जामिया मिल्लिया इस्लामिया
JAMIA MILLIA ISLAMIA
(A Central University by an Act of Parliament)

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फिजियोथेरेपी एवं पुनर्वास विज्ञान केंद्र
Centre for Physiotherapy and Rehabilitation Sciences

To Whom soever it vmay concern

This is to certify that Bachelor in Physiotherapy (BPT) and Master in Physiotherapy (MPT) courses offered by Centre for Physiotherapy & Rehablitation sciences, JMI are professional courses recognized by JMI/UGC . The employment prospect for the qualified Physiotherapist passing out from the centre is very high in India and abroad. Most of our passouts are either employed in mutispecality govt./private hospital in in India or abroad or they are running their own clinic and earning their livelihood.

Prof.M.Ejaz Hussain
Director

Prof. M. Ejaz Hussain
Director
Centre for Physiotherapy
& Rehabilitation Sciences
Jamia Millia Islamia
New Delhi-110025

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SYLLABUS

MASTER OF PHYSIOTHERAPY PROGRAMME

MPT

Centre For Physiotherapy & Rehabilitation Sciences
JAMIA MILLIA ISLAMIA

(A Central University)
New Delhi-110025

Description of the Programme

Master of Physiotherapy (MPT) is a two year fulltime regular programme having multiple pedagogy methods, ranging from classroom teaching, self-academic activities , clinical training and clinical presentations. The programme also focusses on research component with students undergoing training to develop, conduct and infer research findings. The available specialisations under this programme are Cardiopulmonary, Orthopaedics, Neurology and Sports Physiotherapy. The course is divided into 4 semester with an end semester examination. The students will be continuously evaluated during the programme with theory and practical evaluation, group discussions, seminars and critical appraisal of existing literature related to physiotherapy, biomedical and rehabilitation sciences.

The courses offered in the programme is developed and implemented based on the latest updates in the field of physiotherapy education and training. First semester consists of courses common to all specialities. This semester is to build foundation for the coming semesters by refreshing and adding new knowledge to clinical as well as physiotherapy Courses. In the second and third semesters , the students learn about various clinical conditions, their physiotherapy assessment, advanced techniques and comprehensive management pertaining to their respective specialty. The courses offered in final semester is common to all the specialities and targets overall development on clinical, administrative and academic skills. This semester also has the major component of research which has to be submitted by the end of the semester in the form of a dissertation. During these two years, the students also undergo intensive clinical training according to their specialty they opted.

Total credits of the programme is 111.The student will be required to opt for all the courses offered in programme and also be required to undergo evaluation of all the courses. The admission, evaluation, promotion and award of degree is governed by the Ordinances and Regulation (Academic) of the university (https://www.jmi.ac.in/aboutjamia/ordinances/ordinancesregulations).

Objectives of the programme

- To impart physiotherapy education of highest standards and set a benchmark in the field of physiotherapy.
- To offer affordable physiotherapy education at postgraduate level.
- To develop competency and skill sets in advanced physiotherapy assessment and techniques in physiotherapists.
- To have highly competent physiotherapy professionals in Cardiopulmonary, Orthopaedics, Neurology and Sports Physiotherapy.
- To develop research competency among physiotherapists.
- To develop teachers and administrators in the field of physiotherapy.

Programme Outline
MPT- SPORTS

SEMESTER - I

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT101	ABMS (Advanced Topics in Biomed Science)	56	4	4	25	75	100
MPT 102	Exercise Physiology,Testing & Prescription	56	4	4	25	75	100
MPT 103	Research Methodology, Biostatistics & EBP	56	4	4	25	75	100
MPT 104	Biomechanics & Kinesiology	56	4	4	25	75	100
MPT 105	Advanced Therapeutics	56	4	4	25	75	100
MPT 106P	Practical- I- Exercise Physiology, Testing, Prescription & ABMS	84	6	3	25	75	100
MPT 107P	Practical- II – Biomechanics & Kinesiology	28	2	1	10	40	50
MPT 108P	Practical – III- Evaluative Clinical Practice-I	140	10	5	50	150	200
	Total	**532**	**38**	**29**	**210**	**640**	**850**
UCC-I	Critical Research Appraisal & Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**30**	**260**	**640**	**900**

SEMESTER – II

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 211	Sports Injury Diagnosis &Medical Management-I	56	4	4	25	75	100
MPT 212	Sports Injury Diagnosis &PT Management-I	70	5	5	25	75	100
MPT 213	Sports Physiology & Biochemistry	70	5	5	25	75	100
MPT 214	Sports Biomechanics &Manual Therapy	70	5	5	25	75	100
MPT 215	Sports training –I	42	3	3	25	75	100
MPT 216 P	Practical –IV Sports Biomechanics and Manual Therapy	28	2	1	10	40	50
MPT 217 P	Practical V- Evaluative Clinical Practice-II	168	12	6	50	150	200
	Total	**504**	**36**	**29**	**185**	**565**	**750**
UCC II	Project Development	28	2	1	50	-	50
UCC III	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**31**	**285**	**565**	**850**

SEMESTER - III

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 311	Sports Injury Diagnosis & Medical Management-II	56	4	4	25	75	100
MPT 312	Sports Injuries Diagnosis & PT Management-II	70	5	5	25	75	100
MPT 313	Sports Training-II	56	4	4	25	75	100
MPT 314	Sports Psychology &Nutrition	56	4	4	25	75	100
MPT 315 P	Clinical viva Sports Injury Diagnosis Med. Management	28	2	1	10	40	50
MPT 316 P	Practical- VI -Evaluative Clinical Practice-III	210	15	8	50	150	200
MPT 317 P	Technical Writing	56	4	2	10	40	50
	Total	**532**	**38**	**28**	**170**	**530**	**700**
UCC IV	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**29**	**220**	**530**	**750**

SEMESTER – IV

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics &Hospital management	56	4	4	25	75	100
MPT411P	Dissertation	464	33	17	75	225	300
Grand Total		**520**	**37**	**21**	**100**	**300**	**400**

Courses summary

Total Hours : 2200 hrs

Total Credit (I-IV Sem.) : 111

UCC: - University Compulsory Clearance (Not to be considered for credit calculation)
IA: Internal Assessment Marks, SE: Semester Exam Marks

Programme outline
MPT-Orthopaedics

SEMESTER – I

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT101	ABMS (Advanced Topics in Biomed Science)	56	4	4	25	75	100
MPT 102	Exercise Physiology testing & prescription	56	4	4	25	75	100
MPT 103	Research Methodology, Biostatistics & EBP	56	4	4	25	75	100
MPT 104	Biomechanics & Kinesiology	56	4	4	25	75	100
MPT 105	Advanced Therapeutics	56	4	4	25	75	100
MPT 106P	Practical- I- Exercise Physiology, Testing, Prescription & ABMS	84	6	3	25	75	100
MPT 107P	Practical- II – Biomechanics & Kinesiology	28	2	1	10	40	50
MPT 108P	Practical – III- Evaluative Clinical Practice-I	140	10	5	50	150	200
	Total	**532**	**38**	**29**	**210**	**640**	**850**
UCC-I	Critical Research Appraisal & Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**30**	**260**	**640**	**900**

SEMESTER – II

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 221	Orthopedics Medicine & Surgery-I	56	4	4	25	75	100
MPT 222	Assessment &Special Issues in Orthopaedic Physiotherapy	70	5	5	25	75	100
MPT 223	Physiotherapy in Orthopedic Trauma	70	5	5	25	75	100
MPT 224	Disability &Rehabilitation	70	5	5	25	75	100
MPT 225	Manual Therapy	42	3	3	25	75	100
MPT 226P	Practical – IV – Assessment & Special issues in Orthopaedic Physiotherapy & Manual Therapy	28	2	1	10	40	50
MPT 227P	Practical – V –Evaluative Clinical Practice - II	168	12	6	50	150	200
	Total	**504**	**36**	**29**	**185**	**565**	**750**
UCC-II	Project Development	28	2	1	50	-	50
UCC-III	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**31**	**285**	**565**	**800**

SEMESTER – III

Course No.	Title	**Total Hours**	**Hours/ week**	**Credits**	**IA Marks**	**SE Marks**	**Total Marks**
MPT 321	Orthopedic Medicine & Surgery - II	56	4	4	25	75	100
MPT 322	Physiotherapy in Regional Orthopaedics –I	70	5	5	25	75	100
MPT 323	Physiotherapy in Regional Orthopaedics-II	56	4	4	25	75	100
MPT 324	Geriatric, Palliative & Rheumatological Physiotherapy	56	4	4	25	75	100
MPT 325P	Clinical Viva Orthopaedic Medicine & Surgery	28	2	1	10	40	50
MPT 326P	Practical VI Evaluative Clinical Practice – III	210	15	8	50	150	200
MPT 327 P	Technical Writing	56	4	2	10	40	50
	Total	**532**	**38**	**28**	**170**	**530**	**700**
UCC-IV	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**29**	**220**	**530**	**750**

SEMESTER – IV

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics & Hospital Management	56	4	4	25	75	100
MPT411P	Dissertation	464	33	17	75	225	300
Grand Total		**520**	**37**	**21**	**100**	**300**	**400**

Courses summary

Total Hours : 2200 hrs

Total Credit (I-IV Sem.) : 111

UCC: - University Compulsory Clearance (Not to be considered for credit calculation)
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Programme outline
MPT-Neurology

SEMESTER – I

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT101	ABMS(Advanced Topics in Biomed Science)	56	4	4	25	75	100
MPT 102	Exercise Physiology Testing & Prescription	56	4	4	25	75	100
MPT 103	Research Methodology, Biostatistics& EBP	56	4	4	25	75	100
MPT 104	Biomechanics & Kinesiology	56	4	4	25	75	100
MPT 105	Advanced Therapeutics	56	4	4	25	75	100
MPT 106P	Practical- I- Exercise Physiology, Testing, Prescription & ABMS	84	6	3	25	75	100
MPT 107P	Practical- II – Biomechanics& Kinesiology	28	2	1	10	40	50
MPT 108P	Practical – III- Evaluative Clinical Practice-I	140	10	5	50	150	200
	Total	**532**	**38**	**29**	**210**	**640**	**850**
UCC-I	Critical Research appraisal & Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**30**	**260**	**640**	**900**

SEMESTER – II

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 231	Neurology & Neurosurgery	56	4	4	25	75	100
MPT 232	Neurological Physiotherapy : Assessment & Techniques	70	5	5	25	75	100
MPT 233	Physiotherapy in Neurological Disorders	70	5	5	25	75	100
MPT 234	Principles of Neurological Physiotherapy	56	4	4	25	75	100
MPT235	Disability and Rehabilitation	56	4	4	25	75	100
MPT 236P	Practical IV: Neurological Physiotherapy Assessment & Techniques	28	2	1	10	40	50
MPT 237P	Practical V: Evaluative Clinical Practice - II	168	12	6	50	150	200
	Total	**504**	**36**	**29**	**185**	**565**	**750**
UCC-II	Project Development	28	2	1	50	-	50
UCC-III	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**31**	**285**	**565**	**850**

SEMESTER – III

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 331	Paediatric Neurology & Neurosurgery	56	4	4	25	75	100
MPT 332	Paediatric Neurological Physiotherapy	70	5	5	25	75	100
MPT 333	Geriatric & Palliative Care	56	4	4	25	75	100
MPT 334	Assistive Technology	56	4	4	25	75	100
MPT 335 P	Clinical viva Neurological Disorders	28	2	1	10	40	50
MPT 336 P	Practical VI :Evaluative Clinical Practice -III	210	15	8	50	150	200
MPT 337 P	Technical Writing	56	4	2	10	40	50
	Total	**532**	**38**	**28**	**170**	**530**	**700**
UCC-IV	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**29**	**220**	**530**	**750**

SEMESTER – IV

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics & Hospital Management	56	4	4	25	75	100
MPT411P	Dissertation	464	33	17	75	225	300
Grand Total		**520**	**37**	**21**	**100**	**300**	**400**

Courses summary

Total Hours : 2200 hrs

Total Credit (I-IV Sem.) : 111

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Programme outline
MPT-Cardiopulmonary

SEMESTER – I

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT101	ABMS(Advanced Topics in Biomed Science)	56	4	4	25	75	100
MPT 102	Exercise Physiology Testing & prescription	56	4	4	25	75	100
MPT 103	Research Methodology, Biostatistics& EBP	56	4	4	25	75	100
MPT 104	Biomechanics & Kinesiology	56	4	4	25	75	100
MPT 105	Advanced Therapeutics	56	4	4	25	75	100
MPT 106P	Practical- I- Exercise Physiology, Testing, Prescription & ABMS	84	6	3	25	75	100
MPT 107P	Practical- II – Biomechanics& Kinesiology	28	2	1	10	40	50
MPT 108P	Practical – III- Evaluative Clinical Practice-I	140	10	5	50	150	200
	Total	**532**	**38**	**29**	**210**	**640**	**850**
UCC-I	Critical Research Appraisal & Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**30**	**260**	**640**	**900**

SEMESTER – II

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 241	Pulmonary Medicine & Surgery	56	4	4	25	75	100
MPT 242	Cardiopulmonary Physiotherapy Techniques	70	5	5	25	75	100
MPT 243	Pulmonary Physiotherapy & Rehabilitation	70	5	5	25	75	100
MPT 244	Cardiopulmonary Physiotherapy Examination & Evaluation	56	4	4	25	75	100
MPT245	Fitness training & Health promotion	56	4	4	25	75	100
MPT 246P	Practical – IV Cardiopulmonary Examination Evaluation and Technique	28	2	1	10	40	50
MPT 247P	Practical – V Evaluative Clinical Practice	168	12	6	50	150	200
	Total	**504**	**36**	**29**	**185**	**565**	**750**
UCC-II	Project Development	28	2	1	50	-	50
UCC-III	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**31**	**285**	**565**	**850**

SEMESTER – III

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 341	Cardiovascular Medicine and Surgery	56	4	4	25	75	100
MPT 342	Cardiovascular Physiotherapy and Rehabilitation	70	5	5	25	75	100
MPT 343	Intensive care Management	56	4	4	25	75	100
MPT 344	Geriatric and Palliative Care	56	4	4	25	75	100
MPT 345 P	Clinical viva Cardiopulmonary Medicine and surgery	28	2	1	10	40	50
MPT 346 P	Practical – VI Evaluative Clinical Practice-III	210	15	8	50	150	200
MPT 347 P	Technical Writing	56	4	2	10	40	50
	Total	**532**	**38**	**28**	**170**	**530**	**700**
UCC-IV	Seminar Presentation	28	2	1	50	-	50
	Grand Total	**560**	**40**	**29**	**220**	**530**	**750**

SEMESTER – IV

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics & Hospital Management	56	4	4	25	75	100
MPT411P	Dissertation	464	33	17	75	225	300
Grand Total		**520**	**37**	**21**	**100**	**300**	**400**

Courses summary

Total Hours : 2200 hrs

Total Credit (I-IV Sem.) : 111

UCC: - University Compulsory Clearance (Not to be considered for credit calculation)
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SEMESTER –I

Sports/Orthopaedics /Neurology/ Cardiopulmonary

SEMESTER- I

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT101	ABMS(Advanced Topics in Biomed Science)	56	4	4	25	75	100

Course Description: This course covers the topics related to advances in biomedical sciences with particular emphasis on anatomical, physiological and biochemical advances

Course Objective: This course aims to study the recent advances in Biomedical Sciences

Course Outcome: On completion of the study of this Course the student should be able :To advance and comprehend the knowledge of the structure & function of the human body in relevance to Physiotherapy To correlate and apply the knowledge gained, in understanding and analysing the dysfunction of the human body.

Section - I

I. Applied Anatomy

1. Topographic anatomy concerning the neck, arm, leg and back with a focus on vessels, nerves and muscles/fascia and joints.

2. Topographic anatomy concerning thorax, abdomen and the pelvic region with a focus on the abdominal wall, viscera, vessels and nerves.

3. Surface anatomy and palpations concerning extremities, thorax, abdomen and the pelvic region Pathoanatomy of peripheral nerve injuries, various bone pathologies

II. Applied General Physiology

1. Cardiovascular system
   a) Physical characteristics of systemic circulation, Pressure pulses
   b) Oxygen demand theory of local blood flow circulation
   c) Nervous control of blood circulation, Humorous control of blood circulation,
   d) Cardiac output and its regulation

2. Neuromuscular System
   a) Basic physics of membrane potentials, Recording of membrane potentials and action potentials
   b) Mechanism of muscle contraction, Sources of energy for muscle contraction, Neural control of movement
3. Respiratory System
   a) Review of mechanics of respiration
   b) Pulmonary volumes and capacities
   c) Methods of studying respiratory abnormalities
   d) Regulation of Respiration

Section – II

(Clinical Biochemistry)

I. Review of Metabolism
   1. Carbohydrates, Lipids, Proteins and fats
   2. Water: Fluid and electrolyte balance, Water and sodium balance

II. Enzymes and Markers in Blood
   1. Cardiovascular Markers: Troponin, Creatine Kinase, Lactate Dehydrogenase ,Myoglobin, Aspartate transaminase.
   2. Neuromuscular Markers: Acetylcholine, Dopamine, GABA.
   3. Inflammatory Markers and Free Radicals: TNF alpha, Interleukins, NO, H2O2, Superoxides

III. Biochemical And Genetic Basis Of Diseases
   1. Cardiovascular Disorders: Myocardial Infarction, Cardiomyopathy, Diabetes, Artherosclerosis
   2. Neuromuscular Disorders: Epilepsy , Parkinson Disease, Alzheimer, Schizophrenia.
   3. Muscular Disorders: Cystic Fibrosis, Congenital muscular dystrophy, Duchenne muscular dystrophy,
   4. Biochemical, physiological& anatomical change in Ability , Disabilities, Ageing

Essential Readings

1. Clinical Biochemistry (Fundamentals of Biomedical Science) by Nessar Ahmed
2. Clinical Biochemistry 6th Edition by Michael Murphy Rajeev Srivastava Kevin Deans ISBN: 9780702072987 eBook ISBN: 9780702072970
3. A textbook of Biochemistry by B D Chaurasia
4. Textbook of Medical Physiology Guyton and Hall
5. Textbook of Physiology by A K Jain

Suggested Readings

1. Pathology implications for Physical Therapists by Catherine C. Goodman

2. Hutchison's Clinical Methods: An Integrated Approach to Clinical Practice, 23e (Hutchinson's clinical methods) by Michael Glynn MA , William M Drake

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 102	Exercise Physiology testing & prescription	56	4	4	25	75	100

Course description: This course aims to deliver scientifically based standards on exercise testing and prescription. It prepares students through the process of selecting and administering fitness assessments, using Guidelines to interpret results, and drafting an exercise prescription that is in line with Guidelines parameters.

Course Objective: this course should deliver the concepts in exercise physiology and prepares students to test and prescribe suitable exercises to different group of population.

Course Outcome: On completion of the study of this Course the student should be able to select and administer fitness assessments, using Guidelines to interpret results, and drafting an exercise prescription to different poulations.

I. Energy Transfer for Physical Activity
1. Energy transfer in body
2. Energy transfer in exercise and activities

II. Cardiovascular System And Exercise
1. Cardiovascular regulation and integration during exercise
2. Cardiovascular adaptations to sustained aerobic exercises
3. Cardiovascular Endurance testing
4. Athletes heart and sudden cardiac death in sports
5. Lipids and sports, protection from coronary heart disease, exercise and optimization of lipid profile

III. Respiratory System and Exercise
1. Regulation of respiration during exercise
2. Acid-Base regulation during exercise
3. Respiratory adaptations to sustained aerobic exercise
4. Air Conditioning, Second wind, Oxygen debt

IV. Skeletal System and Exercise
1. Growth and exercise
2. Repair and adaptation during exercise
3. Biochemical responses and molecular mechanisms to endurance and power training
4. Effects of training and detraining
5. Strength Measurement
6. Dynamometery
7. Muscle endurance testing
8. Assessment of muscle damage & fatigue

V Gastrointestinal Tract and Endocrine System and Exercise
1. Effect of exercise on GIT and liver
2. Hormone regulation of fluid and electrolytes during exercise
3. Stress hormones in exercise
4. Opioids and Runners High

VI Exercise Testing prescription and Aging
1. Human performance analysis , Electrophysiological assessment
2. Exercise stress testing for diagnosis of CHD
3. Body composition
4. Aging and physiological function
5. Exercise and longevity
6. Exercise prescription for healthy, aged, sedentary adults, Osteoporotic and mood disorders.

Essential Readings
1. Exercise Physiology by Mc Ardle, Katch and katch
2. Text Book of Radiology by K. Bhargava
3. Electromyography and Neuromuscular disorders by David C. Preston
4. Cram's Introduction to Surface Electromyography
5. ACSM's Guidelines for Exercise Testing and Prescription Paperback –by American College of Sports Medicine

Suggested Readings
1. Essentials of Electromyography by Gabriel
2. Johnson's Practical Electromyography Hardcover – 15 Sep 2005 by Willaim S. Pease (Editor), Henry L. Lew (Editor), Ernest W. Johnson

Course No.	Title	Total Hours		Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 103	Research Methodology, Biostatistics & EBP	56		4	4	25	75	100

Course Description: The course covers the concept of research methodology, EBP and biostatistics related to physical therapy

Course Objective: The course aims to introduce the principles of research, methods of research and analysing the research studies using Biostatistics.

Course Outcome: On completion of the study of this Course the student should be able to understand the methods of research process and design so as to effectively plan a research. To understand the statistical measures used in the analysis and interpretation of research data. To acquire skills of critically reviewing the literature.

SECTION- I
(RESEARCH METHODOLOGY & EBP)

I Research In Physiotherapy

1. Introduction
2. Research for Physiotherapist: Why, how and when?
3. Research – Definition, concept, purpose, approaches
4. Web Source for physiotherapists

II Research Fundamentals

1. Define measurement
2. Measurement framework
3. Scales of measurement
4. Pilot study
5. Types of variables
6. Reliability & Validity
7. Drawing tables, graphs, master chart etc.

III Writing A Research Proposal, Critiquing A Research Article

1. Defining a problem
2. Review of literature
3. Formulating a question, operational definition
4. Inclusion and Exclusion criteria
5. Forming groups
6. Data collection & analysis
7. Results, Interpretation, Conclusion, Discussion
8. Informed consent
9. Limitations

IV Research Design

1. Principle of designing

2. Design, instrumentation & analysis for qualitative research
3. Design, instrumentation & analysis for quantitative research
4. Design, instrumentation & analysis for quasi-experimental research
5. Design models utilized in Physiotherapy

V Research Ethics

1. Importance of Ethics in Research
2. Main ethical issues in human Courses' research
3. Main ethical principles that govern research with human Courses
4. Components of an ethically valid informed consent for research

VI Evidence Based Practice

Concept of evidence based practice by addressing topics related to

1. Research design and measurement
2. Measurement error
3. Case design studies and
4. Interpretation of clinical research

SECTION -II
(BIOSTATISTICS)

I Introduction to Biostatistics

1. Introduction- Definition and Application in Physiotherapy
2. Data Presentation
3. Methods of Sampling
4. Sampling distribution
5. Standard error
6. Types I & II error
7. Hypothesis Testing
8. Null Hypothesis
9. Alternative hypothesis
10. Acceptance & rejection of null hypothesis
11. Level of significance

II Measures of Central Value & Measures Of Dispersion

1. Arithmetic mean, median mode, Relationship between them
2. Partitioned values – Quartiles, Deciles, Percentiles
3. Graphical determination
4. Range
5. Mean Deviation
6. Standard Deviation
7. Normal Distribution Curve- Properties of normal distribution, Standard normal distribution
8. Transformation of normal random variables.
9. Inverse transformation
10. Normal approximation of Bioaxial distribution.

III Correlations & Regression Analysis

1. Bivariate distribution
2. Scatter diagram
3. Coefficient of correlation
4. Calculation & interpretation of correlational coefficient
5. T-test, Z-test, P-value
6. Lines of regression
7. Calculation of Regression Coefficient

IV Probability (In Brief)

1. Basic Definition: Events, sample space and probabilities
2. Basic rules for probability

3. The range of values
4. The Rule of complement
5. Mutually exclusive events
6. Conditional probability
7. Independence of events
8. Combinatorial concepts
9. Law of Total probability and Baye's theorem

V Analysis and Evaluation

1. Parametric& Non ParametricTests- Chi square test, Mann-Whitney U test, Wilcoxon Signed test, Kruskal-Wallis test, Friednam test, T-test/student T test, Analysis of variance
2. Agreement Analysis
3. Software Used in Statistical Analysis and research

Essential Readings:

1. Research for physiotherapists Research for Physiotherapists: Project Design and Analysis by Carolyn M. Hicks
2. APA Handbook of Research Methods in Psychology by Harris Cooper, PhD
3. Elements of Research in Physical Therapy by Dean P. Currier
4. Mahajan's Methods In Biostatistics For Medical Students And Research Workers by Bratati Banerjee (Author)

Suggested Readings:

1. Physical Therapy Research by Elizabeth
2. An Introduction to Biostatistics 3rd Edition, by Thomas Glover , Kevin Mitchell
3. Introduction to research in Health Sciences by Stephen Polgar, BSc(Hons), MSc, Shane A. Thomas
4. Research Methodology: Methods and Techniques by C R Kothari
5. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches by John W. Creswell

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 104	Biomechanics & Kinesiology	56	4	4	25	75	100

Course Description: the course covers the understanding of Biomechanics and kinesiology of body movement.

Course Objective: the course should enable the student to acquire in depth knowledge in understanding the biomechanics and kinesiology.

Course Outcome: On completion of the study of this Course the student should be able to identify and apply the principles of biomechanics and kinesiology in understanding the normal functioning of the human body. To identify and apply the principles of biomechanics in understanding pathomechanics of various conditions. To use these principles in managing various clinical conditions.

SECTION I
(Biomechanics)

I Introduction

1. Nature and importance of Biomechanics in Physiotherapy
2. Principle of Biomechanics

II Movement Analysis

1. Biomechanics of shoulder and shoulder complex, elbow complex, wrist and hand complex
2. Biomechanics of pelvic, hip, knee, ankle & foot complex
3. Biomechanics of spine
4. Neuro biomechanics
5. Posture and Gait analysis
6. Biomechanical Analysis & Techniques – Force platforms
7. Instrumentation and methods of movement analysis

8. Electro goniometry and accelerometer

Section II
(Kinesiology)

I Introduction To Kinematics

1. Definition, aims, objectives and role of Kinesiology in sports physiotherapy.
2. Review of fundamental concepts (applied aspect), Centre of gravity, Line of gravity, Planes, Lever system in Body, Fundamental starting positions.
3. Review of linear and angular kinematics

II Mechanics Of Musculoskeletal System

1. Tissue loads, response of tissues to forces- Stress, Strain, Stiffness and mechanical strength, visco elasticity
2. Physical Properties of bone, cartilage, tendon and ligaments, functional adaptation under pathological conditions.
3. Impaired neuromuscular control, muscular force regulation in Frame work and joints of the body: Influence of trauma and classification of the muscles, Relation of structure, functions, role of muscles, types of Muscle, contractions (Static, Concentric and Eccentric), Two joint Muscles, Angle of pull, Role of Gravity affecting muscular action.

Essential Readings

1. Kinesiology by Carol A. Oatis
2. Kinesiology – Scientific Basis of Human Motion, Brown & Benchmark
3. Kinesiology and Applied Anatomy by Philip J. Rasch.
4. Clinical Biomechanics of Spine by Punjabi and white
5. Biomechanics – A Qualitative approach for studying Human Motion
6. Joint Structure and Function - A Comprehensive Analysis by Norkin
7. Neumann, Donald A. - Kinesiology of the musculoskeletal system _ foundations for physical rehabilitation.-Mosby_Elsevier (2010).

Suggested Readings

1. Basic Biomechanics in Sports and Orthopedic Therapy
2. The Biomechanics of Sports Techniques by Hay, James G.
3. Basic Biomechanics of Muscular Skeletal System by Nordin
4. Introduction to Sports biomechanics
5. Ted TemertzoglouKinesiology: Lab Manual & Study Guide (2015).

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 105	Advanced therapeutics	56	4	4	25	75	100

Course Description: The course covers topics related to Advanced and recent updates in physiotherapy treatment with respect to exercise intervention and electrotherapeutics modalities.

Course Objective: The course should enable the student to acquire recent knowledge of exercise therapy intervention and electrotherapeutics modalities used in physiotherapy conditions.

Course Outcome: The student should be able to apply recent knowledge and skill related to exercise therapy intervention and electrotherapeutic modalities in different physiotherapy condition for patient recovery.

I. Exercise Therapy Intervention & Practice

1. Exercise therapy intervention & practice in: Pain management ,Endurance impairment ,Impaired mobility, Impaired neuromuscular control ,Impaired Gait & posture
2. Specific exercise interventions: Isokinetic, Plyometric, Open & closed kinetic chain , PNF, Core stabilization , Aquatic therapy, Home programme& its adherence
3. Specific consideration in exercise therapy: Female, Paediatric, Amputation

II. Electrotherapy Intervention & Practice

1. Pain management
2. Wound management
3. Oedema management
4. Muscular impairment
5. Specific deep heat interventions: Laser Microwave, Shortwave, Russian current Didynamic current Iontophoresis, Phonophoresis, Biofeedback
6. Special consideration for deep heat modalities: Pregnant women, Menstruating women, Paediatric, Geriatric, Neurologically impaired, Mentally impaired
7. Cryotherapy :Physiological & therapeutic effects,Various techniques
8. Recent advances in cryotherapy application

III.Taping techniques for joints, muscles and various pathological conditions : therapeutic and prophylactic

Essential reading**:**

1. Electrotherapy Explained Principles and practice Fourth Edition, Val Robertson, Alex ward, John Low and Ann Reed
2. Physical Rehabilitation, Sussan B O'Sullivan
3. Tidy's Physiotherapy, Edited by Stuart Porter
4. Core Assessment and Training, Human Kinetics with Jason Brumitt
5. Taping Techniques, Rose Macdonald
6. Physical therapy for Children. Suzann K. Cappbell, Robert J. Palisano
7. Physical Agents in Rehabilitation, From Research to Practice, Michelle H. Cameron

Suggested Reading

1. Taping Technique principle and practice, Tom Hewetson and Karin Austin
2. Isokinetics in Human Performance, Lee F. Brown
3. Electrotherapy evidence - based practice: Edited by Tim Watson
4. Dutton's Orthopaedic Examination, Evaluation, and Intervention, Mark Dutton

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 106P	Practical- I- Exercise Physiology,Testing, Prescription & ABMS	84	6	3	25	75	100

Course Description: The course covers topics related to practical training on exercise physiology, exercise testing and exercise prescription for different age groups and patient population. The student also undergoes hands on training in physiology and clinical biochemistry.

Course Objective: The course should enable the student to attain in-depth knowledge and skill in techniques used in exercise physiology, exercise testing and exercise prescription for different age groups and patient population. They should be able to attain skills in physiology and clinical biochemistry techniques also.

Course Outcome: The student should be able to demonstrate skill in techniques used in exercise physiology, exercise testing and exercise prescription for different age groups and patient population. They should be able to demonstrate skills in physiology and clinical biochemistry techniques also.

1. Energy expenditure and exercise
2. Energy metabolism
3. Cardiovascular effect of exercise
4. Respiratory air flow and volume
5. Respiratory gas analysis
6. Blood pressure in humans
7. Electromyogram(EMG)recording and interpretation
8. Oxygen concentration (02 measurements)
9. Sensory and motor nerve responses (NCV)recording and interpretation

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 107P	Practical- II – Biomechanics& Kinesiology	28	2	1	10	40	50

Course Description: The course covers topics related to practical training on biomechanics and kinesiology.

Course Objective: The course should enable the student to attain in-depth knowledge and skill in techniques used in biomechanics and kinesiology.

Course Outcome: The student should be able to demonstrate skill in techniques used in in biomechanics and kinesiology.

1. Perform thorough biomechanical evaluation
2. Qualitative and quantitative analyses of range of motion
3. Calculation of impulse and take off velocity and height of jump during take off in a standing vertical jump
4. Calculate and infer Angular kinetics of exercise
5. Detection of scapular position in rotation of spinous process
6. Measurement of functional limb varus under bilateral and unilateral stance
7. Subtalar neutral joint positioning
8. Determination of Q-angle
9. Measurement of eversion and inversion ranges at subtalar joint
10. Measurement of popliteal angle
11. Measurement of calcaneal inversion and eversion in non weightbearing and weightbearing stance

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 108P	Practical – III- Evaluative Clinical Practice-I	140	10	5	50	150	200

Course Description: The course covers topics related to hands on training in physiotherapy assessment and management of different disease and disorders

Course Objective: The course should enable the student to acquire in-depth understanding and skill in physiotherapy assessment and management of disease and disorders

Course Outcome: The student should be able to interpret and differentiate between various diagnostic tools used for therapeutic plan, take history of the conditions of patients. They should have knowledge of all the physiotherapeutic intervention pertaining to the patient. They should be able to evaluate and plan physiotherapy treatment: its presentation and documentation of all the conditions. The topics and management as discussed in MPT 101, MPT 102, MPT 104 and MPT105.

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
UCC-I	Critical Research appraisal & Presentation	28	2	1	50	-	50

Course Description: The course covers the topics related to critical synthesis and review of published research papers pertaining to a topic of their interest.

Course Objective: The course should enable the student to synthesise and critically appraise and review the published research paper.

Course Outcome: The student should be able to critically analyze five published research papers and present the same in their respective areas of interest.

1. The student shall search for the chosen topic of interest via different search engines like Scopus, web of science and Pubmed.

2. They shall select five full text best papers.
3. They shall make a summary presentation on these articles and submit the same
4. The allocated teacher shall select appropriate method to complete the objective.

SEMESTER -II
Sports

SEMESTER - II

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 211	Sports Injury Diagnosis and Medical Management-I	56	4	4	25	75	100

Course Description: The course covers topics related to pathophysiology, clinical manifestation, medical and surgical management of sport related diseases and disorders in athletes.

Course Objective: The course should enable the student to develop a detailed concept about different sport related diseases and disorders in athletes.

Course Outcome: The students should be able to demonstrate adequate knowledge about management of athletes with sport injuries.

I. Trauma Management

1. Cardio Pulmonary Resuscitation (CPR)with practical hands on training(basic and advanced); Shock management, Internal and External bleeding, Splinting, Stretcher use-Handling and transfer, Management of Cardiac arrest, Epilepsy, Drowning, Burn, Medical management of mass participation. Heat stroke and Heat illness.
2. Sports specific injuries, with special emphasis on the specific risk factor, nature of sports, kind of medical intervention anticipated and prevention with respect to individual sports-Individual events: Field & Track, Team events: Hockey, Cricket, Football
3. Contact and Non-contact sports, Water sports
4. Chest and abdominal injuries: Rib fractures, abdominal wall contusions, sports hernia etc.

II. Injuries in Upper extremities:

Acromioclavicular joint dislocation, anterior shoulder dislocation, biceps rupture, frozen shoulder, impingement syndrome, rotator cuff tears, Labral lesions, Lateral epicondylitis, medial epicondylitis, stress fractures of radial epiphysis, Carpal tunnel syndrome, fractures and dislocations of hand and wrist etc.

III. Injuries to Lower extremities and Spine:

Hip joint labral tears, soft tissue ruptures involving rectus femoris, groin pain, nerve entrapment, stress fractures of femoral neck, knee ligament injuries, patellar injuries and dislocations, ITB friction syndrome, Muscle strains, ankle sprains, nerve entrapments at ankle, rupure of achillis tendon, stress fractures etc. soft tissue injuries, Spinal deformities and fractures of thoracic and lumbosacral spine etc.

IV. Emergency Medical Planning And Cover For Sports Events

1. Emergency Situations, Primary and secondary emergency assessment, emergency plan, transportation of an injured student
2. Treatment of collapsed athlete- Severe head injury, Athlete with spinal injury, ,hypothermia.
3. Causes of Collapse

Essential reading

1) Textbook of Sports Medicine: Basic Science and Clinical Aspects of Sports ; Michael Kjaer, Michael Krogsgaard, Peter Magnusson, Lars Engebretsen, Harald Roos, Timo Takala, Savio L-Y.
2) ACSM's Sports Medicine: A Comprehensive Review; Francis G. O'Connor
3) Brukner & Khan's Clinical Sports Medicine: Injuries, Fifth Ed;Peter Brukner, Karim Khan

Suggested reading

1) The 5-Minute Sports Medicine Consult; Mark D. Bracker
2) Sports Medicine: Study Guide and Review for Boards; Jonathan T. Finnoff, , Mark A. Harrast.
3) Evidence-Based Sports Medicine; Domhnall MacAuley, Thomas Best

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 212	Sports Injury Diagnosis and PT Management-I	70	5	5	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and techniques used in managing different disorders affecting upper quadrant neuro-musculoskeletal system in athletes.

Course Objective: The course should enable the student to acquire in-depth knowledge indifferentphysiotherapy assessment and techniques used in management of different disorders affecting upper quadrant neuro-musculoskeletal system in athletes.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different physiotherapy assessment and techniques used in management of different disorders affecting upper quadrant neuro-musculoskeletal system in athletes.

I. Cryotherapy and Body Composition
   1. Physiological & therapeutic effects
   2. Various techniques
   3. Recent advances in cryotherapy application

II. Stretching
   1. Concept &Types
   2. Advantages & disadvantages
   3. Various techniques
   4. Muscle specific techniques

III. Pre-Participation Examination
   1. Components of preparticipation evaluation
   2. Scope and implementation of preparticipation program

IV. Causes And Mechanism Of Injury
   1. General Aetiological factors of sports injury
   2. Common mechanisms of injury
   3. Preventive aspects of sports injury

V. Sports Traumatology And Physiotherapy Management (Upper Extremity)

   1. Shoulder Complex

a) Background: General Principles of rehabilitation, Intake evaluation, clinical examination of overhead athlete
b) Impingement Syndrome, Rotator cuff tendinitis in overhead athletes
c) Rotator Cuff tear
d) Shoulder Instability: Unidirectional and Multidirectional

e) Biceps tendon disorders
f) Acromioclavicular Joint Injuries
g) Scapular Dyskinesias and fractures

2. Wrist And Hand

a) Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
b) Fractures and dislocations of Metacarpals and phalanges- metacarpal fractures, Thumb Metacarpal fracture, Proximal Interphalanegeal fractures
c) Ulnar Collateral Injuries, avulsion of FDP, Boutonniere deformity and Pseudo Boutonnaire Deformity
d) Proximal Interphalangeal Injuries: Acute dorsal PIP dislocation, PIP joint collateral injuries, Mallet finger
e) Wrist Injuries: Scaphoid Fracture, fracture of hamate, lunate dislocation, keinbock disease
f) Soft tissue Overuse Injuries: Tendinitis, Dequervein's Disease, tenosynovitis of other dorsal compartment, recurrent subluxation of extensor tendon of ulnar side, flexor tendinitis of ulnar wrist
g) Rehabilitation of Overuse Injuries
h) Nerve Compression Syndromes: Median Nerve, Ulnar Nerve,

3. Elbow Complex

a) Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
b) Pathomechanics of humeral epicondylitis: valgus extension overload syndrome
c) Ulnar Collateral Injuries
d) Rehabilitation of elbow injuries
e) Nerve Compression Syndromes- Cubital Tunnel Syndrome, Radial Nerve compression
f) Fractures and dislocations at the elbow and their management

Essential reading

1) Physical Therapies in Sport and Exercise; Gregory Kolt, Lynn Snyder-Mackler
2) Athletic and Sport Issues in Musculoskeletal Rehabilitation; David J. Magee, James E. Zachazewski, William S. Quillen, Robert Manske
3) Sports physical therapy; Barbara Sanders
4) Brukner & Khan's Clinical Sports Medicine: Injuries, Fifth Ed; Peter Brukner, Karim Khan

Suggested reading

1) Orthopedic and Sports Physical Therapy; Terry Malone, Thomas G. McPoil, Arthur J. Nitz
2) Managing Sports Injuries : a guide for students and clinicians; Christopher M Norris
3) Evidence-Based Sports Medicine; Domhnall MacAuley, Thomas Best

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 213	Sports Physiology & Biochemistry	70	5	5	25	75	100

Course Description: The course covers topics related to sport physiological and biochemical basis of athletic training and injury management.

Course Objective: The course should enable the student to acquire in-depth knowledge in different sport physiological and biochemical basis of athletic training and injury management.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different sport physiological and biochemical basis of athletic training and injury management.

I.Sports Specific Physiology

1. Soccer
2. Swimming
3. Weight lifting
4. Tennis
5. Cricket
6. Hockey

II.Temperature Regulation And Sports

1. Heat balance
2. Methods of assessing heat balance
3. Effects of climate
4. Effects of exercise on temperature regulation
5. Limit of tolerance of Heat
6. Acclimatization
7. Avoidance in heat illness during exercise
8. Exercise in cold

III.Deep-Sea Diving, High Altitude And Space Physiology

1. Effect of high partial pressures of gases on the body
2. Breath hold and SCUBA diving
3. Special problems with breathing gases at high pressure
4. Physiologic adaptations to microgravity
5. Physiologic responses to space flight
6. Stress of altitude and acclimatization
7. Metabolic, physiologic and exercise capacities at altitude
8. High altitude training

IV.Miscellaneous Topics

1. Ergogenic aids
2. Sex and performance
3. Assessment of age
4. MORA
5. Sleep and its role in sports
6. Somatotyping

V.Biochemical Basis of Exercise in Sports

1. Sources of Energy and various Body Organs
2. Individual sports event & their metabolism in endurance and strength events
3. Exercise & Gene Expression: Nucleic Acids, Eukaryotic Gene Organization, Gene Therapy, Gene Doping, Control

Essential reading

1) Biochemistry for Sport and Exercise Metabolism; Donald MacLaren, James Morton
2) Exercise Biochemistry; Vassilis Mougios
3) Physiology of Sports; Thomas Reilly, N. Secher, P. Snell, C. Williams, Dr C Williams

Suggested reading

1) Sport Physiology for Coaches, Brian J. Sharkey, Steven E. Gaskill
2) Physiology of Sport and Exercise;W. Larry Kenney, Jack H. Wilmore, David L. Costill
3) Biochemical Monitoring of Sport Training; A.Viru, Mehis Viru

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 214	Sports Biomechanics and Manual Therapy	70	5	5	25	75	100

Course Description: The course covers topics related to sport biomechanics and various manual therapyapproach based athletic assessment, diagnoses and management.

Course Objective: The course should enable the student to acquire in-depth knowledge in sport biomechanics and various manual therapy approach based athletic assessment, diagnoses and management.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in sport biomechanics and various manual therapy approach based athletic assessment, diagnoses and management.

Section- I
Sports Biomechanics

I. Aspects of biomechanical analysis of sports movements

1. Movement descriptors
2. Structural analysis of movements, temporal and phase analysis

II.Principles and Application in Sports

1. Biomechanics of running: Kinematic and kinetic phases, mechanical principles to study running mechanics, pathomechanical errors etc.
2. Biomechanics of rowing: Phases of rowing, mechanical factors to improve rowing performance, rowing as exercise for fitness etc.
3. Biomechanics of throwing and swimming: Kinematic and kinetic phases of throwing, mechanical factors to improve throwing performance, pathomechanical errors etc. basic principles of fluid mechanics, phases of swimming mechanics, pathomechanical errors etc.
4. Biomechanics of jumping: Biomechanical components of jumping, factors to improve jump performance etc.
5. Biomechanics of cycling

Section - II
Manual Therapy

I.Segmental Stabilization Concepts Of Spine

1. Muscle function in spinal stabilization
2. Contribution of various muscles to spinal stabilization
3. Local Muscle dysfunction in Low back pain

4. Principles of clinical management of deep muscle system for segmental stabilization

II.Manual Therapy Intervention

1. Joint Techniques
a) Mckenzie
b) Mulligan
c) Maitland
d) Kaltenborn
2. Soft tissue techniques
a) Butler
b) Positional release
c) MET

Essential reading
1)Sports Biomechanics: Reducing Injury and Improving Performance; Melanie Bussey, Roger Bartlett.
2) Biomechanics of Sport and Exercise; Peter M. McGinnis
4) Maitland's Manipulation; Volume 1 and 2; Elly Hengeveld, Kevin Banks

Suggested reading
1) Principles of Manual Therapy; Deepak Sebastian
2) The Mulligan Concept of Manual Therapy : Textbook of Techniques; Wayne Hing, Toby Hall, Darren A Rivett, Bill Vicenzino, Brian Mulligan
3) Orthopedic Manual Therapy;Chad Cook

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 215	Sports Training-I	42	3	3	25	75	**100**

Course Description: The course covers topics related to scientific basis of athletic training development and implementation.

Course Objective: The course should enable the student to acquire in-depth knowledge in scientific basis of athletic training development and implementation.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in scientific basis of athletic training development and implementation.
1.Sports Training: Importance and definition of sports training: Aims and objectives of sports training Characteristics of sports training, principles of sports Training

I.Parameters And Methods Of Sports Training
1. Training Load, Adaptation and Recovery: Relationship of load and recovery, physiotherapeutic and psychological means of Recovery, Variables of Training: Volume, Intensity, Density, Complexity
2. Relationship between volume and intensity

3. Fatigue and overtraining: Diagnosis, Monitoring and preventing overtraining.
4. Training Methods: Interval training, Continuous training, Circuit training, Fartlek training, Weight training, Plyometric method, Cross training

II.Bio Motor Abilities And Program Design

1. Anaerobic Exercise Training & Prescription: Prerequisites, types and Factors affecting the training variables: Strength Development, Plyometric Training, Speed, Agility and Speed Endurance Development
2. Aerobic Exercise Training & Prescription: Prerequisites, types and Factors affecting the training variables
3. Coordination Training**:** Definition, Classification of coordinative abilities, factors affecting coordination and Methods to develop coordination

Essential reading

1) Essentials of Strength Training and Conditioning; Thomas R. Baechle, Roger W. Earle, National Strength & Conditioning Association
2) The Complete Guide to Sports Training; John Shepherd
3) NASM's Essentials of Sports Performance Training; Micheal Clark, Scott Lucett, Donald T. Kirkendall

Suggested reading

1) Fitness and Strength Training for All Sports: Theory, Methods, Programs;Jürgen Hartmann, Harold Tünnemann

2) Successful Speed Training Methods for All Sports;Steve Silvey

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 216 P	Practical IV- Evaluative Clinical Practice-II	168	12	6	50	150	200

Course Description: The course covers topics related to assessment, diagnosis and management of upper quadrant neuro-muculoskeletal sports injuries

Course Objective: The course should enable the student to acquire in-depth understanding and skill in assessment, diagnosis and management of upper quadrant neuro-muculoskeletal sports injuries

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in assessment, diagnosis and management of upper quadrant neuro-muculoskeletal sports injuries

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 217 P	Practical –V Sports Biomechanics and Manual Therapy	28	2	1	10	40	50

Course Description: The course covers topics related to manual therapy assessment, diagnosis and management of upper quadrant neuromusculoskeletal sports injuries and biomechanical evaluation of the athletes.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in manual therapy assessment, diagnosis and management of upper quadrant neuromusculoskeletal sports injuries and biomechanical evaluation of the athletes.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in manual therapy assessment, diagnosis and management of upper quadrant neuromusculoskeletal sports injuries and biomechanical evaluation of the athletes.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-II	Project Development	28	2	1	50	-	50

Course Description: The course covers topics related to writing and development of projects.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in writing and development of projects.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor. The student shall make af inal presentation of the topic in front of the committee.
The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor

1. Identifying the problem and statement of research question
2. Review of literature
3. Existing knowledge and gap in knowledge
4. Quality of publications
5. Type of publications
5. Data bases
6. Search strategies
7. Costing
8. Ethical concerns
9. Knowledge addition

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-III	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to sports physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of sports physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation submit a written

SEMESTER -II
Orthopaedics

SEMESTER - II

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 221	Orthopedics Medicine & Surgery-I	56	4	4	25	75	100

Course Description: The course covers topics related to pathophysiology, clinical manifestation, conservative and surgical management of Orthopaedic diseases & disorders.

Course Objective: The course should enable the student to develop a detailed concept about different Orthopaedic diseases & disorders and its medical and surgical management.

Course Outcome: The students should be able to demonstrate adequate knowledge about management of people with Orthopaedic diseases & disorders.

I. Pediatric orthopedics
1. Clinical examination
2. Abnormal gait in children and their causes
3. Contracture in pediatric
4. Osteogenesisimperfecta
5. Dysplasia of bone
6. Myopathies
7. Deformities of spine
    i. Kyphosis
    ii. Scoliosis
    iii. Hyper spinal disorders
8. Congenital dislocation of hip
9. Displaced capital femoral epiphysis
10. Developmental coxavara
11. Congenital talipusequinovarus
12. Foot deformities, disease & disorders
13. Knee deformities, disease & disorders
14. Shoulder girdle deformities ,disease& disorders

II. Peripheral nerve injuries
1. Brachial plexus injuries
2. Obstetrical palsy
3. Upper limb nerve injuries
4. Lower limb nerve injuries

III. Fracture & Dislocation
1. General consideration: Fracture healing ,type, complications and management of fractures & dislocations
2. Soft tissue injury management

3. Surgical orthopedic methods –
a) IM nailing
b) External fracture
c) Internal fracture
d) Illizarov
e) Plates & screen
f) Closed reduction
g) Open reduction

IV. Fractures, dislocation and other trauma to Lower limb

V. Fractures, dislocation and other trauma to spine

VI. Fracture, dislocation & other trauma to UL

VII. Orthopedics surgery

1. Arthroscopic
2. Arthroplasty
3. Amputation
4. Arthorodesis
5. Tendon transfer & transplant & releases
6. Bone & tissue grafting

Essential

1. Apley's system of Orthopaedics and Fractures (Ninth edition) by Louis Solomon.
2. Turek's Orthopaedics (6th Edition)
3. Textbook of Orthopaedics and trauma by Kulkarni
4. Campbell's Orthopaedic surgery
5. American Academy of Orthopaedic Surgeons guidelines for the treatment of osteoarthritis of the knee evidence-based guideline 2nd edition. Adopted by Board of Directors May 18, 2013

Suggested

1. Musculoskeletal Trauma by Blankanbaker
2. Watson Jones fracture, joint & injuries
3. Recent advances in Orthopaedic 2 by kulkarni

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 222	Assessment and special issues in Orthopaedic Physiotherapy	70	5	5	25	75	100

Course Description: The course covers topics related to physiotherapy assessment used in managing different disorders affecting musculoskeletal system in adults. It also covers the assessment and management of paediatric Orthopaedic diseases and disorders. It gives a brief overview of lifestyle and occupational medicine .

Course Objective: The course should enable the student to acquire in-depth knowledge in different physiotherapy assessment used in management of different disorders affecting musculoskeletal system. It should equip the student to assess and manage paediatric orthopaedic conditions. It should provide the student with a brief overview of lifestyle and occupational medicine.

Course outcome: The student should be able to:

1. To perform a comprehensive and complete Physiotherapy assessment of various orthopaedic patients.
2. To document systematic, meaningful, accurate written records of the patient.
3. To assess and eventually design individualized treatment strategies for the paediatric patients.
4. To develop an overview of the concept of Lifestyle medicine and Occupational medicine.

Section I

I. Basic musculoskeletal science and its application
   1. Normal structure, function and biomechanical behavior of musculoskeletal tissues
   2. Reaction of musculoskeletal tissues to aeging, injury, disease and disorders.

II. Assessment
   1. Review of general assessment
   2. Pain assessment
   3. Joint assessment techniques
   4. Special tests for all the joints
   5. Motor assessment
   6. Balance & coordination assessment
   7. Posture & gait assessment
   8. Functional assessment
   9. Disability evaluation
   10. Quality of life assessment

III. Pediatric orthopaedic conditions

Physiotherapy examination and management of:
   1. Congenital conditions of the upper limb
   2. Congenital conditions of the lower limb
   3. Congenital conditions of the spine

IV. Special issues in orthopaedic physiotherapy

1. Introduction to lifestyle medicine
   a) Definition and importance
   b) incidence of chronic illness and the contribution of healthy lifestyle to the prevention and treatment of diseases
   c) Definition of health and the foundations for good health
   d) Physiotherapist's health – self -evaluation, personal goals, the importance of being a role model

2.Musculoskeletal issues in women

3.Pathobiological mechanisms of pain:
   a) Recent advances in pain evaluation and management
   b) Psychological components of chronic pain

4.Patient compliance
   a) Definition and types
   b) Factors affecting compliance
   c) Interventions to improve adherence
   d) Patient satisfaction

5.Occupational medicine:
   a) Ergonomic processes: elements, success factors for implementation, psychosocial works factors.
   b) Principles of assessment of industrial fitness and assessment & management of musculoskeletal dysfunctions related to various industries.
   c) Ergonomics assist and safety equipment.
   d) Ergonomic advice: keyboard, computers, laptop etc

Essential reading

1. David J Magee. Orthopedic physical Assesment (Fourth edition)
2. Management of common musculoskeletal disorders by Kessler
3. Orthopaedic Examination, Evaluation and Intervention by Dutton
4. Muscle Testing by Hislop Daniel and Wortuingham
5. Karolina M.Szadek (2009). Diagnostic Validity of Criteria for Sacroiliac Joint Pain: A Systematic Review. The Journal of Pain Volume 10, Issue 4, Pages 354-368. https://doi.org/10.1016/j.jpain.2008.09.014
6. W. S. Watson (2000)A reliable technique for the assessment of posture: Assessment criiteria for aspects of posture The Journal of sports medicine and physical fitness 40(3):260-70 ·
7. Baker R. (2006). Gait analysis methods in rehabilitation. Journal of neuroengineering and rehabilitation, 3, 4. doi:10.1186/1743-0003-3-4

Suggested reading

1. Core Knowledge of orthopaedics
2. Bernhard Reichert. Palpation techniques
3. Muscles testing and function by Kendall
4. Myofascial and pain dysfunction by Travell, Villimans and Wilkins, Baltimore 1983

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 223	Physiotherapy in Orthopedic Trauma	70	5	5	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and management of different orthopaedic trauma conditions

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in assessment and physiotherapy management of different orthopaedic trauma conditions

Course Outcome: On completion of the study of this Course the student should be able:

1. To perform a comprehensive and complete Physiotherapy assessment of the following traumatic orthopaedic but not limited to.
2. To formulate a complete physiotherapy treatment plan of the following conditions but not limited to.

I. Trauma
   1. General physiotherapy management of soft tissue injuries
   2. General physiotherapy management of fractures
   3. General physiotherapy management of dislocation

II. Physiotherapy management post Conservative and pre and post surgical management of Trauma of Lower limb
   1. General consideration of Lower limb trauma
   2. Trauma of hip complex &associated bones
   3. Trauma of knee complex & associated bones
   4. Trauma of foot & ankle complex& associated bones

III. Physiotherapy management post Conservative and pre and post surgical management of Trauma of upper limb
    1. General consideration of upper limb trauma
    2. Trauma of shoulder complex & associated bones
    3. Trauma of elbow & associated bones
    4. Trauma of wrist and hand & associated bones
IV. Physiotherapy management post Conservative and pre and post surgical management of Trauma of spine
    1. General consideration of spinal trauma
    2. Trauma of cervical spine and skull
    3. Trauma of thoracic spine
    4. Trauma lumbosacral spine
V. Physiotherapy management post Peripheral nerve injuries
    1. Upperlimb
    2. Lowerlimb
    3. Spine

Essential Readings

1. Treatment and rehabilitation fractures by Hoppenfield
2. Apley's system of Orthopaedics and Fractures (Ninth edition) by Louis Solomon.
3. Textbook of Orthopaedics and trauma by Kulkarni
4. Brotzman's Clinical Orthopaedic Rehabilitation (2nd Edition)
5. Krischak G D et al (2009).Physiotherapy after volar plating of wrist Fractures is effective using a Home Exercise program.Arch Phys Med Rehabil. 90(4):537-44 doi: 10.1016/j.apmr.2008.09.575
6. Manske, r. c., & Prohaska, d. (2017). Rehabilitation following medial patellofemoral ligament reconstruction for patellar instability. international journal of sports physical therapy, 12(3), 494–511. pmcid: pmc5455199
7. Menorca, R. M., Fussell, T. S., & Elfar, J. C. (2013). Nerve physiology: mechanisms of injury and recovery. Hand clinics, 29(3), 317–330. doi:10.1016/j.hcl.2013.04.002

Suggested Readings

1. Mercer's Textbook of Orthopaedic & Trauma
2. Orthopaedic rehabilitation by Brokmen
3. Robert C Manske. Post surgical orthopaedic sports rehabilitation knee and shoulder.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 224	Disability and Rehabilitation	56	4	4	25	75	100

Course Description: The course covers topics related to disability and process of rehabilitation of people with special needs.

Course Objective: The course should enable the student to acquire in-depth knowledge and about various types of disability and intervention strategies in rehabilitation process.

Course Outcome: The student should be able to demonstrate adequate knowledge about various types of disability and intervention strategies in rehabilitation process.

Section 1 Disability studies

I. Introduction to disability studies
1. Meaning and scope of disability studies and its relationship to other field
2. History of disability studies
3. Contemporary concepts and issues in disability studies
4. International and national scenario of disability.

II. Understanding disability
1. Define: Disability, Handicap, Functional Limitation and Rehabilitation;
2. ICDH and ICF tools
3. Exploration of the psychological and social aspects of disability
4. Cultural perception of disability

III. Legal and ethical issues in disability studies
1. The equal opportunities for persons with disability (UN general assembly)
2. Indian laws regarding persons with disabilities
3. Inclusive education in India

Section 2 Rehabilitation

I. Rehabilitation fundamentals
1. Performance analysis
2. Physical and optimal function
3. Functional independence
4. Quality of life
5. Mobility for patients with disability
   a) Functional ambulation
   b) Wheelchair assessment and transfers
   c) Transportation and community mobility
   d) Strategies for promoting physical activity among persons with disabilities in community settings.
   e) Family-centered intervention approaches for families of persons with disabilities.
   f) Environmental barriers

II.Amputation
1. General considerations of upper and lower limb amputations
2. Upper limb prosthesis
   a) Evaluation & management
   b) Check out
   c) Shoulder prosthesis
   d) Elbow prosthesis
   e) Wrist & hand prosthesis
3. Lower limb prosthesis
   a) Evaluation & management
   b) Check out
   c) Hip & pelvic prosthesis
   d) Knee prosthesis
   e) Foot & ankle prosthesis

III.Orthotics for orthopaedic physiotherapist

1. Upper limb orthosis
   a) Evaluation & management
   b) Shoulder girdle and associated orthotics
   c) Elbow orthotics
   d) Wrist and hand orthotics

2. Lower limb orthosis
a) Evaluation & management
b) Hip orthosis
c) Knee orthosis
d) Foot & ankle orthosis
3. Spinal orthosis
a) Evaluation & management
b) Cervical orthosis
c) Thoracic orthosis
d) Lumbosacral orthosis

IV. Assistive technology in orthopaedic physiotherapist
1. Principles of assistive technology
2. Rehabilitation technology
3. Assistive technology
4. Universal design
5. Electronic aids to daily living: Applications for orthopaedic patients

V. Community Rehabilitation
1. Coping with stress
a) Introduction
b) History and definition of stress
c) Anatomy and Physiology of stress
2. Clinical implications of stress
a) Self management
b) Tools to manage stress

VI. Prevention and treatment of Obesity
Epidemiology, environmental and genetic factors, Paediatric obesity, complications, prevention and treatment.

VII. Diabetes: Exercise testing and prescription

VIII. Hypertension: Exercise testing and prescription

Essential Readings

1. Prosthetics and Orthotics by Seymour
2. Rehabilitation Medicine by Delisa
3. Essentials of Physical Medicine and Rehabilitation by Silver
4. Stefano Negrini et al .2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. Scoliosis and Spinal Disorders, 2018, Volume 13, Number 1, Page 1.https://doi.org 10.1186/s13013-017-0145-8
5. Silva, C., Coleta, I., Silva, A. G., Amaro, A., Alvarelhao, J., Queiros, A., & Rocha, N. (2013). Adaptation and validation of WHODAS 2.0 in patients with musculoskeletal pain. Revista de saude publica, 47(4), 752-758.
6. Hordacre, B., Birks, V., Quinn, S., Barr, C., Patritti, B. L., & Crotty, M. (2013). Physiotherapy Rehabilitation for Individuals with Lower Limb Amputation: A 15-Year Clinical Series. Physiotherapy Research International, 18(2), 70-80.
7. Salmon, P. (2001). Effects of physical exercise on anxiety, depression, and sensitivity to stress: a unifying theory. Clinical psychology review, 21(1), 33-61.

Suggested Readings

1. Hand Rehabilitation by Christine, Churchcill, Livingstone London 1995

2. Andrews, G., Kemp, A., Sunderland, M., Von Korff, M., & Ustun, T. B. (2009). Normative data for the 12 item WHO Disability Assessment Schedule 2.0. *PloS one*, *4*(12), e8343.
3. Ströhle, A. (2009). Physical activity, exercise, depression and anxiety disorders. Journal of neural transmission, 116(6), 777.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 225	Manual Therapy	42	3	3	25	75	100

Course Description: The course covers topics on various school of thoughts of joint, muscle and neural tissue manual therapy techniques . The course aims to provide a more functional and comprehensive approach based on manual therapy to the manage a range of neuromusculoskeletal conditions.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in managing musculoskeletal conditions by using Manual therapy techniques.
Course Outcome

Course Outcome: The student should be able to compare & contrast the outcome of various manual and mechanical therapy approaches.

I. Segmental Stabilization Concepts Of Spine

1. Muscle function in spinal stabilization
2. Contribution of various muscles to spinal stabilization
3. Local Muscle dysfunction in Low back pain
4. Principles of clinical management of deep muscle system for segmental stabilization

II. Manual Therapy Intervention

1. Joint Techniques
   a) Mckenzie
   b) Mulligan
   c) Maitland
   d) Kaltenborn
   e) Cyriax
2. Soft tissue techniques
   a) Butler
   b) Positional release
   c) MET
   d) Myofascial release

III. Stretching

1. Concept &Types
2. Advantages & disadvantages
3. Various techniques
4. Muscle specific technique

IV. Soft Tissue Mobilization

1) General overview of Soft Tissue Mobilization
2) Principles of various techniques of Soft tissue mobilization

3) Effects and uses in various musculoskeletal conditions.

V. Chest Mobility

1) Chest mobilization techniques
2) Aims and goals of Breathing exercises.
3) Procedures of Diaphragmatic breathing, segmental breathing, Pursed lip breathing, Glossopharyngeal breathing and respiratory resistance training
4) Relieving episodes of dyspnea.

Essential reading

1. Assesment and treatment of muscle imbalance , The Janda Approach
2. Leon Chatow. Muscle Energy technique (2nd Edition)
3. Micheal Shacklock. Clinical Neurodynamics
4. Peripheral Manipulation Maitland
5. The Lumbar spine mechanical diagnosis and therapy by Mc kenzie

Suggested reading

1. Neural Mobilization David Butler
2. Vertebral manipulation by Maitland
3. Mulligan manual therapy. Mobilization with movement
4. Direct release Myofascial technique by Micheal Stanborough.
5. Freddy M Kaltenborn. Kaltenborn method of Joint examination and treatment.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 226P	Practical – IV – Assessment and special issues in orthopaedic Physiotherapy and Manual Therapy	28	2	2	10	40	50

Course Description: The course covers topics related to hands on training in physiotherapy assessment in managing different orthopaedic disease and disorders . It also includes the assessment and management of Paediatric orthopaedic conditions. The covers skill development in various techniques of manual Therapy .

Course Objective: The course should enable the student to acquire in-depth understanding and skill in various assessment techniques used in managing different disorders of musculoskeletal system . It will equip the students to manage Paediatric orthopaedic case. The student shall be trained in manual therapy techniques.

Course Outcome: On completion of the study of this Course the student should be able to practice different joint mobilization and soft tissue mobilization techniques and understand and apply principles of topics covered in MPT 222 and MPT225

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 227P	Practical – V –Evaluative Clinical Practice - II	168	12	6	50	150	200

Course Description: The course covers topics related to hands on training in physiotherapy assessment and management of different disease and disorders of musculoskeletal system . The topics of course is listed in Course code MPT 222 , MPT 223 and MPT 224.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in physiotherapy assessment and management of disease and disorders of musculoskeletal system.

Course Outcome: The student should be able to interpret and differentiate between various diagnostic tools used for therapeutic plan, take history of the conditions of patients. They should have knowledge of all the physiotherapeutic intervention pertaining to the patient. They should be able to evaluate and plan physiotherapy treatment: its presentation and documentation of all the conditions. The topics and management as discussed in MPT 222, MPT 223, MPT 224 and MPT225.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-II	Project Development	28	2	1	50	-	50

Course Description: The course covers topics related to writing and development of projects.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in writing and development of projects.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor. The student shall make af inal presentation of the topic in front of the committee.
The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor

1. Identifying the problem and statement of research question
2. Review of literature
3. Existing knowledge and gap in knowledge
4. Quality of publications
5. Type of publications
5. Data bases
6. Search strategies
7. Costing
8. Ethical concerns
9. Knowledge addition

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-III	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to orthopaedic physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of orthopaedic physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation submit a written

SEMESTER -II
Neurology

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 231	Neurology and Neurosurgery	56	4	4	25	75	100

Course Description: The course covers topics related to pathophysiology, clinical manifestation, medical and surgical management of neurological disorders in adults.

Course Objective: The course should enable the student to develop a detailed concept about different disorders and its management of nervous system in adults.

Course Outcome: The students should be able to demonstrate adequate knowledge about management of people with neurological disorders.

1. Disorders of cerebral circulation.
    a. Stroke
2. Movement Disorderssss
    a. Parkinson's Disease
    b. Multiple system atrophy
    c. Dystonia
3. Disorders of cerebellum
    a. Genetic
    b. Acquired
4. Disorders of peripheral &cranial nerves.
    a. Demyelinating neuropathies
    b. Diabetic neuropathies
    c. Trigeminal neuralgia
    d. Bell's and Facial palsy
    e. other cranial nerves
5. Demeylinating disorders of central nervous system
    a. Mutilpe sclerosis
6. Myelopathy
    a. Traumatic myelopathy.
    b. Infections
7. Neuronopathies
    a. Motor neuron diseases
    b. Amyotrophic lateral sclerosis
8. Degenerative disorders
    a. Dementia
    b. Alzheimer's disease
9. Disorders of Muscles
    a. Adult onset genetic myopathies
    b. Inflammatory
10. Infectious disorders
    a. Bacterial
    b. Viral
11. Epilepsy
12. Nervous system malformation.
    a. Spina bifida
    b. cranio- vertebral junction anomalies
13. Traumatic brain injury

14. Neoplasm.
15. ICU management of neurologically ill

Essential Reading

1. Neurology And Neurosurgery Illustrated by Lindsay
2. Brain's Diseases of the Nervous System by Michael Donaghy

Suggested Reading

1. Adams and Victor's Principles of Neurology by Allan Ropper and Robert H Brown

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 232	Neurological Physiotherapy : Assessment & Techniques	70	5	5	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and techniques used in managing different disorders affecting nervous system in adults.

Course Objective: The course should enable the student to acquire in-depth knowledge in different physiotherapy assessment and techniques used in management of different disorders affecting nervous system in adults.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different physiotherapy assessment and techniques used in management of different disorders affecting nervous system in adults.

I. Neurological assessment
   1. Frame works of assessment
   2. Review of general neurological assessment
   3. Functional assessment
   4. Pain Assessment
   5. Gait analysis ,posture and balance disorders in neurological conditions.

II. Assessment with specialized tools and assessment in various set ups
   1. Questionnaires, functional performance scales and scales in neurological disorders
   2. Assessment in :Acute care, wards/ Rehab units, OPD and community

III. Neurological Physiotherapy techniques
   1. NDT/Bobath Approach
   2. Rood's Approach
   3. PNF
   4. Motor relearning programme
   5. Sensory integration therapy
   6. Neural Mobilization
   7. Biofeedback.
   8. Mental Imagery
   9. Functional electrical stimulation

IV. Special issues in neurological rehabilitation
   1. Psychosocial and community based rehabilitation in neurological disorders

2. Management of Autism, intellectual and learning disabilities and Down syndrome

Essential Reading

1. Motor Relearning Programme by J Carr and R Shepherd
2. PNF by Adler
3. Pediatric Physical Therapy by Tecklin
4. Neural mobilization by D. Butler

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 233	Physiotherapy in Neurological Disorders	70	5	5	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and management of different disorders affecting nervous system in adults.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in assessment and physiotherapy management of different disorders affecting nervous system in adults.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy assessment and management of different disorders affecting nervous system in adults.

Physiotherapy assessment and management of the following neurological disorders.

1. Disorders of cerebral circulation.
   a. Stroke
2. Movement Disorders
   a. Parkinson's Disease
   b. Multiple system atrophy
   c. Dystonia
   d.dysphagia
3. Disorders of cerebellum
   a. Genetic
   b. Acquired
4. Disorders of peripheral &cranial nerves.
   a. Demyelinating neuropathies
   b. Diabetic neuropathies
   c. Trigeminal neuralgia
   d. Bell's and Facial palsy
   e. other cranial nerves
5. Demeylinating disorders of central nervous system
   a. Mutilpe sclerosis
6. Myelopathy
   a. Traumatic myelopathy.
   b. Infections
7. Neuropathies
   a. Motor neuron diseases
   b. Amyotrophic lateral sclerosis
8. Degenerative disorders
   a. Dementia

b. Alzheimer's disease
9. Disorders of Muscles
   a. Adult onset genetic myopathies
   b. Inflammatory
10. Infectious disorders
   a. Bacterial
   b. Viral
11. Nervous system malformation.
   a. Spina bifida
   b. cranio vertebral junction anomalies
12. Traumatic brain injury
13. Vestibular disorders.
14. Physiotherapy management in neurological ICU

Essential Reading

1. Neurological rehabilitation by Darcy A Umphred
2. Physical Rehabilitation by O'Sullivan
3. Neurologic interventions for Physical Therapy by Martin Kessler

Suggested Reading

1. Neurological Rehabiliation Optimizing Motor Performance by J Carr and R. Shepherd
2. Tetraplegia and Paraplegia A Guide for Physiotherapists by Glen Gillen Ida Bromley
3. Stroke Rehabilitation A Function-Based Approach by Glen Gillen
4. Braddom's Physical Medicine and Rehabilitation by David X Cifu

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 234	Principles of Neurological Physiotherapy	56	4	4	25	75	100

Course Description: The course covers topics related to foundations and principles of neurological physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding in foundations and principles of neurological physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge in foundations and principles of neurological physiotherapy.

I. Motor control and motor learning
   1. Theories of motor control , motor learning and its application
   2. Issues related with motor control
   3. Physiological and genetic basis of neurological disorders
   4. Neural injury and repair

II. Postural Control
   1. Development of postural control

2. Normal postural control
3. Abnormal postural control
4. Postural control disorder and their management

III. Mobility & Stability
1. Control of normal mobility & stability
2. Coordinated movements
3. Abnormal mobility & stability
4. Management of mobility, stability and coordination issues

IV. Reach, grasp and manipulation
1. Normal reach, grasp and manipulation
2. Changes across life span in reach, grasp & manipulation
3. Abnormal reach, grasp & manipulation
4. Management of reach, grasp & manipulation problems.

V. Disorders of Muscle
1. Muscle weakness
2. Altered muscle tone

Essential Reading
1. Motor Control: Translating Research into Clinical Practice by Anne Shumway-Cook, Marjorie Hines Woollacott
2. Neurological rehabilitation by Darcy A Umphred

Suggested Reading
1. Braddom's Physical Medicine and Rehabilitation by David X Cifu

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 235	Disability and Rehabilitation	56	4	4	25	75	100

Course Description: The course covers topics related to disability and process of rehabilitation of people with special needs.

Course Objective: The course should enable the student to acquire in-depth knowledge and about various types of disability and intervention strategies in rehabilitation process.

Course Outcome: The student should be able to demonstrate adequate knowledge about various types of disability and intervention strategies in rehabilitation process.

I. Introduction to disability studies
1. Meaning and scope of disability studies and its relationship to other field
2. History of disability studies
3. Contemporary concepts and issues in disability studies
4. International and national scenario of disability.

II. Understanding disability
1. Different models of disability
2. Types of disability
3. Disability evaluation
4. Psychological and social aspects of disability
5. Cultural perception of disability

III.Legal and ethical issues in disability studies
1. The equal opportunities for persons with disability (UN general assembly)
2. Indian laws regarding persons with disabilities
3. Inclusive education in India

IV. Rehabilitation fundamentals
1. Models of rehabilitations
2. Rehabilitation team
3. Role of physiotherapist in neurorehabilitation
4. Functional independence
5. Health care of caregivers.

V. Quality of life
1. Components of quality of life
2. Assessment of quality of life
3. Disability and quality of life
4. Prevention and treatment of Obesity

a) Introduction to nutrition
b) Obesity- epidemiology, environmental and genetic factors, paediatric obesity, complications, prevention and treatment.

5. Diabetes: Exercise testing and prescription
6. Hypertension: Exercise testing and prescription
7. Assessment & management of cognitive perceptual dysfunction.

Essential Readings
1. Textbook of rehabilitation by S.Sundar
2. Prosthetics and Orthotics by Seymour
3. Rehabilitation Medicine by Delisa
4. Essentials of Physical Medicine and Rehabilitation by Silver
5. American College of Sports Medicine. (2013). ACSM's guidelines for exercise testing and prescription. Lippincott Williams & Wilkins.

Suggested Readings
1. Hand Rehabilitation by Christine, Churchill, Livingstone London

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 236P	Practical IV: Neurological Physiotherapy Assessment & Techniques	28	2	1	10	40	50

Course Description: The course covers topics related to hands on training in physiotherapy assessment and techniques used in managing different disorders of nervous system in adults. The topics of course is listed in Course code MPT 232

Course Objective: The course should enable the student to acquire in-depth understanding and skill in various assessment and techniques used in managing different disorders of nervous system in adults. .

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in various assessment and techniques used in managing different disorders of nervous system in adults.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 237 P	Practical V: Evaluative Clinical Practice - II	168	12	6	50	150	200

Course Description: The course covers topics related to hands on training in physiotherapy assessment and management of different disorders of nervous system in adults. The topics of course is listed in Course code MPT 232 and 234.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in physiotherapy assessment and management of disorders of nervous system in adults.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy assessment and management of disorders of nervous system in adults.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-II	Project Development	28	2	1	50	-	50

Course Description: The course covers topics related to writing and development of projects.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in writing and development of projects.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor

1. Identifying the problem and statement of research question
2. Review of literature
3. Existing knowledge and gap in knowledge
4. Quality of publications
5. Type of publications
5. Data bases
6. Search strategies
7. Costing
8. Ethical concerns
9. Knowledge addition

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-III	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to neurological physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of neurological physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation submit a written

SEMESTER -II
Cardiopulmonary

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 241	Pulmonary Medicine and Surgery	56	4	4	25	75	100

Course description: An overview of epidemiology, pathomechanics, clinical presentation relevant diagnostic test and medical management of conditions related to pulmonary medicine and surgery are presenteds

Course objective: The objective of this course is to provide the students with information on the epidemiology, pathomechanics, clinical presentation, relevant diagnostic tests, medical and surgical management of disorders of the pulmonary system.

Course objective outcomes: Students will be able to use this information in planning and tailoring effective, specific and safe physiotherapy treatment program.

SECTION I (PULMONARY MEDICINE) (45 Marks)

Epidemiology, pathomechanics, clinical presentation, relevant diagnostic tests (PFT, ABG, CXR, CT-scan, Labs, Etc.) and medical management of disorders of the pulmonary system.

1. Assessment of symptoms of respiratory diseases
2. Obstructive pulmonary diseases
3. Sleep apnoea
4. Infections of the respiratory system
5. Interstitial and infiltrative pulmonary disorders
6. Pulmonary disorders due to exposure to organic and inorganic pollutants
7. Pulmonary disorders due to systemic inflammatory disease
8. Pulmonary vascular diseases
9. Diseases of the pleura
10. Respiratory failure
11. Neuromuscular and skeletal disorders leading to global alveolar hypoventilation
12. Pathophysiology of paralytic-restrictive pulmonary syndromes
13. Conventional approaches to managing neuromuscular ventilator failure
14. Post -tubercular sequelae
15. Acute respiratory distress syndrome

SECTION II (PULMONARY SURGERY)(20 Marks)

1. Incisions for procedures in thoracic surgery: incisions on sternum, anterior and lateral chest wall, thoraco-abdominal, abdominal including for procedures on diaphragm, mediastinum oesophagus.
2. General Thoracic Surgery: Surgery of chest wall, diaphragm, mediastinum, trachea and bronchus, pleura and lungs, Oesophagus, Chest Trauma, Neonatal cardiovascular –thoracic emergencies.
3. Inter costal drainage (ICD)
4. VATS (Video assisted thoracic surgery) Basics : diagnostic and therapeutic Procedures
5. Complications of pulmonary surgery

SECTION III (ANAESTHESIOLOGY) (10 Marks)

1. Anaesthesia: types, benefits, effects on cardiopulmonary system, complications.
2. Post-operative atelectasis: types, pathogenesis, and management.
3. Ventilation-perfusion mismatch, shunting of blood in lungs, dead space ventilation.
4. Respiratory Mechanics.
5. Artificial airways, intubation, bronchoscopy.
6. Haemodynamic monitoring
7. Invasive and non-invasive mechanical ventilation.
8. CPR and emergency management strategies in the ICU.

Essential Readings:

1. Principles & Practice of Surgery, Adapted International Edition, 6th Edition, O James Garden, 20 Oct 2017
2. Handbook of Pulmonary & Critical Care Medicine Paperback by S.K Jindal,
3. Textbook of Pulmonary Medicine (Set of 2 Volumes) by Behra

4. Suggested Readings:

1. Equine Respiratory Medicine and Surgery, Bruce C Mc Gorum,

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 242	Cardiopulmonary Physiotherapy Technique	70	5	5	25	75	100

Course Description: The purpose of this course is to teach the student components of basic therapeutic skills that apply to cardiovascular and pulmonary patients with a potential need for physiotherapy services. Students will learn the basics of techniques, selection of appropriate techniques and the use of critical thinking and decision-making to determine the most appropriate intervention and outcomes for all patients with cardiopulmonary disorders.

Course objective and outcomes: Demonstrate various cardiopulmonary techniques which can be used in patients with cardiopulmonary disease and set appropriate goals and prepare prescriptions for the patients with cardiopulmonary disorders.

Course outcome: After completion of the course students will be able to perform various airway clearance techniques and technologies used in the management of patients with cardiopulmonary disorders. They will be skilled in performing exercise testing and training in cardiopulmonary dysfunction.

1. Airway Clearance Techniques: physiological basis, Procedure, Indications, Contraindications, procedure, Physiological effects, Mechanism of action of the following.

a) Percussion, Vibration, Shaking
b) Postural Drainage
c) Huffing and coughing
d) Active Cycle of Breathing Technique
e) Autogenic Drainage

2. Airway Clearance Technologies: Procedure, Indications, Contraindications, procedure, Physiological effects, Mechanism of action of the following.

a) Vibratory PEP Devices : Acapella, Flutter,
b) Non-Vibratory PEP Devices: Thera PEP
c) High- Frequency chest wall oscillation
d) PNF respiration

3. Breathing Exercises and Ventilator Training

a) Diaphragmatic Breathing Exercise
b) Segmental breathing exercise
c) Pursed lip breathing
d) Respiratory resistance training
e) Glossopharyngeal Breathing
f) Relaxation positions to control dyspnoea

4. Exercises to Mobilize Chest

a) To mobilize one side of chest
b) To mobilize upper chest and stretch the pectoralis muscles
c) To mobilize upper chest and thorax

5. Ventilatory facilitatory techniques

a) Positioning concerns
b) Ventilatory and movement strategies
c) Manual facilitation techniques
d) Enhancing phonation skills

6. Exercise testing and training for cardiopulmonary dysfunctions

a) Primary cardiopulmonary dysfunctions
b) Secondary cardiopulmonary dysfunctions

7. Mobilisation and exercise

a) Hazards of bed rest
b) Oxygen transport and metabolic demand of patient
c) Effects of mobilisation and exercise on oxygen transport
d) Acute and long term effect of prescription of mobilization and exercise
e) Mobilisation testing, monitoring and prescription

8. Body positioning

a) Prescriptive versus routine body positioning
b) Physiological effects of various body positions
c) Physiological effects of frequent changes in body position
d) Prescription of therapeutic body positions and body position changes
e) Mechanical body positioning

9. Heart rate variability: introduction, Measurement of heart rate variability: time domain method; frequency domain methods, stability & reproducibility of HRV measurements, recording requirements, physiological correlate of HRV, clinical use of HRV, changes of HRV related to specific pathologies.

10. Heart rate recovery: methods of recoding heart rate recovery after various exercise, interpretation and clinical use.

Essential Readings**:**

1. Cardiovascular and Pulmonary Physical Therapy, 5th Edition from Donna Frownfelter, Elizabeth Dean. Mosby, 2015, ISBN-9780323059138.
2. Essentials of Cardiopulmonary Physical Therapy H. Steven Sadowsky, Ellen A. Hillegass, ISBN-9781437703832.
3. Physiotherapy for Respiratory and Cardiac Problems: Adults and Paediatrics, 4e (Physiotherapy Essentials) by Jennifer A. Pryor , Ammani S Prasad 2008

Suggested Readings**:**

1. Chest physiotherapy in Intensive care unit – Makezie,Williams & Wilkins, Baltimore.
2. Cardiopulmonary symptoms in physiotherapy practice- CohenM. Churchill Livingstone, London 1988.
3. Physiotherapy in Respiratory and Cardiac Care: An Evidence-Based Approach Paperback by Alexandra Hough, 2014

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 243	Pulmonary Physiotherapy & Rehabilitation	70	5	5	25	75	100

Course Description: The purpose of this course is to teach the student the basic elements of pulmonary rehabilitation and some therapeutic principles that apply to pulmonary patients with a potential need for physiotherapy practice. Students will learn the basics of examination and evaluation, selection of appropriate tests and measures, use of validity, reliability, and best evidence to select tests and measures, and the use of critical thinking and decision-making to determine the most appropriate intervention and outcomes for all patients with pulmonary disorders. This also includes proper documentation with the use of SOAP format.

Course objective: The objective of this course is to demonstrate exercise testing and prescription methodology for patients with pulmonary disorders.

Course outcomes: The students will be able to conduct assessments for patient's referred to pulmonary rehabilitation. They will able to impart patient education and skill training along with exercise assessment and training. They will be competent in utilising disease-specific approaches in pulmonary rehabilitation program

SECTION I: THERAPEUTIC PRINCIPLES AND PRACTICE IN PULMONARY REHABILITATION (25 marks)

1. Oxygen therapy
2. Humidity and aerosol therapy including drug inhalation
3. Assessment of pulmonary function test

4. Functional performance assessment
5. Exercise testing: incremental shuttle walk test, endurance shuttle walk test, six minute walk test, Step test, treadmill tests.(i.e. Balke, Bruce, Noughton, Modified Bruce protocol), interval bike test, sub maximal GXT, symptom limited GXT, exercise testing using cycle ergometer, oxygen uptake (VO_2)
6. Scales used in pulmonary rehabilitation: Becks Depression Inventory (BDI) and Hamilton Anxiety Scale (HAS);mni- mental state examination, SGRQ,CRQ,SF-36,CAT,Activities-specific balance scale (ABC) etc.

SECTION II: PULMONARY REHABILITATION (50 marks)

1. Overview of pulmonary rehabilitation
2. Assessment of the pulmonary rehabilitation patient
3. Outcome measures in pulmonary rehabilitation
4. Patient education and skill training
5. Exercise assessment and training
6. Disease-specific approaches in pulmonary rehabilitation
7. Program management

Essential Readings:

1. Pulmonary Rehabilitation - by Casaburi.
2. Guidelines for Pulmonary Rehabilitation Programs-3rd Edition AACVPR
3. Rehabilitation Of The Patient With Respiratory Diseases - N.S. Cherniack And M. D. Altose
4. Cardiopulmonary Rehabilitation. S Irwin
5. Gloeckl, R., Marinov, B., & Pitta, F. (2013). Practical recommendations for exercise training in patients with COPD.

Suggested readings:

1. Principles and Practice Of Cardiopulmonary Physiotherapy. D Frownfelter, E Dean
2. Physiotherapy for Respiratory and Cardiac Problems. J Pryor, A Prasad
3. Exercise Prescription – Shankar

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 244	Cardiopulmonary Physiotherapy Examination and Evaluation	56	4	4	25	75	100

Course Description: The purpose of this course is to teach the student the basic elements of assessment that apply to cardiovascular and pulmonary patients with a potential need for physiotherapy services. Students will learn the basics of examination and evaluation, selection of appropriate tests and measures, use of validity, reliability, and best evidence to select tests and measures, and the use of critical thinking and decision-making to determine the most appropriate intervention and outcomes for all patients with cardiovascular & pulmonary disorders. This also includes proper documentation with the use of SOAP format.

Course objective: The objective of this course is to teach the students the basic elements of assessment that apply to all patients with a potential need for cardiopulmonary physiotherapy evaluation and treatment.

Course outcomes: Students will be able to perform examination and evaluation of the patients with cardiopulmonary disorders. They will be able to select appropriate test and measures for specific conditions. Students will be able to develop critical thinking and decision making to determine to the most appropriate intervention for the patients.

I. Assessment of pulmonary system and diseases

1. History taking
    a. General appearance of the patient
    b. Physical examination of chest
    c. Topographical and anatomical land marks
    d. Visual inspection
    e. Analysis of chest shape and dimensions
    f. Posture or preferred positioning
    g. Breathing pattern
    h. Chest mobility
    i. Tracheal deviation
2. Inspection- Chest wall deformities, respiratory pattern, cyanosis, clubbing, palpation
    a. Chest wall pain
    b. Mediastinal shift
    c. Mediated percussion
    d. Auscultation of breath sounds
    e. Cough and cough production
3. Assessment of functional status:
    a. Generic questionnaires
    b. Disease specific questionnaires
    c. Performance-based tests

II. Assessment of cardiac system and diseases

1. Determination of chief compliant
2. Review of patient history
3. Physical examination
4. Observation
5. Inspection and palpation
6. Auscultation of the heart: heart sounds, normal & abnormal
7. Assessment of Fatigability
8. Laboratory investigations
9. Physiological tests

III. Assessment of patients with cardiothoracic surgeries

1. Chief complaints
2. History taking
3. Associated co-morbidities
4. Investigation
    a. Chest x-ray
    b. ECG: Lead placement, tracing, recording, interpretation of normal & abnormal stress testing.
    c. Electrocardiography
    d. Auscultation
5. Operative procedure
    a. Incision line
    b. Type of surgery
    c. Any special event
    d. Medication

6. ADL + Functional evaluation in cardiac patients
7. Exercise testing
   a) Low level/submaximal/maximal.
   b) Procedure of testing, Contraindications &precautions in adults and Paediatrics
   c) Exercise testing and prescription, METS in stress testing.

IV. Assessment of Peripheral vascular diseases

1. Personal information from patient
2. Duration of onset of problem
3. Medical/ social history
4. Medications
5. Allergic history
6. Courseive assessment
   a) Pain assessment
   b) Wound history
7. Other objective tests
   a) Temperature
   b) Girth
   c) Volumetric
   d) Pulse
   e) Bruits
   f) Percussion test
   g) Trendelenburg test
   h) Cuff test
   i) Doppler index
   j) Ruber of dependency
   k) Venous filling time
   l) Claudication time
   m) Semmes-Weinstein monofilament testing
   n) Other findings

Essential Readings:

1. Irwin S, Techlin JS. Cardiopulmonary Physical Therapy: a guide to practice. St. Louis, Mo. : Mosby Co., 2004.
2. Hillegass E, Sadowsky HS. Essentials of Cardiopulmonary Physical Therapy. W.B. Saunders Co., 2001.
3. Hodgkin JE, Connors GL, Celli BR. Pulmonary rehabilitation : guidelines to success. Philadelphia : Lippincott Williams & Wilkins Co., 2001.
4. Watchie J. Cardiopulmonary Physical Therapy: a clinical manual. philadelphia:W.B. Saunders Co., 1995.

Suggested Readings:

1. Frownfelter D, Dean E. Principles and Practice of Cardiopulmonary Physical Therapy. St. Louis: Mosby-Year Book, Inc., 1996.
2. Pryor JA, Webber BA. Physiotherapy for Respiratory and Cardiac Problems. Adults and Paediatrics. 3rd ed. London: Churchill Livingstone, 2002.
3. Tecklin JS. Pediatric Physical Therapy. 2nd ed., 1994; pp249-282.
4. Symposium: Respiratory Care. Phys Ther 1981; 61: 1711~1781.
5. Symposium: Focus on Ventilatory Muscle Training. Phys Ther 1995;75:971-1014.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT245	Fitness Training and Health Promotion	56	4	4	25	75	100

Course description: This program is designed to provide cardiopulmonary physiotherapy students with the knowledge, skills and experience necessary to become leaders in the fitness and health promotion industry.

Course objective: Success in the Fitness and Health promotion industry is supported by a fundamental understanding of scientific and business theory, which can be translated into practical application. Student in this program are exposed to the theory that they require to excel in this field, and are given multiple opportunities to apply theory in both class room and industry settings.

Course outcome: After completion of the course students will become leaders in the fitness and health promotion industry

1. Fitness, definition, aspects and parameters for testing.
2. Scientific basis for exercise programs
3. Exercise and the Human Condition
4. Exercise Planning and Prescription
5. Fitness Business and Entrepreneurship
6. Personal Training
7. Fitness Appraisal and Testing
8. Advanced Exercise Techniques
9. Stress modifications by exercise
10. Fitness for cardiac patients normal and abnormal cardiac activity and effects on cardio vascular system
11. Fitness for pulmonary patients normal and abnormal lung function and effects on cardio respiratory system.
12. Exercise testing - principles of testing and prescription for individuals
13. Effects of various exercise regimen on body
14. Functional Anatomy and Injury Prevention
15. Advance Concepts in Nutrition

Essential Reading:

1. ACE Essential of exercise science for fitness professionals.
2. Physical Activity and Health-2nd Edition By Claude Bouchard, Steven N. Blair, William Haskell.
3. Interventions for promoting physical activity. Charles Foster, Melvyn Hillsdon, [...], and Thamindu Wedatilake. The Cochrane database of systematic reviews.

Suggested Reading:

1. ACE psychology of health and fitness

Course Code	Course	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 246P	Practical – IV Cardiopulmonary Examination Evaluation and Technique	28	2	1	10	40	50

Course description: This course involves a description of the assessment, skill development and treatment of patients with cardiopulmonary conditions.

Course objective: The students will be able to conduct a safe and effective evaluation and physiotherapy treatment of patients with cardiopulmonary conditions.

Course outcomes: By the end of this course students will be able to conduct screening of a patient with various cardiovascular and/or pulmonary conditions. They will be able to critically evaluate a chronic condition; identify the role of exercise in ameliorating the chronic condition and determine safe and effective exercise assessment(s) and exercise prescription. They will acquire proficiency in heart and lung sounds/auscultation, blood pressure measurements, arterial blood gas analysis, oxygen saturation, evaluation and interpretation of normal and abnormal ECG rhythms. Furthermore, they will be competent in spirometry readings and interpretation, heart rate recovery and heart rate variability analysis in various cardiopulmonary disorders.

Activity -1 :The students will be shown patients of relevant disease and disorders for:History taking of the cardiovascular and pulmonary conditions of patients. All the basic physiotherapeutic intervention pertaining to the Courses. Evaluation and physiotherapy treatment: its presentation and documentation of all the techniques listed in MPT 242

1. Activity-2 : Demonstration , application and interpretation of ECG lead placement, tracing, recording, interpretation of normal & abnormal ECG
2. Activity-3 : Interpretation of arterial blood gas disorders
3. Activity-4 : Demonstration , application and interpretation of pulmonary function test
4. Activity-5 : Demonstration interpretation and application of chest X-ray
5. Activity-6: Demonstration and interpretation of auscultation: breath sounds added sounds, vocal resonance, heart sounds.
6. Activity-7 : Demonstration and application of airway clearance techniques
7. Activity-8 : Demonstration and application of airway clearance devices
8. Activity-9 : Demonstration and application techniques of breathing exercises
9. Activity-10 : Demonstration and application of ventilatory facilitatory techniques
10. Activity-11 : Demonstrations and practice of various cardiopulmonary exercise testing
11. Activity-12 : Demonstration and application of mobilization and exercise
12. Activity-13 :Demonstration and application of heart rate variability
13. Activity-14 :Demonstration and application of heart rate recovery.

Course Code	Course	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 247P	Practical – V Evaluative Clinical Practice	168	12	6	50	150	200

Course description: Evaluation and physiotherapy treatment: its presentation and documentation of all the conditions. The topics and management will be as discussed in MPT 243 and clinical practice.

Course Objective: The objective of this course is to develop and refine the basic clinical skills required to provide effective and efficient treatment to the patients with pulmonary disorders.

Course outcomes: This course will develop pulmonary evaluation skills and effective pulmonary rehabilitation designing approach in the students in various pulmonary disorders. This course will further inculcate the diagnostic decision making in the

students. Students will be able to independently perform pulmonary function testing and interpretation, filed test as well as laboratory test to determine exercise capacity, oximetry testing, able to perform airway clearance techniques and apply specific airway clearance technologies according to specific conditions.

1. Activity 1. Demonstration and practice of pulmonary rehabilitation physiotherapy evaluation and documentation
2. Activity 2. Demonstration and practice of pulmonary function testing interpretation severity classification for chronic respiratory disease
3. Activity 3.Demonstration and practice of measurement of exertion dyspnoea :Baseline Dyspnoea Index/Transition Dyspnoea Index (BDI/TDI), Medical Research Council (MRC) Scale, Borg-Scale (CR-10)
4. Activity 4. Demonstration and practice of measurement of health related quality of life (QoL)St. George's Respiratory Questionnaire (SGRQ), Chronic Respiratory Disease Questionnaire (CRQ), Medical Outcomes Study Short Form-36 (SF-36)
5. Activity 5. Demonstration and practice of measurement of inspiratory muscle strength and training
6. Activity 6. Demonstration and practice of field tests to determine exercise capacity in chronic respiratory disease (6-minute walk test, shuttle walk test)
7. Activity 7. Demonstration and practice of oximetry testing to determine oxygen requirement during rest and activity
8. Activity 8. Demonstration and practice of laboratory tests to assess exercise capacity in chronic respiratory disease (bicycle ergometer, treadmill)
9. Activity 9. Demonstration and practice of assessment of activity levels in chronic respiratory disease
10. Activity 10. Demonstration and practice of aerobic exercise prescription and training to various chronic respiratory conditions
11. Activity 11. Demonstration and practice of assessment of peripheral muscle strength and exercise prescription for resistance exercise in chronic respiratory disease
12. Activity 12. Demonstration and practice of exercise prescription and training of interval endurance training in chronic respiratory disease patients
13. Activity 13. Demonstration and practice of exercise prescription and training of neuromuscular electrical stimulation chronic respiratory disease
14. Activity 14. Demonstration and practice of breathing exercise for obstructive and restrictive disease patients
15. Activity 15. Demonstration and practice of humidification and nebulisation for chronic respiratory disease
16. Activity 16. Demonstration and practice of airway clearance technique and technologies for chronic respiratory disease patients
17. Activity 17. Demonstration and practice of management of patients with acute exacerbations.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-II	Project Development	28	2	1	50	-	50

Course Description: The course covers topics related to writing and development of projects.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in writing and development of projects.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor. The student shall make af inal presentation of the topic in front of the committee.

The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor

1. Identifying the problem and statement of research question
2. Review of literature
3. Existing knowledge and gap in knowledge
4. Quality of publications
5. Type of publications
5. Data bases
6. Search strategies
7. Costing
8. Ethical concerns
9. Knowledge addition

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-III	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to neurological physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of neurological physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation submit a written

SEMESTER -III
Sports

SEMESTER – III

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 311	Sports Injury Diagnosis & Medical Management-II	56	4	4	25	75	**100**

Course Description: The course covers topics related to pathophysiology, clinical manifestation, medical and surgical management of sport related diseases and disorders in athletes.

Course Objective: The course should enable the student to develop a detailed concept about different sport related management diseases and disorders in athletes.

Course Outcome: The students should be able to demonstrate adequate knowledge about medical management of athletes with sport injuries and diseases.

I. Infections And Other Medical Conditions

1. Diagnosis and management of Hypertension, Urine abnormalities; Venereal Diseases; Anemia, Delayed onset muscle soreness (DOMS), Runner's high & exercise addiction.
2. Diagnosis and management of skin conditions of Athletes, Bacterial infections, Fungal infections, Viral infections, boils and cellulitis.
3. Common Diseases diagnosis and management:Common Cold, Diarrhea, Dysentery, Typhoid, Cholera, Amoebiasis, Food Poisoning, Tuberculosis, Malaria, Hepatitis, DVT etc
4. AIDS in athletes
5. Diagnosis and Management of cardiovascular symptoms in sportspeople during exercise.
6. Diagnosis and Management of Respiratory symptoms in sportspeople during exercise.
7. Diagnosis and Management of Gastro-intestinal symptoms in sportspeople during exercises
8. Diagnosis and Management of Renal symptoms in sportspeople during exercise.
9. Diagnosis and Management of Diabetes mellitus in sportspeople during exercise.

II. Female Athlete and their Concerns

1) Sports Amenorrhea
2) Injury to female reproductive tract
3) Menstrual Synchrony
4) Sex determination
5) Exercise and pregnancy
6) Eating disorders in athletes

III. Miscellaneous Topics

1) Medical screening of sports persons
2) Hazards of cold water
3) Time zone shift and sleep deprivation problems
4) Doping In Sports, Procedure of dope testing and Control of doping abuse

5) Banned drugs
6) Hyperthermia
7) Tired athlete

Essential reading

1) Textbook of Sports Medicine: Basic Science and Clinical Aspects of Sports ; Michael Kjaer, Michael Krogsgaard, Peter Magnusson, Lars Engebretsen, Harald Roos, Timo Takala, Savio L-Y.
2) ACSM's Sports Medicine: A Comprehensive Review; Francis G. O'Connor
3) Brukner & Khan's Clinical Sports Medicine: Injuries, Fifth Ed;Peter Brukner, Karim Khan

Suggested reading

1) The 5-Minute Sports Medicine Consult; Mark D. Bracker
2) Sports Medicine: Study Guide and Review for Boards; Jonathan T. Finnoff, ,Mark Harrast.
3) Evidence-Based Sports Medicine; Domhnall MacAuley, Thomas Best

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 312	Sports Injuries Diagnosis & PT Management-II	70	5	5	25	75	**100**

Course Description: The course covers topics related to physiotherapy assessment and techniques used in managing different disorders affecting lower quadrant neuro-musculoskeletal system in athletes.

Course Objective: The course should enable the student to acquire in-depth knowledge in different physiotherapy assessment and techniques used in management of different disorders affecting lower quadrant neuro-musculoskeletal system in athletes.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different physiotherapy assessment and techniques used in management of different disorders affecting lower quadrant neuro-musculoskeletal system in athletes.

Sports Traumatology And Physiotherapy Management (Lower Extremity, Spine, Head and Neck)

I. Hip And Thigh

1. Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
2. Fractures and dislocations: Stress fracture, traumatic avlusion, Avulsion fractures, traumatic subluxation and hip dislocation
3. Muscle Strains: Gluteus Medius, Adductor strain, hamstring strain, Quadriceps strain
4. Contusions: Hip pointer, Quadriceps contusion, Myositis ossificans, Acute compartmental syndrome
5. Snapping hip
6. Other conditions: Apophysitis, Osteitis Pubis, transient synovitis of hip
7. Nerve Compression syndrome

II. Knee Complex

1. Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
2. Review of functional anatomy and biomechanics and role of knee proprioception
3. Foundations for surgical and non surgical management of meniscal and ligamentous injuries
4. Straight plane vs. rotational knee instability
5. Knee dislocations and multiple ligament injuries at knee
6. Fractures of knee joint complex
7. Patellofemoral Pain Syndrome, patellar ruptures, articular cartilage procedure of knee, baker's cyst

III. Foot And Ankle Joint

1. Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
2. Review of functional anatomy and biomechanics
3. Ankle Sprain, chronic lateral ankle instability-Rehabilitation considerations following lateral ankle ligament reconstruction
4. Planar fasciitis- Pathomechanics, aetiology and management
5. Achilles tendon dysfunction, Posterior tibial tendon insufficiency
6. Metatarsalgia, Hallux rigidus, turf toe
7. Nerve Compression syndrome- Morton's Neuroma

IV. Spine And Pelvis

1. Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
2. Review of functional anatomy and biomechanics
3. Traumatic injuries to cervical spine
4. Injuries to thoracolumbar spine and pelvis- Injuries to sternum, rib injuries, thoracic disc lesions, Scheurmann's disease
5. Injuries to lumbar spine: Muscle Strains, ligament sprains, Spondylolysis, spondylolesthesis, lumbar disc lesions, lumbar facet injuries, spinal fracture, lateral spinal stenosis, central canal stenosis
6. Post surgical rehabilitation interventions for lumbar surgeries
7. Pelvis injuries: Sacroiliac joint sprain, pelvic stress fractures, avlusion fractures

V. Head

1. Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
2. Review of functional anatomy and biomechanics
3. Clinical Injuries: Skull fracture, epidural hematoma, subdural hematoma, subdural hematoma, cerebral contusions
4. Concussion: Classification system, post concussion syndrome and its management
5. Punch drunk syndrome
6. Post concussion syndrome

VI. Maxillofacial Region

1. Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete
2. Initial Management priorities
3. Airway Management
4. Soft tissue injuries
5. Lacerations and its types
6. Ocular and facial injuries: Lefort Classification

Essential reading

1) Physical Therapies in Sport and Exercise; Gregory Kolt, Lynn Snyder-Mackler

2) Athletic and Sport Issues in Musculoskeletal Rehabilitation; David J. Magee, James E. Zachazewski, William S. Quillen, Robert Manske
3) Sports physical therapy;Barbara Sanders
4) Brukner & Khan's Clinical Sports Medicine: Injuries, Fifth Ed; Peter Brukner, Karim Khan

Suggested reading

1) Orthopedic and Sports Physical Therapy; Terry Malone, Thomas G. McPoil, Arthur J. Nitz
2) Managing Sports Injuries : a guide for students and clinicians; Christopher M Norris
3) Evidence-Based Sports Medicine; Domhnall MacAuley, Thomas Bes

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 313	Sports Training-II	56	4	4	25	75	**100**

Course Description: The course covers topics related to scientific basis of athletic training development and implementation.

Course Objective: The course should enable the student to acquire in-depth knowledge in scientific basis of athletic training development and implementation.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in scientific basis of athletic training development and implementation.

I. Periodization

1. Planning: Principles, need and importance of planning
2. Types of plan (training conception, macro, micro, meso and training session plan)
3. Annual Training Program, phases and characteristics
4. Periodization, psychological supercompensation, Periodization of strength training, speed and endurance, Periodization for Injury Prevention and Surveillance
5. Peaking for Competitions, Factors facilitating peaking during competition
6. Technical preparation: Definition and meaning of technique, skill and style
    a. Technique training & its implication in various phases; methods employed for technique training, causes of technical fault and their correction, Definition and meaning of tactics, aim of tactics according to sport
7. Long Term Athlete Development: Stages of Athletic Development: Generalized and Specialized training, Olympic Cycle: classification of Olympic cycle plan and compiling an Olympic cycle Plan Talent Identification: Methods, Criteria, Factors and Phases of Talent Identification

II. Precision Heart Rate Training

1. Heart rate monitoring and training
2. Training in heart zones
3. Precision heart rate training for specific sports
4. Multi Activity training
5. Monitoring of training effects

III. Protective Equipments, Youth and Special Population

1. Principles of protective equipment, Protective Equipment for: Head & Face, Upper & Lower Extremity
2. Cardiac Adaptations
3. Exercise and the skeleton
4. Respiratory adaptations of athletes to exercise
5. Training induced adaptation in skeletal muscles

6. Exercises for Special Populations: Older Athletes- Special problems of older athletes
    a. Osteoarthrosis and other geriatric conditions**,** Child and adolescent athlete's problems
7. Special concerns for handicapped athletes: Wheel chair skills**,** type advantages & disadvantages,Various skills of wheel chair for effective rehabilitation.

IV. Sports Management

1. History of Sports
2. sports and Recreational Events
3. Financial and Corporate Management in Sports – clubs, events
4. Marketing and Management
5. International Relations and Business
6. Organizational Behavior and Culture
7. Sports Economics

Essential reading

1) Essentials of Strength Training and Conditioning; Thomas R. Baechle, Roger W. Earle, National Strength & Conditioning Association
2) The Complete Guide to Sports Training; John Shepherd
3) NASM's Essentials of Sports Performance Training; Micheal Clark, Scott Lucett, Donald T. Kirkendall

Suggested reading

1) Fitness and Strength Training for All Sports: Theory, Methods, Programs;Jürgen Hartmann, Harold Tünnemann

2) Successful Speed Training Methods for All Sports; Steve Silvey

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 314	Sports Psychology and Nutrition	56	4	4	25	75	**100**

Course Description: The course covers topics related to sports psychological and nutritional basis of athletic training and injury management.

Course Objective: The course should enable the student to acquire in-depth knowledge in different sports psychological and nutritional basis of athletic training and injury management.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different sport sports psychological and nutritional basis of athletic training and injury management.

Section I
(Sports Psychology)

I. Introduction To Sports Psychology

1. History, definition and scope of sports psychology
2. Methods of studying behavior
3. Personality and its relevance in sports

II. Attention Perception And Emotion In Sports

1. Precompetitive Anxiety-Sources and effects on performance
2. Aggression –Theories and handling aggression in sports
3. Emotion- an introduction, Characteristics of emotion, meaning of controlling and training of emotions and its importance
4. Contribution of sports to emotional health
5. Meaning of sentiment, its type, importance and formation.

III. Group Behaviors And Leadership

1. Nature of group behavior and group
2. Types of group
3. Educational implication of group behavior
4. Meaning of leadership, types of leadership quality of leadership, training and functioning of leadership

IV. Psychology Of Sports Injuries

1. Psychological Aspects Of Sports Injuries
2. Goal Setting- Principles and importance in sports
3. Eating disorders- Types, etiology and effects on sports performance
4. Motivation- Principles in Sports

V. Psychological Preparation Of Elite Athletes

1. Concept of psychological preparation
2. Stress, Arousal and Anxiety: effects on sports and intervention strategies
3. Concentration training
4. Biofeedback training
5. Cognitive stress and somatic stress management techniques
6. Relaxation training

Section II
(Nutrition)

I. Role Of Nutrition In Sports

1. General Considerations for the physically active individual
2. Macronutrient needs for the physically active individual
3. Exercise and food intake
4. Vitamins and exercise performance
5. Minerals and exercise performance: Mineral Loss in sweat, trace minerals and exercise

II. Special Nutritional Considerations For Heavy Training And Competition

1. Carbohydrate Requirement & Glycemic Index
2. Carbohydrate: Needs of Strength & Endurance Athletes
3. Pre & Post Exercise Carbohydrate Intake
4. Protein and fats requirement and needs of Athlete
5. Water and Electrolyte Loss and Replacement in Exercise
6. Pre competition Meal and Carbohydrate Loading

III. Measurement Of Human Energy Expenditure

1. Energy produced by the body
2. Indirect and direct calorimetry
3. Respiratory quotient for CHO, protein, lipid and mixed diet
4. Respiratory Exchange Ratio

IV. Nutrition And Performance

1. Nutritional Ergogenic Aids and Supplements

2. Sports Specific Nutrition: Sprinting, running, cycling, swimming, weight lifting, power sports and team Sports
3. Eating disorders and management : Anorexia and bulimia Nervosa, Binge eating disorder

Essential reading

1) Handbook of Sport Psychology; Gershon Tenenbaum, Robert C. Eklund
2) Applying Sport Psychology: Four Perspectives; Jim Taylor, Gregory Scott Wilson
3) Essentials of Sports Nutrition and Supplements; Jose Antonio, Douglas Kalman, Jeffrey R. Stout, Mike Greenwood, Darryn S. Willoughby, G. Gregory Haff

Suggested reading

1) Sport Psychology: The Basics; David Tod
2) Sports Psychology - A Complete Introduction; John Perry
3) Practical Sports Nutrition; Louise Burke

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 315 P	Clinical viva Sports Injury Diagnosis & Med. Management	28	2	1	10	40	**50**

Course Description: The course covers topics related to assessment, diagnosis and ,medical management of sports injuries and diseases.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in assessment, diagnosis and medical management of sports injuries and diseases.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in assessment, diagnosis and management of assessment, diagnosis and ,medical management of sports injuries and diseases.

Course No.	Title	Total Hours	Hours /week	Credits	IA Marks	SE Marks	Total Marks
MPT 316 P	Practical- VII -Evaluative Clinical Practice-III	210	15	8	50	150	200

Course Description: The course covers topics related to assessment, diagnosis and management of lower quadrant neuromusculoskeletal sports injuries and athletic training planning.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in assessment, diagnosis and management of lower quadrant neuromusculoskeletal sports injuries and athletic training planning.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in assessment, diagnosis and management of lower quadrant neuromusculoskeletal sports injuries and athletic training planning.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 317P	Technical Writing	56	4	2	10	40	50

Course Description: The course covers topics related to scientific writing.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in scientific writing.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and scientific writing. They should be able to prepare the review of literature of the dissertation work.

1. Identifying the specific headings
2. Theoretical frame work of area of study
3. Details of available information of area of study
4. Referencing styles
5. Reference managing soft wares
6. Plagiarism

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-IV	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to neurological physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of neurological physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation.

SEMESTER -III
Orthopaedics

SEMESTER - III

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 321	Orthopedic Medicine & Surgery - II	56	4	4	25	75	100

Course Description: The course covers topics related to pathophysiology, clinical manifestation, conservative and surgical management of Orthopaedic diseases & disorders.

Course Objective: The course should enable the student to develop a detailed concept about different Orthopaedic diseases & disorders and its management.

Course Outcome: The students should be able to demonstrate adequate knowledge about management of people with Orthopaedic diseases & disorders.

I. Metabolic and endocrine bone diseases
1. Osteoporosis
2. Osteopenia
3. Gout
4. Rickets & osteomalacia
5. Endocrine disorders
6. Hypo & hyperthyroidism

II. Bone & its infections
1. Osteomyelitis
2. Septic arthritis. &gonococcal arthritis
3. Congenital syphilis
4. Surgical site infection
5. AIDS
6. Tuberculosis of bone joints
7. Poliomyelitis
8. Leprosy

III. Diseases of joint
1. Tumors of bone & joint
2. Rheumatoid arthritis
3. Osteoarthritis
4. Gouty arthritis
5. Seronegativespondylo-arthropathies
6. Disorders & disease of shoulder girdle
7. Disorders & disease of elbow
8. Disorders & diseases of wrist
9. Disorders& diseases of hand
10. Disease & disorders of cervical spine
11. Disease & disorder of thoracic spine
12. Disease & disorders of lumbosacral spine
13. Disease & disorders of hip & pelvis
14. Diseases & disorders of knee
15. Disease & disorders of foot and ankle

Essential Reading

1. Apley's system of Orthopaedics and Fractures (Ninth edition) by Louis Solomon.
2. Turek's Orthopaedics (6^{th} Edition)
3. Textbook of Orthopaedics and trauma by Kulkarni
4. Campbell's Orthopaedic surgery
5. American Academy of Orthopaedic Surgeons guidelines for the treatment of osteoarthritis of the knee evidence-based guideline 2nd edition. Adopted by Board of Directors May 18, 2013

Suggested Reading

1. Musculoskeletal Trauma by Blankanbaker
2. Watson Jones fracture, joint & injuries
3. Recent advances in Orthopaedic 2 by Kulkarni

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 322	Physiotherapy in Regional Orthopedics - I	70	5	5	25	75	100

Course Description: The course covers topics in Physiotherapy assessment and management of the orthopaedic conditions affecting the spine and lower limb.

Course Objective: The course should enable the student to acquire in-depth understanding in Physiotherapy assessment and management of the orthopaedic conditions affecting the spine and lower limb.

Course Outcome: The student should be able to plan and conduct a thorough orthopaedic physiotherapy assessment and plan a comprehensive management of the following conditions but not limited to.

I. Diseases & Disorder the cervical spine
1. Clinical examination & special considerations
2. Conditions affecting the inert structure of the Cervical spine
3. Conditions affecting the contractile structure of the cervical spine

II. Diseases & Disorder affecting the thoracolumbosaral spine
1. Clinical examination & special consideration
2. Conditions affecting the inert structures of thoraco lumbosacral spine
3. Conditions affecting the contractile structures of the thoracolumbosacral spine

III. Diseases & disorders of sacroiliac joint
1. Clinical examination & special considerations
2. Conditions affecting the inert structure of the SI joint
3. Conditions affecting the contractile structures of the SI joint

IV. Diseases & disorders of the hip joint
1. Clinical examination & special considerations
2. Disease & disorder affecting the inert structures of hip
3. Disease & disorder affecting the contractile structure hip

V. Diseases & disorders of the knee joint
1. Clinical examination & special consideration
2. Disease & disorder affecting the inert structures of knee.

3. Disease & Disorder affecting the contractile Structure of the knee

VI. Disease & Disorder of the foot ankle

1. Clinical examination & special consideration
2. Disease & Disorder affecting the inert structure of the foot and ankle
3. Disease & Disorder affecting the contractile structures of the foot and ankle.

Essential Readings

1. Low back disorders (2nd edition) by Stuart Mc Gill.
2. Management of common musculoskeletal disorders by Randolph M Kessler.
3. Calliet series for orthopaedic conditions
4. Essential of Orthopaedic for Physiotherapist by Ebnezar
5. Orthopaedic Physical therapy by Donatteli, London Churchill Livingstone
6. Kreiner D S et al. North American Spine Society (NASS) Guidelines for Multidisciplinary Spine Care. Diagnosis and Treatment of Degenerative Lumbar Spinal Stenosis (update) SpineJ.2013 Jul;13(7):734-43. doi: 10.1016/j.spinee.2012.11.059.
7. NASS Clinical Guidelines – Diagnosis and Treatment of Cervical Radiculopathy from Degenerative Disorders . The Spine Journal Volume 11, Issue 1, January 2011, Pages 64-72. https://doi.org/10.1016/j.spinee.2010.10.023
8. Huxel Bliven, K. C., & Anderson, B. E. (2013). Core Stability Training for Injury Prevention. Sports Health, 5(6), 514–522. https://doi.org/10.1177/1941738113481200

Suggested Readings

1. Clinical Biomechanics of spine (2nd Edition) by Punjabi and White.
2. Clinical orthopaedic Physical therapy by Richardson
3. Rehabilitation of spine by Craig Leibenson

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 323	Physiotherapy in Regional Orthopaedic-II	56	4	4	25	75	100

Course Description: The course covers topics in Physiotherapy assessment and management of general orthopaedic and orthopaedic conditions affecting the upper limb.

Course Objective: The course should enable the student to acquire in-depth understanding in Physiotherapy assessment and management of general orthopaedic and orthopaedic conditions affecting the upper limb.

Course Outcome: The student should be able to plan and conduct a thorough orthopaedic physiotherapy assessment and plan a comprehensive management of the following conditions but not limited to.

I. General orthopedics

1. Metabolic diseases and conditions

a) Osteomyelitis
b) Gout
c) Rickets &Osteomalacia
d) Endocrinal disorders

2. Tuberculosis of bone & joint

a) Upper limb
b) Lower limb
c) Spine

3. Post polio residual paralysis (PPRP)
a) Upperlimb
b) Lowerlimb
c) Spine

II. Diseases & Disorders of the shoulder
1.Clinical examination & special considerations
2. Shoulder instability
3. Rotator cuff lesion and impingement
4. Biceps lesion & rupture
5. Scapular dyskinesis
6. Adhesive capsulitis
7. Thoracic inlet syndrome
8. AC joint dysfunctions

III. Diseases & Disorders of elbow
1.Clinical examination & special consideration
2.Condition affecting the inert structures of elbow
3.Conditions affecting the contractile structures

IV. Diseases & Disorder of wrist & hand
1.Clinical examination & special consideration
2.Condition affecting the inert structures of elbow
3.Conditions affecting the contractile structures

Essential Readings

1. Physical Therapy of the Shoulder (4th edition) by Robert A Donatelli.
2. Brotzman's Clinical Orthopaedic Rehabilitation (2nd Edition)
3. Management of common musculoskeletal disorders by Kessler
4. Philip W McClure (2004).Shoulder function and 3-dimensional kinematics in people with shoulder impingement syndrome before and after a 6-week exercise program. Physical Therapy. Volume 84. Number 9. PMID:15330696
5. Cools AMJ, Struyf F, De Mey K, et al (2014).Rehabilitation of scapular dyskinesis: from the office worker to the elite overhead athlete. British Journal of Sports Medicine;48:692-697. http://dx.doi.org/10.1136/bjsports-2013-092148
6. Vo A, Zhou H, Dumont G, Fogerty S, Rosso C, et al. (2013) Physical Therapy and Rehabilitation after Rotator Cuff Repai: A Review of Current Concepts. Int J Phys Med Rehabil 1:142. doi: 10.4172/2329-9096.1000142

Suggested Readings

1. Orthopaedic rehabilitation by Brokmen
2. Recent advances in Orthopaedic 2 by Kulkarni
3. Wilk, K. E., Macrina, L. C., & Reinold, M. M. (2006). Non-operative rehabilitation for traumatic and atraumatic glenohumeral instability. North American journal of sports physical therapy : NAJSPT, 1(1), 16–31. PMC2953282
4. Perez, R. S., Zollinger, P. E., Dijkstra, P. U., Thomassen-Hilgersom, I. L., Zuurmond, W. W., Rosenbrand, K. C. (2010). CRPS I task force. Evidence based guidelines for complex regional pain syndrome type 1. BMC neurology, 10, 20. doi:10.1186/1471-2377-10-20

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 324	Geriatric, Palliative and Rheumatological physiotherapy	56	4	4	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and management of strategies in rheumatological, geriatric and palliative care.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in assessment and physiotherapy management in rheumatological, geriatric and palliative care

Course Outcome: The student should be able to understand and identify the special health needs and treatment strategies related to assessment and management of the various problems associated with the older adult. They should be able to plan and conduct a thorough orthopaedic of geriatric population physiotherapy assessment of the various rheumatological conditions encountered in physiotherapy practise. Student should be able to understand the basic principles of palliative care and apply them to commonly seen palliative care conditions.

Section I

I. Geriatric care

1. Theories of ageing
2. Physiological and anatomical changes associated with ageing
3. Functional assessment of elderly
4. Muscle fatigue and impaired muscle endurance in elderly
5. Postural impairment and its management
6. Exercise consideration for elderly
7. Management of pain in elderly
8. Arthritis
9. Fall & its prevention
10. Perspectives on ageing and disability
11. Management of frail and institutional elderly
12. Health Promotion and Disease Prevention for the gerontological Population

II. Degenerative joint disease

1. Osteoarthritis
2. Degenerative joint diseases of cervical spine
3. Degenerative diseases of thoracic and lumbar spine
4. Neuropathic joint disease (Charcot's disease)

III. Non-articular rheumatism

1. Fibromyalgia
2. Myofascial pain syndrome

3. Rheumatoid arthritis

a. Juvenile rheumatoid arthritis
b. Rheumatoid arthritis in extremities
c. Rheumatoid arthritis of the spine

d. Seronegative spondylo-arthropathies

IV. Sleep Medicine

1. Acquaintance with basic concepts in sleep medicine, the structure and physiology of sleep
2. Understanding the clinical implications of sleep disturbance in musculoskeletal conditions
3. Physiotherapeutic interventions for improving sleep

Section II

I. Introduction to palliative care

1. Concepts of hospice care, terminal illness/care, end of life care, palliative care
2. The concept of dying with dignity
3. Understanding that goals of treatment will be different
4. Ethics in palliative care
5. Euthanasia and other such issues of terminal illness
6. Bereavement/ Grief and its management
7. Importance of support systems in managing terminal illness
8. Identifying common needs and preferences of patients with terminal illness
9. Communication Skills and their importance in physiotherapy management
10. Role and members of the multidisciplinary team
11. Alternative treatments

II. Pain and Physical symptoms management in palliative care

1. General principles of pain management
2. Various physiotherapeutic methods of pain management
3. Role of opioid , non -opioid and NSAID's
4. Treating co morbidities
5. Respiratory physiotherapy
6. Exercise principles in P. C

III. Physiotherapy in palliative care

1. Introduction to tumors- types, pathology, staging, conservative and surgical management.
2. Conservative, Pre and postoperative assessment and management of common tumors
3. Palliative care in other conditions like AIDS and HIV Positive patients etc

Essential Readings

1. Geriatric Physical therapy by Andrew A. Guccione
2. Geriatric physical Rehabilitation by Koffmann Moron
3. Rheumatology by Hammond
4. European League against Rheumatism EULAR recommendations for physical activity in people with inflammatory arthritis and osteoarthritis, http://dx.doi.org/10.1136/annrheumdis-2018-213585.
5. Linda Fernandes, EULAR recommendations for the non-pharmacological core management of hip and knee osteoarthritis. Ann Rheum Dis 2013;72:1125–1135. doi:10.1136/annrheumdis-2012-202745
6. Micheal Bancroft et al. (2003).Physiotherapy in Cancer Rehabilitation: A theoretical approach Physiotherapy Volume 89, Issue 12, Pages 729-733 https://doi.org/10.1016/S0031-9406(05)60498-1

Suggested Readings

1. Pathy's Principles and practice of Geriatric medicine (5^{th} edition)
2. Textbook of Palliative care by Rodrick Duncan

3. Oxford handbook of Palliative care by Max Watson
4. Textbook of palliative medicine and supportive care by Irene Higginson

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 325P	Clinical Viva–:Orthopaedic Medicine and Surgery	28	2	1	10	40	50

Course Description: The course covers topics related to training on management of people with orthopaedic conditions. The topics is listed in MPT 221 and MPT 321.

Course Objective: The course should enable the student to acquire in-depth knowledge about management of people with diseases and disorders of orthopaedics in clinical setting.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in on management of people with musculoskeletal system disorders in clinical setting.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 326P	Practical – VII Evaluative Clinical Practice – III	210	15	8	50	150	200

Course Description: The course covers topics related to hands on training in physiotherapy assessment and management of different disease and disorders of musculoskeletal system . The topics of course is listed in Course code MPT 332 , MPT 333 and MPT 334.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in physiotherapy assessment and management of disease and disorders of musculoskeletal system.

Course Outcome: The student should be able to interpret and differentiate between various diagnostic tools used for therapeutic plan, take history of the conditions of patients. They should have knowledge of all the physiotherapeutic intervention pertaining to the patient. They should be able to evaluate and plan physiotherapy treatment: its presentation and documentation of all the conditions. The topics and management as discussed in MPT 332, MPT 333, MPT 334

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 327P	Technical Writing	56	4	2	10	40	50

Course Description: The course covers topics related to scientific writing.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in scientific writing.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and scientific writing. They should be able to prepare the review of literature of the dissertation work.

1. Identifying the specific headings
2. Theoretical frame work of area of study
3. Details of available information of area of study
4. Referencing styles
5. Reference managing soft wares
6. Plagiarism

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-IV	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to orthopaedic physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of orthopaedic physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation.

SEMESTER-III
Neurology

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 331	Pediatric Neurology and Neurosurgery	56	4	4	25	75	100

Course Description: The course covers topics in medical and surgical management of nervous system in children.

Course Objective: The course should enable the student to acquire in-depth understanding in medical and surgical management of nervous system in children.

Course Outcome: The student should be able to demonstrate adequate knowledge in medical and surgical management of nervous system in children

I. Introduction to:

1. Neonatal care; risk babies and management
2. Genetic basis of pediatric disorders
3. Embryology & genetic counseling

II. Clinical presentation, management & complications of the following clinical conditions

1. Central nervous system malformations
2. Traumatic brain injury
3. Cerebral Palsy
4. Anterior Poliomyelitis & post Polio syndrome
5. Muscular Dystrophy
6. Infections of CNS – Bacterial & Viral infections
7. Infantile Hemiplegia
8. Peripheral nerve injuries - Brachial Plexus Injuries,etc
9. Malformations of the spine and spinal cord
10. General Principles of neurosurgery in children
11. Disorders of CSF Fluid & circulation
12. Spasticity management
13. Neoplasm

Essential Reading

1. Neurology and Neurosurgery Illustrated by Lindsay
2. Brain's Diseases of the Nervous System by Michael Donaghy

Suggested Reading

2. Adams and Victor's Principles of Neurology by Allan Ropper and Robert H Brown

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 332	Pediatric Neurological Physiotherapy	70	4	5	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and management of different disorders affecting nervous system in children.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in assessment and physiotherapy management of different disorders affecting nervous system in children.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy assessment and management of different disorders affecting nervous system in children.

I. Normal human development

1. Growth and development during prenatal, infancy, and child hood including deviations from normal
2. Nervous system and musculoskeletal development.
3. Components of a newborn examination.
4. Developmental reflexes
5. Fine motor, vision and perception development

II. Atypical Development

1. Identify potential problem signs, soft signs, or "red flags" of abnormal development.
2. Sequence of atypical motor development including missing components, compensations, possible contractures and deformities.
3. Atypical motor development leading to problem areas.

III. Pediatric neurologic assessment and management

1. Early intervention- high risk babies, neonatal care and management.
2. Central nervous system malformations
3. Traumatic brain injury
4. Cerebral Palsy
5. Anterior Poliomyelitis & post Polio syndrome
6. Muscular Dystrophy
7. Infections of CNS – Bacterial & Viral infections
8. Infantile Hemiplegia
9. Peripheral nerve injuries - Brachial Plexus Injuries,etc
10. Malformations of the spine and spinal cord
11. Neoplasm
12. post-operative management
13. Analysis of exercise testing and prescription in pediatric neurological disorders

14. CBR in pediatric conditions.

Essential Reading

1. Pediatric Physical Therapy by J S Tecklin
2. Physical Therapy for Children by SK Campbell, R. J. Pilasano, MN Orlin
3. Physiotherapy for Children Teresa Pountney

Suggested Reading

1. Treatment of Cerebral Palsy and Motor Delay Sophie Levitt

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 333	Geriatric and Palliative Care	56	4	4	25	75	100

Course Description: The course covers topics related to physiotherapy assessment and management of strategies in geriatric and palliative care.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in assessment and physiotherapy management in geriatric and palliative care

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy assessment and management in geriatric and palliative care.

Section I

I. Basic of Geriatrics

1. Biology of aging, Genetic theories of aging, Physiology of aging Microscopic Theories, Changes in Ageing scenario, interactions between Biological, psychological, physiological and social processes in ageing
2. Describe philosophy, development & scope of geriatric rehabilitation in India

II. Principles of Geriatric Rehabilitation

1. Principles of rehabilitation in older people and importance of comprehensive geriatric assessment (CGA)
2. Different measures (assessment scales) used to assess functional status and outcome of rehabilitation and their limitations: to include objective evaluation of ADL ability and level of activity limitation and participation restriction, cognitive status, and mood
3. Quantity and Quality of Life - Individual Differences
4. Physical Development and Decline

III. Assessment and management in geriatric care

1. Physical Function of Older Adults
2. Assessment of cardiopulmonary Function, Muscle Strength, fatigue and power in the elderly
3. Balance evaluation/fall risk assessment
4. General approaches to strengthening and reconditioning the elderly – PT, group exercises in the elderly
5. Cognitive Function

6. Perception and cognitive impairments in the elderly
7. Evaluation and management of acute and chronic pain in the elderly
8. Non-operative management of degenerative and other arthritides

Section II

I. Introduction to palliative care
1. Concepts of hospice care, terminal illness/care, end of life care, palliative care
2. The concept of dying with dignity
3. Understanding that goals of treatment will be different
4. Ethics in palliative care
5. Euthanasia and other such issues of terminal illness
6. Bereavement/ Grief and its management
7. Importance of support systems in managing terminal illness
8. Identifying common needs and preferences of patients with terminal illness
9. Communication Skills and their importance in physiotherapy management
10. Role and members of the multidisciplinary team

II. Pain and Physical symptoms management
1. Physiology and anatomy of pain
2. Types and mechanism of pain
3. Assessment of pain and its various tools
4. General principles of pain management
5. Various physiotherapeutic methods of pain management
6. Role of Opoid , non Opoid and NSAID's
7. Treating co morbidities
8. Respiratory physiotherapy
9. Exercise principles in P. C

III. Physiotherapy in palliative care
1. Introduction to tumors- types, pathology, staging, conservative and surgical management.
2. Management of cancer pain
3. Conservative, Pre and post operative assessment and management of common tumors
4. Palliative management in other conditions like neurodegenerative disorders, spinal cord and brain injuries etc
5. AIDS and HIV Positive patients

Essential Readings

1. Geriatric Physical therapy by Andrew A. Guccione
2. Geriatric physical Rehabilitation by Koffmann Moron
3. Rheumatology by Hammond
4. European League against Rheumatism EULAR recommendations for physical activity in people with inflammatory arthritis and osteoarthritis, http://dx.doi.org/10.1136/annrheumdis-2018-213585.
5. Linda Fernandes, EULAR recommendations for the non-pharmacological core management of hip and knee osteoarthritis. Ann Rheum Dis 2013;72:1125–1135. doi:10.1136/annrheumdis-2012-202745
6. Micheal Bancroft et al. (2003).Physiotherapy in Cancer Rehabilitation: A theoretical approach Physiotherapy Volume 89, Issue 12, Pages 729-733 https://doi.org/10.1016/S0031-9406(05)60498-1

Suggested Readings

1. Pathy's Principles and practice of Geriatric medicine (5th edition)
2. Textbook of Palliative care by Rodrick Duncan
3. Oxford handbook of Palliative care by Max Watson
4. Textbook of palliative medicine and supportive care by Irene Higginson

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 334	Assistive Technology	56	4	4	25	75	100

Course Description: The course covers topics related to application of assisted technology in management of people with neurological disorders.

Course Objective: The course should enable the student to acquire in-depth knowledge about various assistive technology

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy assessment and management in geriatric and palliative care.

I. Orthotics
   1. Biomechanical principles
   2. Material & its properties
   3. Assessment
   4. Ideal orthotics/splints & its properties

II. Orthotics in neurological rehabilitation
   1. Regional orthotics
   2. Upper limb
   3. Lower limb
   4. Neck and spine
   5. Gadgets in various neurological disorders

III. Mobility Aids
   1. Canes, Crutches, Walkers, Wheelchairs
   2. Principles of prescription

IV. Environmental barriers
   1. Universal accessibility
   2. Methods of evaluation
   3. Modification of Environment

Essential reading

1.AAOS Atlas of Orthoses and Assitive devices by J D HU, J W Michael, JR Fisk

2. Prosthetics and orthotics of lower limn and spinal by Ron Seymour

Suggested

1. Physical Rehabilitation by O'Sullivan

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 335 P	Clinical Viva :Neurological Disorders	28	2	1	10	40	50

Course Description: The course covers topics related to training on management of people with nervous system disorders. The topics is listed in MPT 231 and MPT 331.

Course Objective: The course should enable the student to acquire in-depth knowledge about on management of people with nervous system disorders in clinical setting.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in on management of people with nervous system disorders in clinical setting.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 336 P	Practical VI :Evaluative Clinical Practice -III	210	15	8	50	150	200

Course Description: The course covers topics related to hands on training in physiotherapy assessment and techniques used in managing different disorders of nervous system in children. The topics of course is listed in Course code MPT 332. 333,334.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in various assessment and techniques used in managing different disorders of nervous system in children.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in various assessment and techniques used in managing different disorders of nervous system in children.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 337 P	Technical Writing	56	4	2	10	40	50

Course Description: The course covers topics related to scientific writing.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in scientific writing.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and scientific writing. They should be able to prepare the review of literature of the dissertation work.

1. Identifying the specific headings
2. Theoretical frame work of area of study
3. Details of available information of area of study
4. Referencing styles
5. Reference managing soft wares
6. Plagiarism

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-IV	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to neurological physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of neurological physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

1. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.
2. At the end of the semester they have to make a well researched presentation submit a written

SEMESTER-III
Cardiopulmonary

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 341	Cardiovascular Medicine & Surgery	56	4	4	25	75	100

Course description: Knowledge of the pathophysiology of primary and secondary cardiovascular disease and dysfunction is essential requirement of this course.

Course Objective: The objective of this course is to understand clinical presentation, pathophysiology, relevant screening and/or diagnostic tests appropriate for cardiovascular risk stratification.

Course outcomes: Students will be able to educate and counsel patients on risk factor modification to reduce the risk of cardiovascular disease. They will be able to address, and treat cardiovascular risk factors according to evidence-based guidelines. They will develop ability to counsel patients regarding therapeutic lifestyle changes (exercise, heart-healthy dietary habits, weight management, tobacco cessation, stress management, and behaviour modification) according to AHA guidelines, where appropriate.

SECTION I CARDIOVASCULAR MEDICINE

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 Heart Valves
9. Infective Endocarditis
10. Ischemic Heart Disease
11. Hypertension
12. Orthostatic Hypotension
13. Cardiac arrest and resuscitation
14. Pericarditis
15. Heart Disease in Pregnancy
16. Degenerative Arterial Disease
17. Inflammatory Arterial Disease
18. Raynaud's Disease
19. Venous Thrombosis
20. Peripheral Vascular Disease
21. Cardiomyopathy
22. Diseases ofPericardium

23. ECG interpretation.

SECTION II CARDIOVASCULAR SURGERIES

Surgical management oftheabove conditions, indications, contraindications for surgery, precautions after surgery. Also Included:

1. Haemodynamic Performance Of CTVS Patients
2. A-V Shunt
3. Procedures on Sternum, Chest Wall, Diaphragm, Mediastinum,Oesophagus.
4. Cardiopulmonary Bypass
5. CTVS Procedures: outline and definition of procedures,
6. Differences inopen andclosed heart surgery, recent advances LikeMIDCAB, OPCAB, Heart-Port, etc.
7. Incisions for procedures in cardio-thoracic and vascularsurgery (Incisions On Sternum, Anterior And Lateral Chest Wall, abdominal 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 ofcardiac 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 ofshunt and dead space and exchange of gases.
17. Interpretation of arterial blood gases
18. Peripheral vascular disease
19. Oncology – Cardiovascular and respiratory system conditions.

Essential Readings:

1. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine, Single Volume, 18TH September, 2014 10th Edition
2. Schwartz's Principles of Surgery, 11th edition, 2019

Suggested Readings:

1. The ESC Textbook of Cardiovascular Medicine (2 ed.) Edited by A. John Camm, Thomas F. Lüscher, and Patrick W. Serruys

Course Code	Course	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 342	Cardiovascular Physiotherapy and Rehabilitation	70	5	5	25	75	100

Course description: This course involves description of the manifestations, diagnosis, and assessment of the patients with cardiovascular disease. This program further includes the knowledge of designing appropriate exercise prescriptions for patients involved in cardiovascular rehabilitation program.

Course objective: The objective of this course is to introduce the students to cardiovascular physiotherapy rehabilitation**.** Students will be able to understand the rationale for the development of exercise program in the management of cardiovascular conditions. These topics will be discussed in conjunction with case studies, problem solving approaches, and current research.

Course Outcomes: This course will make the students independent to design safe and effective cardiovascular rehabilitation program. This is essential in building professional competence within the preventive, rehabilitative, and clinical outcomes of physical therapy settings.

I. Overview: major manifestations of heart disease & cardiac rehabilitation

1. Coronary heart disease
2. Valvular heart disease
3. Peripheral vascular disease
4. Definition of cardiacrehabilitation
5. Phases of cardiacrehabilitation
6. Outcome measures in cardiacrehabilitation

II. Development, intervention, and prevention of coronary artery disease.

1. Efficacy of Secondary Prevention and Risk FactorReduction
2. Psychosocial Issues and Strategies
3. Role of Exercise in heart disease

III. Exercise and the coronary heart disease connection

1. Cardio-respiratory fitness and coronary death
2. Exercise training in established coronary disease
3. Risks of acute exercise
4. Potential mechanisms of exercise benefit

IV. Exercise prescription for cardiac rehabilitation

1. General guidelines and preliminary Considerations
2. Phase I: Inpatient cardiac rehabilitation
3. Phase II: Outpatient cardiac rehabilitation
4. Phase III and IV: community-based cardiac rehabilitation program
5. Considerations for special populations

V. Patient education: guidelines in cardiac rehabilitation

VI. Outcome measures in cardiac rehabilitation

VII. Special Considerations

1. Older patients
2. Hypertension
3. Diabetes Mellitus
4. Chronic Heart Failure
5. Heart Transplantation
6. Patient Compliance
7. Drug Effects
8. Women
9. Young Adults

a. Revascularization and valve surgery
b. Ventricular arrhythmias, pacemakers and ICDs
c. Patients with Left Ventricular Assist devices
d. Pulmonary disease
e. Peripheral arterial disease.

Essential Readings:

1. Guidelines for Cardiovascular Rehabilitation Programs-3rd Edition AACVPR
2. Cardiopulmonary Rehabilitation. S Irwin

Suggested readings:

1. Physiotherapy for Respiratory and Cardiac Problems. J Pryor, A Prasad
2. Exercise Prescription – Shankar

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 343	Intensive care Management	56	4	4	25	75	100

Course description: This Course is designed to build on existing theoretical knowledge in the areas of acute cardiopulmonary pathophysiology, diagnostic and investigative procedures and physiotherapy techniques used in the management of acute complex patients. Current management issues in the areas of adult, paediatric and neonatal critical care, major surgery and complex medical patients will be covered. Evaluation of current clinical practice and the reliability and validity of cardiopulmonary outcome measures used in the acute care area will be explored.

Course Objective: The main objective of this course is to extend the theoretical, practical and equipment based skills used in Intensive care management of acute complex patients. Students will have the opportunity to practice these both at the centre and in the clinical setting.

Course outcomes: By the end of this course students will be able to independently perform assessment of the critically ill patients. They will be skilled in utilising appropriate techniques and approaches in the intensive care management.

Section I: Physiotherapeutic principle and techniques in intensive care (25 marks)

1. Extracorporeal membrane oxygenation (ECMO)
2. Mobilization of critically ill patients
3. Intensive care unit-acquired weakness (ICUAW)
4. Continuous rotational therapy
5. Management of Airway Secretions Mechanically ventilated patients in the ICU
6. Intrapulmonary percussive ventilation (IPV)
7. Positive expiratory pressure (PEP)
8. Manual hyperinflation (MHI)
9. Ventilator hyperinflation(VHI)
10. Insufflation-exsufflation

Section II: Intensive care for critically ill patients (50 marks)

1. Assessment of critically ill patient :introduction, medical and chart interview with patients and family, physical examination, neurological system;cardiovascular system; respiratory system; renal system; haematological/ immunological system; gastrointestinal system; musculoskeletal system
2. Treatment of acute respiratory conditions: airway clearance techniques; weaning from mechanical ventilation; positioning; breathing exercises; patient education; paediatric consideration

3. Non-invasive ventilation: berating sleep and respiratory failure;indication for non invasive ventilation;practical issues in the application of non invasive ventilation; non-invasive ventilation in children
4. Physiotherapy intervention during non-invasive ventilation
5. Implication for physiotherapy in mechanically ventilated patients: intubation weaning
6. Musculoskeletal problems
7. Patient groups with specific needs: e.g.systemic inflammatory syndrome,sepsis,ARDS,inhalation burn, trauma, neurological conditionsrequiring intensive care
8. Physiotherapy techniques used in intensive care: gravity assisted, manual or mechanical hyperinflation, suctioning of intubated patients, manual techniques, intermittent positive pressure berating, periodic continuous positive pressure ventilation
9. Defibrillators & Cardiopulmonary resuscitations

Essential Readings:

1. Clinical Application of Mechanical Ventilation Paperback – 25 Jan 2013 by David Chang (Author)
2. Critical Care Medicine: Principles of Diagnosis and Management in the Adult Hardcover – 10 Dec, 2013

Suggested Readings:

1. Handbook of Intensive Care Organization and Management, September 2016 Pages: 424, Edited By: Andrew Webb (*UBC*)
2. The flying publisher guide to Critical Care in Neurology, Kitchener, Hashem, Wahba, Khalaf, Zarif, Mansoor , 2012

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 344	Geriatric and Palliative Care	56	4	4	25	75	100

Course description: Palliative and geriatric care program is designed to achieve the best possible quality of life for patients and their families facing a life-threatening or terminal illness, through relief of symptoms and aggressive management of other sources of suffering. The interdisciplinary care addresses physical, psychological, social and spiritual needs.

Course objective: To improve student's knowledge of geriatric and palliative care and symptom management. Improve their knowledge and appreciation for the spiritual needs of patients with terminal cardiopulmonary disease and cancer.

Course outcomes: After completion of the course students should be able to improve their cultural sensitivity and appreciate the role of culture in geriatric population. Students will be able to have a positive impact on the life of patients suffering from terminal illness.

I.Geriatric Care

1. Describe and discuss changes that occur in the physiological systems of aging adults.
2. Describe and discuss basic cardiopulmonary changes that occur in aging adults.
3. Explain the effects of exercise and activity on physiological cardiopulmonary systems of aging adults.

4. Interpret basic clinical evaluation data and develop effective treatment programs for elders
5. Health promotion and body maintenance in elderly

II.Palliative Care

1. Context and principle of palliative care
2. Palliative care in the community
3. Public and patient involvement in palliative care
4. Palliative care: choice equity and diversity
5. Ethical issues in palliative care
6. Communication skill in palliative care
7. Adapting to death, dying and bereavement
8. Pain and its management
9. Management of respiratory symptom in advance heart disease
10. Management of complications of cancer
11. Management of complications of renal failure
12. Management of respiratory symptoms and advance respiratory conditions
13. Terminal case and dying

Essential Readings:

1. Andrew Guccione Rita Wong Dale Avers Geriatric Physical Therapy 3rd Edition Mosby. 2011
2. MacLeod, Roderick Duncan, Van den Block, Lieve (Eds.) Textbook of Palliative Care, springer, 2019
3. Nathan Cherny (Editor), Marie Fallon (Editor), Stein Kaasa (Editor), Russell K. Portenoy (Editor),Oxford Textbook of Palliative Medicine 199

Suggested Reading:

1. Spirduso, WW. Physical Dimensions of Aging (Second Edition). Human Kinetics. 2005

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 345P	Clinical viva Cardiopulmonary medicine and surgery	56	4	4	25	75	100

Course description: This course will include viva-voce for the theoretical syllabus of cardiopulmonary medicine and surgery

Course objective The objective of this course is to assess the knowledge of cardiopulmonary disorders which include clinical manifestations, pathophysiology, various diagnostic tools and procedures utilized in cardiovascular medicine and surgery.

Course outcomes: Students will be refined in knowledge of cardiopulmonary medicine and surgery.

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 346P	Practical – VI Evaluative Clinical Practice -III	210	15	8	50	150	200

Course description: The students will be allocated patients of relevant diseases and disorders for:

1. History taking of the conditions of patients.
2. All the physiotherapeutic intervention pertaining to the Course
3. Evaluation and physiotherapy treatment: its presentation and documentation of all the conditions as discussed in MPT 343, MPT 344

Course objective: The objective of this course is to develop and refine the basic clinical skills required to provide effective and efficient treatment to the patients with cardiovascular disorders. This course will develop cardiovascular evaluation skills in the students in various cardiovascular disorders. This course will further inculcate the diagnostic decision making in the students. These topics will be discussed in conjunction with case studies, problem solving approaches, and current research. Students will be able to understand the rationale for the development of exercise program in the management of cardiovascular conditions.

Course Outcomes: They will be competent in performing various clinical tests including ECG, functional evaluation, heart rate recovery and heart rate variability in cardiovascular conditions. They will be able to design individualized exercise prescription based on patient's conditions and requirements. This is essential in building professional competence within the preventive, rehabilitative, and clinical outcomes of physical therapy settings. Students will be able to independently perform physiotherapy evaluation in cardiac surgeries- Pre operative &Post operative, haemodynamic monitoring of the critically ill patients. They will be able to prescribe appropriate body positioning and mobilisation testing and prescription for patient requiring intensive care management. They will be independent in demonstrating and practicising breathing exercises, various airway clearance techniques and technologies in ICU patients.

On completion of the study of this Course the student should be able to understand and apply principles of topics covered in MPT 342

1. Activity 1: Demonstration and practice of physiotherapy evaluation for patient with cardiac rehabilitation
2. Activity 2: Demonstration and practice of evaluation of Peripheral vascular diseases Artery/Vein/Lymphatic
3. Activity 3:Demonstration and practice of interpretation and practice of electrocardiography in heart disease
4. Activity 4:Demonstration and practice of secondary prevention and risk factor identification and reduction
5. Activity 5: Demonstration and practice of ADL and Functional evaluation in cardiac patients.
6. Activity 6:Demonstration and practice of response of exercise to Hemodynamics
7. Activity 7:Evaluation of fatigability in cardiovascular disease
8. Activity 8:Demonstration and practice of auscultation of Heart sounds
9. Activity9: Demonstration and practice of interpretation of Radiological Investigations (CT, MRI, Echo, Doppler, Angiography)
10. Activity 10:Demonstration and practice of methods of calculating training heart rate.
11. Activity 10:Demonstration and practice of exercise testing and interpretation for cardiovascular disease
12. Demonstration and practice of heart rate variability in cardiovascular conditions
13. Demonstration and practice of phase I (inpatient) cardiac rehabilitation programme for MI, PTCA, CABG, valvular heart disease, heart failure etc.
14. Demonstration and practice of phase II (outpatient) cardiac rehabilitation programme for MI,PTCA, CABG, valvular heart disease, heart failure etc.
15. Demonstration and practice of phase III (community or home based) cardiac rehabilitation programme for MI, PTCA, CABG, valvular heart disease, heart failure etc.
16. Activity 1: Demonstration and practice of Physiotherapy evaluation in cardiac surgeries- Pre operative &Post operative.
17. Activity 2:Demonstration and practice of Coma patient evaluation & management in ICCU

18. Activity 3:Demonstration and practice of evaluation of ventilator dependent patients
19. Activity 4:Activity 10:Demonstration and practice of suctioning in intubated patient
20. Activity 5:Demonstration and practice of cough assist machine
21. Activity 6:Demonstration and practice of mechanical and ventilator hyperinflation
22. Activity 7:Demonstration and practice of mobilization exercise for ICU patients
23. Activity 8:Demonstration and practice of humidification and nebulisation for ICU patients
24. Activity 9:Demonstration and practice of hemodynamic monitoring in ICU
25. Activity 10:Demonstration and practice various airway clearance techniques and technologies in ICU patients
26. Activity 11:Demonstration and practice various breathing exercise techniques in ICU patients
27. Activity 12: Demonstration and practice of Defibrillators. & Cardiopulmonary resuscitations

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT 337 P	Technical Writing	56	4	2	10	40	50

Course Description: The course covers topics related to scientific writing.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in scientific writing.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and scientific writing. They should be able to prepare the review of literature of the dissertation work.

1. Identifying the specific headings
2. Theoretical frame work of area of study
3. Details of available information of area of study
4. Referencing styles
5. Reference managing soft wares
6. Plagiarism

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
UCC-IV	Seminar Presentation	28	2	1	50	-	50

Course Description: The course covers development and presentation of seminars on various topics related to neurological physiotherapy.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in seminar presentation in topics of neurological physiotherapy.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in seminar presentation.

3. The student shall be allocated a topic in the beginning of the semester by the concerned teacher.

At the end of the semester they have to make a well researched presentation submit a written

SEMESTER IV
Sports

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics and clinic management	56	4	4	25	75	100

Course Description: The course covers topics related to physiotherapy ethics, clinic management and theory of teaching.

Course Objective: On completion of the course the student should be able to understand the dynamics of teaching & learning, plan effective teaching sessions in physiotherapy, the basic issues of physiotherapy management & administration and practice as an informed professional on Legal & ethical issues.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy Ethics, clinic management and learn ways to effectively teaching.
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SECTION - A

I. Administration

1. Functions of management
2. Fundamentals of hospital administration
3. Management Process – Planning, Organization, Direction, Controlling, Decision making
4. Personnel Management – Staffing, Recruitment Selection, Performance appraisal, Collective bargaining, Job Satisfaction.
5. Total Quality management – basics, quality control, quality assurance programme in hospitals and medical audit, International Quality System, Six Sigma approach, Just in Time approach

SECTION - B

I. Ethics & legal issues

1. Rules of Professional conduct
2. Legal responsibility
3. Code of ethics
4. Functions of Physiotherapy associations
5. Role of International health agencies
6. Standards of practice for Physiotherapists
7. Liability and obligations in the case of medical legal action
8. Law of disability and discrimination
9. Confidentiality of the Patient's status
10. Consumer Protection Law, Health law, MCI, DCPTOT
11. Laws and Ethics governing fair play in sports
12. Regulations of State Professional Councils (DCPTOT, MCPTOT)

II. Hospital management

1. History of hospital Administration, Planning and designing supportive services
2. Planning and designing ancillary and medical services
3. Financial / Management of a hospital
4. Planning and designing administrative services
5. Marketing of a hospital

6. Management of the hospital
7. Planning and developing a hospital (emphasis on physiotherapy department)
8. Administrative running of a hospital
9. Organization of a hospital

SECTION - C

I. Concept of teaching and learning

1. Meaning and scope of Educational Psychology
2. Meaning and Relationship between teaching and learning
3. Learning theories
4. Dynamics of behavior
5. Individual differences

II. Curriculum

1. Meaning and concept
2. Basis of curriculum formulation
3. Framing objectives for curriculum
4. Process of curriculum development and factors involve
5. Evaluation of curriculum

III. Teaching methodology & teaching aids

1. Methods of teaching- Lecture, Demonstration, Discussion, Seminar, Assignment, Project, Case study
2. Planning for teaching- Bloom's taxonomy of instructional objectives, Writing instructional objectives I behavioral terms, Unit planning, Lesson planning
3. Teaching Aids- Types of teaching aids, Principles of selection, preparation and use of audio-visual aids

IV. Measurement and evaluation

1. Nature of educational measurement: meaning, process, types of tests
2. Construction of an achievement test and its analysis
3. Standardized test-Introduction of some standardized tools, important tests of intelligence, aptitude and personality
4. Continuous and comprehensive evaluation

Essential Readings

1. Developing a Pedagogy of Teacher education: Understanding teaching and learning about teaching by J. John Laughran
2. Handbook of Technological pedagogical content knowledge (TPCK) for educators (2^{nd} edition) by Mary c. Herring
3. Language, Culture and community in Teacher education by Maria Estela Brisk.
4. Human Resource Management by NK Singh
5. Public Power & Administration by Wilenski, Hale & Iremonger
6. Physical Therapy Administration & Management by Hickik Robert J
7. Medical ethics & consumer protection act by S K Singhal

Suggested Readings

1) Education of the masses: A Quest for Pedagogy by Vetukuri P. S. Raju

2) Managerial accounting for hospital by American Hospital Association
3) Hospital: planning, design & management by G D Kunders

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT411P	Dissertation	322	31	16	150	150	300

Course Description: The course covers carry out an independent research, which will involve conducting of the work as per the documented methodology, data collection, statistical analysis, dissertation writing. The work will build on the knowledge acquired through study of research methodology and biostatistics.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in independent dissertation writing.

Course Outcome: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.

SEMESTER IV
Orthopaedics

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics and clinic management	56	4	4	25	75	100

Course Description: The course covers topics related to physiotherapy ethics, clinic management and theory of teaching.

Course Objective: On completion of the course the student should be able to understand the dynamics of teaching & learning, plan effective teaching sessions in physiotherapy, the basic issues of physiotherapy management & administration and practice as an informed professional on Legal & ethical issues.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy Ethics, clinic management and learn ways to effectively teaching.
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SECTION - A

I. Administration

1. Functions of management
2. Fundamentals of hospital administration
3. Management Process – Planning, Organization, Direction, Controlling, Decision making
4. Personnel Management – Staffing, Recruitment Selection, Performance appraisal, Collective bargaining, Job Satisfaction.
5. Total Quality management – basics, quality control, quality assurance programme in hospitals and medical audit, International Quality System, Six Sigma approach, Just in Time approach

SECTION - B

I. Ethics & legal issues

1. Rules of Professional conduct
2. Legal responsibility
3. Code of ethics
4. Functions of Physiotherapy associations
5. Role of International health agencies
6. Standards of practice for Physiotherapists
7. Liability and obligations in the case of medical legal action
8. Law of disability and discrimination
9. Confidentiality of the Patient's status
10. Consumer Protection Law, Health law, MCI, DCPTOT
11. Laws and Ethics governing fair play in sports
12. Regulations of State Professional Councils (DCPTOT, MCPTOT)

II. Hospital management

1. History of hospital Administration, Planning and designing supportive services
2. Planning and designing ancillary and medical services
3. Financial / Management of a hospital
4. Planning and designing administrative services
5. Marketing of a hospital

6. Management of the hospital
7. Planning and developing a hospital (emphasis on physiotherapy department)
8. Administrative running of a hospital
9. Organization of a hospital

SECTION - C

I. Concept of teaching and learning
1. Meaning and scope of Educational Psychology
2. Meaning and Relationship between teaching and learning
3. Learning theories
4. Dynamics of behavior
5. Individual differences

II. Curriculum
1. Meaning and concept
2. Basis of curriculum formulation
3. Framing objectives for curriculum
4. Process of curriculum development and factors involve
5. Evaluation of curriculum

III. Teaching methodology & teaching aids
1. Methods of teaching- Lecture, Demonstration, Discussion, Seminar, Assignment, Project, Case study
2. Planning for teaching- Bloom's taxonomy of instructional objectives, Writing instructional objectives I behavioral terms, Unit planning, Lesson planning
3. Teaching Aids- Types of teaching aids, Principles of selection, preparation and use of audio-visual aids

IV. Measurement and evaluation
1. Nature of educational measurement: meaning, process, types of tests
2. Construction of an achievement test and its analysis
3. Standardized test-Introduction of some standardized tools, important tests of intelligence, aptitude and personality
4. Continuous and comprehensive evaluation

Essential Readings
1. Developing a Pedagogy of Teacher education: Understanding teaching and learning about teaching by J. John Laughran
2. Handbook of Technological pedagogical content knowledge (TPCK) for educators (2nd edition) by Mary c. Herring
3. Language, Culture and community in Teacher education by Maria Estela Brisk.
4. Human Resource Management by NK Singh
5. Public Power & Administration by Wilenski, Hale & Iremonger
6. Physical Therapy Administration & Management by Hickik Robert J
7. Medical ethics & consumer protection act by S K Singhal

Suggested Readings
4) Education of the masses: A Quest for Pedagogy by Vetukuri P. S. Raju
5) Managerial accounting for hospital by American Hospital Association
6) Hospital: planning, design & management by G D Kunders

Course No.		Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT421P	Dissertation	322	31	16	150	150	300

Course Description: The course covers carry out an independent research, which will involve conducting of the work as per the documented methodology, data collection, statistical analysis, dissertation writing. The work will build on the knowledge acquired through study of research methodology and biostatistics.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in independent dissertation writing.

Course Outcome: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.

SEMESTER IV
Neurology

Course No	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics and clinic management	56	4	4	25	75	100

Course Description: The course covers topics related to physiotherapy ethics, clinic management and theory of teaching.

Course Objective: On completion of the course the student should be able to understand the dynamics of teaching & learning, plan effective teaching sessions in physiotherapy, the basic issues of physiotherapy management & administration and practice as an informed professional on Legal & ethical issues.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy Ethics, clinic management and learn ways to effectively teaching.
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SECTION - A

I. Administration

1. Functions of management
2. Fundamentals of hospital administration
3. Management Process – Planning, Organization, Direction, Controlling, Decision making
4. Personnel Management – Staffing, Recruitment Selection, Performance appraisal, Collective bargaining, Job Satisfaction.
5. Total Quality management – basics, quality control, quality assurance programme in hospitals and medical audit, International Quality System, Six Sigma approach, Just in Time approach

SECTION - B

I. Ethics & legal issues

1. Rules of Professional conduct
2. Legal responsibility
3. Code of ethics
4. Functions of Physiotherapy associations
5. Role of International health agencies
6. Standards of practice for Physiotherapists
7. Liability and obligations in the case of medical legal action
8. Law of disability and discrimination
9. Confidentiality of the Patient's status
10. Consumer Protection Law, Health law, MCI, DCPTOT
11. Laws and Ethics governing fair play in sports
12. Regulations of State Professional Councils (DCPTOT, MCPTOT)

II. Hospital management

1. History of hospital Administration, Planning and designing supportive services
2. Planning and designing ancillary and medical services
3. Financial / Management of a hospital

4. Planning and designing administrative services
5. Marketing of a hospital
6. Management of the hospital
7. Planning and developing a hospital (emphasis on physiotherapy department)
8. Administrative running of a hospital
9. Organization of a hospital

SECTION - C

I. Concept of teaching and learning

1. Meaning and scope of Educational Psychology
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3. Learning theories
4. Dynamics of behavior
5. Individual differences

II. Curriculum

1. Meaning and concept
2. Basis of curriculum formulation
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4. Process of curriculum development and factors involve
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III. Teaching methodology & teaching aids

1. Methods of teaching- Lecture, Demonstration, Discussion, Seminar, Assignment, Project, Case study
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3. Teaching Aids- Types of teaching aids, Principles of selection, preparation and use of audio-visual aids

IV. Measurement and evaluation

1. Nature of educational measurement: meaning, process, types of tests
2. Construction of an achievement test and its analysis
3. Standardized test-Introduction of some standardized tools, important tests of intelligence, aptitude and personality
4. Continuous and comprehensive evaluation

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Suggested Readings

1) Education of the masses: A Quest for Pedagogy by Vetukuri P. S. Raju
2) Managerial accounting for hospital by American Hospital Association
3) Hospital: planning, design & management by G D Kunders

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT431P	Dissertation	322	31	16	150	150	300

Course Description: The course covers carry out an independent research, which will involve conducting of the work as per the documented methodology, data collection, statistical analysis, dissertation writing. The work will build on the knowledge acquired through study of research methodology and biostatistics.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in independent dissertation writing.

Course Outcome: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.

SEMESTER IV
Cardiopulmonary

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT401	Pedagogy, Ethics and clinic management	56	4	4	25	75	100

Course Description: The course covers topics related to physiotherapy ethics, clinic management and theory of teaching.

Course Objective: On completion of the course the student should be able to understand the dynamics of teaching & learning, plan effective teaching sessions in physiotherapy, the basic issues of physiotherapy management & administration and practice as an informed professional on Legal & ethical issues.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy Ethics, clinic management and learn ways to effectively teaching.
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SECTION - A

I. Administration

1. Functions of management
2. Fundamentals of hospital administration
3. Management Process – Planning, Organization, Direction, Controlling, Decision making
4. Personnel Management – Staffing, Recruitment Selection, Performance appraisal, Collective bargaining, Job Satisfaction.
5. Total Quality management – basics, quality control, quality assurance programme in hospitals and medical audit, International Quality System, Six Sigma approach, Just in Time approach

SECTION - B

II. Ethics & legal issues

1. Rules of Professional conduct
2. Legal responsibility
3. Code of ethics
4. Functions of Physiotherapy associations
5. Role of International health agencies
6. Standards of practice for Physiotherapists
7. Liability and obligations in the case of medical legal action
8. Law of disability and discrimination
9. Confidentiality of the Patient's status
10. Consumer Protection Law, Health law, MCI, DCPTOT
11. Laws and Ethics governing fair play in sports
12. Regulations of State Professional Councils (DCPTOT, MCPTOT)

III. Hospital management

1. History of hospital Administration, Planning and designing supportive services
2. Planning and designing ancillary and medical services
3. Financial / Management of a hospital
4. Planning and designing administrative services

5. Marketing of a hospital
6. Management of the hospital
7. Planning and developing a hospital (emphasis on physiotherapy department)
8. Administrative running of a hospital
9. Organization of a hospital

SECTION - C

I. Concept of teaching and learning

1. Meaning and scope of Educational Psychology
2. Meaning and Relationship between teaching and learning
3. Learning theories
4. Dynamics of behavior
5. Individual differences

II. Curriculum

1. Meaning and concept
2. Basis of curriculum formulation
3. Framing objectives for curriculum
4. Process of curriculum development and factors involve
5. Evaluation of curriculum

III. Teaching methodology & teaching aids

1. Methods of teaching- Lecture, Demonstration, Discussion, Seminar, Assignment, Project, Case study
2. Planning for teaching- Bloom's taxonomy of instructional objectives, Writing instructional objectives I behavioral terms, Unit planning, Lesson planning
3. Teaching Aids- Types of teaching aids, Principles of selection, preparation and use of audio-visual aids

IV. Measurement and evaluation

1. Nature of educational measurement: meaning, process, types of tests
2. Construction of an achievement test and its analysis
3. Standardized test-Introduction of some standardized tools, important tests of intelligence, aptitude and personality
4. Continuous and comprehensive evaluation

Essential Readings

15. Developing a Pedagogy of Teacher education: Understanding teaching and learning about teaching by J. John Laughran
16. Handbook of Technological pedagogical content knowledge (TPCK) for educators (2nd edition) by Mary c. Herring
17. Language, Culture and community in Teacher education by Maria Estela Brisk.
18. Human Resource Management by NK Singh
19. Public Power & Administration by Wilenski, Hale & Iremonger
20. Physical Therapy Administration & Management by Hickik Robert J
21. Medical ethics & consumer protection act by S K Singhal

Suggested Readings

1) Education of the masses: A Quest for Pedagogy by Vetukuri P. S. Raju

2) Managerial accounting for hospital by American Hospital Association
3) Hospital: planning, design & management by G D Kunder

Course No.	Title	Total Hours	Hours/ week	Credits	IA Marks	SE Marks	Total Marks
MPT441P	Dissertation	322	31	16	150	150	300

Course Description: The course covers carry out an independent research, which will involve conducting of the work as per the documented methodology, data collection, statistical analysis, dissertation writing. The work will build on the knowledge acquired through study of research methodology and biostatistics.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in independent dissertation writing.

Course Outcome: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.

DDU Kaushal Kendra

Centre for Physiotherapy and Rehabilitation

Sciences

Jamia Millia Islamia

New Delhi-110025

(Syllabus)

w.e.f Academic Session 2015-2016

B.VOC. Medical Electrophysiology (B.VOC. -MEP)

B.VOC. Medical Electrophysiology (B.VOC. MEP)
Duration: Three Years (6 semesters)

Semester	Sl No	Paper Code	Paper Name	Total Hrs	Credit	IE	SE	Total
1	1	MEP101	Fundamentals of Human Anatomy	42	3	25	75	100
	2	MEP 102	Fundamentals of Physiology	42	3	25	75	100
	3	MEP 103	Biochemistry	42	3	25	75	100
	4	MEP 104	Cell Biology & Medical Genetics	42	3	25	75	100
	Skill Components							
	5	MEP 105	Fundamental of Computer & IT	42	3	25	75	100
	6	MEP 106	English	42	3	25	75	100
	7	MEP 107P	Practical I(MEP 101, MEP 102)	84	3	25	75	100
	8	MEP 108P	Practical II (MEP 103, MEP 104)	84	3	25	75	100
			Total	**420**	**24**	**200**	**600**	**800**
2	1	MEP 201	General and Systemic Pathology	56	4	25	75	100
	2	MEP 202	Electronics & Instrumentation	56	4	25	75	100
	3	MEP 203	Introduction to Medical Electrophysiology	42	3	25	75	100
	4	MEP 204	Cardiology & Electrocardiography-I	56	4	25	75	100
	5	MEP 205	Medical Emergencies & Patient Care	56	4	25	75	100
	Skill Components							
	6	MEP 206P	Practical III (MEP 202, MEP 203)	84	6	50	150	200
	7	MEP 207P	Practical IV (MEP 204, MEP 205)	84	6	50	150	200
			Total	**434**	**31**	**225**	**675**	**900**

Sem.	Sl No	Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
3	1	MEP301	Cardiology & Electrocardiography-II	56	4	25	75	100
	2	MEP 302	Neuromuscular Disorders	42	3	25	75	100
	3	MEP 303	Electromyography & Nerve Conduction Studies	56	4	25	75	100
	Skill Components							
	4	MEP 304P	Practical V(MEP 301)	42	3	50	50	100
	5	MEP 305P	Practical VI(MEP 302,303)	84	6	100	100	200
	6	MEP 306P	Evaluative Clinical Training I	126	4	100	-----	100
			Total	**406**	**24**	**325**	**375**	**700**
4	1	MEP 401	Cardiovascular Techniques & Fitness	56	4	25	75	100
	2	MEP 402	Respiratory Care Technology	56	4	25	75	100
	3	MEP 403	Neurological Disorders	56	4	25	75	100

	4	MEP 404	Brain Waves & Electroencephalography	56	4	25	75	100
	Skill Components							
	4	MEP405P	Practical VII (MEP 401, 402)	84	6	100	100	200
	5	MEP 406P	Practical VIII (MEP 403, 404)	84	6	100	100	200
	Total			**392**	**28**	**300**	**500**	**800**

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP101	Fundamentals of Human Anatomy	42	3	25	75	100

Unit I: General & Systemic Anatomy: Introduction to anatomical terms and organization of the human body. Tissues –Definitions, Types, characteristics, classification, location, functions and formation. Musculoskeletal system: Bones – types, structure**,** Axial & appendicular skeleton. Bone formation and growth, Joints –classification and structure. Types and structure of muscles. Movements at the joints and muscles producing movements.

Unit II: Nervous System: Structure of Neuroglia & neurouns Parts, Clsssification CNS – Structure of Brain and spinal cord and their functions. PNS - Cranial nerves and spinal nerves ANS - Sympathetic and Parasympathetic. Structure of Skin, Eye, Nose, Tongue (Auditory and Olfactory apparatus)

Unit III: Cardiovascular System: Circulatory system – Structure of the Heart, Structure of Blood Vessels – arterial and venous system. Gross and microscopic structure of lymphatic tissue.

Unit IV: Respiratory System: Parts, Nasal cavity and Paranasal air sinuses, trachea, Gross and microscopic structure of lungs, Diaphragm and Pleura.

Unit V: Digestive System: Parts, Structure of Tongue, Salivary glands, stomach, Intestines, Liver, Pancreas.

Unit VI: Urinary & Reproductive System: Parts, structure of Kidney, Ureters, Urinary Bladder and Urethra. Parts of both male and female reproductive organs. Gross structure of both male and female reproductive organs.

Unit VII: Endocrine System: Gross structure of Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal glands.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP102	Fundamentals of Human Physiology	42	3	25	75	100

Unit I. BLOOD: Components, haematocrit, ESR, blood volume measurements. RBC, WBC & platelet counts, names of developmental stages of RBC, functions and fate of RBC. Functions of WBC and platelets. Basis of blood coagulation. Blood groups – ABO & Rh

Unit II: MUSCLE: Structure in brief, mechanism of muscle contraction, isotonic and isometric contractions, energy sources of muscle contractions, motor unit.

Unit III: GASTRO INTESTINAL TRACT: Functional anatomy of G.I.T, functions of G.I secretions, principles of secretion and movements of GIT.

Unit IV: KIDNEY & ENDOCRINES: Structure of Nephron, measurement and regulation of GFR, mechanism of urine formation. Clearance tests & values of insulin, PAH and urea clearance. Names of endocrine glands & their secretions, functions of various hormones, Brief account of endocrine disorders.

Unit V: REPRODUCTION: Reproductive cycle in female including menstrual cycle, pregnancy, parturition, lactation. Male sex hormones and spermatogenesis. Basis of contraception.

Unit VI: CARDIO VASCULAR SYSTEM: Anatomy of heart, cardiac cycle, heart sounds, definitions of cardiac output, stroke volume, principles of measurements of cardiac output. ECG – methods of recording and ECG waves. Normal values of blood pressure, heart rate and their regulation in brief.

Unit VII: RESPIRATION: Principles of respiration, respiratory muscles, lung volumes and capacities, collection and composition of inspired alveolar and expired airs. Transport of oxygen and carbon dioxide. Brief account of respiratory regulation. Definition of hypoxia, Cyanosis, asphyxia. Methods of artificial respiration.

Unit VIII: CENTRAL NERVOUS SYSTEM: Structure of neuron, nerve impulse, myelinated and non-myelinated nerve. Brief account of resting membrane potential, action potential and conduction of nerve impulse. Neuro-muscle transmission. Various parts of nervous system, C.S.F., Functions of muscle spindle and motor tracts including reflexes , cutaneous receptors, joint receptors, sensory pathways. Ascending reticular formation, EEG, functions of cerebellum, basal ganglia, thalamus & hypothalamus, vestibular apparatus and functions. Autonomic nervous system its division & functions. Structure of eyeball, retina, visual pathway, accommodation, visual acuity, error of refraction, color vision. Brief account external, middle and inner ear, hearing tests. Taste & smell receptors, pathways, method of transduction.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP103	Basic Biochemistry	42	3	25	75	100

Unit I: Carbohydrates: Definition, function and classification of carbohydrate. Monosaccharide, glycoside formation, oligosaccharides and polysaccharides. Glycolysis, catabolic fates of pyruvate,

metabolic fate of Acetyal-CoA and Citric acid cycle, gluconeogenesis, glycogen metabolism, pentose phosphate pathway.

Unit II: Biological Oxidation: Enzyme, coenzyme and electron carriers involved in biological oxidation. Electron transport chain. Oxidative phosphorylation. Substrate level phosphorylation. Inhibitors of electron transport chain.

Unit III: Amino acids and proteins: Definition, structure, classification, essential & non essential amino acids. Proteins definition and classification. Primary, secondry, tertiary and quaternary of proteins of proteins

Unit IV: Vitamins: Definition and classification of vitamins, difference between fat soluble and water soluble vitamins. Water soluble vitamins and fat soluble vitamins

Unit V: Lipids: Definition, classification and function of lipids. Fatty Acids, Triacylglycerols or Triacylgcerides or neutral fat. Fatty acid metabolism. Ketone body metabolism.

Unit VI: Enzymes : Introduction, definition, classification, coenzymes, active site of enzyme, cofactors of coenzyme, isoenzymes, properties, mechanism of enzyme action.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP104	Cell Biology & Medical Genetics	42	3	25	75	100

Section A: Cell Biology

Unit I: Cell Structure: Cell as a basic unit of life - discovery of cell, procaryotic and eukaryotic cell; unicellular and multicellular organisms;

Unit II: Microscopic Study of Cell: tools and techniques (compound microscope, electron microscope and cell fractionation); Ultrastructure of prokaryoytic and eukaryotic cell - cell wall, cell membrane - unit membrane concept (flauidmosaic model); membrane transport; cellular movement (exocytosis, endocytosis);

Unit III: organelles of Cell: Cell organelles and their functions- nucleus, mitochondria, plastids, endoplamasic reticulum, Gogli complex, lysosomes, lysosomes, microtubules, centriole, vacuole, cytoskeleton, cilia and flagella, ribosomes.

Unit IV: Cell Cycle: Eukaryotic Cell Cycle, Regulation of Cell cycle progression, Events of Mitotic Phase, Meiosis and Fertilization. Programmed Cell Death, Stem Cells and Maintenance of adult tissues, Embryonic Stem Cells and Therapeutic cloning

Section B: Medical Genetics

Unit V: Continuity of life: Heredity, variation; mendel's laws of inheritance, chromosomal basis of inheritance; other patterns of inheritance - incomplete dominance, multiple allelism, quantitative inheritance.

Unit VI: Chromosomes: Bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination; sexchromosomes; sex determination; sex linked inheritance; mutation and chromosomal aberrations; Human genetics - methods of study, genetic disorders.

Unit VII: DNA as a genetic material: DNA structure and repliaction; structure of RNA and its role in protein synthesis; Gene expression - transcription and translation in prokaryotes and eukaryotes; regulation of gene expression, induction and repression - housekeeping genes; nuclear basis of differentiation and development; oncogenes.

Unit VIII: Recombinant DNA technology: Basics of Recombinant DNA technolgy cloning; gene bank; DNA fingerprinting; genomics -principles and applications, transgenic plants, animals and microbes.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP105	Fundamentals of Computer &IT	42	3	25	75	100

Unit I: Computer Systems as Information Processing System, Different Type of Computer Hardware; CPU, Input Devices, Storage Devices Communication Devices Configuration of hardware devices and their applications.

Unit II: Basic idea of Local Area Network (LAN) and Wide Area Network (WAN),E-mail Internet browsing, Multimedia. Introduction to Operating System: Software needs, operating systems, application software, programming language. Windows, windows explorer,print manager, control panel, paint brush, calculator, desktop, my computer, setting, find, Run.

Unit III: Introduction and working with Ms- Word in Ms-office: Word basic ommands,Formatting-text and documents,sorting and tables,working with graphics; Introduction to mail merge

Unit IV: Working with excel-formatting,Functions,chart features,workings with graphics in excel,using worksheets a database

UNIT V. Presentation with Power Point: Power point Basics, creating

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP106	English	42	3	25	75	100

Unit I: English grammar: Articles,Preposition,Tenses,Voice,Direct and Reported Speech

Unit II: Vocabulary: Common Vocabulary, Word Often Confused, Some Common Errors

Unit III: Paragraph Writing: Process Writing, Descriptions Summarizing and Writing in brief of Medical passages,Note- taking Exercise,Formal Correspondence (Letter and application)- Application for job, for higher studies- Letter to The Editor, Ordering Equipments, Requesting for Information

Unit IV: SPOKEN ENGLISH: Communicative Skills, Discussion Sessions, Dialogue Sessions

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP201	General & Systemic Pathology	56	4	25	75	100

Unit I: Cell Injury – Etiology, Pathogenesis, Morphology of Reversible and Irriversible Injury, Intracellular Accumulation, Pigments,Theory of Aging, Organ Change in Aging, Basic Concepts of Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Dysplasia. **Inflammation and Healing –** Types – Acute and Chronic, Acute - Response , Mediators, Regulation, Inflammatory Cells, Morphology Effects and Fate. Chronic –Granulomatous Inflammation. Healing – Regeneration, Repair, Healing in Skin and in Special Tissue.

Unit II: Pathophysiology of Disturbed Homeostasis and Haemodynamics – Disturbance of Body Water – Pathogenesis of Dehydration, Overhydration and Oedema.Disturbance in Electrolytes and Ph – Acid Base Imbalance. Haemodynamic Derangment – Distubance in Volume of Circulating Blood. **Neoplasia –** Rate of Growth,Clinical and Gross Features, Microscopic Features, Grading and Staging of Cancer, Chemical, Physical and Biological Cacinogenesis, Pathological Diagnosis of Cancer.

Unit III: Cardiovascular & Respiratory Diseases Cardiovascular system-atherosclerosis, vasculitis, aneurysms, ischaemic heart disease, cor pulmonale , rheumatic heart disease , rheumatic fever, disease of endocardium, pericarditis, myocardial disorders. Respiratory diseases- chronic obstructive lung disease, chronic restrictive lung disease

Unit IV: Neurogenic Disease- Neurogenic disease , myopathic disease, myopathies, cerebrovascular disease, misc CNS Disease, peripheral neuropathie

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP202	Electronics & Instrumentation	56	4	25	75	100

Unit I: -Basic Concepts. Definition and Units of Basic Electrical Quantities: Voltage, Current, Charge, Power, Resistance, Capacitance, Impedance Reactance, AC and DC, Power Factor, RMS, Average and Maximum Value of AC. Waves Form: Sine Wave, Square Wave,Triangular Waves,Ramp Signals. Basic Circuit Elements: Resistors, Capacitors, Inductors-Types Symbol, Colour Code Representation Series and Parallel Combination and Their Equivalent. Transformer. Circuit Laws: Ohm's Law, Wheat Stone Bridge. Motors: Types and Uses. Thermocouples.

Unit II: - **Elements of Electronics.** -Material Classification According to their Conduction. Semi Conductors- Intrinsic, Extrinsic, P Type, N Type, Diodes, Transistors, Characteristics &

Schematic Representation. Application of Diodes as a Switch & Rectifier, HWR – Half Wave Rectifier, FWR – Full Wave Rectifier, Bridge Rectifier. Application of Transistor, Amplifier. Power Supply Unit, Introduction to Integrated Circuit, Introduction To Operational Amplifiers - Adder, Subtractor Multiplier, Generator - Sine Wave, Square Wave, Triangular Wave**.**

Unit III: - Digital Circuits

Binary Number System, Bits, Bytes, Octal, Hexadecimal, Addition, Subtraction, 1"S Complement and 2"S Complement. Gates: Universal Gates Or and Not. Exor, Exnor. Truth Table and Boolean Expression. A-D Convertor, D-A Converter.

Unit IV: – Electrical Saftey and Medical Equipments- Physiological Effect of Electrical Current, Shock Hazards from Electrical Equipment, Methods of Accident Prevention. Classification of Medical Equipments According to the 1. Type of Protection 2. Mode of Protection.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP203	Introduction to Electrophysiology	42	3	25	75	100

Unit I: Cellular Neuroelectrophysiology: Structure of cell membrane, Transport of substances across cell membrane, Sodium and potassium ion channels, Voltage and chemical gating of ion channels, Nernst potential, Electrochemical equilibrium, Resting membrane potential, Postsynaptic potentials, Action potential, Compound action potential, Synaptic transmission, Structure of skeletal muscle, Neuromuscular junction, Motor unit, Motor unit action potential, Recruitment of motor units.

Unit II: Techniques in Neuroelectrophysiolgy: Noninvasive electrophysiological recording techniques: Advantages of noninvasive procedures, Recent clinical neuroelectrophysiological approaches i.e. Electroencephalography, Electromyography, Nerve conduction studies and Event-related potentials. Invasive electrophysiological recording techniques: Electrocorticorticography- definition, procedure and clinical application, Intramuscular Electromyography- uses, advantages and disadvantages.

Unit III: Basic Electromyography: Definition, Type of recording procedure, surface electromyography- silver/silver chloride disc electrodes, electrodes montages, Advantages of bipolar derivation, Differential amplification of signal, Frequency filters, Signal to noise ratio, Signal analysis for amplitude and frequency, recruitment of motor units during the voluntary activity. Needle electromyography- insertional and spontaneous activity, motor unit action potential, clinical application of the invasive procedures.

Unit IV: Basic Electroencephalography: Definition, Origin of electrical signal, Dendritic postsynaptic potential, Cortical organization and cortical dipole, brain waves- alpha, beta, theta and delta, Surface electrodes, 10-20 international system of electrode placement, Bipolar and referential montages, Sine wave calibration, Impedance, Amplification of signal, Frequency filters, Signal analysis, Research and clinical applications in sleep studies and epilepsy. Available invasive procedure and their applications.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP204	Cardiology & Electrocardiography-I	56	4	25	75	100

Unit I :- Basic & Bedside Cardiology - Physiological Anatomy of Heart, General Principal of Circulation and Regulation, Coronary Circulation, Cardiovascular Regulatory Mechanism, Heart Rate & Cardiac Output, Apical Impulse, Arterial Pulse, Jugular Venous Pulse, Heart Sounds (S1, S2, S3 & S4), Murmurs (Systolic/Diastolic), Ejection Sounds, Non Ejection Sounds, Blood Pressure & Its Regulation.

Unit II : – Circulatory & Functional Cardio Pathology - Concept of Hper / Hypotention, Secondary Hypertention, Low Volume and Absent Pulse in Lower Limbs, Basic Concept of Peripheral Vascular Disease, Coronary Artery Disease – Atherosclerosis, Ischemic Heart Disease, Angina Pectoris and Acute Myocardial Infarction, Heart Block – Sino-Atrial, Atrio – Ventricular, Bundle Branch Block, New Rhythm Centre – A. Extra systole – Atrial/ Ventricular, B. Cardiac Arrhythmia – Atrial, Ventricular & Paroxysmal Tachycardia, WPW Syndrome

Unit III : –- Clinical Electrocardiography - Fundamentals of Electrocardiography, Einthovin theory of Electrical Activity, Electrode & Lead System, Electrocardiography – Procedure of Recording of ECG, Unipolar Recording, Bipolar Recording, Cardiac Vector & the Electrical Axis, The Electrical Rotation of Heart, Normal ECG, Normal Electrocardiographic Variants in Adults

Unit IV : – Abnormal ECG - Disorders of Cardiac Rhythm, Electrolyte Disturbances, Coronary Artery Disease – Myocardial Ischemia, Myocardial Infarction

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP205	Medical Emergencies & Patient Care	56	4	25	75	100

Unit – I: Introduction to Emergency Services - Organization of Emergency Department, Guidelines in Emergency, Clinical Monitoring, Fluid Therapy and Blood Transfusion, Airway Management, Cardiopulmonary Resuscitation, Principal of Mechanical Ventilation, Injection – An Infusion Method, Acid Base and Electrolyte Imbalance

Unit – II: Handling of Different Emergencies - Carcinogenic Shock, Congestive Cardiac Failure, Myocardial Infarction, Head Injuries, Vasovagal Syncope, Seizer, Epilepsy, Conjunctival and Corneal Foreign Body, Foreign Body in Nose & in Ear, Epistaxis, Asthma, COPD, Haemoptysis, Rib Fracture, Tear Gas Exposure, Food Poisoning, Diarrhea, Urine Retention, Blunt Scrotal Trauma, Hypo & Hyperthermia

Unit – III: Fundamentals of Patient Care - Concept of health & Illness, Health Determinants, Concept of Patients & Their Types, Patient Centred Care & Fundamentals of Communications, Reporting & Recording of Patients, Rights of Patients , Concepts of Disease & Its Types, General Concept, Care & Prevention of Accident, Trauma & Infections

Unit – IV: Patient Care, Associated Units & Departments - Ambulatory Units, Critical Care Units ,Paediatric, Neonatal Intensive Care Unit (NICU), Emergency Department, Inpatient Units, Haematology/Oncology and Immunology Unit , Orthopaedic Unit, Psychiatry Unit ,Neurology and Neurosurgical Unit, Renal, Dialysis Unit, Gastroenterology/Endocrinology Unit, Life Flight Critical Care Transport Program, Radiology Department, Surgical Units, Cardiac Catheterization Lab, Operating Room, Post Anaesthesia Care Unit, Managing patients with disabilities, Geriatric Care, Care of Critically Ill Patients, Tracheotomise Patients. Nutritional Support in ICU

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP301	Cardiology & Electrocardiography-II	56	4	25	75	100

Unit – I: Congenital and Heredofamilial Disorders – Congenital Pulmonary Stenosis, Primary Pulmonary Hypertention, ASD, VSD, Malposition and Malformation of the Heart, Dextrocardia, PDA, Corrected Transposition of Great Vessels, Tetra, Penta and Triology of Fallot, Acquired Prolonged Q-T Syndrome, Wolff-Parkinson White Syndrome, Hypertrophic Cardiomyopathies.

Unit – II: Acquired Heart Disease - Myocarditis, Chagas Myocarditis, Pericarditis with effusion, Chronic Constrictive Pericarditis, Dilated and Restrictive Cardiomyopathies, Rheumatic Heart

Disease – Acute Rheumatic Fever and Chronic Rheumatic Valvular Heart Disease, Acute and Chronic Cor Pulmonale.

Unit – III: Artificial Pacemakers – Electrographic Pattern of Paced Complex, Multifunctioning of Pacemaker, Pacemaker Syndrome.

Unit – IV: Miscellaneous Disorders – Endocrine Disorders – Hypo and Hyperthyroidism, Cushing's Syndrome, Adrenal Insufficiency, Parathyroid Disorders, Drugs Poisons and the Heart, Electrolytes and Heart – Hypo and Hyper calcemia, magnesemia.

Unit –V: Vectorial Analysis of Electrocardiograms- Principles of Vectorial Analysis of Electrocardiograms, Vectorial Analysis of the Normal Electrocardiogram, Mean Electrical Axis of the Ventricular QRS- and Its Significance, Conditions that Cause Abnormal Voltages of the QRS Complex, Prolonged and Bizarre Patterns of The QRS Complex, Current of Injury, Abnormalities in the T Wav

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 302	Neuromuscular Disorder	42	3	25	75	100

Unit I: Polyneuropathies: Diabetic neuropathy, Acute inflammatory demyelinating polyradiculoneuropathy, Chronic inflammatory demyelinating polyneuropathy, Multifocal motor neuropathy, axonal neuropathies, Hereditary neuropathies.

Unit II: Mononeuropathies: Entrapment Neuropathies of Median nerve, Ulnar neuropathy, Radial neuropathy, Brachial plexus lesion, Peroneal neuropathy, Tibial neuropathy, Sciatic neuropathy, Radiculopathy, Mononeuropathy multiplex.

Unit III: Muscular dystrophies: Duchenne and Becker's muscular dystrophy, Limb-girdle dystrophy, Myotonic dystrophy, Tetanus, Stiff-man syndrome, Schwartz-Jampel syndrome, Neuromyotonia , Myotonia congenital, Periodic paralysis.

Unit IV: Inflammatory and metabolic myopathies: Polymyositis, Dermatomyositis, Inclusion body myositis, Viral myositis, endocrine myopathies**,** Mitochondrial myopathies, Hypokalemic periodic paralysis, Hyperkalemic periodic paralysis.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 303	Electromyography & Nerve	56	4	25	75	100

	Conduction Studies					

Unit I: Neuromuscular physiology: Anatomy of nerve and muscle, Normal neuromuscular function**,** Motor function, Sensory function, Neuron cell body dysfunction, Peripheral nerve axon dysfunction, Peripheral nerve myelin dysfunction, Neuromuscular junction dysfunction, Muscle dysfunction, Motor units..

Unit II: Nerve Conduction Basics: Motor nerve conduction study, Sensory nerve conduction study, Electrodes, Electrode Position, Stimulus Characteristics, Procedure, Measurements, Types of abnormalities, Late responses, F-wave study, H-reflex, Blink reflex, Tests for neuromuscular junctions, Repetitive nerve stimulation.

Unit III: Electromyography Basics: Conventional needle EMG, Macro EMG, Surface EMG, Single-fiber EMG, Electrodes, Filters, Amplifier, Display, Averager, Gain and Sweep time, Electrode position, Procedures, Rest, Insertion, Single motor unit activation, Maximal contraction, Normal and abnormal responses.

Unit IV: Approach to Clinical Questions: Common clinical presentations, Evaluation of individual nerves, Evaluation of individual muscles, Evaluation of neuromuscular transmission, Electromyographic findings in myopathic, neurogenic and neuromuscular disorders, Clinical correlations of nerve conduction and EMG.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 401	Cardiovascular Techniques & Fitness	56	4	25	75	100

Unit I: Cardiovascular Pharmacology & Invasive Techniques -

Diuretics – Classification and Clinical Pharmacology of Diuretics, Uses in Cardiovascular Diseases, Vasodilator and Neuro Hormones Modulators, Positive Inotropic Drugs, Antilipid Agents, Antithrombolitic and Antiplatelet Agent, Antiarrhythmic Drugs, Percutaneous Revascularization in CAD.

Unit II: Cardiac Imaging, Computed Tomography, Magnetic Resonance & Echocardiography -

Chest Film Techiques, Overview of Cardiomediastinal Anatomy, Imaging in Cardiac Diseases, Technical aspects of CT, Uses in Cardiovascular Disorders, Technical Aspects of Magnetic Resonance and its uses in guided therapies, Contrast – Enhanced Echocardiogrphy, Transthoracic, Stress, Transesophageal & Three dimentional Echocardiography.

Unit – III: Arrhythmia Mechanism, Cardiac Arrest & Resuscitation –

Atrial Fibrillation,Supraventricular & Ventricular Tachicardia,Bradicardia and Heart Block, Long & Short QT, Brugada Syndrome, Catheter Ablation of Arrhythmias, Cardiac Resynchronization Therapy, Ambulatory Electrocardiographic Monitoring, Cardiac Arrest & Resuscitation

Unit – IV: Preventive Strategies, Exercise and Rehabilitation –

Prevention of Shock, Heart Failure & Rheumatic Fever, Dislipidemia, Smoking and Cardiac Diseases, Definition, Goals, Phases and Core Components of Rehabilitation, ECG Exercise Testing, Exercise Physiology and Athlete's Heart.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 402	Respiratory Care Technology	56	4	25	75	100

Unit – I : Physiological Anatomy of Respiratory System -

Mechanism of Respiration, Transport of Gases, Regulation of Respiration, Hypoxia, Physiology of High Altitude, Effect of High Atmospheric Pressure

Unit – II : Clinical Approach to Respiratory Diseases -

Tuberculosis, Pneumonia, Asthma, Bronchioectasis, Lung Abscess, URTIs, HIV and Lungs, Helminthes & Protozoan Lung Infections, COPD, Pulmonary Embolism & Pneumothorax

Unit – III : Imaging Techniques & PFT -

Chest Radiographs, Computed Tomography, Contrast Media, Radionuclide Imaging, MRI, Pulmonary Angiography, HRCT- High Resolution Computed Tomography, Tests – To Asses Ventilatory Function of Lung, Gaseous Exchange Across the Lungs, Transport of Gases in the body. ABG Analysis.

Unit – IV: Principles of Respiratory Care –

Oxygen Therapy, Mechanical Ventilation, Airway Management, Tracheostomy, Noninvasive Positive Pressure Ventilation – CPAP (Control Positive Airway Pressure), BiPAP (Bi-level PAP), EPAP, IPAP

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 403	Neurological Disorders	56	4	25	75	100

Unit I: Stroke: Definition, Classification of stroke by etiology, Pathophysiology, Diagnosis, Management of acute stroke, Primary Prevention, Secondary Prevention of ischemic stroke and Secondary Prevention of cerebral hemorrhage.

Unit II: Seizures: Clinical characterstics of siezures, Siezures vs Epilepsy, Epilepsy syndrome, Pathophysiology, Diagnosis, Determining the cause of seizures, Management of seizures and epilepsy, Special clinical problems, Status Epilepticus.

Unit III: Dementing Illnesses: Primary Dementing Illnesses, Alzheimer's Disease, Dementia with Lewy Bodies, Frontotemporal Dementia, Vascular Dementia, Normal Pressure Hydrocephalus, Creutzfeldt Jakob Disease, Other neurological diseases that produces dementia.

Unit IV: Movement Disorder: Classification of Movement disorder, Specific movement disorder, Essential Tremer, Parkinson's disease, Parkinsonians Syndromes, Hereditary Ataxia, Huntington's Disease, Tardive Dyskinesia, Dystonias, Wilsons Disease Gilles de la Taurette's Syndrome.

Unit V: Multifocal CNS Disorder: Approach to Multifocal Disorder, Focal disease with multiple progressions, Metastatic cancer, CNS infection, Inheretly Multifocal diseases, Multiple Sclerosis, Connective tissue disease, Sarcoidosis, Coagulation disorders.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 404	Brain Waves & Electroencephalography	56	4	25	75	100

Unit I: EEG Basics: Generation of EEG rhythms, Cortical potentials, Scalp potentials, Basic EEG rhythms, Alpha rhythm, Beta rhythms, Theta rhythms, Delta rhythms, Generation of Epileptiform activity, Spikes and sharp waves. Technical aspects of EE, EEG equipment, Electrodes, Montages,

Routine EEG, Calibration, Sensitivity, Duration, Filters, Activation methods, Photic stimulation, Hyperventilation.

Unit II: Normal EEG: EEG in adults, Anterior cerebral activity, Posterior cerebral activity, EEG in children, Maturation of the posterior rhythm, Normal transient and variants, Lambda waves, Mu rhythm, Wicket spikes, Slow alpha variant, Rhythmic mid-temporal theta, Subclinical rhythmic electrographic discharges, Noncerebral potentials, Eye and muscle artifacts, Movement and machine artifacts, Electrocardiogram and pulse artifacts.

Unit III: Abnormal EEG: Slow activity, Diffuse slowing, Focal slowing and polymorphic delta activity, Intermittent rhythmic delta activity, Slow activity as a seizure discharge, Spike and sharp waves, Focal sharp activity,
Generalized sharp activity, Periodic patterns, Periodic lateralized epileptiform discharges. Normal photic response, Photomyoclonic response, Photoconvulsive response.

Unit IV: Special EEG studies: Neonatal EEG, Recording procedures, Guidelines for interpretation, Maturation of the EEG, Abnormality of maturation, Epileptiform activity, Background abnormality. Brain death, Guidelines for determination of brain death in adult and children, EEG monitoring, Methods and interpretation, Quantitative EEG, Spike detection, Power spectral analysis, Brain mapping.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 501	Sensory Physiology & Evoked Potential	84	6	50	150	200

Unit – I: Basic Sensory Physiology, Taste & Olfaction

Sensory receptors- Touch, Pressure, Pain and Temperature, Somatic and Visceral Senses, Exteroreceptors, Viseroreceptor, Proprioceptors. Taste Receptors, Taste Pathway, Physiology of Taste, Applied – Ageusea, Hyogeusia & Dysgeusia. Olfactory Receptors, Physiology of Olfaction, Olfactory Pathway, Applied – Anosmia, Parosmia & Hyposmia.

Unit – II: Physiology of Eye & Ear

Visual Pathway, Image Forming Mechanism, Photochemistry of Vision, Electrophysiology of Vision, Photopic and Scotopic Vision, Adaptation, Colour Vision, Colour Blindness, Nystagmus. Auditory Pathway, Physical Properties of Sound, Mechanism of Hearing, Electrophysiology of Hearing, Auditory Cortex, Applied Aspect – Deafness, Tinnitus. Audiometry.

Unit III: Visual and Auditory Evoked Potentials

Neural generators, General principles, Methods, Electrode placement and montages, Recording parameters, Interpretation, waveform identification, Variant waveform, Clinical correlations, Optic neuritis, Multiple sclerosis, Tumors, Ocular disorders, Acoustic neuroma, Brainstem tumor, Stroke, Multiple sclerosis, Coma and brain death.

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Unit IV: Somatosensory Evoked Potentials

Neural generators, General principles, Median SEP Tibial SEP Methods, Acquisition of signal, Waveform identification and interpretation, Clinical correlations, Normal and abnormal responses. Transverse myelitis, Multiple sclerosis, Peripheral neuropathy, B12 deficiency Spinal cord injury, Brain death and Stroke.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 502	Polysomnography & Sleep Studies	56	4	25	75	100

Unit I: Sleep Physiology

Normal sleep wake cycle, Sleep stages, Waking state, Non REM sleep, Sleep stage 2, Sleep stage 3, Sleep stage 4, REM sleep, Neurophysiologic mechanisms of Non REM and REM sleep, Sleep wake regulation, Neurotransmitter involved, Indications for sleep studies.

Unit II: Polysomnography

Physiological measurements EEG, Electro-oculogram (EOG), Submental EMG, ECG, Respiration, Blood oxygen saturation, Expired CO2, Body and limb movement, Audiovisual monitoring, Time, Recording protocol for a standard nocturnal study, Interpretation.

Unit III: Sleep disorders

Classification of sleep disorders, Epidemiology of sleep disorders, Non-REM, or isolated, narcolepsy, REM, or compound, narcolepsy, Obstructive sleep apnea (OSA), Central or non-obstructive sleep apnea, Mixed sleep apnea. Treatment and preventive measures.

Unit IV: Sleep studies

Multiple sleep latency tests, Maintenance of wakefulness test, Out of Sleep Center Test, Subjective evaluation of sleepiness, Sleep scoring, Actigraphy, Methods, Interpretation, Sleep deprivation, Clinical application of sleep studies.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 503	Public Health	28	2	10	40	50

Unit --I: Basic Concepts of Public Health

Natural History of Disease--- Determinants of health---- multi – factorial causation of disease – host ,agent , environment relationship ---primary--secondary and tertiary levels of prevention with examples related to few diseases of national importance--- Mode of transmission of disease Air – borne, vector and vehicle transmission--- Methods of control ----Disinfection of the infective materials received in the Laboratory by using the appropriate disinfection methods, at the health centre level.

Unit – II: Health Programme & Organization

Description of organization of health services at the centre and state levels---Primary Health Care - Definition, components and principles of primary health care--- Health for all indicators. Primary Health Centre-- role of laboratory technicians in primary Health--- National Programmes of Health

and disease eradication-- Health Programmes---- Family Welfare Programme ---Immunization and universal immunization programme---- Disease Eradication programme---Leprosy ,--Disease control programmes---Tuberculosis--- Malaria—Goitre

Unit --III: Statistics

Statistics--- Presentation of data ----general tabulations ---Simple Tables-- Frequency Distribution Tables ---diagrams ---Bar Diagrams, Histogram, Line Diagram --Pie Diagram ---statistical averages ---calculation of Mean, Median, Mode-- measures of dispersion ---Normal Curve, Range, Standard Deviation and their significance

Unit – IV: Health Education

Environmental sanitation--- Methods of water purification and disinfection, collection of water samples, their transport and bacteriological analysis--- Food and Nutrition--- Food-borne diseases of Public Health importance---Assessment of Nutritional status—nutrition programmes--Management of Sanitation in Public Health --- Health education – definition, principles, objectives, pupose

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MEP 601	Quality Assurance & Medical Ethics	56	4	25	75	100

Unit – I: Functional Considerations & Design Standards –

Functional Organization, Functional Areas and Relationships, Functional Diagram, Relationship Matrix, Technical Considerations

Unit – II: Quality Guidelines and Regulations -

Quality Management System, Total Quality Management, Failure Testing, Statistical Control, , Models and Standards, Plan to Control Cross Infection, Program Assurance, Quality Engineering, Fully Integrate Electronic Medical Records, Quality Infrastructure, Software Testing, Software Quality Assurance. Source of errors & correlation methods.

Unit – III: Basic Concepts of Ethics -

Ethical Reasoning (Parameter of Ethical Reasoning - The Problem, Information, Option, Moral Assessment), Source of Ethics – (Authority, Law Governing bodies, Responsibility and Accountability, Integrity, Quality, Transparency of Work Done, Compliance to Regulations, Conscience), Ethics seek to fight - Disrespect of Persons, Lack of Interest in Well-being of Patient, Violation of Human Rights, Violation of Autonomy, Falsehood in Professional Practice, Lack of Compassion, Intolerance, Injustice, Professional Incompetence and Lack of Self-Improvement, Violation of Privacy and Protection.

Unit – IV: Ethical Principles –

Beneficence, Non-Malfeasance, Autonomy, Truth Telling, Confidentiality, Preservation of Life, Justice, Professional Attitude and Behaviour , Professional Development, Accountability, Confidentiality and Conflict of interest, Safety, Professional Responsibility, Sample and records collection.

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DDU Kaushal Kendra
Centre for Physiotherapy and Rehabilitation Sciences

Jamia Millia Islamia
New Delhi-110025

Syllabus

(w.e.f Academic Session 2015-2016)
B. VOC. Medical Laboratory Sciences (B. VOC.-MLS)

Duration: 3 years (6 semesters)

B.VOC. Medical Laboratory Sciences (B.VOC. MLS)
Duration: Three Years (6 semesters)

Semester	Sl No	Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
1	1	MLS101	Fundamentals of Human anatomy	42	3	25	75	100
	2	MLS102	Fundamentals of Physiology	42	3	25	75	100
	3	MLS103	Basic Biochemistry	42	3	25	75	100
	4	MLS104	Cell Biology & Medical Genetics	42	3	25	75	100
	Skill Components							
	5	MLS105	Fundamental of Computer & IT	42	3	25	75	100
	6	MLS106	English	42	3	25	75	100
	7	MLS107P	Practical I(MLS101, MLS 102)	84	3	25	75	100
	8	MLS108P	Practical II(MLS103, MLS 104)	84	3	25	75	100
			Total	**420**	**24**	**200**	**600**	**800**
2	1	MLS201	General, Systemic & Clinical Pathology	56	4	25	75	100
	2	MLS202	Clinical Biochemistry I	42	3	25	75	100
	3	MLS203	Instruments & Reagents	42	3	25	75	100
	4	MLS204	General Microbiology	42	3	25	75	100
	5	MLS205	Hematology & Hemoglobinopathies	56	4	25	75	100
	Skill Components							
	6	MLS206P	Practical III (MLS201, MLS 205)	84	6	50	150	200
	7	MLS207P	Practical IV (MLS202, MLS203)	84	6	50	150	200
	8	MLS208P	Practical V (MLS204)	28	2	10	40	50
			Total	**434**	**31**	**235**	**715**	**950**

Semester	Sl No	Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
3	1	MLS301	Clinical Biochemistry II	56	4	25	75	100
	2	MLS302	Systemic bacteriology	56	4	25	75	100
	3	MLS303	Blood Banking & Transfusion Medicine	56	4	25	75	100
	Skill Components							
	4	MLS304P	Practical VI (MLS 301)	42	3	50	50	100
	5	MLS305P	Practical VII (MLS 302)	42	3	50	50	100
	6	MLS306P	Practical VIII (MLS 303)	42	3	50	50	100
	7	MLS307P	Evaluative Clinical Training I	126	4	100	------	100
	Total			**420**	**25**	**325**	**375**	**700**
4	1	MLS401	Diagnostic Endocrinology	56	4	25	75	100
	2	MLS402	Immunology & Serology	70	5	25	75	100
	3	MLS403	Parasitology, Mycology & Virology	70	5	25	75	100
	Skill Components							
	4	MLS404P	Practical IX (MLS 401, MLS402)	84	6	100	100	200
	5	MLS405P	Practical X (MLS 403)	84	6	100	100	200
			Total	**364**	**26**	**275**	**425**	**700**

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 101	Fundamentals of Human Anatomy	42	3	25	75	100

Unit I: General & Systemic Anatomy: Introduction to anatomical terms and organization of the human body. Tissues –Definitions, Types, characteristics, classification, location, functions and formation. Musculoskeletal system: Bones – types, structure**,** Axial & appendicular skeleton. Bone formation and growth, Joints –classification and structure. Types and structure of muscles. Movements at the joints and muscles producing movements.

Unit II: Nervous System: Structure of Neuroglia & neurouns Parts, Clsssification CNS – Structure of Brain and spinal cord and their functions. PNS - Cranial nerves and spinal nerves ANS - Sympathetic and Parasympathetic. Structure of Skin, Eye, Nose, Tongue (Auditory and Olfactory apparatus)

Unit III: Cardiovascular System: Circulatory system – Structure of the Heart, Structure of Blood Vessels – arterial and venous system. Gross and microscopic structure of lymphatic tissue.

Unit IV: Respiratory System: Parts, Nasal cavity and Paranasal air sinuses, trachea, Gross and microscopic structure of lungs, Diaphragm and Pleura.

Unit V: Digestive System: Parts, Structure of Tongue, Salivary glands, stomach, Intestines, Liver, Pancreas.

Unit VI: Urinary & Reproductive System: Parts, structure of Kidney, Ureters, Urinary Bladder and Urethra. Parts of both male and female reproductive organs. Gross structure of both male and female reproductive organs.

Unit VII: Endocrine System: Gross structure of Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal glands

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 102	Fundamentals of Human Physiology	42	3	25	75	100

Unit I: BLOOD: Components, haematocrit, ESR, blood volume measurements. RBC, WBC & platelet counts, names of developmental stages of RBC, functions and fate of RBC. Functions of WBC and platelets. Basis of blood coagulation. Blood groups – ABO & Rh

Unit II: MUSCLE: Structure in brief, mechanism of muscle contraction, isotonic and isometric contractions, energy sources of muscle contractions, motor unit.

Unit III: GASTRO INTESTINAL TRACT: Functional anatomy of G.I.T, functions of G.I secretions, principles of secretion and movements of GIT.

Unit IV: KIDNEY & ENDOCRINES: Structure of Nephron, measurement and regulation of GFR, mechanism of urine formation. Clearance tests & values of insulin, PAH and urea clearance. Names of endocrine glands & their secretions, functions of various hormones, Brief account of endocrine disorders.

Unit V: REPRODUCTION: Reproductive cycle in female including menstrual cycle, pregnancy, parturition, lactation. Male sex hormones and spermatogenesis. Basis of contraception.

Unit VI: CARDIO VASCULAR SYSTEM: Anatomy of heart, cardiac cycle, heart sounds, definitions of cardiac output, stroke volume, principles of measurements of cardiac output. ECG – methods of recording and ECG waves. Normal values of blood pressure, heart rate and their regulation in brief.

Unit VII: RESPIRATION: Principles of respiration, respiratory muscles, lung volumes and capacities, collection and composition of inspired alveolar and expired airs. Transport of oxygen and carbon dioxide. Brief account of respiratory regulation. Definition of hypoxia, Cyanosis, asphyxia. Methods of artificial respiration.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total

MLS 103	Basic Biochemistry	42	3	25	75	100

Unit VIII: CENTRAL NERVOUS SYSTEM: Structure of neuron, nerve impulse, myelinated and non-myelinated nerve. Brief account of resting membrane potential, action potential and conduction of nerve impulse. Neuro-muscle transmission. Various parts of nervous system, C.S.F., Functions of muscle spindle and motor tracts including reflexes , cutaneous receptors, joint receptors, sensory pathways. Ascending reticular formation, EEG, functions of cerebellum, basal ganglia, thalamus & hypothalamus, vestibular apparatus and functions. Autonomic nervous system its division & functions. Structure of eyeball, retina, visual pathway, accommodation, visual acuity, error of refraction, color vision. Brief account external, middle and inner ear, hearing tests. Taste & smell receptors, pathways, method of transduction.

Unit I: Carbohydrates: Definition, function and classification of carbohydrate. Monosaccharide, glycoside formation, oligosaccharides and polysaccharides. Glycolysis, catabolic fates of pyruvate, metabolic fate of Acetyal-CoA and Citric acid cycle, gluconeogenesis, glycogen metabolism, pentose phosphate pathway.

Unit II: Biological Oxidation: Enzyme, coenzyme and electron carriers involved in biological oxidation. Electron transport chain. Oxidative phosphorylation. Substrate level phosphorylation. Inhibitors of electron transport chain.

Unit III: Amino acids and proteins: Definition, structure, classification, essential & non essential amino acids. Proteins definition and classification. Primary, secondry, tertiary and quaternary of proteins of proteins

Unit IV: Vitamins: Definition and classification of vitamins, difference between fat soluble and water soluble vitamins. Water soluble vitamins and fat soluble vitamins

Unit V: Lipids: Definition, classification and function of lipids. Fatty Acids, Triacylglycerols or Triacylgcerides or neutral fat. Fatty acid metabolism. Ketone body metabolism.

Unit VI: Enzymes : Introduction, definition, classification, coenzymes, active site of enzyme, cofactors of coenzyme, isoenzymes, properties, mechanism of enzyme action.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 104	Cell Biology & Medical Genetics	42	3	25	75	100

Section A: Cell Biology

Unit I: Cell Structure: Cell as a basic unit of life - discovery of cell, procaryotic and eukaryotic cell; unicellular and multicellular organisms;

Unit II: Microscopic Study of Cell: tools and techniques (compound microscope, electron microscope and cell fractionation); Ultrastructure of prokaryoytic and eukaryotic cell - cell wall, cell membrane - unit membrane concept (flauidmosaic model); membrane transport; cellular movement (exocytosis, endocytosis);

Unit III: organelles of Cell: Cell organelles and their functions- nucleus, mitochondria, plastids, endoplamasic reticulum, Gogli complex, lysosomes, lysosomes, microtubules, centriole, vacuole, cytoskeleton, cilia and flagella, ribosomes.

Unit IV: Cell Cycle: Eukaryotic Cell Cycle, Regulation of Cell cycle progression, Events of Mitotic Phase, Meiosis and Fertilization. Programmed Cell Death, Stem Cells and Maintenance of adult tissues, Embryonic Stem Cells and Therapeutic cloning

Section B: Medical Genetics

Unit V: Continuity of life: Heredity, variation; mendel's laws of inheritance, chromosomal basis of inheritance; other patterns of inheritance - incomplete dominance, multiple allelism,
quantitative inheritance.

Unit VI: Chromosomes: Bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination; sexchromosomes; sex determination; sex linked inheritance; mutation and chromosomal aberrations; Human genetics - methods of study, genetic disorders.

Unit VII: DNA as a genetic material: DNA structure and repliaction; structure of RNA and its role in protein synthesis; Gene expression - transcription and translation in prokaryotes and eukaryotes; regulation of gene expression, induction and repression - housekeeping genes; nuclear basis of differentiation and development; oncogenes.

Unit VIII: Recombinant DNA technology: Basics of Recombinant DNA technolgy cloning; gene bank; DNA fingerprinting; genomics -principles and applications, transgenic plants, animals and microbes.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 105	Fundamentals of Computer &IT	42	3	25	75	100

Unit I: Computer Systems as Information Processing System, Different Type of Computer Hardware; CPU, Input Devices, Storage Devices Communication Devices Configuration of hardware devices and their applications.

Unit II: Basic idea of Local Area Network (LAN) and Wide Area Network (WAN),E-mail Internet browsing, Multimedia. Introduction to Operating System: Software needs, operating systems, application software, programming language. Windows, windows explorer,print manager, control panel, paint brush, calculator, desktop, my computer, setting, find, Run.

Unit III: Introduction and working with Ms- Word in Ms-office: Word basic ommands,Formatting-text and documents,sorting and tables,working with graphics; Introduction to mail merge

Unit IV: Working with excel-formatting,Functions,chart features,workings with graphics in excel,using worksheets a database

UNIT V: Presentation with Power Point: Power point Basics, creating

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Tota
MLS 106	English	42	3	25	75	100

Unit I: English grammar: Articles,Preposition,Tenses,Voice,Direct and Reported Speech

Unit II: Vocabulary: Common Vocabulary, Word Often Confused, Some Common Errors

Unit III: Paragraph Writing: Process Writing, Descriptions Summarizing and Writing in brief of Medical passages,Note- taking Exercise,Formal Correspondence (Letter and application)-Application for job, for higher studies- Letter to The Editor, Ordering Equipments, Requesting for Information

Unit IV: SPOKEN ENGLISH: Communicative Skills, Discussion Sessions, Dialogue Sessions

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 201	General, Systemic & Clinical Pathology	56	4	25	75	100

Unit I: Introduction of pathology- Concepts of diseases. Classification of lesions. **Inflammation-** General features, vascular changes & cellular events, Chronic and acute Inflammation, Mediators of Inflammation. **Cell Injury, Death & Adaptation-** Definition & etiology (Irritants), Mechanism of cell Injury, Death and adaptation, classification, cellular aging, Celular adaptation to growth and its indicators, apoptosis. **Tissue & Cell Repair-**

Normal growth, Repair of bone, repair of wound, repairs of other structures, Pathology in repair.

Unit II: Haemodynamic Disorders- Odema, thrombosis, Embolism, Infarction, Shock, Hyperemia & congestion, Heomorrhage. **Neoplasm-** Definition, Classification, nomenclature and charatteristics, Ateiology & agents causing neoplasm, Biology of neoplastic growth & neoplasm immunology.

Clinical Pathology

Unit III: Routine urine examination—specimen, physical examination, chemical examination, microscopic examination , **routine** examination of CSF ,semen analysis, routine examination of sputum , routine examination of body fluids- pleural , peritoneal , synovial .

Systemic Pathology

Unit IV: Cardiovascular System- Myocardial Infraction, Atherosclerosis, Pericardial Heart Disease, Ischemic Heart Disease, response of Vascular Walls to injury, Venous Diseases. **Respiratory system-**Restrictive lung disease, pulmonary infection, pleural disorders- pneumothorax, pleural effusion, carcinomas, Cogentital anomalies, pulmonary vascular disease- Embolism, hemorrhage and infaraction, hypertension pulmonary.

Unit V: Digestive System- Disease of Oesophagus – Cngenital, Muscular, Infflamatory and Tumors, Salivary tumors, Stomach - Peptic Ulcer,Gastritis, Neoplasm of Stomach, Intestine – Inflammatory - Ulcerative Colitis, Crohns Disease,Infective – Entrocolitis, Colorectal cancer, Acute and Chronic Hepatitis, Cirrhosis of Liver, Neoplasm of Liver,Pancreatitis and Neoplasm of Pancreas. Glomerulonephritis – An Overview withÙrogenital system, Nephritic & Nephrotic Syndrome, Pyelonephritis, Renal Arteriosclerosis, Hydronephrosis ,Renal Cell Carcinoma, Hydronephrosis, Real cell carcinoma–Carcinoma of the Breast, Vaginitis, Endometrial Hyperplasia,Ovarian Tumors. Testicular Tumors,

Unit VI: Nervous system- Meningitis, Encephalitis, Cerebrovascular disease, Demylenating Disease, Alzheimres disease, Muscular Dystrophy, Disorder of Neuromuscular Junction, **Skeletal System-** Pyogenic Osteomyelitis,Tubercular Osteomyelitis, Tumors, Osteoporosis, Rickets, Osteoarthritis, Musculoskeletal system

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 202	Clinical Biochemistry I	42	3	25	75	100

Unit I:- Introduction of Clinical Biochemistry: Introduction & importance of clinical biochemistry. Methods of taking blood specimen, Separating the serum and plasma aseptically. Anticoagulant.

Unit II:- Integration of Metabolism and Metabolism in Starvation: Definition and Significance of integration of Metabolism, Integration of Metabolism at Cellular and Tissue or Organ Level. Blood glucose regulation. Metabolism in Starvation, Phases of Starvation and Diabetes.

Unit III:-Plasma proteins: Major classes of Plasma proteins, Synthesis of Plasma proteins, Function of Plasma Proteins, Separation of Plasma Protein.

Unit IV:- Metabolic intermediates: Introduction to Non-protein nitrogenous compounds ,urea/BUN: Synthesis, clinico-pathological correlations and estimations, Creatin and creatinine :Synthesis, clinico-pathological correlations and estimations, Uric acid :Synthesis, clinico-pathological correlations and estimations, Ammonia, Prophyrins,

Unit V:- Mineral & Metabolic Bone Diseases: Metabolism of Calcium, Phosphorus, Sulfur etc. Metabolism of Trace elements. Bone metabolism, Markers of bone metabolism.

Unit VI:- Water, Electrolyte Balance and Imbalance: Distribution of water and electrolytes in the body. Water and electrolytes balance. Regulatory Mechanism. Water and Electrolyte Metabolism. Dehydration. Acidosis and Alkalosis.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total

MLS 203	Instruments & Reagents	42	3	25	75	100

Unit I: Laboratory Safety

Laboratory safety measures, safe use and storage of chemicals and reagents , Laboratory hazards and accidents , First aid in accidents, Laboratory contamination and laboratory assoaciated infections, Preventing laboratory infection, Chemical and Biological waste disposal, Biosafety cabinets –types, Biosafety regulations for basic laboratory practises and procedures, WHO guidelines for clinical lab biosafety

Unit II: Clinical Laboratory Organization: Safe laboratory design and organization Operational standard and management, The Laboratory Manual or protocol accomodation, training of staff, quality assurance, Research and Literature in Clinical Laboratory: Medical Dictionaries, Merck Index, Pubmed Database, Role of seminar and conference

Unit III: Use of Basic Laboratory Instruments

Water bath, Balances, Hot plate, Magnetic stirrer, Hot air oven, pH meter, Incubator, Water Distillation Apparatus,

Unit IV: Preparation of Solutions and Reagents

Normal, Molar & percent solutions, Buffers-Preparation and types, pH and significance, Diagnostic kits

Unit V: Laboratory Techniques

Principle, & Applications of Centrifuges, Colorimetry and photometry, Spectrophotometry, flame photometry, fluorometry, End point reaction methods, Turbidimetry and nephelometry, Densitometry.

Chromatography**:** Principle, Chromatographic performance parameters, types of hromatography Electrophoresis:Principle, Types, electrophoresis of proteins & nucleic acids

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 204	General Microbiology	42	3	25	75	100

Unit I:- Introduction to Microbiology: Introduction of Medical Microbiology, Discovery of microorganism. Contribution of Antony Van Leeuwenhoek, Louis Pasteur and theory of spontaneous generation**,** Robert Koch and his postulates, Metchnikoff, Alexander Fleming.

Unit II:- Control of growth of Microorganism & Biomedical Waste management: Physical and Chemical Method of Control of Microorganism. Classification of Hazardous Waste. Different Locations of Biomedicals waste Generation. Importance of Segregation. Biomedical Waste Management process.

Unit III:- Microorganisms : The morphology and fine structure of Bacteria, Fungai, Alge, Protozoa and Viruses.

Unit IV: -Cultivation of Microorganism: Purpose of cultivation of Microorganism. Basic growth requirements and Essential growth factor. Types of media, Preparation of media, storage of media.

Unit V:- Staining: Classification of microbiology stains and different types of staining – Simple staining, Negative staining, Impregnation methods, Different staining (Gram staining), Special Staining – Z. N. stain & Albert stain, KOH test.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 205	Heamatology & Hemoglobinopathies	56	4	25	75	100

UNIT I. **Formation of blood cells -**General aspects of blood cell formation. Sites of blood formation- Structure of bone marrow, Development of blood cells- Morphology. Erythropoiesis, granulopoiesis, lymphopoiesis. Monocyte-macrophage series. Thrombopoiesis. Regulation of haemopoiesis.

UNIT 2. Blood Cells- Structure and Function of the red blood cell. Nutritional requirements for red cell production. metabolism of the red cells, Red cell count, Red cell indices. Physiology of white blood cells, functions of WBC. Ultra Structure, development & functions of platelets, platelet count

UNIT 3. Blood Cell Disorders - Disorders of Red Blood cells –Anaemia-Definition, causes of anaemia, morphological classification, Types, clinical features, physiological adaptation & Laboratory investigation of various types of anaemia Disorders of White blood cells: Leukemia: Definition, Etiology, Clinical features, Classification and laboratory diagnosis ,Lymphomas, Disorders of Granulocytes, Monocyte Macrophage system,Lymphocytosis, Immunodeficiency diseases Leukemoid reaction: Definition, Causes, Blood picture and differences from leukemia Platelet Disorders: Bleeding disorders caused by abnormalities of platelets, platelet function tests and their interpretation.

UNIT4. Hereditary disorders of Hemoglobin: Hemoglobinopathy, Hemoglobin Variants, Approach to diagnosis of hemoglobinopathies, Fetal hemoglobin , Hemoglobin electrophoresis, Sickling phenomena, Inclusion bodies .Thalassemia- classification, molecular basis, pathogenesis, clinical and laboratory features of Thalassemias, carrier screening. Sickle-cell disorders

UNIT5. Coagulation : Mechanism of coagulation, Screening of coagulation, , Inhibitors of coagulation,Role in Diseases, Disorders of Coagulation, Bleeding disorders caused by abnormalities of blood vessels **Fibrinolysis**: Components, Mechanism and diagnosis

UNIT 6. Principles, interpretation and clinical correlation of common laboratory tests Glucose6Phosphate Deficiency, Osmotic fragility, Methemoglobin, Serum Iron and TIBC.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS301	Clinical Biochemistry II	56	4	25	75	100

Unit I: Evaluation of liver & gastric function: - Test based on excretory function- serum bilirubin, bile acids and bile salts. Test based on synthetic function, test based on serum enzymes-serum enzymes as markers of hepatobiliary disease, markers of obstructive liver disease. Assessment of gastric & pancreatic function, malabsorption studies.

Unit II: Kideny function test: - Test to screen for kidney disease-complete urine analysis, plasma urea and creatainine. Test to assess renal function-glomerular filtration rate, clearance tests, glomerular permeability, proteinuria, assessment of tubular function-reabsorption studies, secretion test, concentration and dilution test, renal acidification. Uric acid excretion.

Unit III: Acid-Base balance & pH: - Buffers of body fluids, respiratory regulation of pH, renal regulation of pH, disturbances in acid-base balance- metabolic acidosis, metabolic alkalosis. Respiratory acidosis & alkalosis, anion gap, determination of blood pH & gases.

Unit IV: Clinical enzymology & biomarkers: – Clinical enzymology, plasma lipid profile, hypolipoproteinemias, hyperlipidemias. Cardiac markers-creatine kinase (CK-MB), cardiac troponins, high sensitive TnT, AST & LDH. Markers of Muscle diseases-creatine kinase (CK-MM), aldolase. Markers of bone disease- Alkaline phosphatase, heat labile bone isoenzymes. Prostate markers- prostate specific antigen, acid phosphatase. Miscellaneous enzymes-Glucose-6-phosphate dehydrogenase, urease, glucose oxidase & peroxidase.

Unit V: Automation: - Introduction of automation, continuous flow analyzers, semi-automated analyzers, fully-automated analyzer

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS302	Systemic bacteriology	56	4	25	75	100

Unit I: Collection, Transport and Examination of specimens

Specimen collection, preservation transportation and examination of specimens- urine, urogenital, throat and mouth, feces, blood and bone marrow, CSF, eye specimens, ear discharge, pus from wounds, abscesses, burns & sinuses.

Unit II: Identification of Bacteria

Culture media, Culture Methods-Aerobic & Anaerobic culture methods, Identification methods-Morphology & Culture characteristics, Staining Reactions, Resistance, Metabolism, Biochemical properties-IMViC Tests, Biochemical reactions on TSI slants, Antibiotic resistance, Antimicrobial sensitivity tests

Unit III: Study of gram positive bacteria

Gram positive cocci – staphylococci,streptococci.

Gram positive bacilli – Corynebacterium, Mycobacterium, Listeria, LactoBacillus, Anaerobic bacteria -Clostridia.

Unit IV: Study of Gram negative bacteria

Gram negative cocci - Neisseria

Gram negative bacilli – Enterobacteriaceae, Pseudomonas, Vibrio, Aeromonas, plesiomonas, Campylobacter, Bacteroides, Bordetella, Brucella, Haemophilus, Pasteurella, Francisella, Spirochaetes, Chlamydia, Rickettsia, Mycoplasma, etc

Unit V: Automation in Bacteriology

Introduction, BACTEK system, The ATB system, The VITEK system, The API systems, BacT/ALERT 3D automated microbial detection system

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS303	Blood Banking & Transfusion Medicine	56	4	25	75	100

Unit I: Introduction to blood banking ---basic immunohematologic concepts — red cell Antigens--- Immunogenicity--Blood Group Antibodies---Natural antibodies –immune antibodies—autoantibodies ---alloantibodies ---The Complement System and role of Complement in Erythrocyte Destruction -- human blood group systems ---ABO and Rh blood group Systems -- other blood groups - inheritance of blood group systems

Unit II: Pretransfusion testing ---Blood groupig & Rh typing --- Basic Principles—Hemagglutination--- Factors Affecting Hemagglutination---Grading of Hemagglutination Reactions---Tube Reactions---ABO blood group typing problems - Antihuman globulin test --- direct Coomb's test--- indirect Coomb's test---antibody screening – cross matching --- Specimen Requirements--Documentation and Record Keeping ---anti -D titration ---blood screening for Transfusion transmitted diseases --TTD—quality control in blood bank procedures

Unit III: Blood collection –- donor selection criteria—phlebotomy—anticoagulants-- blood preservation ---techniques for separation of blood components—apheresis—hemapheresis —blood and blood component transfusion therapy – indications & selection of blood components – leucoreduction -- irradiation

Unit IV: Blood transfusion --- presurgical blood donation – autologous transfusion -- Massive blood transfusion---exchange transfusion —neonatal and paediatric transfusion --- Maximum Surgical Blood Order Schedule--- transfusion reactions—transfusion reaction investigations---blood transfusion interavtive.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS401	Diagnostic Endocrinology	56	4	25	75	100

Unit I: Introduction and classification of hormones, difference between hormones and enzymes, Regulation and general mechanism of action of hormones.

Unit II: Pituitary gland & hypothalamus, hormones of the Anterior Pituitary- Growth hormone, Prolactin, Gonadotropin, Follicle Stimulating hormone, Leuteinizing Hormone, Thyroid stimulating hormone (TSH), Adrenocorticotropic hormone (ACTH)
Unit III: Thyroid hormones – T3, T4, PTH, disorders. Neurohypophysis hormones-Oxytocin, Antidiuretic hormone.
Unit IV: Kidney hormone-Renin, Adrenal gland hoemones-Aldosterone, Glucocorticoids, Mineralocorticoids, cortisol, disorders.
Unit V: Gonads hormones-Testosterone, Estrogens, Progesterone, Human Chorionic Gonadotropin (HCG), disorders.
Unit VI: pancreatic hormone- Insulin, glucagon, somatostatin, disorders.
Unit VII: Diagnostic endocrinology techniques- ELISA, RIA, chemiluminescence assay Procedure for hormones – physiological effects produced by normal and abnormal levels of various hormones.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 402	Immunology & Serology	70	5	25	75	100

Unit I: Cells and organs of the Immune system, Immunity – innate and acquired immunity, humoral and cell mediated immunity, Primary and secondary immune response.

Unit II: Antigen – Classes, properties. Antibodies/Immunoglobulins – Structure, Properties, Types of Immunoglublins, Complement, Introduction to serology

Unit III: Immunological principles of various reactions and techniques: Affinity and avidity, cross reactivity, precipitation, agglutination, neutralisation, opsonisation, immunodiffusion, immunoelectrophoresis, ELISA (indirect, sandwich, competitive, chemiluminescence, and ELISPOT assay), western blotting, immunofluorescence, flow cytometry and immunoelectron microscopy.

Unit IV: Diagnostic Immunology & serology -qualitative & quantitative tests, Widal test, VDRL Test, ASO Titre, Rheumatoid factor, C Reactive protein, HbsAg, Anti HCV, Anti HIV, Automation in serology

Unit V: Allergy, Hypersensitivity, Different hypersensitive reactions -type I, II, III, IV, Major Histocompatibility Complex and Antigen presentation, Tumor immunity, Tolerance, Autoimmunity-Mechanism, Transplantation immunology

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 403	Parasitology, Mycology & Virology	70	5	25	75	100

Unit I: General parasitology-introduction – Basic concepts in medical parasitology -- Association between parasite and host—Effect of parasites on the host—Mechanism of disease production by parasites—life cycle—types of life cycle—transmission of parasitic disease- preventive measures for parasitic diseases
Unit II: Introduction & classification of medically important parasites –E.histolylica, Giardia-Malaria parasite – Leishmanial parasites-Tapeworms—Flukes of liver—Intestinal nematodes —tissue nematodes –Arthropods—Importance of Arthropods in Parasitology—Classification of Arthropods- Medical conditions related to arthropods
Unit III: Introduction to Mycology – Classification of pathogenic Fungi—Morphology of Fungi —Laboratory diagnosis of Fungi- KOH preparation – LCB mount – Culture media and

methods –collection and transport of Specimen – Brief idea of Superficial Mycoses – Subcutaneous Mycoses –Systemic Mycoses – Opportunistic Mycoses

Unit IV: Introduction to Virology—general properties of viruses-classification of viruses-virus host interaction –Morphology of viruses –Replication of viruses –Cultivation of viruses, mode of infection –spread—Laboratory diagnosis of viral infections—Hepatitis –HIV-oncogenic virus – structure and significance of bacteriophage

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 501	Histopathology & Cytology	70	5	50	150	200

Unit I:

Introduction to histotechnology – Cells, Tissue ,organs and their functions -- Different human organs and their gross and histological structure and functions --- Collection of specimen ---Fixation -- Classification of fixatives, Simple Fixatives and their properties-- fixation of different tissues --Decalcification

Unit II:

Tissue processing—manual & automated tissue processing –- fixation-- Dehydration ----Clearing -- Impregnation --Embedding--Paraffin block making --- Section Cutting---- Microtomes and microtome knives -- types --- use and care-- sharpening of knife, Microtome use – Honing—Stropping--Techniques of section cutting ---- Frozen section.

Unit III:

Priniples of staining-- Dyes and their properties -- stains used in histopathology -- Staining with haematoxylin and eosin.--Congo red-- methyl violet-- Leishman stain — Giesma – Special stains ----VG , PAS ---Masson's trichrome , Perl'Prussian blue -- Alcian blue ---Reticulin –immunohistochemistry.

Unit IV:

Introduction to Cytology ---- Exfoliative Cytology --- Fine needle aspiration cytology ----collection and preservation of specimens ---- Preparation and fixation of smears --- Staining methods --- Papanicolaou's staining technique --- MGG staining --- H & E staining --- Cytospin and cell block preparation.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total
MLS 502	Molecular Diagnostics	70	5	25	75	100

UNIT 1:

Organization of the Genome –Molecular composition and structure, Pathway for the transfer of genetic information, Chromosome structure, Structure of gene, Replication of DNA, Transcription of DNA to RNA, Translation, Transcriptional control, The operon concept, DNA repair, DNA mutations.

UNIT II:

Molecular Biology Techniques- Nucleic acid extraction, Hybridization assays, DNA amplification techniques – Fundamentals of polymerase chain reaction, Restriction Fragment Length Polymorphism.

UNIT III:

Applications of Molecular diagnostics- Diagnosis of cancer by using molecular techniques, Molecular diagnosis of genetic diseases, Forensic identify testing (Parentage testing, DNA finger printing).

UNIT IV:

Cytogenetics- Use of cell culture for cytogenetic studies, General method of preparation of cell culture, Study of constitutional chromosome patterns.

Paper Code	Paper Name	Total Hrs	Credit	IA	SE	Total

MLS 503	Public Health	28	2	10	40	50

Unit --I: Basic Concepts of Public Health

Natural History of Disease--- Determinants of health---- multi – factorial causation of disease –host ,agent , environment relationship ---primary--secondary and tertiary levels of prevention with examples related to few diseases of national importance--- Mode of transmission of disease Air – borne, vector and vehicle transmission--- Methods of control ----Disinfection of the infective materials received in the Laboratory by using the appropriate disinfection methods, at the health centre level.

Unit – II: Health Programme & Organization

Description of organization of health services at the centre and state levels---Primary Health Care - Definition, components and principles of primary health care--- Health for all indicators. Primary Health Centre-- role of laboratory technicians in primary Health--- National Programmes of Health and disease eradication-- Health Programmes---- Family Welfare Programme ---Immunization and universal immunization programme---- Disease Eradication programme---Leprosy ,--Disease control programmes---Tuberculosis--- Malaria —Goitre

Unit --III: Statistics

Statistics--- Presentation of data ----general tabulations ---Simple Tables-- Frequency Distribution Tables ---diagrams ---Bar Diagrams, Histogram, Line Diagram --Pie Diagram --- statistical averages ---calculation of Mean, Median, Mode-- measures of dispersion --- Normal Curve, Range, Standard Deviation and their significance

Unit – IV: Health Education

Environmental sanitation--- Methods of water purification and disinfection, collection of water samples, their transport and bacteriological analysis--- Food and Nutrition--- Food-borne diseases of Public Health importance---Assessment of Nutritional status—nutrition programmes-- Management of Sanitation in Public Health --- Health education – definition, principles, objectives, pupose

MLS -- 601 Quality Assurance & Medical ethics

Unit 1

Introduction to laboratory quality management --- Essential elements of Quality Assurance Programme -- quality assurance – quality assessment – quality control---quality planning --- Internal Quality control—Control of pre-analytical variables-- control of analytical variables--- Quality Control of the chemicals, reagent ---laboratory precision, accuracy & sensitivity --basic steps –sources of error ---correction methods -- Corrective action preventive action

Unit 2

Validation of methods--- Reference materials and calibrating definitive methods --- Systemic and random errors —Westgard rules -- Quality control charts--Levey-Jenning chart-- Cusum chart and Gaussian curve--- Internal and external factors for quality control assurance – external quality control--- quality improvement-- current trends in laboratory accreditation

Unit 3

Basic principles of ethics in laboratory medicine ---general application of ethical principles – Co-operation and working relationship with other health professionals--- Respect and equal treatment -- Dignity and privacy of patient --Communication and informed consent--- Decision-making for incompetent patients--Responsibility from acquisition of the specimen to the production of data --- confidentiality of information ---storage and retention of medical records --- access to medical records--- Reporting unsafe or unethical practices--- future of medical ethics