events, field visits and educational tour etc.

4. THE COURSE STRUCTURE: M.P.T.

Hours Distribution and marks distribution

First Year

Course Code	Subject	Hours	Marks	IA	EA	Credits
MTC 161	Basic Health Sciences	48	100	25	75	3
MTC 162	Medical and Surgical Management of Disorders of the Cardiopulmonary System	64	100	25	75	4
MTC 163	Advanced Diagnostics and Therapeutics	48	100	25	75	3
MTC 164	Research Methodology, Biostatistics and Computer Application	80	100	25	75	5
MTC 165	Seminars on clinical issues	48	100	100		3
MTC 166	Physiotherapy I- Therapeutic Principles and practice in Cardiopulmonary Physiotherapy(Theory)	96	100	25	75	6
MTC 167	Physiotherapy I- Therapeutic Principles and practice in Cardiopulmonary Physiotherapy (Lab hours)	48	100	25	75	3
MTC 168	Exercise Physiology	64	100	25	75	4
MTC 169	Clinical training	704				44
TOTAL		Total hours 1200	Total marks 800			75

Total hours:1200 (Theory hours:400, lab hours:48 hours, Seminars:48 hours, Clinical training:704 hours)

SECOND YEAR

Course code	Subject	Hours	Marks	IA	EA	Credits
MTC 261	Management, Education and ethics	80	100	25	75	5
MTC 262	Biomechanics and Kinesiology (Theory)	96	100	25	75	6

MTC 263	Biomechanics and Kinesiology (Lab hours)	32	100	25	75	2
MTC 264	Seminars on clinical issues	48	100	100		3
MTC 265	Dissertation	208	100		100	13
MTC 266	Physiotherapy II- Exercise testing and Cardiopulmonary Rehabilitation(Theory)	96	100	25	75	6
MTC 267	Physiotherapy II- Exercise testing and Cardiopulmonary Rehabilitation(Lab hours)	48	100	25	75	3
MTC 268	Clinical training	592				37
TOTAL		Total hours 1200	Total marks 700			**75**

Total hours: 1200 (Theory hours: 272, Lab hours: 80, Seminars: 48 hours, Dissertation: 208 hours, Clinical training: 592 hours)

5. ATTENDANCE

A. All students must attend every lecture / lab hour held in each subject. However, to account for late joining or other such contingencies the attendance requirement for appearing in the examinations shall be minimum of 75% of the classes actually held from the date of admissions. Each student is also required to participate in educational trips/ tour of the class.

B. In order to maintain the attendance record of a particular subject, a roll call will be taken by the teacher in every scheduled lecture and practical classes.

C. The teacher in -charge will consolidate the attendance record for theory & practical separately for each annual session. Attendance on account of participation in the prescribed functions of NCC, NSS, Inter-University Sports, Educational tours/ Fieldwork, shall be credited to the aggregate, provided the attendance record is duly signed by the Officer in-charge ,is sent to the Dean of the School within two weeks of the function / activity, etc.

D. The statement of attendance of students shall be displayed on the school notice board twice in each annual session. Copies of the same shall be kept in the Office of the Dean of the School/ of the concerned Department for record. Notice displayed on notice board shall be deemed to be a proper notification and no individual notice to students will be necessary.

E. If a student is found to be continuously absent from the classes without information for a period of thirty days, the teacher in-charge shall report it to the Head of Department. The Head will report it to Dean for necessary action.

F. A student with less than 75% attendance in theory and practical of each subject in a session shall be detained from appearing in the Annual Examination of the subject (s) in which the attendance is short. If the student has less than 85% attendance in the clinical practice, he/ she shall be detained from appearing in the practical examination. A 75% attendance is necessary in 'Seminars on Clinical Issues', failing which the marks in this subject will not be forwarded for final result, and the student shall have to reappear in the next academic session. However, the Dean of the School may consider for the condonation of attendance up to 5% on account of sickness or any other extenuating circumstances, provided the application condonation of attendance, duly certified by a Registered Practitioner/supported by documentary evidence has been submitted within seven days from recovery.

G. The students will get half summer and winter breaks only. Students will not get the autumn break. During the working half of summer and winter breaks, the students will continue with their clinical posting for the full day at their respective placements.

6. INTERNAL ASSESSMENT

A. There will be a total of 3 internal assessments in an academic session and best 2 out of 3 will be counted for final assessment. Tests will carry a weightage of 15marks in theory/practical, 5marks for attendance and 5 for assignment. The total weightage of the internal exams will be 25% of total marks in each subject in the Final/annual exams.

B. The Dates of the internal assessment exam will be notified in the academic calendar.

C. The Head of the Dept. shall consolidate the marks of internal assessment tests before forwarding it to the Asst. Registrar (Exam) at the conclusion of each academic session.

D. Sessional exams are to be conducted during the scheduled lecture time of the subject and other classes scheduled for that day are not to be cancelled.

E. A promoted candidate, who has to reappear in the Final/Annual examination of the paper, will retain internal assessment marks of the previous academic session

F. For 'Seminars on Clinical Issues' the marks will be based on presentations done by the students throughout the session. The assessment will be done by teachers of the specialty.

G. In the case of readmission the candidate shall go through the internal assessment process afresh and shall retain nothing of the previous academic session.

H. Missing an examination without prior permission of the competent authority will be counted as an attempt.

I. The marks of the internal assessment as well as the attendance will be notified and the examination answer sheets will be shown to the students and kept in record after receiving their signatures.

J. In exceptionally genuine and deserving cases, additional internal assessment tests may be held at the discretion of the competent authority.

7. ANNUAL EXAMINATIONS AND SUPPLEMENTARY EXAMINATIONS.

Final examination of theory and practical shall be conducted at the end of each session as outlined below.

a. Mode: Theory Papers	Written only
Lab Hours	Written, Demonstration and/ or Viva Voce
Viva Voce	Viva Voce
b. Duration: Theory	3 hours
Practical	Upto one hour per candidate
c. Examiner Theory	01 (from the panel)
Practical	02 (1 internal and 1 external) from the panel

*Panel to be prepared by the department and approved by the Competent Authority.

Viva Voce	02 (1 internal and 1 external) from the panel
d. Moderation of Theory Papers	For papers set by external examiners only. Change

	cannot be more than 30% by the teacher nominated by the Head.
e. Dissertation evaluation	There will be an internal and an external evaluator for each dissertation. The dissertation will be evaluated by the internal examiner and the viva voce will be conducted by the external examiner.

MINIMUM PASS MARKS

The minimum pass marks in each subject (theory and practical separately) shall be 50% of the maximum marks of the aggregate of Internal Assessment marks and Annual Examination marks. The student will need to obtain 50% of the maximum marks as aggregate of internal and external assessment, and need not obtain 50% of maximum marks in internal and external assessment separately.

8. PROMOTION SCHEME

In order to pass a paper a student has to secure at least 50% marks in paper. A student has to clear theory and practical separately.

(A) From 1st year to 2nd year

A candidate will be promoted from 1st year to 2nd year provided that he/she has passed in atleast 4 papers out of 9 prescribed in the first year in annual/supplementary examinations. If a candidate fails to satisfy the criteria mentioned above, he/she shall be detained in the 1st year.

A candidate failing in any subject will not be required to reappear in the internal assessment. His/her old internal assessment marks will be considered

(B) Second/final year

After having passed all the subjects of first and second year, a candidate shall be eligible for award of degree of Master of Physiotherapy.

A candidate failing in any subject will not be required to reappear in the internal assessment. His/her old internal assessment marks will be considered
Note :A candidate will be permitted to apply for re-evaluation if he /she wishes so.

There will be supplementary examinations within 45 days of declaration of the result of the annual examination.

9. CLINICAL PRACTICE

Students will engage in clinical practice in Physiotherapy Departments in the Orthopaedics/ Neurology/ Cardiopulmonary/ Sports Medicine setting to enhance their clinical skills and apply theoretical knowledge gained during teaching sessions.

10. AWARD OF DEGREE

A. The candidate shall be awarded a Degree Certificate only on successful completion of the course including clinical practice for both the years.

B. The entire course of study in MPT for both the years must be completed within 4 years of the date of first admission.

11. MINIMUM PASS MARKS

The minimum pass marks in each subject (theory and practical separately) shall be 50%.

12. SPAN PERIOD

The entire course should be completed within a period of 4 years from the date of first admission to the program.

13. PAPER FORMAT

Max marks: 75
Duration: 3 hours

1) Essay type answer (total 30marks)
Attempt any 2 out of 3: each question carries 15 marks

2) Long answer questions (total 20 marks)
Attempt any 2 out of 3: each question carries 10 marks.
3) Short answer questions (25 marks)
Attempt any 5 out of 6: each question carries 5 marks

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COURSE DESIGN

SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH
DEPARTMENT OF PHYSIOTHETARPY

NAME OF THE ACADEMIC PROGRAM: MASTER OF PHYSIOTHERAPY (CARDIOPULMONARY)

COURSE CODE: MTC 161

TITLE OF THE COURSE: BASIC HEALTH SCIENCES(THEORY)

L-T-P 48-0-0 Credits : 3
(L=Lecture hours, T=Tutorial hours, P=Practical hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Comprehend the knowledge of the structure & function of the human body (especially the cardiac, pulmonary and vascular structures) in relevance to Physiotherapy.
CLO-2: Understand the factors leading to disease state and guidelines for assessment of cardiopulmonary and vascular disorders.
CLO-3: Correlate and apply the knowledge gained, in understanding and analysing the dysfunction of the human body.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	3	2	3	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO2	3	2	3	2	3	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO3	3	1	3	2	3	2	2	1	2	3	2	**3**	**3**	**1**	**3**	**1**

Detailed Syllabus:

This course provides students an increased understanding of the functions of the cardiopulmonary system in disease and in health with an emphasis on current findings in the respective areas.

Through a study of pharmacology students will be provided information on the principles guiding the prescription of medications and their effects, side effects and influence on exercise when administered in disorders of the cardiopulmonary systems.

Following are the topics to be included but not limited to:

UNIT 1: ANATOMY (10 Hours)

1. Coronary Circulation
2. Structure of the Myocardium ,cardiac muscle and muscle fibre.
3. Nerve Supply of the Heart.
4. Anatomy of the Upper and Lower Respiratory Tract
5. Bronchopulmonary Segments.
6. Electrical conduction of the heart.

UNIT 2: PHYSIOLOGY (10 Hours)

1. Cardiac Physiology and Circulation:
   Physiology of Cardiac Muscle ,action potential of cardiac muscle.
   Cardiac Cycle
   Regulation of Cardiac Cycle
   Rhythmic Excitation of the Heart
   Blood Pressure
   Blood Gas Exchange
   Local Control of Blood Flow
   Heart Sounds
   Control of arterial Pressures

2. Respiration:
   Mechanism of Respiration
   Regulation of respiration (chemical and neural).
   Pulmonary Volumes and Capacities
   Principles of Gas Exchange
   Transport of oxygen and carbon-dioxide

3. Body Fluids and Kidney:
   Oedema
   Capillary Dynamics
   Osmotic Equilibrium between ICF and ECF

UNIT 3: PATHOLOGY (10 Hours)

1. CVS:
   Diseases of CVS

2. Haematological System:
   Blood transfusion
   PVD

3. Respiratory System:
   Restrictive Lung Disease .
   Obstructive Lung disease .
   Tuberculosis, diseases of the pleura(hemothorax, pneumothorax).
   Environmental and Occupational Disease .
   ARDS.

UNIT 4: PHARMACOLOGY(10 Hours)

1. Pharmacokinetics.
2. Anti-Anaemic
3. Anti-Coagulants
4. Thrombolytic Agents
5. CV Drugs (beta blockers, calcium channel blockers)
   Cardiac Glycosides
   Anti-Anginal
   Peripheral Vasodilators
   Anti-HTN
   Anti-Arrhythmic
   Anti-Hyperlipidaemic And Hypocholesterolaemic
6. Drugs Affecting Respiratory System
7. Diuretics
8. NSAIDS

UNIT 5: RADIOLOGY(8 Hours)

1. Chest Radiograph

a. PA, AP< Lateral & Oblique view
b. Chest X-ray in children
c. Bronchography
d. Reading radiograph; mediastinum, hila, lungs, heart, diaphragm, subdiaphragmatic area, thoracic cage, soft tissue.

2. CT Scan

3. NMR

4. ECG

a. Basic electrophysiology
b. Conduction in normal heart beat
c. Exercise ECG
d. Ambulatory ECG

5.ECHO,TMT ,Pharmacological exercise testing.

Reference Books:

1) Standring S, Ellis H, Healy J, Johnson D, Williams A, Collins P, Wigley C. Gray's anatomy: the anatomical basis of clinical practice.2005
2) Ciccone CD. Pharmacology in rehabilitation. FA Davis; 2015 Apr 10.
3) Snell RS. Clinical anatomy by regions. Lippincott Williams & Wilkins; 2011 Oct 28.
4) Corne J, Kumaran M. Chest X-ray made easy. Elsevier Health Sciences; 2015 Jun 26.
5) Hampton J, Hampton J. The ECG made easy e-book. Elsevier Health Sciences; 2019

Teaching-Learning Strategies in brief :

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief :

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 162

TITLE OF THE COURSE: MEDICAL AND SURGICAL MANAGEMENT OF DISORDERS OF THE CARDIOPULMONARY SYSTEM (THEORY)

L-T-P 64-0-0 Credits : 4

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Demonstrate adequate knowledge about management of people with Cardio-pulmonary disorders.
CLO-2: Understand the complications associated with various cardiopulmonary conditions that may require medical or surgical management.
CLO-3: Use this information in planning and tailoring effective, specific, safe Physiotherapy treatment programmes.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	3	2	2	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO2	3	2	3	3	2	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO3	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

This course provides the student with information on the epidemiology, pathomechanics, clinical presentation, relevant diagnostic tests and medical and surgical management of

disorders of the cardiopulmonary system. An overview of diagnostic imaging techniques is presented, with special emphasis on the role of the physiotherapist in using imaging within the scope of physiotherapy and to plan physiotherapy care. Students will be able to use this information in planning and tailoring effective, specific, safe Physiotherapy treatment programmes.

Following are the topics to be included but not limited to:

UNIT 1: CARDIOLOGY (22 Hours)

Epidemiology, pathomechanics, clinical presentation, relevant diagnostic tests (ECG, Echocardiography, Cardiac Catheterisation, Radionuclide Scanning, Stress Testing, ABG, Labs, etc.) and medical management of disorders of the cardiac system.

1. Assessment of Symptoms of Heart Disease
2. Disorders of Cardiac Rate, Rhythm and Conduction
3. Cardiac Arrest
4. Cardiac Failure
5. Shock
6. Rheumatic Fever
7. Congenital Heart Disease
8. Diseases of the Heart Valves
9. Infective Endocarditis
10. Ischemic Heart Disease
11. Hypertension
12. Orthostatic Hypotension
13. CPR
14. Heart Disease In Pregnancy
15. Degenerative Arterial Disease
16. Inflammatory Arterial Disease
17. Raynaud's Disease
18. Venous Thrombosis
19. Peripheral Vascular Disease
20. Cardiomyopathy
21. Diseases of the Pericardium
22. ECG interpretation.

UNIT 2: PULMONOLOGY (11 Hours)

Epidemiology, Pathomechanics, Clinical Presentation, Relevant Diagnostic Tests (PFT, Labs, Etc.) And Medical Management Of Disorders Of The Pulmonary System.

1. Obstructive Pulmonary Diseases
2. Infections Of The Respiratory System
3. Interstitial And Infiltrative Pulmonary Disorders
4. Pulmonary Disorders Due To Exposure To Organic And Inorganic Pollutants
5. Pulmonary Disorders Due To Systemic Inflammatory Disease
6. Pulmonary Vascular Diseases
7. Diseases of the Pleura

8. Respiratory Failure
9. Supplemental Oxygen and Oxygen Delivery Devices in Chronic Respiratory Disease
10. Neuromuscular And Skeletal Disorders Leading To Global Alveolar Hypoventilation
    - Myopathies
    - Spinal Muscular Atrophies
    - Poliomyelitis
    - Motor Neuron Disease
    - HSMN
    - Kyphoscoliosis
    - Pectus Carinatum
    - Pectus Excavatum
11. Pathophysiology of Paralytic-Restrictive Pulmonary Syndromes
12. Conventional Approaches to Managing N-M Ventilatory Failure
13. Interpretation of Chest X-rays.

UNIT 3: CARDIOTHORACIC AND VASCULAR SURGERY (20 Hours)

1. Surgical Management of the Above Conditions, Indications, Contra-Indications for Surgery, Precautions after Surgery. Also Included:
2. Haemodynamic Performance Of CTVS Patients
3. A-V Shunt
4. Procedures On Sternum, Chest Wall, Diaphragm, Mediastinum, Oesophagus.
5. Cardiopulmonary Bypass
6. CTVS Procedures: Outline And Definition Of Procedures, Differences In Open And Closed Heart Surgery, Recent Advances Like MIDCAB, OPCAB, Heart-Port, Etc.
7. Incisions For Procedures In Cardio-Thoracic And Vascular Surgery (Incisions On Sternum, Anterior And Lateral Chest Wall, Thoraco-Abdomenal Including For Procedures On Diaphragm, Mediastinum, Oesophagus And Aorta)
8. Extra-Corporeal Circulation: Techniques
9. Cardiopulmonary Bypass: Pathophysiology And Introduction To OPCAB
10. Emergencies In CTVS
11. LV Assist Devices
12. Heart Transplant
13. Complications Of Cardiac Surgery (Thrombo-Embolism In Brain, Lungs And Distal Vessels, Phrenic Nerve Injuries, Unstable Sternum And Implication Of Procedures Like Omentoplasty, Etc.)
14. Preoperative Assessment Of Patients
15. Haemodynamic Monitoring In CTVS Patients
16. Respiratory Physiology In Relation To Concept Of Shunt And Dead Space And Exchange Of Gases.
17. Interpretation Of Arterial Blood Gases
18. Peripheral Vascular Disease
19. Oncology – Cardiovascular and respiratory system conditions.

UNIT 4: ANAESTHESIOLOGY (11 Hours)

1. Anaesthesia: Types, Benefits, Effects on Cardiopulmonary system, Complications.
2. Post-operative Atelectasis: Types, Pathogenesis, Management.

3. Ventilation-perfusion mismatch, shunting of blood in lungs, dead space ventilation.
4. Respiratory Mechanics:
    - Normal mechanics
    - Under influence of Anaesthesia
    - In Respiratory Pathological conditions
5. Artificial Airways: Types, Benefits, Indications, Contraindications, Effects on Cardiopulmonary system, Complications.
6. Intubation: Methods, Indications, Complications, Instrumentation
7. Bronchoscopy – Principle, method, use and complication.
8. Haemodynamic monitoring: Methods, Instrumentation, Clinical Application.
9. Oxygen Therapy: Methods, Oxygen Delivery Devices, Oxygen toxicity, Clinical Application.
10. Mechanical Ventilation: Modes, Physiological Effects, Indications, Contraindications, Benefits, Complications, Weaning from Ventilator.
11. Mechanical Ventilation in Respiratory disorders and under influence of Anaesthesia.
12. CPR and emergency management strategies in the ICU.

Reference Books:

1) Williams NS, Bullstrode CJ, O'Connell PR. Bailey & Love's Short Practice of Surgery. Annals of the Royal College of Surgeons of England. 2010 Mar;92(2):
2) Walker BR, Colledge NR. Davidson's principles and practice of medicine e-book. Elsevier Health Sciences; 2013 Dec 6.
3) Kasper D, Braunwald E, Fauci SH, Longo D, Jameson J. HARRISON'S PRINCIPLES OF INTERNAL MEDICINE.;2005
4) Kaiser L, Kron IL, Spray TL, editors. Mastery of cardiothoracic surgery. Lippincott Williams & Wilkins; 2013 Dec 24.
5) Hampton J, Hampton J. The ECG made easy e-book. Elsevier Health Sciences; 2019 Feb 12.

Teaching-Learning Strategies in brief :

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief :

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 163

TITLE OF THE COURSE:ADVANCED DIAGNOSTICS AND ELECTROTHERAPEUTICS(THEORY)

L-T-P 48-0-0 Credits : 3
(L=Lecture hours, T=Tutorial hours, P=Practical hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Understand theoretical concepts and physiological effects of electrotherapeutic modalities at cellular level.
CLO-2: Identify recent advances in pain models.
CLO-3: Apply recent knowledge and skill related to exercise therapy interventions and electrotherapeutic modalities in different physiotherapy conditions for patient recovery.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**	**PLO 8**	**PLO 9**	**PLO 10**	**PLO 11**	**PLO 12**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CLO1	3	1	3	2	2	1	1	1	1	3	1	**2**	**3**	**1**	**3**	**1**
CLO2	3	1	3	2	3	1	1	1	1	3	1	**2**	**3**	**1**	**3**	**1**
CLO3	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

UNIT 1 14 Hours.

1. Human performance analysis

- Body composition, strength, agility, endurance and performance testing
- Basic principles, procedure and clinical implications of Body Composition analysis
- Muscle strength -Physiological, biochemical and biomechanical Parameters for assessment of Muscle strength
- Dynamometry-Hand held dynamometer, back and leg dynamometer, Hand grip measurement, 1 R M measurement
- Instrumentation, Procedure of data measurement and Role of Isokinetic dynamometer in Rehabilitation
- Endurance testing; muscle and cardiovascular endurance testing
- Assessment of muscle damage and fatigue
- Assessment of Jointproprioception, Balance, Coordination and Agility

2. Applied movement analysis

- Introduction to two and three dimensional movement analysis

- Instrumentation and Methods of movement analysis
- Electro goniometry and accelerometer, Inclinometer, Pressure transducers and Force plate

3. Electromyography and N C V in Rehabilitation

- Electrophysiology of nerve and muscles
- EMG;-Basic principles, , Processing ,Recording, Normal and Abnormal Potentials, single fibers and macro EMG, Reporting Results, Clinical implications of EMG test, Kinesiological E M G
- N C V (M N C V and S N C V) Basic concepts and methods of recording and interpretation, Clinical implication in various musculoskeletal and neuromuscular conditions
- Basics of E CG waves-Normal and Abnormal interpretation

UNIT 2 - 14 Hours

- Evidence based Role of Exercise therapy intervention and practice in: Pain management, Endurance impairment, impaired mobility, impaired neuromuscular control, impaired joint sense, Impaired Gait and posture
- Specific Exercise Interventions: Isokinetic, Plyometric, Pilates, Open and closed kinetic chain, PNF, Core Stabilization, Aquatic therapy , Home Programme and its adherence.
- Specific consideration in exercise therapy: Female, Pediatric, Amputation, geriatric patients
- Evidenced based role of Electrotherapy intervention and Practice in- Spasm management. Healing and Wound management, Oedema management, Muscular impairment
- Evidenced based role of Microwave diathermy, Shortwave diathermy, Ultra violet radiation therapy and Ultrasound Therapy in physiotherapy.
- Special consideration for electrotherapeutic modalities: Pregnant women, Menstruating women, Pediatric, Geriatric, Neurologically impaired, mentally impaired people.

UNIT 3 - 14 Hours

- Introduction, basic principles, techniques of application, indications, contraindications and evidenced based role of the following in Rehabilitation:
  - Neuromuscular Electrical Stimulation (NMES)
  - Russian and Interferential and H V P G Currents
  - Functional electrical stimulation (FES)
  - Extra corporeal Shock wave therapy (ESWT)
  - E M G Biofeed back
  - Microcurrents.
  - LASER
  - Virtual reality.

UNIT 4 - 14 Hours

- Basic molecular biology of pain
- Electrophysiology of peripheral and central aspect of pain
- Pain measurement tools and physiotherapy management strategy
- Role of different electrotherapeutic modalities in management of pain and healing

Reference Books:

1) Sheila K, Sarah B. Electrotherapy: Evidence-Based Practice. Churchill Livingstone,. 2002.
2) Low JL, Reed A. Electrotherapy explained: principles and practice. Elsevier Health Sciences; 2000.
3) Penrose HW. Electrical Motor Diagnostics. Success by Design; 2015.

Teaching-Learning Strategies in brief :

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Assessment methods and weightages in brief :

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COURSE CODE: MTC 164

TITLE OF THE COURSE: RESEARCH METHODOLOGY, BIOSTATISTICS AND COMPUTER APPLICATION(THEORY)

L-T-P 80-0-0 Credits : 5

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Enumerate the steps of research process and be able to design the different research methods .
CLO-2: Acquire skills to critically review literature, formulate problems, writing and publishing conducted research.
CLO-3: Apply basic biostatistics in research and analytical statistical tests to analyse the result of research .

CLO-4: To Analyse Recent Advances in Research Methodology and Biostatistics and to understand and familiarize the student with different softwares and resources used in statistical analyses of research data.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	2	3	3	3	2	2	2	2	**3**	**3**	**3**	**3**	**3**
CLO2	3	3	3	3	3	3	3	2	2	2	2	**3**	**2**	**3**	**3**	**3**
CLO3	2	3	2	2	3	2	3	1	1	1	1	**3**	**1**	**2**	**1**	**2**
CLO4	1	1	3	3	3	2	3	1	1	1	1	**3**	**1**	**3**	**3**	**1**

Detailed Syllabus:

To enhance the ability of the Physiotherapist to conduct scientific studies thereby addressing the concerns of a commitment to inquiry , knowledge development &responsible (knowledge based) clinical practice & to construct valid & reliable assessment tools capable of yielding data of scientific value.

UNIT 1-Concepts of Research Methodology **24 Hours**

- An introduction to research methodology 2 Hours
- Defining the research problem 2 Hours
- Review of literature/use of IT & Database for ROL 2 Hours
- Research Design –Experimental & Non-experimental 4 Hours
- Measurement and scaling techniques 2 Hours
- Reliability and validity 2 Hours
- Variables and operational definition 2 Hours
- Methods of data collection 2 Hours
- Sampling and sample size calculation. 1 Hour
- Level of evidence 1 Hour
- Research ethics, Informed Concent , Plagerism 2 Hours
- Writing proposal 1 Hour
- Use of animals and Human Subjects in research 1 Hour

UNIT 2**: Applications of Research Methodology (17 Hours)**

- Choosing & Developing Research question
- Critiquing a published article
- Presenting research Proposal
- Applying for research funding
- Writing in scientific style-Research Paper,Book review, Thesis,Project Report
- Referencing, citation, Indexing and impact factor
- Presenting research
- Preparing a conference poster
- Research in rehabilitation

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UNIT 3: Concepts in Biostatistics (25 Hours)

- **Introduction to Biostatistics (4 Hours.)**
  a. Definition, concept, function and limitation
  b. Measures of central tendency (Mean, mode and median) and dispersion (absolute and relative measure)
  c. Rate, ratio, proportion, incidence and prevalence, Point prevalence.

- **Sampling &Assignment (5 Hours)**
  a. Methods of sampling-Probabilistic and non-probabilistic Sampling
  b. Methods of Assignment

- **Basic probability distribution and sampling distributions:(6 Hours)**
  a. Concept of probabilityand probability distribution.
  b. Normal,Binomial distribution, Standard error and confidence intervals, Skewness and kurtosis.

- **Tests of Significance :(10Hours)**
  a. Basic of Testingof hypothesis-Null and alternate hypothesis. 2. TypeIand typeIIerrors.
  b. Level of significance, p value.
  c. Parametric test, non-parametric test, correlation and regression
  d. Concept of t test, f test and chi square

UNIT 4: Computer application in research and Biostatistics(14 Hours.)

- Overview of available software used in analysis and research-SPSS, STATA etc
- Procedure of preparation of Master chart in Excel sheet
- Procedure of representation of data, Result and descriptive statistics with table, Graph, Pie chart, scatter diagram, pictograph etc.

Reference Books:

1) Christopher Bork: 1992: Research in physical therapy
2) Domholdt E. Physical therapy research. Principles and applications. 1993.
3) Hicks CM. Research methods for clinical therapists: applied project design and analysis. Elsevier Health Sciences; 2009 Aug 7.
4) Swisher LL, Page CG. Professionalism in physical therapy: History, practice, and development. Elsevier Health Sciences; 2005 Feb 15.
5) Mahajan BK. Methods in Biostatistics For Medical Students & Research Workers, Jaypee Brothers Medical publishers (P) Ltd. New Delhi, India. 1991.

Teaching-Learning Strategies in brief :

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief :

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 165

TITLE OF THE COURSE: SEMINARS ON CLINICAL ISSUES

L-T-P 0-0-48 Credits : 4

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: The student should be able to demonstrate adequate knowledge and skill in evidence-based seminar presentation on topic allocated to him/her pertaining to Cardiopulmonary health, fitness and various Disorders
CLO-2: The student should be able to develop presentation skills while developing persuasive speech.
CLO-3: the student should be able to present information in a compelling, well structured and logical sequence, respond respectfully to opposing ideas, show depth of knowledge and develop ability to synthesize, evaluate and reflect on information.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	3	3	3	3	1	1	3	3	**3**	**3**	**3**	**3**	**3**
CLO2	1	3	3	3	3	1	3	1	1	1	3	**3**	**1**	**3**	**3**	**2**
CLO3	1	3	3	3	3	3	3	3	1	1	3	**3**	**1**	**3**	**3**	**3**

Detailed Syllabus:

These will serve as a platform for students to integrate various components of patient management and debate contentious issues in the efficacy of Physiotherapy techniques. Students will give presentations on topics provided to them

Teaching-Learning Strategies in brief :

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief :

Assessment is in form of internal assessment which is of 100 marks. The student will present seminars on topics allocated to them and will be marked on the basis of their presentation skills, information presented, ability to defend their argument and answering the questions put up.

COURSE CODE: MTC 166

TITLE OF THE COURSE: PHYSIOTHERAPY I-THERAPEUTIC PRINCIPLES AND PRACTICE IN CARDIOPULMONARY PHYSIOTHERAPY(THEORY)

L-T-P 96-0-0 Credits : 6

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Describe Anatomy & Physiology of cardiovascular and pulmonary system.
CLO-2: Describe the pathophysiology, aetiology, clinical features and impairments of cardiovascular and pulmonary conditions.
CLO-3: Select appropriate scales, outcome measures and investigations
CLO-4: Analyse common investigations like ECG, ECHO, Colour Doppler, PFT etc and be able to interpret them.
CLO-5: Perform physiotherapy assessment for above mentioned conditions.
CLO-6: Formulate a differential diagnosis and deliver appropriate physiotherapy management protocol.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	1	1	1	1	1	1	1	1	2	1	**3**	**1**	**1**	**1**	**1**
CLO2	3	1	1	1	1	1	1	1	1	2	1	**3**	**1**	**1**	**1**	**1**
CLO3	3	1	2	3	3	1	2	1	1	3	1	**3**	**3**	**1**	**2**	**1**
CLO4	3	2	3	3	3	1	3	1	1	3	1	**3**	**3**	**1**	**3**	**1**
CLO5	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**
CLO6	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

This course provides students with the principles of Physiotherapy management in disorders of the cardiopulmonary system and the application of these principles in specific disorders.

Through lectures, case conferences, journal discussions and class discussions students will be able to set up a treatment programme tailored to the patient's needs.

Objectives

1. Analyze the multifaceted aspects of the clinical problem and appreciate a multifaceted approach to evaluation and treatment.

2. Identify treatment approaches and their appropriate match with clinical problems.

3. Recognise the role of the Physiotherapist in helping the patient reach his or her optimal level of functional independence within their environment.

Following are the topics to be included but not limited to:

UNIT 1: GENERAL PRINICIPLES (30Hours)

1) Clinically oriented anatomy and physiology of the cardiovascular and respiratory system:
   a) Pulmonary ventilation and circulation
   b) Principles of gas exchange
   c) Ventilation –perfusion relationship
   d) Transport of oxygen and carbon dioxide in blood.
   e) Respiratory insufficiency and respiratory failure.
   f) Energy cost of breathing
   g) Respiratory mechanics
   h) Alveolar gas equation.
   i) Shunting of blood in lungs and the shunt equation,
   j) Physiology of high altitude and deep sea diving.
   k) Effects of ageing on cardiovascular and respiratory system.
   l) Anatomy and physiology of cardiovascular and respiratory sytem of neonates and children.

2) Cardiopulmonary Physiotherapy evaluation and documentation:
   a) Assessment of cardiovascular and respiratory system.
   b) Sub maximal exercise testing.
   c) Documentation: purpose and methods.

3) Questionnaires for evaluation of cardio respiratory status of the patient (general and disease specific)

4)Questionnaires for evaluation of functional capacity, quality of life , dyspnoea.

UNIT 2: CARDIOPULMONARY PHYSIOTHERAPY TECHNIQUES

(20 Hours)

1. Body Positioning
2. Breathing Exercises
3. Mobilization And Exercises
4. Airway Clearance

- Airway Clearance Techniques including postural drainage, FET, endotrachealsuctioning, ACBT and AD.
- Airway Clearance Technology including acapella, flutter,therapep,IPPB,high frequency chest compression etc.
- Respiratory Muscle Testing and Training

5.Mechanical Ventilation:
a) Modes, Physiological Effects, Indications, Contraindications, Benefits, Complications, Weaning from Ventilator.
b) strategies to improve respiratory mechanics in mechanically ventilated patients.
c) strategies for airway clearance and bronchial hygiene in mechanically ventilated patients.

6.Humidification And Aerosol Therapy

7.Oxygen Therapy and Oxygen Delivery Devices

8.Techniques For Facilitating Ventilatory Pattern and Breathing Strategies.

9.Respiratory PNF.

UNIT 3: GENERAL CONCEPTS OF CARDIOPULMONARY PHYSIOTHERAPY MANAGEMENT(20 Hours)

1. Clinical Application of Cardiopulmonary Physiotherapy Techniques (4 Hours)
2. Physiotherapy Management in the Intensive Care Unit and ICCU (4 Hours)
3. Physiotherapy in Neonatal and paediatric I.C.U .(4 Hours)
4. Physiotherapy management of Oncology patients and palliative care. (3 Hours)

5. Physiotherapy management in Geriatric patients: problems faced by the elderly, effects of exercise on ageing adults.(3 Hours)
6. Telerehabilitation: Definition, modes of delivery, Evidence based practice, status and practice in India. (2 Hours)

UNIT 4: PHYSIOTHERAPY MANAGEMENT IN SPECIFIC CONDITIONS (26 Hours)

1. Chest Physiotherapy management in specific conditions:
   a) Infections of the respiratory system
   b) Acute exacerbation of COPD,Asthma.
2. Respiratory Failure
3. Diseases Of The Pleura
4. Neuromuscular And Skeletal Disorders
5. Pre And Post Op Blood Gas Exchange
6. Surgical incisions.
7. Acute post surgical ICU management of:
   a) Cardiac surgeries.
   b) Pulmonary surgeries.
   c) Abdominal surgeries.
   d) Vascular surgeries.
   e) Neurosurgery.

8.emergencies in CTVS.

Reference Books:

1) Frownfelter D, Dean E(1996). Principles and Practice of Cardiopulmonary Physical Therapy. Mosby-Yearbook.
2) Shapiro BA. Clinical application of respiratory care. Mosby; 1991.
3) Fink JB, Hunt GE. Clinical practice in respiratory care. Lippincott Williams & Wilkins; 1999.
4) Fink JB, Hunt GE. Clinical practice in respiratory care. Lippincott Williams & Wilkins; 1999.
5) Watchie J. Cardiovascular and pulmonary physical therapy: a clinical manual. Elsevier Health Sciences; 2009

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COURSE CODE: MTC 167

TITLE OF THE COURSE: PHYSIOTHERAPY I-THERAPEUTIC PRINCIPLES AND PRACTICE IN CARDIOPULMONARY PHYSIOTHERAPY (PRACTICALS)

L-T-P 0-0-48 Credits : 3

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Ability to analyse the multifaceted aspects of the clinical problem and appreciate a multifaceted approach to evaluation and treatment leading to sound clinical reasoning.

CLO-2: Ability to Identify treatment approaches and their appropriate match with clinical problems.

CLO-3: Recognise the role of the Physiotherapist in helping the patient reach his or her optimal level of functional independence within their environment.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

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CLO2	3	3	3	3	3	3	3	2	3	3	2	**3**	**3**	**3**	**3**	**2**
CLO3	3	3	3	2	2	3	2	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Students will be instructed via demonstrations, hands on techniques, field visits and case conferences on specific techniques used in management of patients with cardiopulmonary disorders. Students will draw on their experiences at the clinical postings to formulate a treatment plan for cases

Reference Books:

1) Frownfelter D, Dean E(1996). Principles and Practice of Cardiopulmonary Physical Therapy. Mosby-Yearbook.
2) Shapiro BA. Clinical application of respiratory care. Mosby; 1991.
3) Fink JB, Hunt GE. Clinical practice in respiratory care. Lippincott Williams & Wilkins; 1999.
4) Fink JB, Hunt GE. Clinical practice in respiratory care. Lippincott Williams & Wilkins; 1999.
5) Watchie J. Cardiovascular and pulmonary physical therapy: a clinical manual. Elsevier Health Sciences; 2009

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COURSE CODE: MTC 168

TITLE OF THE COURSE: EXERCISE PHYSIOLOGY (THEORY)

L-T-P 64-0-0 Credits : 4

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Describe various physiological/systemic changes that occur during exercise.
CLO-2: Describe various types, principles and application of different types of exercise training methods.
CLO-3: Apply the principles of diet and nutrition in exercise prescription
CLO-4: Assess and prescribe exercise protocol in special populations like Geriatrics, athletes', obese, pregnancy and in various systemic conditions like hypertension and respiratory conditions.
CLO-5: Describe the process of body's acclimatization to various environmental conditions.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO2	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO3	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO4	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO5	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**

Detailed Syllabus:

UNIT I: ENERGY TRANSFER (17 HOURS)

A. Review of Bioenergetics, Energy Release from food and Energy transfer in body **(2 hours)**

B. Energy transfer during exercise **(4 hours)**
   a. Adenosine Triphosphate-Phosphocreatine system
   b. Lactic acid system
   c. Aerobic system
   d. Maximal Oxygen uptake
   e. Oxygen debt

C. Energy generation capacity during exercise:

1. Measurement and evaluation of anaerobic energy systems **(3 hours)**
   a. The immediate energy system
   b. Performance tests of anaerobic power and capacity
   c. The short term energy systems
2. Measurement and evaluation of aerobic energy systems **(4 hours)**
   a. Direct calorimetry
   b. Indirect calorimetry
      - Closed circuit spirometry
      - Open circuit spirometry
   c. Respiratory Quotient
   d. Respiratory exchange ratio
   e. The maximal oxygen uptake (VO_{2max})

D. Expenditure of energy during rest and physical activity

1. Energy expenditure at rest **(2 hours)**
   a. Basal metabolic rate
   b. Body size and resting metabolism
   c. Resting daily energy expenditure
2. Energy expenditure during physical activity **(2 hours)**
   a. Classification of work by energy expenditure
   b. Metabolic equivalent (MET)

UNIT II: PHYSIOLOGIC SUPPORT SYSTEMS(15 HRS)

A. Exercise and Respiratory System **(2 hours)**
   i. Review of gas exchange and transport of oxygen and carbon dioxide transport

ii. Regulation of pulmonary ventilation during rest and exercise

B. Exercise and Cardiovascular system

1. Blood Pressure **(2 hours)**
    a. At rest
    b. During exercise
    c. In recovery
2. Regulation of heart rate and blood pressure **(1 hour)**
3. Exercise and blood flow regulation **(1 hour)**
4. Functional Capacity of the Cardiovascular System **(1 hour)**
5. Exercise Testing **(2 hours)**

C. Exercise and Neuromuscular System **(4 hours)**

i. Muscle fibre types: structure and function.
ii. Motor unit – Functional Characteristics
iii. Chemical and mechanical events during muscle contraction and relaxation
iv. Proprioceptors in muscles, joints and tendons
v. Action potential and neural transmission

D. Endocrine System and Exercise **(2 hours)**

UNIT III: EXERCISE TRAINING AND ADAPTATIONS(26 HRS)

A. Training the aerobic and anaerobic systems

a. Principles of exercise training **(1 hour)**
    i. Overload principle
    ii. Specificity principle
    iii. Individual differences principle
    iv. Reversibility principle
b. Adaptations to exercise training **(2 hours)**
    i. Anaerobic system changes
    ii. Aerobic system changes
c. Factors affecting aerobic training response **(1 hour)**
d. Establishment of training intensity **(2 hours)**
    i. Training at percentage of VO_{2max}
    ii. Training at percentage of maximum heart rate
    iii. Training at a perception of effort
    iv. Training at Lactate threshold
    v. Estimation of Exercise HR
e. Methods of training: **(3 hours)**
    i. Anaerobic training
    ii. Aerobic training: Continuous versus intermittent methods
    iii. Formulating the exercise: Relief interval
    iv. Overtraining & Fatigue

B. Strength training

a. Measurement of muscular strength **(2 hours)**
    i. Cable tensiometry
    ii. Dynamometry

iii. One-repetition maximum
iv. Computer-assisted electromechanical and isokinetic determinations

b. Strength testing considerations **(1 hour)**
c. Training of muscles for improvement of strength **(3 hours)**
   i. Overload and intensity
   ii. Force-velocity relationship
   iii. Power-velocity relationship
   iv. Load-repetition relationship
d. Male and female differences in muscular strength **(1 hour)**
e. Systems of resistance training **(4 hours)**
   i. Isometric training
   ii. Dynamic constant external resistance training
   iii. Variable resistance training
   iv. Isokinetic training
   v. Plyometric training
f. Periodization **(2 hours)**
g. Adaptations to resistance training **(1 hour)**
h. Recommendations for resistance training program initiation **(1 hour)**
i. Resistance training guidelines for sdentary adults, the elderly and cardiac patients **(2 hours)**

UNIT IV: EXERCISE PERFORMANCE AND ENVIRONMENTAL STRESS(6 HRS)

A. Environmental factors affecting exercise performance **(3 hours)**
   a. Mechanism of thermoregulation
   b. Exercise in heat
   c. Exercise in cold

E. Exercise at altitude **(3 hours)**
   a. Altitude related medical problems
   b. Acclimatization
   c. Exercise capacity at altitude

Reference Books:

1) McArdle WD, Katch FI, Katch VL. Essentials of exercise physiology. Lippincott Williams & Wilkins; 2006.
2) Hale T. Exercise physiology: a thematic approach. John Wiley & Sons; 2004 .
3) Clarke D. Exercise physiology. Prentice-Hall.
4) Wolinsky I, editor. Nutrition in exercise and sport. CRC press.
5) Brooks GA, Fahey TD, White TP. Exercise physiology: human bioenergetics and its applications. Mayfield publishing company.
6) Åstrand PO, Rodahl K, Dahl H, StrÃ SB. Textbook of work physiology: physiological bases of exercise. Human kinetics; 2003.

7) Fox EL, Bowers RW, Foss ML. The physiological basis of physical education and athletics. William C Brown Pub.
8) Eston RG, Reilly T, editors. Kinanthropometry and exercise physiology laboratory manual: exercise physiology. Taylor & Francis; 2009.
9) Rowland TW. Developmental exercise physiology. Human Kinetics Publishers.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 169

TITLE OF THE COURSE: CLINICAL TRAINING

L-T-P - 0-0-704 Credits : 44

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Understanding of community and health care workers
CLO-2: Understanding the bedside assessment of a patient and its management
CLO-3: Understanding of different departments in a hospital
CLO-4: Understanding basic knowledge of modality and its implementation
CLO-5: Understanding basic knowledge of cardiopulmonary-rehabilitation and its implementation
CLO-6: Understanding the recent advance techniques in cardiopulmonary-rehabilitation and its application

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	1	3	2	1	1	3	1	3	3	1	3	**1**	**1**	**3**	**3**	**3**
CLO2	3	3	3	3	3	3	3	3	3	3	3	**2**	**3**	**3**	**3**	**3**

CLO3	2	2	1	1	1	3	1	1	1	1	1	**1**	**1**	**2**	**1**	**3**
CLO4	2	2	1	1	1	3	1	1	1	1	1	**1**	**1**	**2**	**1**	**2**
CLO5	3	3	3	3	3	3	2	2	2	3	2	**3**	**3**	**3**	**3**	**2**
CLO6	3	2	3	3	3	2	2	1	2	3	2	**3**	**3**	**2**	**3**	**2**

Detailed Syllabus:

Students will engage in clinical practice in Physiotherapy departments in the Cardiopulmonary setting (including medical and surgical ICU and wards) to enhance their clinical skills and apply contemporary knowledge gained during teaching sessions.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

SECOND YEAR SYLLABUS

COURSE CODE: MTC 261

TITLE OF THE COURSE: MANAGEMENT, EDUCATION AND ETHICS(THEORY)

L-T-P 80-0-0 Credits : 5

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: The student should be able to demonstrate adequate knowledge and skill in ethical principles of physiotherapy
CLO-2: Be aware of legal rights and duties as per the laws of Physiotherapy Governing bodies.
CLO-3: Apply managerial skills in planning, implementation and administration of clinical activities.
CLO-4: To document comprehensive and accurate health records.
CLO-5: To be able to understand and apply different teaching – learning methods for imparting physiotherapy education.
CLO-6: Describe the concept of learning evaluation and curriculum development

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	1	2	2	1	1	1	1	1	3	1	2	**2**	**1**	**2**	**2**	**1**
CLO2	1	2	2	1	1	1	1	1	3	1	2	**2**	**1**	**2**	**2**	**1**
CLO3	1	2	3	2	1	3	3	3	1	1	3	**2**	**1**	**3**	**1**	**3**
CLO4	1	1	1	1	1	1	3	1	1	1	1	**1**	**1**	**3**	**1**	**1**
CLO5	3	3	3	3	2	3	2	2	2	2	3	**2**	**3**	**3**	**3**	**3**
CLO6	1	2	2	1	1	2	2	1	1	1	2	**1**	**1**	**1**	**1**	**2**

Detailed Syllabus:

UNIT 1: MANAGEMENT **{40 Hours.}**
To enhance the ability of the Physio Therapist to implement the principles of management & administration in the context of increasing interaction between the Health – care facility & the community.

1.Health care delivery system (including in health prevention and promotion)
Hospital: types and functions; clinical, supportive &ancillary services of a hospital
2. Facility planning
designing values based faciltity, strategic planning , design decisions
planning steps & process
planning for growth
(Acute care, rehabilitation center , school system , adult day care , long – term care , home care and private practice , community care , industrial set-up , .Hospice)

3. Organizing & engaging people in work setting
concept of productivity
organizational leadership : roles , responsibilities & competencies.
management styles
work teams
organizational performance improvement (quality & service improvement)

1. Dealing with differences(values , diversity concerns)
Conflicting values& motivations
Organizational, personal & professional guidance (organizational self-veiw, fundamental documents

2. Organizational structure & control for business success
characteristics of business structures
(legal structure, tax status, operating structure)
Organizational structure
(organizational chart, hierarchy in organizations, organizational patterns)
product strategy decisions
policies & procedures
re-organization
human resource management in relation to the operating structure.

3. Recruitment (personnel & entry level students)

4. Directing and controlling

5. Monitoring and evaluation

9. Information management
management & flow of information in an organization
use of data
documentation (personnel , technological , financial considerations & realistic expectations)

6. Outcome management

11.Quality management- basis of quality management , quality assessment/control (audit), quality assurance, international quality system

12.Risk management

13. Financial management (fiscal management & cost accounting)

14. Marketing
    market orientation , segmentation , consumer behaviour, consumer research
    basics of marketing
    marketing plan
    marketing strategies in health care/ rehabilitation services.
    promotional considerations (communication methods & media , the marketing campaign)

15. Consultancy

16. Entrepreneurship : ownership & private practice

UNIT –II
PEDAGOGY in PHYSICAL THERAPY EDUCATION (30 Hours)

To enhance the potential of the Physical Therapist to become effective communicators especially in the context of education

1. Introduction to Education and emerging issues in education (5 Hours)
   a) Meaning, functions and aims of education
   b) Agencies of education
   c) Formal , informal & non – formal education
   d) Current issues & trends in higher education
      i. Issue of quality in higher education
      ii. Autonomy & accountability
      iii. Privatization of education
      iv. Professional development of teachers
      v. Education of persons with disabilities
   e) Philosophy of Education
      i. Need for educational philosophy
      ii. Some major philosophies (Idealism, Naturalism, Pragmatism) & their implications for education.

2. Concepts of teaching & learning (3 Hours)
   a) Meaning need & scope of educational psychology
   b) Meaning & relationship between teaching & learning
   c) Learning theories
   d) Dynamics of behavior
   e) Individual differences

3. Curriculum (4 Hours)
   a) Meaning & Concept of Curriculum

b) Basis for curriculum formulation/development.
c) Framing objectives for a curriculum
d) Process of curriculum development (including field work)
e) Factors affecting curriculum development
f) Evaluation of curriculum

4. Planning for teaching (3 Hours)
   a) Bloom's taxonomy of instructional objectives
   b) Writing instructional objectives in behavioral terms
   c) Unit Planning & Lesson Planning
   d) Preparation of unit plan & lesson plan
   e) Concept of Microteaching

5. Teaching Methods (6 Hours)
   a) Lecture, lecture – demonstration, discussion, seminar, assignment, project method and case study method

6. Teaching aids (2 Hours)
   a) Types of teaching aids
   b) Principles of selection
   c) Preparation and use of audio – visual aids

7. Measurement & Evaluation (4 Hours)
   a) Nature of educational measurement : meaning , process & types of testing
   b) Construction of an achievement tests & its analysis.
   c) Standardized tests
   d) Introduction of some standardized tools and important tests of intelligence, aptitude and personality
   e) Continuous & comprehensive evaluation.

8. Guidance & counselling (1 Hour)
   a) Meaning & concepts of guidance & counselling
   b) Principles of guidance & counseling services for students & faculty members
   c) Faculty development & development of personnel for physiotherapy services

9. Clinical Education (2 Hours)
   a) Awareness & guidance to the common people about health & disease and available Professional services.
   b) Patient education
   c) Education of health care practitioners
   d) Use of media in clinical education

UNIT– III (10 hours)

Legal Professional and Ethical Issues (10 hours)

a. Physiotherapy: Definition and Development.

b. The Implications & Conformation To The Rules Of Professional Conduct.

c. Legal Responsibility For Their Actions In The Professional Context And Understanding The Physiotherapist's Liability And Obligations In The Case Of Medical Legal Action.

d. Code of Ethics

e. A Wider Knowledge of Ethics Relating To Current Social And Medical Policy In The Provisions Of Health Care.

f. Functions of The Relevant Professional Associations Education Body And Trade Union.

g. The Role of The International Health Agencies Such As The World Health Organizations.

h. Standards of Practice For Physiotherapists

i. Current Issues.

Reference Books:

1)Chandra SS, Sharma RK. Principles of education. Atlantic Publishers & Dist; 2004.
2) Srinibas Bhattacharya(2002) Philosophical Foundation of Education
3) Bhattacharya S. Sociological Foundation of Education. Atlantic Publishers & Dist; 2006.
4) kotler P. From mass marketing to mass customization. Planning review. 1989.
5) Chandra SS, Sharma RK. Principles of education. Atlantic Publishers & Dist; 2004.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 262

TITLE OF THE COURSE: BIOMECHANICS AND KINESIOLOGY (THEORY)

L-T-P 96-0-0 Credits : 6

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: To apply the knowledge of biomechanical and kinesiological principles for assessing the physiotherapeutic requirement of the patient

CLO-2: To apply the knowledge of joint biomechanics in evaluation and treatment of patients.

CLO-3: To understand and apply the applications of movement dysfunction into therapeutic exercise prescription

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	3	3	3	2	2	2	2	3	1	**3**	**3**	**2**	**3**	**2**
CLO2	3	2	3	3	3	3	2	3	3	3	2	**3**	**3**	**2**	**3**	**3**
CLO3	3	2	3	3	3	3	2	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Injury occurs from mechanical overload of tissue. This simple tenet is often overlooked by those responsible for injury prevention and rehabilitation of those already injured. This subject fills the current need for a resource that synthesizes the links between tissue properties, skeletal architecture, applied loads and injury. This subject will provide the mechanical bases of musculoskeletal injury to better understand causal mechanisms, the effect of injury on musculoskeletal tissues, and how our current knowledge of biomechanics can contribute to injury prevention. The subject will include comprehensive information on

- The basic biomechanical concepts of force, stress and strain, stiffness, and elasticity;
- The mechanics of joints that are subject to disabling injury;
- The structure of connective tissues (bone, cartilage, tendons, and ligaments), which are most often involved in musculoskeletal injuries; and
- Factors such as age, gender, nutrition, and exercise, which affect the musculoskeletal system's response to force.

UNIT 1: Biomechanical Concepts (6 Hours)

- Mechanical principles of Materials
- Kinematics
- Kinetics
- Fluid Mechanics
- Material Mechanics
- Biomechanical Modeling and Simulation

UNIT 2: Tissue Biomechanics and Adaptation (12 Hours)

- Bone Biomechanics (2 hours)
- Articular Cartilage Biomechanics (2 hours)
- Tendon and Ligament Biomechanics (4 hours)
- Skeletal Muscle Biomechanics (2 hours)
- Biomechanics of Joint (2 hours)

UNIT 3: Mechanisms of Injury (06 Hours)

- Overview of Injury Mechanisms
- Principles of Mechanical Loading
- Principles of Injury
- Tissue Injury
- Compartment and Entrapment Conditions
- Joint Injury

UNIT 4: Kinesiology of upper limb, lower limb spine and cardiopulmonary mechanics (40 Hours)

Shoulder complex (4 hours)
Elbow and forearm complex (4 hours)
Wrist andHand (2 + 4 = 6 hours)
Spine (10 hours)
Hip (4 hours)
Knee (4 hours)
Ankle and Foot (5 hours)
Cardiopulmonary Mechanics (3 hours)

UNIT 5: Gait Analysis (10 Hours)

- Fundamentals: Gait Cycle, Phases of Gait, Basic Functions
- Normal Gait: Ankle Foot Complex, Knee, Hip, Head, Trunk and Pelvis, Arm, Total Limb Function
- Pathological Gait: Pathological Mechanisms, Ankle and Foot Gait Deviations, Knee Abnormal Gait, Hip Gait Deviations, Pelvis and Trunk Pathological Gait, Clinical Examples
- Gait Analysis Systems: Motion Analysis, Dynamic Electromyography, Ground Reaction Forces and Vectors, Stride Analysis, Energetic

UNIT 6: Measurement Instruments (11 Hours)

- Goniometer (1 hour)
- Accelerometer (1 hour)
- Photo Optical Devices (2 hour)
- Pressure Transducers & Force Plates (2 hour)
- Gait Analyzer(2 hour)
- Isokinetic Device (3 hours)

UNIT 7: EMG (5 Hours)

a. Electrophysiology Of Muscle Contraction
b. Recording
c. Processing
d. Relationship between EMG and Biomechanical Variables

UNIT 8: Biomechanical consideration for Orthoses & Prosthesis (06 Hours)

Reference Books:

1)Winter DA. Biomechanics of human movement. Biomechanics. 1979.
2) Levangie PK, Norkin CC. Joint structure and function: a comprehensive analysis. FA Davis; 2011 .
3) Nordin M, Frankel VH, editors. Basic biomechanics of the musculoskeletal system. Lippincott Williams & Wilkins; 2001.
4) Kapandji IA. Physiology of the Joints E-Book: Volume 2 Lower Limb. Elsevier Health Sciences; 2016 .
5) Soderberg GL. Kinesiology: application to pathological motion. Lippincott Williams & Wilkins; 1997.
6) Smith LK, Weiss L, Lehmkuhl LD. Brunnstrom's clinical kinesiology

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 263

TITLE OF THE COURSE: BIOMECHANICS AND KINESIOLOGY

(VIVA-VOCE)

L-T-P 0-0-32 Credits : 2

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: To understand and apply knowledge of movement dysfunction into therapeutic expression.
CLO-2: To demonstrate skills and techniques used in biomechanics and kinesiology
CLO-3: To demonstrate upper and lower limb joints biomechanics in evaluation and treatment of patients.
CLO-4: Apply the knowledge of Biomechanics in exercise prescription with clinical reasoning.
CLO-5: Analyse kinetics and kinematics of all joints & its application in body movements.
CLO-6: Apply the principles of Biomechanics in prosthetics, orthotics & mobility aids.
CLO-7: Prescribe ergonomic alterations at workplace using biomechanical principles.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	1	3	3	2	2	2	2	2	3	2	**2**	**3**	**1**	**2**	**1**
CLO2	3	2	3	3	3	2	2	2	2	3	2	**2**	**3**	**2**	**3**	**2**
CLO3	3	3	3	2	3	2	2	2	2	3	2	**3**	**3**	**3**	**3**	**3**
CLO4	3	2	3	3	3	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**3**
CLO5	3	3	3	2	3	2	2	2	2	3	2	**2**	**3**	**2**	**3**	**2**
CLO6	3	1	2	2	2	2	2	2	2	3	2	**3**	**3**	**1**	**3**	**2**
CLO7	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

This involves application of above topics via demonstrations, field visits and case presentations

Reference Books:

1)Winter DA. Biomechanics of human movement. Biomechanics. 1979.
2) Levangie PK, Norkin CC. Joint structure and function: a comprehensive analysis. FA Davis; 2011 .
3) Nordin M, Frankel VH, editors. Basic biomechanics of the musculoskeletal system. Lippincott Williams & Wilkins; 2001.
4) Kapandji IA. Physiology of the Joints E-Book: Volume 2 Lower Limb. Elsevier Health Sciences; 2016 .
5) Soderberg GL. Kinesiology: application to pathological motion. Lippincott Williams & Wilkins; 1997.
6) Smith LK, Weiss L, Lehmkuhl LD. Brunnstrom's clinical kinesiology.

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Assessment methods and weightages in brief:

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COURSE CODE: MTC 264

TITLE OF THE COURSE: SEMINARS ON CLINICAL ISSUES

L-T-P 0-0-48 Credits : 3

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: The student should be able to demonstrate adequate knowledge and skill in evidence-based seminar presentation on topic allocated to him/her pertaining to Cardiopulmonary health, fitness and various Disorders
CLO-2: The student should be able to develop presentation skills while developing persuasive speech.
CLO-3: the student should be able to present information in a compelling, well-structured and logical sequence, respond respectfully to opposing ideas, show depth of knowledge and develop ability to synthesize, evaluate and reflect on information

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	3	3	3	3	1	1	2	3	**2**	**3**	**3**	**3**	**3**
CLO2	3	3	3	3	3	3	3	1	1	2	3	**2**	**3**	**3**	**3**	**3**
CLO3	3	3	3	3	3	3	3	1	1	2	3	**2**	**3**	**3**	**3**	**3**

Detailed Syllabus:

These will serve as a platform for students to integrate various components of patient management and debate contentious issues in the efficacy of Physiotherapy techniques. Students will give presentations on topics provided to them

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is in form of internal assessment which is of 100 marks. The student will present seminars on topics allocated to them and will be marked on the basis of their presentation skills, information presented, ability to defend their argument and answering the questions put up.

COURSE CODE: MTC 265

TITLE OF THE COURSE: DISSERTATION

L-T-P 208-0-0 Credits : 13

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.
CLO-2: Engage in systematic discovery and critical review of appropriate and relevant information sources.
CLO-3: appropriately apply qualitative and /or quantitative evaluation process to original data, understand and apply ethical standards of conduct in the collection and evaluation of data and other resources.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	2	3	3	2	3	2	3	1	1	2	2	**2**	**2**	**3**	**3**	**1**
CLO2	2	3	3	2	3	2	3	1	1	2	2	**2**	**2**	**3**	**3**	**1**
CLO3	2	3	3	2	3	2	3	1	3	2	2	**2**	**2**	**3**	**2**	**3**

Detailed Syllabus:

As part of the requirement for the Master's degree the student is required to undertake a research study under the guidance of faculty/guide/clinician qualified for the purpose as recommended by the council/university. The student is supposed to do a research in the field of cardiopulmonary physiotherapy in his/her area of interest. The research will involve making a research proposal, conduct of the work as per the documented methodology, statistical analyses and dissertation writing. After finishing the study he/she has to submit the dissertation which will be scrutinized by the examiners for acceptance.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is in form of external assessment which is of 100 marks. The student will conduct research, have it analysed , write it in proper format and present it .He/She will be marked on the basis of their presentation skills, information presented, ability to conduct research and presenting it in proper format , defend their argument and answering the questions put up to them.

COURSE CODE: MTC 266

TITLE OF THE COURSE: PHYSIOTHERAPY II: EXERCISE TESTING AND CARDIO- PULMONARY REHABILITATION (THEORY)

L-T-P 96-0-0 Credits : 6

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Determine the need and channels of rehabilitation of patients with cardiopulmonary disorders
CLO-2: Develop assessment and management program for various conditions that may lead to deterioration of cardiopulmonary health status.
CLO-3: Evaluate and treat post-surgical conditions
CLO-4: To study recent advances in physiotherapeutic in cardiopulmonary physiotherapy

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**	**PLO 8**	**PLO 9**	**PLO 10**	**PLO 11**	**PLO 12**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CLO1	3	2	2	2	2	1	1	1	1	3	1	**3**	**3**	**2**	**2**	**1**
CLO2	3	2	2	2	2	1	1	1	1	3	1	**3**	**3**	**2**	**2**	**3**
CLO3	3	2	2	2	2	1	1	1	3	3	1	**3**	**3**	**2**	**2**	**3**
CLO4	3	2	3	3	3	3	3	1	2	3	2	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

UNIT I – EXERCISE TESTING (30 Hours)

Cardiopulmonary fitness:

- Concept of maximal oxygen uptake
- Maximal verses submaximal exercise testing
- Modes of testing
- Cardiopulmonary test sequence and measures
- Test termination criteria

Clinical exercise testing:

- Indication and applications
- Diagnostic exercise testing
- Exercise testing for disease severity and progression
- Exercise testing after myocardial infarction
- Functional exercise testing
- Exercise test modalities
- Exercise protocols
- Upper body exercise testing
- Testing for return to work
- Measurements
    - Heart rate
    - Blood pressure
    - Expired gases
    - Electrocardiographic monitoring
    - Subjective ratings
- Post exercise period
- Indication for exercise test termination
- Exercise testing with imaging modalities
    - Exercise echocardiography
    - Exercise nuclear imaging
    - Pharmacological stress testing
- Consideration for pulmonary patients

- Lung function
- Exercise testing of pulmonary patients

Interpretation of clinical test data

- Exercise testing as a screening tool for coronary artery disease
- Interpretation of response to graded exercise testing
- Maximal oxygen uptake
  - Heart rate response
  - Blood pressure response
  - ECG wave forms
  - Symptoms
- Diagnostic value of exercise testing
  - Sensitivity
  - Specificity
  - Predictive value
  - Comparison with imaging stress tests
  - Prognostic application of exercise test
- Interpretation of exercise tests in pulmonary patients

UNIT II- CARDIAC REHABILITATION (25 Hours)

Section A: principals in cardiac Rehabilitation

Part I: Development, Intervention, and Prevention of Coronary Artery Disease.

1. Efficacy of Secondary Prevention and Risk Factor Reduction.
2. Psychosocial Issues and Strategies including psychosocial evaluation and interventions.

Part II: Role of Exercise in Heart Disease

3. Exercise and the Coronary Heart Disease Connection
4. Cardiovascular and exercise physiology.
5. Exercise Prescription for Cardiac Rehabilitation

6. Patient Education: Guidelines

7.Outcome Measures in Cardiac Rehabilitation

Section B – special consideration in cardiac rehabilitation

1. Older Patients
2. Hypertension
3. Diabetes Mellitus
4. Chronic Heart Failure
5. Heart Transplantation
6. Patient Compliance
7. Drug Effects
8. Women
9. Racial and cultural diversity.
10. Patients with left ventricular assist devices.
11. Ventricular arrhythemias, pacemakers and ICDs.

UNIT III:PULMONARY REHABILITATION (25 Hours)

SECTION A: INTRODUCTION TO PULMONARY REHABILITATION

1. Overview of Pulmonary Rehabilitation
2. Selection and Assessment of the Pulmonary Rehabilitation Candidate
3. Patient Education and Skills Training

SECTION B: ASSESSMENT AND EVALUATION

1. Outcome Measures in Pulmonary Rehabilitation
2. Exercise Assessment and Training
3. Psychosocial Assessment and Intervention
4. Outcome Assessment

SECTION C: DISEASE-SPECIFIC APPROACHES IN PULMONARY REHABILITATION

1. Asthma
2. Cystic Fibrosis

3. Interstitial Lung Disease
4. Obesity-Related Respiratory Disorders
5. Pulmonary Hypertension
6. Neuromuscular and Chest Wall Disorders
7. Lung Volume Reduction Surgery
8. Lung Transplantation
9. Lung Cancer and Thoracoabdominal Surgery
10. Mechanical Ventilation
11. Pediatric Patients With Respiratory Disease
12. Patients with Coexisting Respiratory and Cardiac Disease

SECTION D: PROGRAM MANAGEMENT

1. Role of various Professionals & Staffing
2. Program Components and structure
3. Facilities, Policies and Procedures
4. Strategies for program success
5. Continuous Program improvement.

UNIT IV: PHYSIOTHERAPY MANAGEMENT IN SPECIFIC CONDITIONS (16 Hours)

1. Congenital Heart Disease
2. Ischemic heart disease.
3. Hypertension.
4. Infections of the respiratory system
5. Interstitial pulmonary disorders
6. Heart transplant
7. Heart Disease In Pregnancy
8. Peripheral Vascular Disease
9. Obstructive pulmonary disease

10. Interstistial pulmonary diseases

11. Left ventricular assist devices

12. Pulmonary vascular diseases.

Reference books:

1) Guidelines for Pulmonary Rehabilitation Programs-3rd Edition AACVPR , 2004
2) Dean E, Frownfelter D, Gappmaier E. Exercise Primary Pulmonary Testing Cardiovascular Dysfunction and Training: and. Cardiovascular and Pulmonary Physical Therapy: Evidence to Practice. 2014 Mar.
3) American College of Sports Medicine. ACSM's resource manual for guidelines for exercise testing and prescription. Lippincott Williams & Wilkins; 2012.
4) Prasad P, Pryor JA. Physiotherapy for Respiratory and Cardiac Problems.
5) Guidelines for Cardiac Rehabilitation & Secondary Prevention Program, 4th Edition – AACVPR, 2004
6) American Association of Cardiovascular & Pulmonary Rehabilitation. AACVPR cardiac rehabilitation resource manual: promoting health and preventing disease. Human Kinetics; 2006.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessional exams are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 267

TITLE OF THE COURSE: PHYSIOTHERAPY II: EXERCISE TESTING AND CARDIO- PULMONARY REHABILITATION (PRACTICALS)

L-T-P 0-0-48 Credits : 3

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1:Take appropriate patient history in the prescribed format and select an appropriate outcome measure and correlate patient examination findings.
CLO-2:Use appropriate Physiotherapeutic Technique / approaches to treat patients.
CLO-3:Discuss the recent management approaches for common conditions and deliberate on best practice model for patient cantered care
CLO-4:To interpret the differential diagnosis of various cardiopulmonary conditions.
CLO-5:To apply the various therapeutic techniques for the management of conditions of the cardiopulmonary system.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	3	2	3	2	2	2	3	3	**3**	**3**	**3**	**3**	**3**
CLO2	3	3	3	3	2	3	2	2	3	3	3	**3**	**3**	**3**	**3**	**3**
CLO3	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**
CLO4	3	3	3	3	2	3	2	2	2	3	3	**3**	**3**	**3**	**3**	**3**
CLO5	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:
Students will be instructed via demonstration, hands on technique, exercise testing labs, field visits and case conferences on specific cardiopulmonary exercise testing and training used in management of patients with cardiovascular disorders.

Students will draw on their experiences at the clinical postings to formulate a treatment plan for case presented at the case conference.

Reference books:
1) Guidelines for Pulmonary Rehabilitation Programs-3rd Edition AACVPR , 2004
2) Dean E, Frownfelter D, Gappmaier E. Exercise Primary Pulmonary Testing Cardiovascular Dysfunction and Training: and. Cardiovascular and Pulmonary Physical Therapy: Evidence to Practice. 2014 Mar.
3) American College of Sports Medicine. ACSM's resource manual for guidelines for exercise testing and prescription. Lippincott Williams & Wilkins; 2012.
4) Prasad P, Pryor JA. Physiotherapy for Respiratory and Cardiac Problems.
5) Guidelines for Cardiac Rehabilitation & Secondary Prevention Program, 4th Edition – AACVPR, 2004
6) American Association of Cardiovascular & Pulmonary Rehabilitation. AACVPR cardiac rehabilitation resource manual: promoting health and preventing disease. Human Kinetics; 2006.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:
Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are

for sessional. Three sessional exams are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTC 268

TITLE OF THE COURSE: CLINICAL TRAINING(PRACTICAL)

L-T-P 0-0-592 Credits : 37

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Understanding of community and health care workers
CLO-2: Understanding the bedside assessment of a patient and its management
CLO-3: Understanding of different departments in a hospital
CLO-4: Understanding basic knowledge of modality and its implementation
CLO-5-Understanding basic knowledge of cardiopulmonary rehabilitation and its implementation.
CLO-6: Understanding the recent advance techniques in cardiopulmonary rehabilitation and its application.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	1	3	2	2	2	3	2	3	2	1	3	**1**	**1**	**3**	**2**	**3**
CLO2	3	3	3	3	3	3	1	3	2	3	3	**2**	**3**	**3**	**3**	**3**
CLO3	1	3	2	1	1	3	1	1	1	1	1	**1**	**1**	**3**	**1**	**3**
CLO4	3	1	3	3	3	2	2	1	1	2	1	**1**	**1**	**1**	**1**	**1**
CLO5	3	3	3	3	3	3	2	2	2	3	2	**2**	**3**	**3**	**3**	**2**
CLO6	3	3	3	3	3	3	3	1	1	3	2	**1**	**3**	**3**	**3**	**3**

Detailed Syllabus:
Students will engage in clinical practice in Physiotherapy departments in the Cardiopulmonary setting to enhance their clinical skills and apply contemporary knowledge gained during teaching sessions.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.
