KHALSA COLLEGE AMRITSAR DEPARTMENT OF PHYSIOTHERAPY

Syllabus for MASTER OF PHYSIOTHERAPY (Cardiopulmonary)

SEMESTER I - IV Examination: 2017

MPT (Cardiopulmonary)

Course Code: MPC

Semester I

S. No.	Subject Code	Subject Title	Internal Assessment		Theory	Practical	Total Marks
			Th	Pr			
1	MPT-01	Research Methodology	20	-	80	-	100
2	MPC-01	Basic Medical Sciences	20	20	80	80	200
3	MPC-02	Physical and Functional Evaluation in Cardiopulmonary Disorders	20	20	80	80	200
4	MPC-03	Clinical/Journal Club - I	-	20	-	80	100

Semester II

S. No.	Subject Code	Subject Title	Internal Assessment		Theory	Practical	Total Marks
			Th	Pr			
1	MPT-02	Skill Enhancing Studies	20	-	80	-	100
2	MPC-04	Exercise Physiology and Nutrition	20	20	80	80	200
3	MPC-05	Medical and Surgical Aspects of Cardiopulmonary Conditions	20	20	80	80	200
4	MPC-06	Clinicals/Journal Club - II	-	20	-	80	100

Semester III

S. No.	Subject Code	Subject Title	Internal Assessment		Theory	Practical	Total Marks
			Th	Pr	•		
1	MPC-07	Cardiopulmonary Physiotherapy	20	20	80	80	200
2	MPC-08	Preventive Cardiology	20	20	80	80	200
3	MPC-09	Dissertation – I	-	20	-	80	100
4	MPC-10	Practical	-	20	-	80	100
5	MPC-11	Clinicals/Journal Club – III	-	20	-	80	100

Semester IV

S. No.	Subject Code	Subject Title	Internal Assessment		Theory Prac	Practical	Total
			Th	Pr			
1	MPC-12	Cardiac and Pulmonary Rehabilitation	20	20	80	80	200
2	MPC-13	Modalities and Interventions in ICU	20	20	80	80	200
3	MPC-14	Dissertation – II	-	40	-	160	200
4	MPC-15	Practical	_	40	-	160	200
5	MPC-16	Clinicals/Journal Club - IV	-	20	-	80	100

SEMESTER I

Research Methodology & Biostatistics

Paper: MPT-01 Time: 3 hrs Max Marks: 100 Theory: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

Research in physiotherapy: Introduction, Need for Research in Physical Therapy, Research Definition, Concepts, Purpose and Significance, Types of Research, Ethical issues in Research.

Research Design: Meaning, Need, Features and Various concepts relating to research design, Types of research design, research Approaches: Quantitative and Qualitative- assumptions and problems, Experimental design: Basic principles of experimental research designs, single system and group or Multiple factor design- Problems, Characteristics and limitations, Non Experimental design: Survey research-Scope, types & Implementation. Clinical case reports, Qualitative Research designs & methods

Research Process: Research problems, Questions and Hypothesis, Various steps involved in Research process, criteria of good research and problems encountered by researchers.

Measurement of Scaling techniques: Measurement in Research- Definition, Various Scales, Errors in Measurement and Scaling Technique, Reliability and validity in research.

Methods of Data Collection: Types of Data sources- Primary and secondary. Collection of Primary data (Observation and Oral Interview method, Questionnaire, Schedules); Collection of secondary data (published and unpublished sources)

Statistical Reasoning, Processing & Analysis: Introduction to Data set, Frequency Distribution, Central tendency, Variability in Distribution, Measures of Asymmetry (Skewness), Measures of Relationship, Correlation-Simple, Partial and Multiple. Regression - Simple and Multiple.

Sampling Fundamentals: Basic concepts, Need of sampling, Sample design- Steps in Sample Design, Characteristics of Good Sample Design, Types of Sampling.

Sampling Theory: Principles of Sampling, Sampling and Non Sampling Errors, Theory of Estimation, Sampling Distributions, Central limit theorem, Sample size & its determination.

Measures of Central Tendency and Dispersion- Arithmetic mean, median, mode and standard deviation (application).

Correlation and Regression: Karl Pearson's correlation method, Rank correlation method, Regression Equation and their coefficients (numerical)

Hypothesis Testing: Null Hypothesis, Alternative Hypothesis, Acceptance and Rejection Region, Level of Significance, Type I & II errors, Hypothesis Testing for Means, Sample Proportions and Variances, Chi-Square Test for comparing variances, Conditions and steps involved in applying Chi-Square Test, Analysis of Variance (ANOVA)- Basic Principles Techniques, Coding Method, Two way ANOVA and Analysis of Covariance (ANCOVA); Importance and characteristics of Non Parametric or Distribution- Free Tests.

Parametric and Non-Parametric Tests (Simple Applications): Z-test, t-test, F-test, chi-square test, ANOVA (One way and two way), ANCOVA, Spearman's rank Correlation and Kendall's Coefficient of Concordance.

Multivariate Analysis Techniques: Characteristics, Classifications and Variables in Multivariate Analysis, Techniques of Factor Analysis.

Writing an Research Proposal, Critiquing a Research Article: Defining a problem, Locating the Literature, Types of Literature, Evaluating Literature- Evaluating Single Studies and Review Articles, Elements of Research article- Inclusion and Exclusion Criteria, Funding, Data Collection & Analysis, Results, Interpretation, Conclusion, Discussions.

Interpretation and Report writing: Meaning, Techniques, Precautions, Significance, Steps and Types

Publication and Presentation of Research

- 1. Cooper D.R and Schindler, P.S., Business Research Method, Tata McGraw Hill Publishing Co.
- 2. Carolyn. M.Hicks, Research for Physiotherapists, Project Design and Analysis, Elsevier Health Sciences, Second Edition.
- 3. C.R Kothari. Research Methodology-Methods and Techniques, New age International Limited, Publishers, Second Edition.

Basic Medical Sciences

Paper: MPC-01 Time: 3 hrs Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

Unit I

APPLIED ANATOMY AND BIOMECHANICS

- Review of anatomy of cardiovascular system, surface marking of heart and great vessels.
- Review of anatomy of lungs, surface marking of lungs and pleura.
- Respiratory Mechanics: Chest wall mechanics- Movement of ribs, mode of action of intercostals muscle and diaphragm.
- Antagonistic and synergistic action of diaphragm and abdominals, thoracic movement during inspiration and expiration.

Unit II

APPLIED PHYSIOLOGY

- Physics of diffusion and gas physics.
- Gas laws- Boyles law, Charles law, Daltons law of partial pressure, Diffusion of gases through respiratory membrane, Ficks law, Henrys law of solubility, Graham's law of diffusion and diffusion capacity.
- Ventilation perfusion relationship –concept of physiological shunt and physiological dead space.

- Physics of ventilation: Pressures changes during ventilation and pressure flow relationship of pulmonary airways, principle of elastance law of laplace, surface tension and role of surfactant.
- Principle of airway resistance and lung impedance- types of flow-laminar and turbulent flow, work of breathing and ventilatory reserve, static and dynamic lung mechanics.
- Pressure flow relationship, vascular distensibility and compliance, delayed compliance or stress relaxation of vessel.
- Cough reflex.
- Properties of cardiac muscles electrical properties like excitability, autorhythmicity and conductivity, mechanism and control of cardiac contractile process, length-tension relationship and force-velocity relationship, myocardial contractility and lusitropy.
- Cardiac cycle: Determinants of ejection and filling, starling curves and pressure volume loop, interplay between venous return and cardiac output, neurohumoral response of heart and hemodynamic defense reactions.
- Arterial blood pressure.
- Lymphatic circulation.

Unit III

- Age related changes in cardiovascular and pulmonary system.
- Body positioning and various systemic changes.
- Difference between adult and pediatric lung.
- Hill equation, Internal and external work of heart, minute work, energy cost of work of heart, cardiac efficiency.

Unit IV

PHARMACOLOGY

- Cardiovascular drugs
 - a. Anti arrhythmic
 - b. Anti hypertensive
 - c. Drugs used in cardiac failure
- Drugs used in respiratory diseases

- 1. Arthur Clifton Guyton, John Edward Hall, Textbook of Medical Physiology, Saunders, 2000.
- 2. Shapiro B, M.D, Clinical Application of Respiratory Care, Year Book, 1979.
- 3. Braunwald Eugene, Heart Disease A Textbook of Cardiovascular Medicine, W.B Saunders.
- 4. Kapandji, The Physiology of the Joints- Annotated Diagrams of the Mechanics of the Human Joints, Churchill Livingstone.

Physical and Functional Evaluation in Cardiopulmonary Disorders

Paper: MPC-02 Time: 3 hrs

Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

- Cardiopulmonary Assessment.
- A complete physical and functional diagnostic approach to patient presenting with the cardinal symptoms of cardiopulmonary diseases.
- Electrocardiography: Recording and evaluating ECG strip, Imaging Techniques: Chest radiography, Computed Tomography.
- Cardiopulmonary exercise testing: Principles of exercise testing, Exercise testing equipments and testing protocols, Maximal and sub maximal testing.
- Pulmonary Function Testing Test of lung volumes and capacities, test of gas diffusion.
- Arterial Blood Gas Analysis measurement of acid base status, Simple acid base disorders (Metabolic acidosis, metabolic alkalosis, respiratory acidosis, and respiratory alkalosis), Compensatory and Mixed acid base disorders.
- Cardiac catheterization and coronary angiography, Complication and risk associated with procedure.
- Special tests: Echocardiography Principles of Echocardiography, M mode, two dimensional, Doppler and Transesophageal.

- MRI: An Introduction to MRI along with its technical considerations, Interpretation of MRI in various conditions; Ultrasonography.
- Bronchoscopy Types of bronchoscopy, Indications, Procedure/ technique of bronchoscopy, Associated risks/ complications; Techniques for obtaining biological specimens like Sputum specimen and culture, Thoracocentesis/Pleural aspiration and biopsy – indications, contraindications, interpretation of pleural fluid analysis.
- Multisystem assessment and Laboratory Investigations: Elements of multisystem investigation along with their normal values – Blood lipids, complete blood count, coagulation profile, electrolytes, blood urea nitrogen and creatinine, serum glucose.

- 1. Jennifer A. Pryor, S Ammani Prasad, Physiotherapy for Respiratory and Cardiac Problems, Elsevier Health Sciences, 2002.
- 2. Goldberger, Clinical Electrocardiography- A simplified approach, Elsevier Health Sciences, 2006.
- 3. Steven A. Conrad, Gary T. Kinasewitz, Pulmonary Function Testing: Principles and Practice, Churchill Livingstone, 1984.
- 4. Dale Davis, Differential Diagnosis of Arrhythmias, W.B. Saunders

SEMESTER II

Skill Enhancing Studies

Paper: MPT-02 Time: 3 hrs

Max Marks: 100 Theory: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

Unit I

Management and Ethics in Physiotherapy

- Health care delivery system,
- Ownership and private practice in physiotherapy
- Organizing and engaging people in work setting
- Health care financial, planning and risk management
- Marketing and Information management
- History and Development, Professional conduct in Physiotherapy
- Standards of practice in Physiotherapy
- Morals and ethics
- Code of ethics, social and medical policy in health care
- Professional liability and obligation
- Legal responsibility and medico-legal action

Unit II

Educational Technology

- Educational aims, trends and issues
- Formal and informal education
- Philosophies of education Naturalism, professionalism, idealism, realism
- Contemporary and modern philosophies of education
- Agencies of education
- Relationship between teaching and learning
- Theories of teaching
- Motivational process of learning perception, individual differences, intelligence personality
- Planning of teaching, strategies of teaching, organization, writing lesson plan
- Teaching methods
- A-V aids
- Programme evaluation, cumulative evaluation
- Nature of measurement of education, meaning, process, personnel, standardized, non-standardized
- Standardized tools, important tests of intelligence, aptitude, personality, instrument, achievements and status scale.

- 1. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill Pbl.
- 2. Krishna Mohan and Meena Banerji, Communication Skills, Macmillan Pbl.
- 3. J M Synge, Riders to the Sea.
- 4. Bhushan Anand, Educational Technology, Bawa Publications, 2006.
- 5. Dr. Mangal S.K, Educational Technology, Tandon Publications, 2006
- 6. Sharma R.A, Essentials of E.T, Lyall Book Depot, 2004
- 7. Sharma R.A, Technology of teaching, Lyall Book Depot, 2004.
- 8. Elligworth, Educational Technology, Peerson, 2006.

Exercise Physiology and Nutrition

Paper: MPC-04 Time: 3 hrs Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

- Energy sources- Carbohydrates, Proteins, Fats, Minerals and Vitamins. Metabolism of Carbohydrates, fats and proteins
- Energy balance, Regulation of Food Intake and Ideal Body weight, Pre-competition meal, fluid and energy replacement in prolonged exercise.
- Obesity–Body composition and assessment, Various diets to reduce Obesity and other exercise regimes ACSM guidelines
- Aerobic process- Intensity, duration of Exercises and Calculation of VO2 Max and its variability, How to estimate Aerobic Capacity
- Anaerobic process- Lactate Production, OBLA and Estimation of Anaerobic capacity, Oxygen Debt.
- Training Principles- Biological and Long term adaptations to training, Retraining recovery after exercise, Detraining, Overtraining
- Continuous training, Interval training, Endurance Training, Fartlek training, Plyometrics, Resistance training, Ballistic Stretching, Isokinetic training. Contraindications to physical training.
- Fatigue-Definition, types, causes and prevention. DOMS and its prevention. Deconditioning.

- Applied Work Physiology–MET, Classification of Exercise intensity based on MET.
 VO2 max. Blood lactate and other parameters, factors affecting sustained physical work. Assessment of workload in relation to work capacity.
- Basal metabolic and resting metabolic rates and factors affecting them.
- Classification of physical activities based on energy expenditure. Daily rates of average energy expenditure. Energy expenditure at rest and during various physical activities e.g. sleeping, sedentary work, household work, walking, jogging, running and swimming.
- Measurement of energy cost of exercise–direct calorimetry, indirect calorimetry, net oxygen cost of aerobic and anaerobic exercise, MET, body size and energy cost.
- Factors Affecting Performance- High Altitude- Physiological changes and adaptations in high altitudes, high altitude disorders. Deep sea diving and Breath hold diving, Physiological changes and adaptations in deep sea diving, SCUBA, Consequences of Deep sea diving- Nitrogen bends, Oxygen Poisoning, CO poisoning and Hyperbaric oxygen therapy, Doping- Ergogenic and Ergolytic IOC banned substances. Tobacco smoking - circulatory effects, respiratory effects, metabolic effects, smoking habits among athletes. Caffeine, alcohol & Exercise.
- Cardiovascular system and exercise
 Athletes heart, cardiovascular adaptations to sustained aerobic exercises
 Lipids and sports, protection from coronary heart disease, exercise and optimization of lipid profile.
 Sudden cardiac death in sports
 Regulation of circulations during exercise
- Exercise and Respiratory system
 Athletes lungs
 - Regulation of respiration during exercise

- 1. William D. McArdle, Frank I.Katch, Victor L. Katch Exercise Physiology Energy Nutrition and Human Performance Sixth Edition.
- 2. LippinCott Williams and Wilkins.
- 3. Exercise Physiology and Nutrition Jack H.Wilmore 3rd edition Churchill Livingstone.

Medical and Surgical Aspects of Cardiopulmonary Conditions

Paper: MPC-05 Time: 3 hrs

Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Unit I

- Obstructive lung diseases
- Restrictive lung diseases
- Suppurative lung diseases
- Infective lung diseases
- Respiratory tract infections
- Occupational and interstitial lung diseases
- Chest trauma
- Chest wall deformities & Neuromuscular disorders
- Lung cancers
- Children with respiratory dysfunction
- Diaphragmatic diseases & Abnormalities
- Sleep apnoea
- Hyperventilation syndrome
- Diseases of the Pleura

- Adult Respiratory Distress syndrome
- Alveolar Proteiniosis
- Drug induced lung disease, Oxygen toxicity and related syndromes.
- Development disorders of the lung

Unit II

- Congenital heart diseases
- Acquired heart diseases
- Ischemic heart disease
- Diseases of the myocardium
- Pericardial diseases
- Tumors of heart
- Vascular diseases
- Hypertension
- Diabetes and Heart disease
- Peripheral vascular diseases.

Unit III

Thoracoscopy, video assisted thoracoscopy, lobectomy, pneumonectomy, thoracotomy, pleurodesis, pleurectomy, bullectomy, segmental resection.

CABG, angioplasty, repair of congenital defects, valvoplasties, pericardiectomy, aneurysectomy, cardiac transplant.

- 1. Crofton and Douglas's Respiratory Diseases Anthony Seaton Douglas Seaton 5th edition Blackwell Science.
- 2. Davidson's Principles and Practice of Medicine Christopher Haslet 19th edition Churchill Livingstone.
- 3. Braunwald's Heart Disease Zipes, Libby 7th edition Saunders.

SEMESTER III

Cardiopulmonary Physiotherapy

Paper: MPC-07 Time: 3 hrs

Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

- Therapeutic Body Positioning: Indications and physiological effects of different body positions, Positioning in neonates/infants.
- Mobilization and Therapeutic Exercises: Physiological consequences of immobilization, Acute and long-term responses to mobilization and exercises, Exercise testing and training prescription Primary Cardiopulmonary dysfunction, Exercise testing and training prescription Secondary Cardiopulmonary dysfunction Clinical decision making in cardio-pulmonary therapeutics
- Breathing Exercises, Controlled Diaphragmatic breathing, Facilitation of ventilatory pattern and Breathing strategies, Chest wall mobilization, Ventilatory or respiratory muscle training. Repatterning techniques.
- Glossopharyngeal Breathing, Pursed lip breathing, relaxed breathing, segmental breathing, indications for each technique.
- Bronchopulmonary hygiene techniques: Percussion, Vibration, Shaking, Quick Stretch coughing, huffing, Postural drainage. Indications, contraindications and precautions of each technique.
- Autogenic drainage, active cycle of breathing techniques.
- Physiological basis for Airway Clearance Techniques, Clinical application of airway clearance techniques and Facilitating airway clearance with coughing techniques

- Guidelines for the delivery of Cardiovascular and Pulmonary Physical Therapy Acute Conditions both medical and surgical including Peripheral vascular disorders
- Guidelines for the delivery of Cardiovascular and Pulmonary Physical Therapy Chronic conditions –Primary and Secondary Cardiopulmonary dysfunction
- Respiratory care Practice Review, Other techniques: Manual Hyperinflation and Airway Suction and its adjuncts like Saline Instillation and Bronchoalveolar Lavage
- Body Mechanics The art of Positioning and Moving Patients
- The neonatal and Pediatric patient and the aging patient
- PNF techniques In Cardiopulmonary Physiotherapy

Preventive Cardiopulmonary Medicine

Paper: MPC-08 Time: 3 hrs

Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

Unit I

- Cardiorespiratory Disability Evaluation: Definition of Impairment, disability and handicap; Guidelines for assessing pulmonary and cardiac impairment. Questionnaires like CCQ, SF36.
- Cardiorespiratory and Physical Fitness: An overview to physical activity, health and diseases.
- Effect of aging process in the performance of heart and lung.
- Effect of nutrition on heart, lungs and blood vessels.
- The role of physical activity in disease prevention
- Lifestyle modification.
- Role of nutrition and immunization in disease prevention.
- Role of physiotherapy in prevention and rehabilitation of patients with cardiorespiratory diseases.
- Public health approaches to communicable diseases.

Unit II

- Cardiovascular disease prevention CINDI protocol, primary and secondary prevention of coronary heart disease.
- Body composition assessment.
- Community Cardiology and Pulmonology.

- Gymnasium and fitness: the concept behind healthy living.
- Aerobic and resistance training programs. Effects of different exercises on heart.
- Disease Prevention Programs in India.
- Telemedicine: An introduction to telemedicine, types of telemedicine, Guidelines and standards for the practice of Telemedicine in India, Scope of practice and future prospects.

SEMESTER IV

Cardiac and Pulmonary Rehabilitation

Paper: MPC-11 Time: 3 hrs

Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

Unit I

Cardiac Rehabilitation

- Cardiac Rehabilitation: Historical Background, objectives and definition of cardiac rehabilitation, Patients selection and risk stratification.
- Phases of Cardiac Rehabilitation
- An overview of Inpatient program and emphasizing outpatient program along with its structure and content, Rehabilitation of special patient population (angina or silent ischemia and chronic heart failure etc).
- Education and Psychological aspects of Cardiac Rehabilitation, Dietary aspects of Cardiac Rehabilitation, Outcomes of cardiac rehabilitation.
- Transplant Patient Rehabilitation Advanced techniques in cardiac rehabilitation and Rehabilitation for Pediatric and Geriatric age groups.

Unit II

Pulmonary Rehabilitation

- Pulmonary Rehabilitation: Principal goals and rationale of pulmonary rehabilitation, Patients' selection and assessment.
- Measurement of respiratory and peripheral muscle strength, assessment of performance of ADL and health status.
- Education and Life style management in Pulmonary Rehabilitation.
- Nutritional and psychological aspects and recent advances in Pulmonary Rehabilitation.
 Pulmonary Rehabilitation in specific disorders.

Modalities and Interventions in ICU

Paper: MPC-12 Time: 3 hrs

Max Marks: 160 Theory: 80 Practical: 80

- 1. There will be ten questions of equal marks distribution. Candidate will have to answer any eight questions.
- 2. The questions should be equally distributed in whole syllabus.

Description:

- Monitoring Systems in I.C.U invasive and non-invasive cardio-respiratory equipments for monitoring vital signs, Pulse oximetry, Transcutaneous PO2 and PCO2, Capnometry.
- Intensive care unit management of individuals with Primary cardiopulmonary dysfunction (principles, mobilization, positioning, secretion clearance, specific maneuvers).
- ICU management of secondary cardiopulmonary dysfunction (obesity, musculoskeletal trauma, head injuries, spinal injuries, burns etc.).
- Care of unconscious patient.
- Special precautions during physiotherapy treatment of various conditions in ICU.
- Physiotherapy management in pediatric and neonatal ICU.
- Complications, Adult Respiratory distress syndrome, acute asthma, shock, sepsis, and mulitorgan system failure.
- ICU management of Neurologic disorders, Essentials for ICU Patient: Patient safety concerns and infection Control.
- Basic and Advanced airway tubes, Monitoring of chest tube drainage and underwater seal system.

- Emergency management of airways: Manual Resuscitators, Suction equipments and suction catheters, Types of oropharengeal airways, Endotracheal intubation, Care of the patient with an Artificial Airway. Extubation and post extubation care.
- Respiratory Therapy Procedures: Gas delivery system i.e. Regulators, Flow meters, Oxygen therapy - its clinical indications, hazards and complications, various oxygen delivery devices (invasive and non-invasive). Symptoms of hypoxia and carbon dioxide narcosis.
- Mechanical Ventilation, indications and contraindications, complications, overview of modes, CPAP and Bi-PAP, Positive End Expiratory Pressure and its significance and detrimental effects. Weaning of patient from ventilator. Care of patient with mechanical ventilation.
- Humidifiers Principles of operation and clinical indications for humidity therapy, Devices used for humidification; Aerosol drug therapy.
- Advanced Cardiac care: Cardiac Pacemaker its indications, safety measures and care and Cardioverter Defibrillators.
- Basic Life Support and Advanced Cardiac Life Support: Defibrillator (Types, Waveforms and How to give DC shock).

- 1. Gray's Anatomy- Williams & Warwick Churchill Livingston
- 2. Clinical Anatomy for Medical Students- Snell's -Lippincott.
- 3. Text Book of Medical Physiology- Guyton Mosby.
- 4. Pathologic Basis of Diseases- Robbins, Kotran and Kumar W.B Saunders
- 5. Rau Respiratory care Pharmacology, 6e
- 6. Pharmacology and Pharmacotherapeutics, R.S Satoskar- Popular Publications, Bomby.
- 7. Pharmacology- Praseem K. Das Churchill Livingstone.
- 8. Essential of Medical Pharmacology K.D Tripathi Jaypee Brothers.
- 9. General Pathology- Walter & Israel Churchill Livingstone.
- 10. Muirs Textbook of Pathology, Anderson- Edwards Arnold Ltd.
- 11. Textbook of Pathology- Harsh Mohan- Jaypee Brothers.
- 12. Pathology: Implications for Physical Therapists Goodmann and Boissonnault W.E Saunders.
- 13. Essential of Medical Microbilogy Bhatia & Lal Jaypee Brothers.
- 14. Microbiology & Introduction for the Health Sciences Ackerman and Richards W.B. Saunders Co.
- 15. Essentials of Exercise Physiology: McArdle, WD, Katch, FI, and Katch, VL. 2nd edn, Lippincott Williams and Wilkins (2000).
- 16. Fundamentals of Exercise Physiology: For fitness Performances and Health, Robergs RA, and Roberts, S.O McGraw Hill (2000).
- 17. Exercise Physiology: Powers, SK and Howley ET. 4th edn; Mc Graw Hill (2001)
- 18. Physiology of Sport and Exercise: Wilmore, JH and Costil, DL. Human Kinetics (1994)
- Exercise Physiology- Human Bioenergetics and its Application: Brooks, GA, Fahey, TD, White, TP. Mayfield Publishing Company (1996)
- Levick, JR. (1998) An Introduction to Cardiovascular Physiology, 2nd ed. Butterworth Heinemann.

- 21. McArdle, WD, Katch, FI & Katch, VL (2001) Exercise Physiology. 5th ed. Lippincott, Williams & Wilkins.
- 22. Text Book of Medical Biochemistry- MN Chatterjea- Rana Shinde- Japyee.
- 23. Johan Low & Reed: Electro therapy Explained, Butterworth.
- 24. Joseph Kahn: Principles and practice of Electrotherapy, Churchill Livingstone.
- 25. Claytons Electrotherapy 10th Ed. Sarah & Bazin- W.B Saunders.
- 26. T B of Therapeutic Exercise, Narayanan, Jaypee.
- 27. Therapeutic Exercise, Basmajian, Williams & Wilkins.
- 28. Therapeutic Exercise Foundation & Techniques, Kisner Colby, Japyee.
- 29. A.G. Sinha, Principles and Practices of therapeutic Massage. Jaypee.
- 30. Orthotics and Prosthetics in Rehabilitation, 2e Lusardi, Elsevier.
- 31. Orthotics in Functional Rehabilitation of the Lower Limb. Nawoczenski, Elseivier.
- 32. Gardiner M. Dena: The Principles of Exercise Therapy CBS Publishers, Delhi.
- 33. Woods & Baker: Beard's Massage, W.B Saunders.
- 34. Kendall: Muscles Testing and Function Williams & Wilkins.
- 35. Daniels and Worthinghams: Muscle Testing Techniques of Manual.
- 36. Examination, W.B Saunders.
- 37. First Aid to Injured: St. John's Ambulance Association.
- 38. Norkin & White: Measurement of Joint Motion A Guide to Goniometry.
- 39. Luttgens K. Hamilton N.: Kinesiology Scientific Basis of Human Motion 9th Ed, 1997, Brown & Benchmark.
- 40. White and Punjabi Biomechanics of Spine Lippincott.
- 41. Basmajian Muscle alive- Williams & Wilkins.
- 42. Muscle Energy Technique, Leon Chaitow, Churchill Livingstone.
- 43. Maitland's vertebral Manipulation, GD Maitland, Butterworth Heinemann.

- 44. Cyriax's Illustrated Manual of Orthopaedic Medicine, JH Cyriax, Butterworth.
- 45. Position Release Technique, Leon Chaitow, Churchill Livingstone.
- 46. Manual Therapy, Brain Mulligan.
- 47. Butler Neural mobilization, Butler.
- 48. Kapandji: Physiology of Joints Vol. I, II, & III, W.B Saunders.
- 49. Methods in Biostatistics Mahajan- J.P.
- 50. Research for Physiotherapist: Project Design and Analysis Hicks Churchill Livingstone.
- 51. Biostatics: The manual for Statistical methods for use in health and nutrition K.V. Rao J.P.
- 52. Manual of Cardiac Rehabilitation: Dr. Peeyush Jain & Dr. R. Panda.
- 53. The steps to a healthy heart: Kowalski R.E.
- 54. Czervinske Perinatal and Pediatric Respiratory care, 2e.
- 55. Des Clinical Manifestations and Assessment of respiratory disease, 5e.
- 56. Frownfelter Cardiovascular and Pulmonary Physical Therapy: Evidence and Practice, 4e.
- 57. Hess Self Assessment: Guide to Accompany Respiratory Care: Principles & Practice.
- 58. Hess Respiratory Care: Principles and Practice.
- 59. Hicks Cardiopulmonary Anatomy and Physiology.
- 60. Hillegass Essentials of Cardiopulmonary Physical Therapy, 2e.
- 61. Irwin Cardiopulmonary Physical Therapy: A Guide to Practice, 4e.
- 62. Kacmarek Essentials of Respiratory Care, 4e.
- 63. Pryor Physiotherapy for Respiratory and Cardiac Problems: Adults and Pediatrics, 3e.
- 64. Pilbeam Mechanical Ventilation: Physiological and Clinical Applications, 4e.
- 65. Shapiro Clinical Application of Blood Gases, 5e.
- 66. Simmons Workbook to Accompany Respiratory Care Pharmacology, 6e.
- 67. Smith Cardiovascular Respiratory Physiotherapy.

- 68. Watchie Cardiopulmonary Physical Therapy: A Clinical Manual.
- 69. Wilkins Clinical Assessment in Respiratory Care, 5e.