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REGULATIONS & COURSES OF STUDIES OF 2 YEARS
MASTER OF PHYSIOTHERAPY (MPT): 2023

THE ODISHA UNIVERSITY OF HEALTH SCIENCES,
BHUBANESWAR- 751009

5-4-24

REGULATIONS & COURSES OF STUDIES FOR THE 2 YEARS MASTER OF PHYSIOTHERAPY (MPT) (ALL 7- SPECIALITY) DEGREE - 2023

1. **Title and commencement of the Program**:
   (a) These regulations may be called "Master of Physiotherapy (In short MPT) Regulations 2023".
   (b) They shall come into force from the current academic year 2023-24.
   (c) The Regulations and courses of studies prescribed are subject to modification by the Academic Council and Executive Board of the Odisha University of Health Sciences, Bhubaneswar from time to time.

2. **Introduction:** Physiotherapy is concerned with human function and movement and maximising physical potential. It is concerned with identifying and maximising quality of life and movement potential within the spheres of promotion, prevention, treatment / intervention, habilitation and rehabilitation. Physiotherapy helps to restore movement and function when someone is affected by injury, illness or disability. It can also help to reduce risk of injury or illness in the future. Physical forces like heat, electricity, mechanical pressure, and mechanical forces are used in physiotherapy to treat patients.

   Physiotherapy courses focus more on practical and hands-on education about treating joint and muscular impairments. Physiotherapy is a form of treatment to aid injuries, disabilities and any other form of deformities through movement and manual therapy. Physiotherapists use methods like massages, heat therapy, and exercises to treat patients.

   This course aims to deepen students' understanding of human anatomy, physiology, biomechanics, and the principles of rehabilitation. It emphasizes hands-on learning, enabling you to develop expertise in physiotherapy assessment, diagnosis, and advanced techniques across all specialities in Rehabilitation, Musculoskeletal Conditions (Orthopaedics), Paediatrics, Neurology, Cardio Pulmonary Disorder, Sports Science and Biomechanics. During the program, the learner will learn a wide range of techniques, including manual therapy, neurological techniques, ICU techniques, sports physiotherapy etc. This diverse skill set will make the learner a versatile and sought-after professional. By mastering these techniques, you will acquire specialized skills that are highly valued in the field of physiotherapy.

3. **Goal**: Throughout a person's life, the goal of physiotherapy is to restore maximum movement and functional ability.

4. **Objective:** The objective is to;
   (i) Provide honest, competent and accountable physiotherapy services to the community,
   (ii) Enable student to gain adequate knowledge, skills and clinical hands-on experience leading to an ability to establish independent professional practice in the specialized areas of interest.
   (iii) Prepare for ethical, evidence-based, efficient treatment of adult as well as paediatric patients / clients with an array of conditions (e.g. musculoskeletal, neuromuscular, cardiovascular / pulmonary, integumentary etc) across the lifespan and the continuum of care, to all people irrespective of gender, caste, nation, states and territories, region, minority groups or other groups.
   (iv) Promote the health and wellbeing of individuals and the general public / society, emphasizing the importance of physical activity and exercise.
   (v) Prevent impairments, activity limitations, participatory restrictions and disabilities in

individuals at risk of altered movement behaviors due to health factors, socio-economic stressors, environmental factors and lifestyle factors.

5. **Eligibility and admission to the Course:**
(i) Bachelor in Physiotherapy or Bachelor of Science in Physiotherapy recognised by any Indian University with 50% in aggregate.
(ii) Certificate: Every candidate before admission to the course shall be required to submit College Leaving Certificate, Migration Certificate (if applicable) in original, Physical Fitness Certificate and a declaration before the Principal / Director of the Institution that
(a) I am not continuing in any Degree Course under any State, Deemed, Central University and Autonomous Body.
(b) I am not continuing in any position under any state or central government and shall join during the continuation of this course.
(c) I have not been involved in any kind of criminal and unlawful activities in the past.

Provided, the guidelines prescribed from time to time by the Government in Health & Family Welfare Department, Odisha pertaining to enrolment of candidates to the course shall be binding on all colleges / institutions.

Provided further, after fulfilment of all condition (s), the University on receipt of student detail with prescribed fees, shall issue University Registration Number as per OUHS First Statute-2023, which shall be used as Roll Number for all Examination (s).

6. **Duration**: The duration of the programme is of two years including compulsory submission of dissertation and clinical practice, which can be completed in a maximum of 4 years from the date of admission to the programme.

7. **Medium of instruction**: English shall be the medium of instruction for all the subjects of study and for examination of the course.

8. **Commencement of the Course**: The course will commence from August / September 1st of every year.

9. **Academic Year**: The academic year shall be twelve months and commencing on the first day of enrolment into the course.

10. **Attendance**: The component wise attendance percentage shall be as under;

Subjects	Eligibility criteria
Subjects taught in one phase (Theory)	80 %
Clinical / Practical Training	100 %

11. **Course Cycle, Codes and Structure:** The two-year full-time programme. There shall be 11 (Eleven) Numbers of Theory, Practical / Clinical including Dissertation in all two years. The total marks for the Course is **1150**.
The total number of digits used as subject code in the course is 08 (Eight).
i. The 1st two digits (Numerical) indicates the Year of Courses of Studies.
ii. The 3rd, 4th & 5th digits (Letters) indicate the Course Code "MPT".
iii. The 6th digit (Numerical) indicates the sequence of the Year.
iv. The 7th & 8th digits (Numerical, Numerical and Letter) indicate sequence of the Theory Subject (s) of the Year, and Speciality or Practical.

Table No 01 Course Structure:

Sub Code	Sub Title	Contact Hours		Internal Assessment		U- Assessment		Total
		Theory	Practical / Clinical	SE	Prac / Viva	Theory	Prac / Oral	
First Year								
23MPT101*	Physiotherapy Process & Practice	90	20	20	--	80	--	100
23MPT102*	Research Methodology & Biostatistics	90	20	10	--	40	--	50
23MPT103*	Biomechanics & Therapeutics	90	--	20	--	80		100
23MPT1__	Specialty Paper- I (Physiotherapeutic perspective in _____)	120	120	20	--	80		100
23MPT1P1	Biomechanics & Therapeutics	--	120	--	20	--	80 **	100
	Skill Acquisition & Refinement (Teaching Assessment, Seminars, Journal Club & Case Studies etc.)	--	240	--	--	--	--	--
	Dissertation	--	240	--	--	--	--	--
	Clinical Training	--	540	--	--	--	--	--
Total		390	1260	70	20	280	80	450
Second Year								
23MPT201 *	Exercise Physiology	90	--	20	--	80	--	100
23MPT___	Specialty Paper – II Physiotherapy Assessment in _____	120	--	20	--	80	--	100
23MPT___	Specialty Paper- III Physiotherapy in Clinical_____)	120	--	20	--	80		100
23MPT___	Practical Paper – II Physiotherapy Assessment in _____		120	--	20		80** (50+30)	100
23MPT___	Practical Paper- III Physiotherapy in Clinical _____		120	--	20	--	80** (50+30)	100
23MPT2DP	Dissertation & Project Report	--	720	--	--	--	100	100
	Skill Acquisition & Refinement (Teaching Assessment, Seminars, Journal Club & Case Studies etc.)	-	240	--	-	--		
	Clinical Training		540					
Total		330	1740	60	40	240	260	600
Grand Total								1050

** Common Subject for all Specialties, and ** (50 Marks-Presentation + 30 Marks- Oral Viva)*

SPECIALITIES

(i) **Rehabilitation:**

First Year

23MPT1R1 Physiotherapy perspective in Rehabilitation.

Second Year

23MPT2R2 Physiotherapy Assessment in Rehabilitation.

23MPT2R3	Assessment & Diagnosis of Rehabilitation.
23MPT2P1	Physiotherapy Assessment in Rehabilitation.
23MPT2P2	Assessment & Diagnosis of Rehabilitation.

(ii) **Musculoskeletal Conditions:**

First Year

23MPT1M1	Physiotherapy perspective in Musculoskeletal Conditions.

Second Year

23MPT2M2	Physiotherapy Assessment in Musculoskeletal Conditions.
23MPT2M3	Assessment & Diagnosis of Musculoskeletal Conditions.
23MPT2P1	Physiotherapy Assessment in Musculoskeletal Conditions.
23MPT2P2	Assessment & Diagnosis of Musculoskeletal Conditions.

(iii) **Pediatrics:**

First Year

23MPT1P1	Physiotherapy perspective in Pediatrics.

Second Year

23MPT2P2	Physiotherapy Assessment in Pediatrics.
23MPT2P3	Assessment & Diagnosis of Pediatrics.
23MPT2P1	Physiotherapy Assessment in Pediatrics.
23MPT2P2	Assessment & Diagnosis of Pediatrics.

(iv) **Neurology:**

First Year

23MPT1N1	Physiotherapy perspective in Neurology.

Second Year

23MPT2N2	Physiotherapy Assessment in Neurology.
23MPT2N3	Assessment & Diagnosis of Neurology.
23MPT2N1	Physiotherapy Assessment in Neurology.
23MPT2N2	Assessment & Diagnosis of Neurology.

(v) **Cardio-Pulmonary Disorder:**

First Year

23MPT1C1	Physiotherapy perspective in Cardio-Pulmonary Disorder.

Second Year

23MPT2C2	Physiotherapy Assessment in Cardio-Pulmonary Disorder.
23MPT2C3	Assessment & Diagnosis of Cardio-Pulmonary Disorder.
23MPT2C1	Physiotherapy Assessment in Cardio-Pulmonary Disorder.
23MPT2C2	Assessment & Diagnosis of Cardio-Pulmonary Disorder.

(vi) **Sports Science:**

First Year

23MPT1S1	Physiotherapy perspective in Sports Science.

Second Year

23MPT2S2	Physiotherapy Assessment in Sports Science.
23MPT2S3	Assessment & Diagnosis of Sports Science.
23MPT2S1	Physiotherapy Assessment in Sports Science.
23MPT2S2	Assessment & Diagnosis of Sports Science.

(vii) **Biomechanics:**

First Year	
23MPT1B1	Physiotherapy perspective in Biomechanics.
Second Year	
23MPT2B2	Physiotherapy Assessment in Biomechanics.
23MPT2B3	Assessment & Diagnosis of Biomechanics.
23MPT2B1	Physiotherapy Assessment in Biomechanics.
23MPT2B2	Assessment & Diagnosis of Biomechanics.

12. **Plan of Studies (Teaching, Training & Practice):** The teaching and training shall be on a full-time pattern with graded responsibilities in the management and treatment of patients entrusted to his / her care. The plan of studies consists of classroom lectures, practical and laboratory demonstrations, bed side clinics, discussions, self-directed academic activities and clinical postings. Every candidate required to take part in seminars, group discussions, clinical rounds, case demonstrations, clinics, journal review meetings etc. In addition, shall be required work, prepare, and submit a Dissertation in the speciality and is mandatory.

12.1. First Year: A student admitted in a speciality will be required to study - theory, undertake training, practical, clinical postings etc for 1650 clock hours. During the first year, s/he shall be required to study in Physiotherapy Process & Practice, Research Methodology & Biostatistics, and Biomechanics & Therapeutics. In addition, s/he shall be required to study one paper of his / her Speciality enrolled in, and clinical training of 540 hours. There shall be one practical paper of Biomechanics & Therapeutics. Besides, s/he will devote 240 clock hours to for skill acquisition & refinement (Teaching, Assessment, Seminars, Journal Club, and Case Studies. Further, s/he shall involve him / herself for 240 hours in identification of an area for undertaking his / her dissertation work which will be submitted in the second year.

Provided, activity (s) of second year will start from first year but assessment shall be made in the second year only.

12.2. Second Year: A student will be required to undertake theory, training, practical, clinical postings etc for 2070 clock hours. During second year, s/he shall study the compulsory paper Exercise Physiology, and Paper II and II respectively - Physiotherapy Assessment, and Physiotherapy in Clinical of Speciality, and Clinical training. Besides, s/he will devote 240 clock hours to for skill acquisition & refinement (Teaching, Assessment, Seminars, Journal Club, and Case Studies. Further, s/he shall involve him / herself for 720 hours in preparation of his / her Dissertation & Project Report which will be submitted for approval by the Institutional Research Committee. After approval of the Dissertation Report, it shall be evaluated by an External Examiner. The submission and acceptance / pass shall form a pre-requisite to register / for being eligible to appear 2nd Year Annual Examination.

12.2.1. Dissertation: Every candidate is required to carry out work on a selected research work in his / her speciality under the guidance of a regular postgraduate teacher of the conducting College / Institution. The Institutional Research Committee will consist of the Head of the Department, all regular member faculties of the Department, and University nominees in respective areas of speciality. Dissertation thus prepared shall be submitted to the Head of the Department of the College / Institution who in turn will place before the Institutional Research Committee, and upon acceptance, it shall be sent for evaluation (report and comprehensive viva voce) by an external examiner appointed by the University. Dissertation once defended need not be defended at successive examination attempts.

13. Scheme of Internal Assessments, Practical / Clinical, and passing criteria:

13.1. Theory & Practical / Clinical:

(i) There shall be a minimum of 2 periodic assessments, for theory and practical including viva separately, and are mandatory for the student.

(ii) Average of the marks of the best two periodic assessment shall be taken as internal assessment mark of the candidate.

(iii) The class average of internal assessments mark of theory and practical should not exceed 80 % of Maximum marks.

(iv) The class average of internal assessment for an examination shall be calculated based on the total number of candidates in a particular batch appearing for that internal assessment examination.

(v) The candidate must secure the minimum 50 % marks for internal assessment in theory and practical separately in each subject in order to be eligible to appear in the university examination of the Year.

(vi) Each student should maintain a logbook and record the procedures they do and the work patterns they are undergoing. It shall be based on periodical assessment, evaluation of student assignment, preparation for seminar, clinical case presentation, assessment of candidate's performance in the sessional examinations, routine clinical works, logbook and record keeping etc.

14. Eligibility criterions for appearing University Examinations:

A candidate shall be eligible to carry forward all the courses if a s/he fulfills the following criterions and hereafter prescribed under Regulation 18.1.

In addition,

(i) Attended 80 % theory and 100% Clinical / Practical training classes,

(ii) Passed in Internal Assessment (s) with minimum 50% marks, and

(iii) Acceptance of Dissertation Report to be eligible for registering 2nd Year Annual Examination,

(iv) Have passed minimum two theory subjects with practical / clinicals in the 1st Year Examination, and

(iii) Not been debarred for any objectionable mis-conduct or malpractice by the Institution, and University.

15. Examinations [University (Theory & Practical / Clinical)]:

15.1. There shall be annual examination at the end of each academic year. A candidate securing a minimum of 50% marks in internal assessments of individual subjects and 50% marks in internal clinical evaluations (clinical assessment, client contact hours and internal viva) to be conducted by the College / Institution will only be eligible and allowed to appear for university examinations of the respective year.

Provided, the College / Institution shall submit the internal marks to the University before registering the eligible students for appearing annual examinations of the year. In the event, a College / Institution fail or does not submit the mark (s) before the cut-off date, it shall be treated that no examination (s) have been conducted, and thereby the students shall not be allowed to register for respective University annual Examinations.

15.2. Theory examinations: Each theory paper of the examinations conducted by the University shall be valued by external examiner appointed by the University, and marks rounded to the next integer shall be awarded to the candidate.

15.3. Clinical / Practical Examinations: The University practical / clinical Examination (s) carrying 75 (Seventy-five) marks shall be conducted by one internal examiner and one external examiner (s) appointed by the University.

16. Registration: A candidate shall be eligible to register for Annual (Regular / Back) Examination only when s/he has fulfilled college and corresponding university criterions.

(i) The College / Institution shall register the subjects of eligible students with the University on payment of a fee as to be notified by the University towards conduct of Regular / Back Theory examinations. The College / Institution shall retain 15 % of the University Examinations fees to meet the expenditure of Examination Centre. However, such retention of fees shall not be applicable in case of Back Paper or Supplementary Examinations.

(ii) The College / Institution shall follow uniform Question pattern / template / Answer Booklets and Records for conducting Internal Assessment and Clinical / Practical Tests.

17. Passing Heads: The passing head (Theory and Practical / Practicum) is as under;

(i) A Student is required to obtain a minimum of 50% in each of the theory papers, internal assessment, practical and clinical exams for a pass.

(ii) A Students will not be able to appear for University theory exam if they do not pass in their practical, internal assessment or clinical component.

(iii) A Students will have to pass the clinical examination of the given year to proceed to the next year.

(iv) A candidate failing in one or more subject (s) shall appear for the subject (s) as a whole in the next appearance (i.e. Theory, Practical, and Viva).

(v) A student shall be declared to have passed the examination if he/she obtains the following minimum qualifying marks: -

(a) 50% of Marks in Internal Assessment (I.A) – Theory & Practical / Clinical.
(b) 50% of Marks in the University Practical / Clinical Examination.
(c) 50% of Marks in the University Theory Examination,
(d) Fail in University Clinical / Practical subject Examination (s) shall be treated as fail in Theory of the Subject.
(e) 80% marks- for acceptance of Dissertation.

18. Promotion to Higher Year, Re-admission after discontinuation or Break of Study into the Course:

(i) A candidate having 80% attendance in theory and 100% in practical in all the subjects,
(ii) Passed in internal assessment, registered and appeared the 1st Year subjects (Theory & Clinical / Practical) will be allowed to keep terms up to 2nd Year.
(iii) The candidate shall be promoted to second year examinations only after clearing minimum two theory subject and all practical papers of 1st year Examinations.
(iv) The candidates shall be eligible for registering 2nd Year Annual Examinations provided s/he has passed all practical internal assessments, submitted and Passed in Dissertation & Project Report on or before the notification for the Annual Examinations.

18.1. A candidate will be allowed for re-admission;

a) If s/he did / could not register for the 1st year Annual Examinations.
b) If the candidate is eligible, and has permissible tenure to complete the remaining tenure / years of four year to complete the course.

Provided further, s/he shall be required to apply in the prescribed form with fees as prescribed for the purpose, and shall be admitted in the course in force (Dual Syllabus).

19. **Supplementary Examination**: There will be a supplementary examination for final year theory subjects within three months from the date of publication of 2nd year annual examination to extend a chance to clear the failed theory subjects of 2nd year if any only. However, a candidate shall not be eligible; if s/he has not registered for the 2nd Year Annual Examinations, or not being eligible to register and accordingly has not appeared the respective years Annual Examinations.

A student having more backlog after availing the chance, shall not be allowed to re-appear in the subsequent years Supplementary Examination meant for the regular final year students only. Such student (s) will be allowed re-appear back theory subjects only with the student in Regular Examinations.

20. **Classification of successful candidates and award of Degree**: The University shall adopt Marking and division practice.

20.1. Candidate will be awarded division after successful completion and internship at the end of four and half years. The percentage of marks will be calculated from aggregate of total marks obtained in all the four years University examinations.

(i) First Class with Distinction: 75 % and above in aggregate of marks of all subjects including theory, clinical / practical with Internship -Project in the first attempt.

(ii) First Division - 60% and above in the aggregate marks of all subjects.

(ii) Second Division – 50% or more but less than 60% in the aggregate of marks of all subjects.

20.2. A candidate will be awarded Master Degree in Physiotherapy in Speciality (M.P.T in Speciality) to a candidate who complete the prescribed period, two academic year's courses of Studies, and has passed in all subjects (Theory, Practical / Clinical and Compulsory Dissertation).

21. **Record and Evaluation Guidelines:** The Practical Answer Booklet, Project Assignment / Record Book shall be as per the guidelines to be issued and to be strictly followed by the Examiners while assessing a practical component.

22. **Withdrawal from Course, Struck off from the rolls of the College / Institution Admitted and withdrawal of Degree**:

22.1. The University upon application, shall cancel the registration number issued to the candidate, and issue migration certificate on payment of fee as to be prescribed by the University.

22.2. Any student who does not clear the Master of Physiotherapy Course in all the subjects within a period of 4 years (from the year of admission / academic year shall be discharged from the course.

22.3. Any student found to have obtained admission in fraudulent manner, if the documents furnished for gaining admission by any student are found to be forged / false / doctored at any stage of study.

22.4. If any student is found to be involved in serious breach of discipline.

22.5. A degree awarded by the University may be withdrawn if it is found at the later stage that the candidate has submitted any forged document or ineligible at the time of admission to the course.

23. **Medal (s), Award (s) & Prize (s)**: The University shall notify as and when decided by the Academic Council and Executive Body from time to time.

24. **Discretionary Power**: Notwithstanding anything contained in the above, in case of any doubt or difficulty as to the interpretation of these Regulation (s), the matter shall be referred to the Vice Chancellor and his / her decision in this behalf, subject to the provisions of the OUHS Act - 2021, and OUHS 1st Statute - 2023 shall be final.

Annexure- A (Series)

Registration no: | | | | | | | | | | |

Total Number of Pages: (XX)			Course: MPT
			SUB_CODE:
(---th) Year Regular / Back Examination: 20			
SUBJECT NAME:			
BRANCH:			
Max Time: 3 Hours			Sitting: 1st 10.00 AM to 1.00 PM
Max Marks: 80			
Q. CODE: (To be allotted by the University)			
All Questions are compulsory. Illustrate answer with diagrams wherever relevant / required			
The figures in the right-hand margin indicate marks.			
(Attend four long questions out of seven, and short questions any five out of eight)			
Q 1		Long Answer Question	(1 X 15 marks)
Q 2		Long Answer Question	(1 X 15 marks)
Q 3		Long Answer Question	(1 X 15 marks)
Q 4		Long Answer Question	(1 X 15 marks)
Q 5		Long Answer Question	(1 X 15 marks)
Q 6		Long Answer Question	(1 X 15 marks)
Q 7		Short Answer Questions (Answer any five out of eight)	(5 x 4 marks)
	a)		
	b)		
	c)		
	d)		
	e)		
	f)		
	g)		
	h)		

Annexure- A (Series)

Registration no: | | | | | | | | | | |

Total Number of Pages: (XX)			Course: MPT
			SUB_CODE:
(---th) Year Regular / Back Examination: 20			
SUBJECT NAME:			
BRANCH:			
Max Time: 1 ½ Hours			Sitting: 1st 10.00 AM to 11.30 AM
Max Marks: 40			
Q. CODE: (To be allotted by the University)			
All Questions are compulsory. Illustrate answer with diagrams wherever relevant / required			
The figures in the right-hand margin indicate marks.			
(Attend two long questions out of four, and short questions any five out of eight)			
Q 1		Long Answer Question	(1 X 15 marks)
Q 2		Long Answer Question	(1 X 15 marks)
Q 3		Long Answer Question	(1 X 15 marks)
Q 4		Long Answer Question	(1 X 15 marks)
Q 5		Short Answer Questions (Answer any five out of eight)	(5 x 2 marks)
	a)		
	b)		
	c)		
	d)		
	e)		
	f)		
	g)		
	h)		

2- Year Master of Physiotherapy: 2003

1ST YEAR MPT

PAPER 23MPT101: PHYSIOTHERAPY PROCESS AND PRACTICE (Compulsory for all Specialties)

On Completion of this course, the post graduate will be able to –

- Be an ethical Physiotherapist, aware of legal rights and duties as per applicable Acts and Laws both nationally and internationally and follow respective guidelines
- Understand and apply principles of learning, and use different teaching - learning methods appropriately
- Describe the concepts of learning, evaluation and curriculum development
- Describe advantages and challenges of different assessment methods
- Apply management skills in planning, implementation & administration of clinical and academic activities
- Understand the quality assessment system
- Document comprehensive and accurate health records
- Be a good communicator and uphold high professional standards
- Be a Critical Thinker and develop problem solving abilities

Course Content:

1. School of Physiotherapy
    a. History of Physiotherapy profession
    b. Evolution of Physiotherapy as a profession
    c. Various school of thoughts in Physiotherapy
    d. Advancements in Physiotherapy with recent trends
2. Administration and leadership qualities in Physiotherapy
    a. Principles and applications of Management and Administration to Physiotherapy practice: Introduction, Definition, Principles, Functions and Evolution of management thought
    b. Management Process: Planning, Organizing, Staffing, Finance, Marketing, Directing, Controlling, Decision making
    c. Role and responsibilities of an independent Physiotherapy practitioner/ Physiotherapy consultant
    d. Responsibilities of a clinician Physiotherapist with hierarchy (novice, senior, departmental head, Manager, Superintendent level etc)
    e. Role and responsibilities of a Physiotherapist in academics and research
    f. Responsibilities of the Physiotherapy Manager: Staffing responsibilities; Responsibility for Patient Care; Fiscal Responsibilities; Responsibility for Risk Management; Legal and Ethical Responsibilities; Communication Responsibilities etc
    g. Documentation in Physiotherapy practice (Clinical/academics/ research/ administrative positions)
    h. Fiscal management in Physiotherapy according to the position/ role & responsibilities
    i. SWOT analysis (Strength, Weakness, Opportunity & Threat)
    j. Hospital as an organization: functions and types of hospitals, MANAGEMENT IN HOSPITAL Setting of a physiotherapy service unit

2- Year Master of Physiotherapy: 2003

1ST YEAR MPT

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    e. Role and responsibilities of a Physiotherapist in academics and research
    f. Responsibilities of the Physiotherapy Manager: Staffing responsibilities; Responsibility for Patient Care; Fiscal Responsibilities; Responsibility for Risk Management; Legal and Ethical Responsibilities; Communication Responsibilities etc
    g. Documentation in Physiotherapy practice (Clinical/academics/ research/ administrative positions)
    h. Fiscal management in Physiotherapy according to the position/ role & responsibilities
    i. SWOT analysis (Strength, Weakness, Opportunity & Threat)
    j. Hospital as an organization: functions and types of hospitals, MANAGEMENT IN HOSPITAL Setting of a physiotherapy service unit

k. Management of teaching institution
l. Entrepreneurship in Physiotherapy Practice: Need, Advantages and Opportunities, Challenges and Barriers
m. Leadership: Need, Relevance, Competencies and Characteristics

3. Quality Assurance
    a. Evidence Based Practice
    b. Clinical reasoning and decision making
    c. Quality Assurance tools and agencies used in Physiotherapy practice and work place (Clinical, Academic, Research)
    d. Medical audit and international quality system

4. Communication:
    a. Process of Communication
    b. Barriers to Communication
    c. Types of Communication
    d. Written Vs Oral Communication
    e. Elements of good communication
5. Laws and Ethics in Physiotherapy
    a. Various Acts, Rules & Regulations in Physiotherapy both regionally, nationally and internationally
    b. Consumer Protection Act, Rights of Persons with disability Act, Right to Education Act, Right to Information Act etc
    c. Ethical guidelines and Code of conducts in Physiotherapy practice – Clinical, Academics and Research
    d. Socio-cultural and spiritual influence in Physiotherapy
    e. Professionalism
        I. Ethics in professional practice
        II. Principles of practice in any profession. Privacy,
        III. Confidentiality
        IV. Shared decision making
        V. Informed consent
        VI. Equality and Equity
        VII. Justice
6. Pedagogy Physiotherapy Education
    a. Education: definition, aims and objectives of education, Agencies of education, Formal and informal education, brief introduction to the philosophies of education, taxonomy of educational objectives, essentials of physiotherapy education, NEP
    b. Basics of Adult Learning Theories including Learning Styles and Motivation
    c. Concept of teaching – learning - nature of learning, type and stages of learning, factors affecting learning, laws of learning, learning style, teaching learning process, role of teacher in teaching learning process, Adult learning
    d. Teaching skills, Teaching Methods in Classroom Setting, clinical teaching methods, planning of teaching: lesson planning and unit planning
    e. Teaching aids and educational technology
    f. Formulating Intended Learning Outcomes Including Tyler's principles, Bloom's Taxonomy, Miller's Pyramid, Clinical Competence, and Dreyfus' Model of Skill Acquisition
    g. Curriculum: meaning and concept of curriculum, factors affecting curriculum, Types of curriculum, Competency based education (CBE) and out-come based education

(OBE), Basic principles of curriculum development and steps of curriculum development. curriculum evaluation

h. Assessment and evaluation: meaning and concepts of assessment, measurement evaluation and examination, purpose of evaluation, types of evaluation, principles of evaluation, techniques of evaluation, methods and tools used in testing of knowledge, skill, clinical performance and attitude, Question paper setting

i. Faculty development, continuing professional education:

Recommended books

1. Beauchamp and Childress, Principles of Biomedical Ethics, Fourth Edition. Oxford.
2. Patricia A Marshall. Ethical challenges in study design and informed consent for health research in resource poor settings. World Health Organization. 2007.
3. National Ethical guidelines for Biomedical and Health Research involving human participants. Indian Council of Medical Research. 2017.427
4. ABC of Learning and Teaching in Medicine. Editor(s): Peter Cantillon, Diana Wood, Sarah Yardley. Ed: 3
5. Understanding Medical Education: Evidence, Theory, and Practice, Editor(s): Tim Swanwick Kirsty Forrest Bridget C. O'Brien. Ed 3
6. Principles of Medical Education. Editor(s): Tejinder Singh, Piyush Gupta, Daljit Singh. Jaypee Brothers. 2012. New Delhi.
7. C S Ram - Pedagogy Physiotherapy Education
8. Gabard Donald L. – Physical Therapy Ethics
9. Grayson Edward – Ethics, Injuries & The Law in Sports Medicine
10. Bioethics core curriculum – section -1, Ethics education program, Version 1.0
11. Raja Kavitha; Davis Fiddy; Sivkumar T - Ethical Issues
12. Zwemer Annj- Professional Adjustments and Ethics for Nurses in India

Sub Code 23MPT102: RESEARCH METHODOLOGY AND BIOSTATISTICS (Compulsory for all Specialties)

On Completion of this course, the post graduate will be able to –

- Describe how research is undertaken, and its benefits
- Differentiate between quantitative research and qualitative research
- Select an appropriate study design based on research question
- Identify ethical issues in research
- Design a research proposal
- Understand scientific writing and prepare a project report, conference presentations, journal and book publications
- Understand and plan to select the appropriate statistical test to analyse the results

Section A:

1. Introduction to research
2. Types of research
3. Defining a research question
4. Qualitative study designs
5. Quantitative study
6. Type I and type II bias
7. Study design: types
   Case study, Case series, longitudinal cohort, Pre post design, Time series design, repeated measures design, Randomized control design etc.
8. Sampling design, calculating minimum sample size based on design
9. Measurement: Properties of measurement: reliability, validity, responsiveness, MCID
10. Outcome measures: Use of outcome measures in rehabilitation research
11. Research Methods: Designing methodology, Reporting results, Type I and Type II bias
12. Communicating research
13. Research Ethics and Documentation:
    a. ICME Guidelines
    b. General principals to conduct research
    c. Risk benefit assessment
    d. Informed Consent Process and its importance in research
    e. Process of CTRI (Clinical Trial Registry of India) registration
    f. Institutional Ethics Committee (IEC) and its functioning
    g. Conflict of Interest (Definition, Types, Identifying, mitigating and managing etc)
14. Evidence based Practice used in research:

a. Evaluating published research: looking at the evidence
b. Asking clinical questions
c. Translating of evidence into practice: strategies
d. Use of clinical practice guidelines, clinical pathways, prediction rules to inform practice.

Section B:

SCIENTIFIC WRITING

1. Definition and kinds of scientific documents – Research paper, Review paper, Book, Reviews, Thesis, Conference and project reports (for the scientific community and for funding agencies).
2. Publication – Its importance, Authorship guidelines according to ICMJE, Role of Guide, Co-authors, Plagiarism check
3. Structure, Style and contents; Style manuals (APA, MLA); Citation styles: Footnotes, References; Evaluation of research

4. Significance of Report writing; Different steps in Report writing; Mechanics and precautions of writing research reports, Oral and poster presentation of research papers in conferences/symposia; Preparation of abstracts
5. Structure of Thesis and Content – Preparing Abstracts.

Section C:
BIOSTATISTICS

1. Descriptive Statistics and measurement variability
2. Inferential Statistics
3. Comparison of group means: T-test
4. Analysis of variance
5. Multiple comparison tests
6. Parametric and non-parametric tests
7. Correlations
8. Regression
9. Analysis of frequencies: Chi square
10. Statistical measure of validity and reliability
11. Factorial Design analysis
12. Power analysis – Determining sample size, Epidemiological Measures – Rate, Ratio, Proportion, Incidence and prevalence, Relative risk, Risk ratio, Odds ratio
13. Application of various statistical software

Recommended books

1. Bailey, N.T.J. -Statistical methods in Biology. The English universities press, London
2. Bajpai, S.R.- Methods of Social Survey and Research, Kitab Ghar, Kanpur.
3. Colton - Statistics in medicine, Little Brown Company, Boston
4. Gupta, S.P -Statistical methods. Sultan Chand and Sons Publishers, New Delhi.
5. Goulden C.H.- Methods of Statistical Analysis. Asia Publishing House, New Delhi.
6. Mohsin S.M.- Research Methods in Behavioural Sciences: Orient Publications. New Delhi.
7. Mahajan - Methods in Biostatistics, Jay Pee Brothers. Medical Publishers (P) Ltd. New Delhi.
8. Hicks- Research for Physiotherapists, Churchill Livingstone, London.
9. Meenakshi. - First Course in Methodology of Research. Kalia Prakashan, Patiala.
10. Kumar, R.- Research Methodology. Pearson Education, Australia.
11. Snedecor, G.W -Statistical Methods, Allied Pacific Pvt. Ltd., London
12. Singh, I.- Elementary Statistics for Medical Workers. Jaypee Brothers Medical Publishers (P) Ltd. New Delhi.
13. Rehabilitation Research: Principles and Applications by Elizabeth Domholdt (Elsevier Science Health Science Div, 2004)
14. C R Kothari – Research Methodology-Methods and Techniques, New Age International Publishers, New Delhi
15. Jyotikumar Biostatistics
16. Negi, K.s – Biostatistics-with Latest MCQs
17. Rao T Bhaskara – Methods of Biostatistics
18. Dixit J V – Principles and Practice of Biostatistics

Sub Code 23MPT103: BIOMECHANICS AND THERAPEUTICS (Compulsory for all Specialties)

On Completion of this course, the post graduate will be able to –

- Practice recent trends in analyzing kinematics and kinetics of all joints and body movements
- Understand the biomechanical properties of various tissue types and concepts of Energetics
- Interpret biomechanical changes with aging
- Understand various Electrophysiological agents, its use in diagnostic and therapeutic purposes
- Understand various radio-imaging and diagnostic tools and its interpretation
- Understand Pain Science in detail including its assessment and common management protocols
- Practice referral system for investigating procedures and develop interdisciplinary approach

Section A: Biomechanics

1. Basic Concepts of Biomechanics:
    a. Kinetics and Kinematics of various joints
    b. Application of various Force system acting on human body
    c. Degrees of freedom, Moment of force, Equilibrium
2. Biomechanical properties of different tissue structures
3. Concept of Energetics (Energy/Power/Efficiency of movement/ metabolic energy consumption)
4. Biomechanics of movement across Life Span:
    a. Growth and development of the musculoskeletal system
    b. Maturation of mobility and gait
    c. Biomechanics of Gait
    d. Gait development in Children and changes in older adults
    e. Biomechanics and aging
5. Biomechanical evaluation of Gait & Posture
6. Recent advances in Biomechanical analysis

Section B: Therapeutics

1. Electrophysical agents used in Physiotherapy practice
2. Electro Physiology and Electrodiagnosis: SD Curve, FG Test, Evoked potential, H – reflex, F-wave, NCV, EMG, ECG, EEG, Echocardiography etc..
3. Radio imaging and diagnosis tools: X-ray, CT Scan, MRI Scan, PET Scan, Ultrasonography etc..
4. Pain Science
    a. Definition, Pain pathways, Neurobiology and Pathophysiology of Pain
    b. Acute Pain & Chronic Pain
    c. Assessment of Pain in different populations
    d. Theories and Models of Pain
    e. Tools for assessment of Pain
    f. Evidence based advances in Pain assessment
5. Body composition Analysis and Anthropometric Measurements
6. Various orthotics and prosthetics devices – substitutive, corrective, assistive, preventive
7. Referral system used in Physiotherapy practice – for interdisciplinary approach, investigating procedures

Recommended books

1. James G. Hay – The Biomechanics of Sports Techniques, Prentice Hall.
2. Brunnstrom - Clinical Kinesiology, F.A. Davis.

3. Luttgens K., Hamilton N.: Kinesiology – Scientific Basis of Human Motion, Brown & Benchmark.
4. Kreighbaum E., Barthels K.: Biomechanics – A Qualitative approach for studying human Motion, MacMillan.
5. Rasch and Burk: Kinesiology and Applied Anatomy, Lee and Fabiger.
6. White and Punjabi - Biomechanics of Spine - Lippincott.
7. Norkin & Levangie: Joint Structure and Function - A Comprehensive Analysis - F.A. Davis.
8. Kapandji: Physiology of Joints Vol. I, II & III, W.B. Saunders.433
9. Northrip et al: Analysis of Sports Motion: Anatomic and Biomechanics perspectives, W.C. Brown Co., IOWA.
10. Leveac B.F.: Basic Biomechanics in Sports and Orthopaedic Therapy, C.V. Mosby.
11. De Boer & Groot: Biomechanics of Sports, CRL Press, Florida.
12. Basmajian - Muscle alive - Williams & Wilkins.
13. Nordin & Frankel - Basic Biomechanics of Muscular Skeletal System - Williams & Wilkins.
14. Bartlet - Introduction to Sports biomechanics - F & FN Spon Madras.

2ND YEAR M.P.T

Sub Code 23MPT201: EXERCISE PHYSIOLOGY
(Compulsory for all Specialties)

On Completion of this course, the post graduate will be able to –

- Comprehend the basic knowledge of sources of energy, aerobic and anaerobic synthesis of ATP along with the understanding of utilization of substrates in relation to the intensity and duration of exercise
- Appreciate the measurement of energy cost of exercise and importance of energy transfer and energy expenditure at rest and during various physical activities
- Understand the role of various macro and micro nutrients as well as their caloric requirements along with the basic classification, functions and utilization of nutrients.
- Acquire about importance of diet for various competitions, nutrient supplements for performance and to design caloric requirements for various sports and age groups.
- Critically evaluate the central and peripheral mechanism that regulates the cardiovascular and respiratory systems in exercise along with the physiological responses and adaptations of these systems to exercise and training
- Identify the regulation and significance of acid base balance following exercise
- Understand the responses of various hormones with respect to exercise

Section A -

1. **Bioenergetics of exercise:** High energy phosphates, Anaerobic and aerobic ATP synthesis, Bioenergetics Control, exercise intensity & substrate utilization, protecting CHO stores, muscle adaptation to endurance training, processes that potentially limit the rate of fat oxidation, regulation of substrate utilization, training - induced increase in FFA oxidization:

2. Basal metabolic and resting metabolic rates and factors affecting them, Classification of Physical Activities by energy expenditure, Concept of MET, measurement of energy cost of exercise
3. **Nutrition:** Metabolism of Carbohydrate, fats, proteins, vitamin, mineral and water
4. **Nutrition in exercise**
    a. optimum nutrition for exercise, nutrition for physical performance, pre-game meal
    b. carbohydrate loading, food for various athletic events, fluid and energy replacement in prolonged exercise

1. **Respiratory responses to exercise:** Ventilation at Rest and during Exercise, Ventilation and the Anaerobic Threshold, static and dynamic lung volume. Gas diffusion, Oxygen and carbon dioxide transport second wind, stich by side control of pulmonary ventilation during exercise adaptive changes in the respiratory systems due to regular physical activities.
2. **Cardiovascular responses to exercise-** Cardiovascular system and exercise, acute vascular effects of exercise, Circulatory responses to various types of exercise regulation of cardiovascular system during exercise, Pattern of redistribution of blood flow during exercise, adaptive responses of cardio-vascular system to aerobic and anaerobic training. Athlete heart
3. **Exercise and Acid Base Balance:**
   Acid and Bases, Buffers, pH, Respiratory Regulation of pH, Alkali Reserve, The kidneys and Acid base balance, Alkalosis and Acidosis, Acid base balance following heavy exercise.
4. **Hormonal responses to exercise with respect to:** Growth Hormone (GH), Thyroid and Para thyroid Hormones. Anti-diuretic Hormone (ADH) and Aldosterone, Insulin and Glucagons,

The cate-cholamine; epinephrine and norepinephrine. The sex hormones. The glucocorticoids (Cortisol) and Adreno Corticotrophic Hormones (ACTH). Prostaglandins and Endorphins:

Section B-

1. **Training and conditioning:** Physiological basis of physical training, training principles, interval training, continues running concept of anaerobic threshold and vo2 max, Physiological effects of various physical training methods, - aerobic and anaerobic training, strength training factors influencing training effects – intensity, frequency, duration, detraining, process of recovery, post exercise oxygen consumption factors affecting recovery process, overtraining
2. **Body temperature regulation during exercise:** Mechanism of regulation of body temperature, Body temperature responses during exercise, Physiological responses to exercise in the heat, Acclimatization to exercise in the heat, Effects of age and gender on body temperature regulation during exercise, Physical activity and heat illness [heat exhaustion, dehydration exhaustion heat cramps & heat stroke] Prevention of Heat Disorders
3. **Exercise in the Cold:** Effects of exposure to cold and severe cold, Wind chill, Temperature receptors, Role of hypothalamus, shivering, Frost Bite and other problems, Clothing and Environment
4. **Exercise at Altitude:** Exercise at altitude immediate physiological responses at high altitude, physiological basis of altitude training, phases of altitude training and specific training effects, altitude acclimatization, oxygen dissociation curve at altitude, disorders associated with altitude training
5. **Exercise and body fluids:** Measurement and regulation of body fluids, Body fluid responses and adaptations to exercise, Effects of dehydration and fluid replenishment on Physiological responses to exercise and performance Fluid/carbohydrate replacement beverages
6. **Physical activity, body composition, energy balance and weight control:** Significance and measurement of body composition, Body composition during growth and aging, Body composition and physical performance, Effect of diet and exercise on body composition, Physical activity, energy balance, nutrient balance and weight control, Physical activity, fat distribution and the metabolic syndrome , Healthy weight loss, Ways and methods of weight reduction , fluid maintenance, disordered eating, nutritional ergogenic aids, diet supplements in athletes and others involved in physical activity.
7. **Exercise and Diabetes Mellitus:** Exercise in insulin, requiring diabetes and non-insulin dependent diabetes mellitus, Effect of physical training on glucose tolerance and insulin sensitivity, Management of diabetes by diet and insulin

Recommended Books:

1. Essentials of Exercise Physiology: McArdle, WD, Katch, FI, and Katch, VL. Lippincott Williams and Wilkins.
2. Fundamentals of Exercise Physiology: For Fitness Performance and Health, Robergs RA, and Roberts, S.O. McGraw Hill
3. Exercise Physiology: Powers, SK and Howley ET; Mc Graw Hill
4. Physiology of Sport and Exercise: Wilmore, JH and Costil, DL. Human Kinetics
5. Exercise Physiology- Human Bioenergetics and its Application: Brooks, GA, Fahey, TD, White, TP. Mayfield Publishing Company
6. Komi, P. (Ed.) Strength and power in sport. Blackwell Scientific Publications.
7. Levick, J.R. An introduction to Cardiovascular Physiology. 2nd ed. Butterworth Heinemann
8. McArdle, WD, Katch, FI & Katch, VL Exercise Physiology. Lippincott, Williams & Wilkins.
9. Shephard and Astrand Endurance in sport. Blackwell Scientific Publications.
10. Willmore, JH & Costill, DL Physiology of Sport and Exercise. 2nd ed. Human Kinetics.

11. Guyton, A.C. Textbook of Medical Physiology. Philadelphia: Saunders,
12. Nutrition for sport and exercise; Berning and Steen

SPECIALITIES

A- REHABILITATION SCIENCE

PHYSIOTHERAPY IN SPECILITY AREA - REHABILITATION SCIENCE

On Completion of this course, the post graduate will be able to –

- Competent to use the physiotherapy knowledge and skills framework to work with people at both individual and population level to promote inclusive health, prevent disease, and identify and treat health conditions; with a goal to maximize their functioning, independence in activities and participation
- Able to effectively use their knowledge and leadership skills to integrate all resources and strategies, as described in the course content, to deliver high quality innovative services that are affordable, accessible, effective and efficient.
- Competent to teach and mentor undergraduate and postgraduate students; undertake independent research; strengthen existing and develop new clinical care pathways
- Able to efficiently advocate for maximizing access to physiotherapy service provisions within the healthcare delivery framework.

23MPT1R1 Physiotherapy perspective in Rehabilitation Science

Course outcome -
On Completion of this course, the post graduate will –

1. Understand the role of Physiotherapy in Rehabilitation Science and in Community health
2. Aware of the role of Government and Non-government organizations in CBR

COURSE CONTENT:

1. Definition, Concept, principles & Scope of Rehabilitation, Community, Health care delivery system, Health Administration, Institutional based rehabilitation and community-based rehabilitation – its principles and differences, multi-disciplinary approach, Physiotherapist as a Master Trainer in CBR & IBR.
2. Epidemiology of dysfunctions & advance skills of physical and functional assessment related to Community. Clinical decision-making skill in management of dysfunction
3. Evidence Based Practice & Recent advances in Community Health. Indian Health statistics
4. Fitness and health promotion – Principles of fitness for health promotion in community, Nutrition and Diet. Stress management through yoga and psycho-somatic approaches. Natural calamity & disaster management – Role of P.T. in disaster management team.
5. I.C.F. [Impairment, Disability, Handicapped and its implications] Evaluation of Disability & Compensation for Persons with disability Act – 1995 and related Government infrastructure.
6. Physiotherapy Ethics – code of conduct, Regulatory Agencies and Legal Issues. W.H.O.`s policies about rural health care -Role of P.T.-Principles of a team work of medical person/P.T./O.T. audiologist/speech therapist /P.&O./vocational guide in C.B.R. of physically handicapped person.
7. Public health education methods and appropriate media – Public awareness to the various disabilities, communications, message generation and dissipation
8. Role of Government & NGOs in CBR, inter-sectoral programs and co- ordination, Implementation of the Act.

23MPT2R2 Physiotherapy Assessment in Rehabilitation Science

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

- Assess, evaluate and prescribe various orthotic and prosthetic appliances and other adaptive devices
- Play vital role in industrial health and vocational **rehabilitation with recent advances**

COURSE CONTENT:

1. Orthotics & Prosthetics: definition, classification, bio mechanical principles; assessment and evaluation, prescription & fabrication
2. Designing & Training of UL, LL, trunk, neck Orthosis, footwear modifications in various conditions
3. Designing & Training of UL, LL prosthesis in Amputees.
4. Indications / Contraindications, psychological aspects of its application.
5. Use of adaptive devices, design & construction e.g., canes, walkers, wheelchairs.

Industrial Health

6. Applied anatomy, physiology and biomechanics related to Industrial health.
7. Clinical decision-making skill in assessment and management of dysfunction related to Industrial health.
8. Industrial physiotherapy- prevention of injuries, physiological restoration, rehabilitation in industrial injuries, work station adaptations/ modifications.
9. Environmental stress in the industrial area --Accidents due to
    a. Physical agents- e.g.-Heat/cold, light, noise, Vibration, U.V. radiation, Ionizing radiation.505
    b. Chemical agents-Inhalation, local action, ingestion,
    c. Mechanical hazards-overuse/fatigue injuries due to ergonomic alteration & evaluation of work place-mechanical stresses as per hierarchy –
        I. Sedentary table work –executives, clerk,
        II. Inappropriate seating arrangement- vehicle drivers
        III. Constant standing- watchman- Defence forces, surgeons,
        IV. Over-exertion in labourers - common accidents
    d. Psychological hazards- e.g.-executives, monotony & dissatisfaction in job, anxiety of work completion with quality,
        I. Role of P.T. in Industrial setup & Stress management- relaxation modes.
        II. Physiotherapy role in industry – preventive, promotive, curative, intervention, ergonomic and rehabilitative services.
        III. Ergonomic considerations and health promotion in the industry
10. Job analysis, job description, job demand analysis, task analysis, Employee fitness, job modification, Employment acts.
11. Vocational Rehabilitation; evaluation & management.

23MPT2R3 Assessment & Diagnosis of Rehabilitation Science

Course outcome -

On Completion of this course, the post graduate will be –

1. Competent to use the physiotherapy knowledge and skills framework to work with people at both individual and population level to promote inclusive health, prevent disease, and identify and treat health conditions; with a goal to maximize their functioning, independence in activities and participation

COURSE CONTENT:

1. Rehabilitation in musculoskeletal conditions, sport sciences and health promotion
2. Rehabilitation in cardio-pulmonary conditions, and health promotion
3. Rehabilitation in neurological conditions, movement & psycho-somatic disorders, paediatric conditions
4. General fitness strategies- body mass composition, assessment, obesity and weight control

Recommended Books:

1. Robert Pool, Wenzel Geissler. Medical Anthropology (Understanding Public Health). 2006 OPEN UNIVERSITY PRESS. ISBN13: 9780335218509
2. Mechanick JI, Kushner RF, editors. Creating a Lifestyle Medicine Center: From Concept to Clinical Practice. Springer Nature; 2020 Sep 4. ISBN: 978-3-030-48087-5
3. Park's Textbook of Preventive and Social Medicine 25th Edition 2019. Publisher: BanarsidasBhanot Publishers Year: 2019. ISBN: 9789382219156
4. COOK, A. M., & POLGAR, J. M. (2015). Assistive Technologies: Principles and Practice. 4th ed. Mossouri. ISBN: 978-0-323-09631-7
5. Bella J. May, Margery A. Lockard. 2011. Prosthetics & orthotics in clinical practice: A Case Study Approach F. A. Davis Company. ISBN- 13: 978-0-8036-2257-9
6. Shrawan Kumar. 2007 Biomechanics in Ergonomics 2nd Edition Taylor & Francis. eBook ISBN: 9780429125133
7. Katrin Kroemer Elbert Henrike Kroemer Anne D. Kroemer Hoffman 2018. Ergonomics: How to Design for Ease and Efficiency. 3rd Edition. Academic Press ISBN: 9780128132968
8. Susan B. O'Sullivan, Thomas J. Schmitz, George D. Fulk. 2014. Physical Rehabilitation, 6th edition. F.A. Davis Co. ISBN 9780803625792
9. Bharati Vijay Bellare, Pavithra Rajan, Unnati Nikhil Pandit. 2018. Textbook of Preventive Practice and Community Physiotherapy. Vol 1 & 2. ISBN: 9789352703258 & ISBN: 9789352704033
10. Dale Avers, Rita Wong. Guccione's Geriatric Physical Therapy. 4th Edition 2019. Mosby. ISBN: 9780323609128
11. Jill Mantle Jeanette Haslam Sue Barton. Physiotherapy in Obstetrics and Gynaecology 2nd Edition. 2004. Butterworth-Heinemann ISBN: 9780750622653
12. Giammatteo, Sharon; Giammatteo, Thomas. Functional Exercise Program for Women's and Men's Health Issues (International College of Integrative Manual Therapy Wellness). 2001. North Atlantic Books ISBN 13: 978155643366
13. American College of Sports Medicine. ACSM's exercise testing and prescription. Lippincott Williams & Wilkins; 2017. ISBN/ISSN: 9781496339065
14. Mary M. Yoke and Carol Armbruster. Methods of Group Exercise Instruction. 2019. Human Kinetics, Inc. ISBN: 9781492571766

B- MUSCULOSKELETAL CONDITIONS

PHYSIOTHERAPY IN SPECILITY AREA -MUSCULOSKELETAL CONDITIONS

On Completion of this course, the post graduate will be able to –

- Exercise professional autonomy based on sound knowledge, skills and discipline at par with global standards in Musculoskeletal Physiotherapy
- Practice within the professional code of ethics and conduct, and the standards of practice within legal boundaries
- Identify and analyse musculoskeletal dysfunction in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning
- Work with integrity and autonomy in an interdisciplinary team
- Involve in undergraduate and post graduate teaching with competence
- Carryout Evidence based practice (EBP) with recent advances
- Conduct research activities and utilize findings for professional development and lifelong learning.

23MPT1M1 Physiotherapy perspective in Musculoskeletal Conditions.

COURSE OUTCOME:

On Completion of this course, the post graduate will be able to -

1. Understand the clinical manifestation in the field of Musculoskeletal Physiotherapy using biomechanical frame of reference

COURSE CONTENTS:

1. Applied anatomy & biomechanics of musculoskeletal system (Upper limb, lower limb joints, spine, mechanical behavior of skeletal structures and implant system)
2. Evolution of musculoskeletal system,
3. Concepts of Pain mechanism related to Musculoskeletal system
4. Pathomechanics of joints and tissues in various musculoskeletal conditions
5. Pathomechanics of Posture & gait deviations

23MPT2M2 Physiotherapy Assessment in Musculoskeletal Conditions.

COURSE OUTCOME:

On Completion of this course, the post graduate will be able to –

1. Identify and analyse musculoskeletal dysfunction in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning
2. Practice recent advances in assessing and diagnosing any musculoskeletal system disorders in physiotherapeutic perspective
3. Use various school of thoughts in Manual therapy for assessment and diagnosis of joint and soft tissue dysfunction

1. Introduction to assessment
   Basic assessment methods
   Physical assessment as a screening tool
2. Screening methods
   a. Screening the Head, Neck, and Back
   b. Screening the Shoulder and Upper Extremity
   c. Screening the Sacrum, Sacroiliac, and Pelvis
   d. Screening the Lower Quadrant: Buttock, Hip, Groin, Thigh, and Leg
   e. Screening the Chest and Ribs
3. ICF Conceptual frame work
4. Physiotherapy practice for Musculoskeletal disorders
   a. Direct access and self-referral
   b. Primary care
   c. Autonomous Practice
   d. Decision making Process
5. Diagnostic approaches and tools in Musculoskeletal Physiotherapy
   a. Physiotherapeutic approach in diagnosing Musculoskeletal system disorders
   b. Differential Diagnosis of Musculoskeletal disorders
   c. Special tests used in Musculoskeletal examination
   d. Medical screening for potential referred pain – Red flags
   e. Investigation methods/Diagnostic Imaging used in musculoskeletal disease, injury and Dysfunction
   f. Electrophysiological testing/Electro diagnosis in musculoskeletal disease, injury and Dysfunction
   g. Exercise testing in musculoskeletal disease, injury and Dysfunction
6. Assessment procedures for various types of Musculoskeletal Conditions
   a. Assessment of fractures, includes (Pre-operative and post-operative assessments)
   b. Prescription of orthotic devices/splints in musculoskeletal disease, injury and Dysfunction
   c. Assessment of Hand Injuries, Soft tissue repairs.
   d. Assessment of Amputations.
   e. Assessment of Degenerative Conditions and orthopaedic diseases
   f. Assessment methods in developmental orthopaedic disorders
7. Manual Therapy: Various school of thoughts for assessment and diagnosis of joint and soft tissue dysfunction like Maitland, McKenzie, Cyrix, mennel, neural tension test, Mulligan and various other manual therapy approaches with Clinical reasoning
8. Functional Assessment: Instrumentation and scales
   a. Functional Assessment

b. Functional Assessment scales used in Trauma and Musculoskeletal dysfunction
c. Critical decision making in selection of outcome measures used in Trauma and Musculoskeletal dysfunction
d. Ergonomics Risk assessment in Musculoskeletal disorders
e. Use of ICF in Musculoskeletal diagnosis

9. Fitness evaluation and Work capacity
    a. Fitness evaluation specific to age, gender and disorders- standard methods with norm referencing for India
    b. Evaluation of work capacity and return to work

10. Recent advances in diagnostic and screening approaches of musculoskeletal physiotherapy

23MPT2M3 Assessment & Diagnosis of Musculoskeletal Conditions.

COURSE OUTCOME:

On Completion of this course, the post graduate will be able to –

1. Search and apply the available evidences for the management of various musculoskeletal/ orthopaedic conditions
2. Practice recent advances in the management of various musculoskeletal conditions
3. Plan and execute evidence-based practice for pre and post operative musculoskeletal rehabilitation program with recent advances and advancing technology

COURSE CONTENT:

1. Interventions for Physiologic Impairments during Rehabilitation
    a. Impaired Muscle Performance
    b. Impaired Endurance
    c. Impaired Mobility
    d. Impaired Neuromuscular control
2. Management of Pain
    a. Pharmacological management of Pain (Opioids, Non – Opioids, Adjuvants, Analgesics and Local anaesthetics)
    b. Electrotherapy in managing pain
    c. Educational and behavioural strategies in managing pain.
    d. Adjuvant therapies in managing pain
    e. EBP in the Management of pain in musculoskeletal disorders
3. Methods of Musculoskeletal Rehabilitation
    a. Biomechanical concepts
    b. Functional concepts
    c. Postural stability and Balance
    d. Core stability in Rehabilitation
    e. Functional Training& Physical activity promotion
    f. Education and behavioural methods
4. Advanced techniques in Musculoskeletal Rehabilitation
    a. EBP in Manual Therapy and Myofascial concepts and methods (Different schools of Thoughts like Cyriax, Maitland, Butler, McKenzie, Kaltenborn, Mulligan and other approaches)
    b. Neurological Concepts and functional methods in musculoskeletal dysfunctions
    c. External applications
    d. Cognitive behavioural methods
    e. Adjuvant methods
5. Electro modalities in Musculoskeletal Rehabilitation
    a. Physical agents in Rehabilitation
    b. Electric currents for Tissue healing
    c. Evidence based electrotherapy management in Musculoskeletal disorders
    d. Electromagnetic agents in Rehabilitation
    e. Alternative modalities for Tissue healing
6. Ergonomics
    a. Ergonomic Interventions for Work related Musculoskeletal disorders
    b. Work hardening and conditioning
    c. Role of Assistive devices in Work Place
    d. Current designs in Assistive technology

7. External aids, appliances, adaptive self-help devices; prescription, biomechanical compatibility, check-out and training with recent advances
8. Trauma Rehabilitation
    a. Evidence based approach in management of Fractures and Post-operative conditions
    b. Rehabilitation of Neoplastic conditions, Tendon transfers, Soft tissue injuries and surgeries, Degenerative and Orthopaedic conditions.
9. EBP of Aquatic therapy in musculoskeletal conditions
10. Recent advances in management strategies of musculoskeletal Physiotherapy

Recommended Books –

1. Jones, M. A., &Rivett, D. A. Clinical reasoning for manual therapists. Edinburgh: Butterworth Heinemann.
2. Eyal Lederman - Fundamentals of manual therapy.
3. Grieve's Modern manual therapy
4. Walter Herzog - Clinical Biomechanics of spinal manipulation
5. Sandy Fritz, Kathleen Paholsky and M.JanesGrosenbach - Basic Science for soft tissue and movement therapies.
6. Jean Sayne Adams, Steve Wright - Theory and practice of therapeutic touch.
7. AkhouryGourang Sinha – Principle and practice of therapeutic massage
8. Carol Manheim – The Myofascial release manual 3rd Edition
9. Maitland's – Peripheral manipulation
10. Maitland's – Vertebral manipulation
11. Chaitow – Cranial manipulation theory and practice
12. Lynn Paul Taylor – Taylor's manual of physical evaluation and treatment
13. Denise Deic – Positional release technique from a dynamic systems perspective.
14. Goodman and Snyder – Differential diagnosis in physical therapy
15. Tidy's Physiotherapy, Elsevier Publication.
16. Chaitow - Muscle energy technique
17. Reid et al – Sports injury assessment and rehabilitation.
18. Kjaer et al – Text book of sports medicine
19. Scudder Mc Can - Sports medicine, A comprehensive approach
20. Norris – Sports injuries, diagnosis and management for physiotherapists.
21. Werner Kuprian – Physical therapy for sports.
22. McGinnis – Biomechanics of sports and exercises.
23. Chew, F. Skeletal radiology: The bare bones. Baltimore, MD: Williams & Wilkins.
24. Eisenberg, R. L., & Johnson, N. M. Comprehensive radiographic pathology St Louis, MO: Mosby.
25. Hughes, J., & Hughes, M.. Imaging: Picture tests. Edinburgh: Churchill Livingstone.
26. Mace, J. D., & Kowalczyk, N. Radiographic pathology for technologists. St Louis, MO: Mosby.
27. Redhead, D. N. Imaging: Colour guide. Edinburgh: Churchill Livingstone.
28. Yochum, T. R., & Rowe, L. R. Yochum and Rowe's essentials of skeletal radiology. Baltimore, MD: Lippincott Williams & Wilkins.
29. Gunn, C. Bones and joints: A guide for students. London: Churchill Livingstone.
30. Haines, D. E. Fundamental neuroscience W. B. Saunders Co.
31. Kandel, E. R., Schwartz, J. H., & Jessell, T. M. Principles of neural science McGraw-Hill
32. Longmore, J., Wilkinson, I., & Rajagopalan, S. Oxford handbook of clinical medicine Oxford: OUP.
33. Newman Dorland, W. A. Dorland's illustrated medical dictionary W. B. Saunders Co.446
34. Nolte, J. The human brain: An introduction to its functional anatomy. St Louis, MO: Mosby.

35. Nolte, J., & Angevine, Jr. J. B. The human brain in photographs and diagrams. St Louis, Mosby.
36. Wicke, L. Atlas of radiologic anatomy, Munich, Germany: Lea &Febiger.
37. Seidel, H. Mosby's guide to physical examination. St Louis, MO: C.V. Mosby.
38. Cailliet, R. Neck and arm pain Philadelphia: FA Davis.
39. Cailliet, R. Shoulder pain Philadelphia: FA Davis.
40. Cailliet, R. Knee pain and disability Philadelphia: FA Davis.
41. Cailliet, R. Hand pain and impairment Philadelphia: FA Davis.
42. Cailliet, R. Low back pain syndrome Philadelphia: FA Davis.
43. Cailliet, R. Soft tissue pain and disability Philadelphia: FA Davis.
44. Chaitow, L. Cranial manipulation: Theory and practice Edinburgh: Churchill Livingstone.
45. Greenman, P. E. Principles of manual medicine. Philadelphia: Lippincott Williams & Wilkins.
46. Wilson, A. Effective management of musculoskeletal injury: A clinical ergonomics approach to prevention. Churchill Livingstone.
47. O'Sullivan, F.A. Davis, Philadelphia. Physical rehabilitation: assessment and treatment.
48. Victor H. Frankel and Mangareta Nordin Basic Biomechanics of the Musculoskeletal system 2nd Edition
49. Essentials of Orthopaedics for physiotherapists by John Ebenezer – Jaypee Publications
50. Practical Fracture Treatment by Ronald Mc Rae, Max Esser – Churchill Livingstone
51. Oxford Textbook of Orthopaedics & Trauma – Christopher Bulstrode, Joseph Buckwalter, Oxford University Press
52. Fractures & Joint Injuries – By Watson Jones – Churchill Livingstone
53. Measurement in Physical Therapy – Churchill Livingstone, London
54. Soft Tissue Pain & Disability – Cailliet Rene, Jaypee Brothers, New Delhi
55. Physical therapy of the low back –Twomey, Churchill, Livingstone, London
56. Clinical Orthopaedic Examination by Ronald McRae – Churchill Livingstone
57. Campbell's operative orthopaedics – By S. Terry Can ale, James H. Beaty – Mosby
58. Orthopaedic Physical Assessment, By David J. Magee – Saunders
59. Diagnostic Imaging for Physical Therapists – by James Swain, Kenneth W. Bush & Juliette Brosing – Elsevier
60. Differential Diagnosis For Physical Therapists: Screening for Referral – by Catherine C. Goodman & Teresa Kelly Snyder – Saunders
61. Lynn Paul Taylor – Taylor's manual of physical evaluation and treatment
62. Goodman and Snyder – Differential diagnosis in physical therapy.
63. Leon Chaitow, and Judith Walker Delany - Clinical application on neuromuscular techniques: Vol-2 (The lower body)

C- PAEDIATRICS

PHYSIOTHERAPY IN SPECILITY AREA (PAEDIATRICS)

On Completion of this course, the post graduate will be able to –

- Exercise professional autonomy based on sound knowledge, skills and discipline at par with global standards in the area of paediatric physiotherapy
- Practice within the professional code of ethics and conduct, and the standards of practice within legal boundaries
- Identify and analyse paediatric conditions (neurology, cardio-respiratory, musculoskeletal) in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning
- Work with integrity and autonomy in an interdisciplinary team
- Involve in undergraduate and post graduate teaching with competence in paediatric physiotherapy
- Carryout Evidence based practice (EBP) with recent advances
- Conduct research activities and utilize findings for professional development and lifelong learning

23MPT1P1 Physiotherapy perspective in Pediatrics.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Understand the clinical manifestations related to Pediatric physiotherapeutic conditions

COURSE CONTENT:

1. General Paediatrics
    a. Neonatal and Paediatric Advanced Life Support (NALS and PALS).
    b. Basics of Genetics and Applied Genetics in Paediatrics.
    c. Exercise physiology in paediatrics- Adaptive response (acute and chronic) on various systems
    d. Nutritional requirements &Immunization schedule in paediatric population.
    e. Neurophysiology of movement.
    f. Theories of pain and its application in paediatrics.
2. Developmental Paediatrics
    a. Embryological Development and Applied embryology- General, Cardiovascular system, Neurological, Musculoskeletal System, Respiratory system and other systems of human body
    b. Normal and Applied Growth and Development/Maturation – Anthropometric changes across paediatric life span, Cardiovascular system, Nervous System, Musculoskeletal System, Respiratory system and other systems of human body
    c. Development - Theories of Development; Typical and Atypical development; Sensory system development; Reflex maturation and Reactions
3. System Based Applied Paediatrics
    a. Theories of Motor Control and Motor Learning and its application.
    b. Development and applied aspects of Bowel and Bladder function.
    c. Development and applied aspects of Gastrointestinal function.
    d. Development and applied aspects of Balance, Coordination and Gait.
    e. Development of Posture and applied Postural deviations
    f. Cardio-respiratory physiology in paediatrics

23MPT2P2 Physiotherapy Assessment in Pediatrics.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Clinically assess and evaluate pediatric conditions and advice the parents appropriately based on EBP
2. Practice recent trends in investigating methods

COURSE CONTENTS:

1. Assessment in General Paediatrics
    a. Prenatal screening and assessment of movement
    b. Clinical identification of possible genetic abnormalities
    c. Interpretation of assessments based on International Classification of Functioning, Disability and Health (ICF) guidelines in Paediatric conditions.
    d. Assessment of motor control and motor learning.
    e. Evaluation and interpretation of sensory disorders (autism and autism related disorders) including perceptual and behavioural disorders.
    f. Assessment, physical and functional diagnosis of gait using various scales and use, interpretation of laboratory-based gait assessment.
    g. Assessment, physical and functional diagnosis of balance and coordination using various scales and use, interpretation of laboratory- based assessment
    h. Ergonomic assessment of Children in Integrated Schools.
    i. Motor Control Assessment - Voluntary control assessment and Selective Motor Control.
    j. Assessment of Paediatric disorders using standardised test /scales at all levels of dysfunction in various condition of paediatric population with their psychometric properties
2. Assessment in Developmental Paediatrics
    a. Growth assessment.
    b. Developmental screening and assessment (Norm referenced, Criterion referenced, Functional and other scales for screening and assessment of various disorders in paediatric population).
    c. Assessment of nutrition and obesity in paediatrics.
    d. Assessment of High-risk Neonates/Children.
    e. Assessment principles in specific genetic disorders with motor system involvement- Down syndrome, bleeding disorders
3. Assessment in System based Paediatrics
    a. Assessment of children in Intensive Care Unit.
    b. Physical and Functional assessment, Differential diagnosis and Investigations including Laboratory, Electrophysiological, radiological investigations in Neurological, Cardio respiratory, Metabolic, Musculoskeletal and various conditions of the paediatric population.
    c. Physical activity and Fitness assessment (including Exercise Tolerance Testing)
    d. Assessment, physical and functional diagnosis in paediatric Oncology.
    e. Assessment, physical and functional diagnosis in paediatrics Burns.66
    f. Pre- and post- surgical assessment in Paediatric conditions.
    g. Assessment of Integumentary System.
    h. Assessment, physical and functional diagnosis of Adolescent Health Disorders and paediatric Mental Health.

i. Pain assessment in Neonates and Children.
j. Assessment of Movement dysfunction in Paediatrics.
k. Assessment of DCD, LD and ADHD.

23MPT2P3 Assessment & Diagnosis of Pediatrics.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Demonstrate a range of clinical skills related to Paediatric therapy such as NDT, Sensory integration concept, classification and their application following diagnosis of dysfunction, indication, contraindication and adjunct therapies.
2. Demonstrate specific rehabilitation skills, principles of rehabilitation of Paediatric disorders
3. Explain factors involved in effective management of patients and also justify the importance of preventive care in rehabilitation
4. Carryout EBP and recent advances in Pediatric physiotherapy management

COURSE CONTENTS:

1. Management in General Paediatrics
    a. Goal setting and treatment guidelines based on International Classification of Functional Disability and Health (ICF) in Paediatric conditions.
    b. Early Intervention in neuro developmental disorders and orthopaedic disorders
    c. Management of Sensory Disorders including Perceptual and Behavioural Disorders - Play behaviour & its clinical application in therapy, Motor learning skills, sensory integration approach etc
    d. Management of motor system disorders
    e. Promotion of Physical activity and Fitness in Typical and Atypical Paediatric population.
    f. Management of disorders of function, posture and gait
    g. Prescription and Application of Orthosis, Prosthesis, Assistive and Adaptive devices, seating systems and mobility devices in congenital locomotor disorders
    h. Technology based intervention in Paediatric Physiotherapy.
    i. Role of Paediatric Physiotherapist in Mainstream, Integrated and Special Schools.
    j. Recovery process in Nervous System and Neural plasticity.
    k. Role of Paediatric Physiotherapy in Community.
    l. Exercise prescription in adolescents
    m. Pre and post operative management in common paediatric surgeries
2. Management in Developmental Paediatrics:
    a. Management of Growth & development disorders (gross motor, fine, speech & language, personal-social-adaptive)
    b. Management of Developmental and genetic disorders specifically bleeding disorders, down syndrome, inborn errors of metabolism and muscular dystrophies
3. Management in System Based Paediatrics
    a. Neonatal care - Management in Neonatal Intensive Care Unit (NICU), Paediatric Intensive Care Unit (PICU) and High-risk babies.
    b. Management strategies and skills for Neuro-paediatric conditions – Handling & positioning techniques, NDT, Vojta, Roods, CIMT, Sensory-motor re-education, PNF, Peto, Temple Fay, Phelps etc
    c. Management of Cardio-respiratory, Metabolic and Musculoskeletal conditions in paediatrics
    d. Management of Paediatric Conditions – Oncology, Burns, Non-communicable diseases, Integumentary systems, amputations
    e. Management of Pain in Neonates and Children using various modalities
    f. Management of Motor dysfunction in Paediatrics.

g. Management of Oromotor and Orosensory dysfunctions.
h. Management of Myopathic and Neuropathic conditions.
i. Management in neurodevelopment disorders -LD, ADHD, DCD.
j. Application of yoga in paediatric population

4. EBP & Recent advances on the role of Physiotherapy in public and special schools
5. Problem based learning relevant to clinical conditions typically seen in pediatrics

Recommended Books –

1. Gallahue, D. L., Ozmun, J. C., & Goodway, J. (2006). Understanding motor development: Infants, children, adolescents, adults, 4/e. Mcgraw-hill.
2. Stamer, M. H. (2015). Posture and movement of the child with cerebral palsy. PRO-ED, Incorporated.
3. Rennie, J. M., & Kendall, G. (2013). A Manual of Neonatal Intensive Care, 5/e. CRC Press.
4. Illingworth, R. S. (2002). The normal child: some problems of the early years and their treatment, 10/e. WB Saunders Company.
5. Illingworth, R. S. (2013). The development of the infant and young child: Normal and abnormal, 10/e. Churchill Livingstone.
6. Fanaroff, J. M., &Fanaroff, A. A. (2012). Klaus and Fanaroff's Care of the High-Risk Neonate, 6/e. Elsevier Health Sciences.
7. Jenson, H.B,Kliegman, R. M., Behrman, R. E. (2003). Nelson Textbook of Paediatrics, 17/e. Elsevier Health Sciences.
8. Effgen, S. K. (2012). Meeting the physical therapy needs of children. FA Davis.
9. Armstrong, N., & Van Mechelen, W. (Eds.). (2008). Paediatric exercise science and medicine. Oxford University Press.
10. Long, T. (2018). Handbook of paediatric physical therapy, 2/e. Lippincott Williams & Wilkins.
11. Fenichel, G. M. (2009). Clinical paediatric neurology: a signs and symptoms approach, 5/e. Elsevier Health Sciences.
12. Parthasarathy, A. (2016). IAP Textbook of pediatrics, 3/e. JP Medical Ltd.
13. Bly, L. (1994). Motor skills acquisition in the first year: an illustrated guide to normal development. Psychological Corp.
14. Dubowitz, L. M., Dubowitz, V., &Mercuri, E. (1999). The neurological assessment of the preterm and full-termnew-born infant, 2/e. Cambridge University Press.
15. Pountney, T. (2007). Physiotherapy for children. Elsevier Health Sciences.
16. DeGangi, G. A. (2017). Paediatric disorders of regulation in affect and behaviour: A therapist's guide to assessment and treatment. Academic Press.
17. DiFiore, J. (2013). The complete guide to postnatal fitness. A&C Black.
18. Campbell, S. K., Palisano, R. J., & Vander Linden, D. W. (2006). Physical therapy for children, 4/e. Saunders.
19. Haddad, G. G., Abman, S. H., &Chernick, V. (2002). Chernick-Mellins basic mechanisms of paediatric respiratory disease, 2/e. PMPH-USA.
20. Kliegman, R. M., Stanton, B. M., Geme, J. S., & Schor, N. F. (2015). Nelson Textbook of Pediatrics, 20/e, Vol 1, 2, 3. Elsevier Health Sciences.
21. Levitt, S., & Addison, A. (2018). Treatment of cerebral palsy and motor delay, 5/e. Wiley-Blackwell.
22. Connolly, B. H., & Montgomery, P. (2005). Therapeutic exercise in developmental disabilities, 3/e. Slack Incorporated.
23. Stamer, M. H. (2015). Posture and movement of the child with cerebral palsy, 2/e. PRO-ED, Incorporated.
24. Bly, L. (1999). Baby treatment based on NDT principles. Therapy Skill Builders

25. Dubowitz, V. (1980). The floppy infant, 2/e. Cambridge University Press.
26. Scherzer, A. L. (2000). Early diagnosis and interventional therapy in cerebral palsy: an interdisciplinary age-focused approach, 3/e. Informa Health Care.
27. Tecklin, J. S. (Ed.). (2008). Paediatric physical therapy, 5/e. Lippincott Williams & Wilkins.
28. Kimura, J. (2001). Electrodiagnosis in diseases of nerve and muscle: principles and practice, 4/e. Oxford university press.
29. Carr, J. H. (2011). Neurological rehabilitation, 2/e. Elsevier India.
30. Shumway-Cook, A., & Woollacott, M. H. (2007). Motor control: translating research into clinical practice, 2/e. Lippincott Williams & Wilkins.
31. Bundy, A. C., Lane, S. J., & Murray, E. A. (2002). Sensory integration: Theory and practice, 2/e. FA Davis.
32. Preston, D. C., & Shapiro, B. E. (2012). Electromyography and Neuromuscular Disorders: ClinicalElectrophysiologic Correlations (Expert Consult-Online and Print), 2/e. Elsevier Health Sciences.
33. Latash, M. L. (2008). Neurophysiological basis of movement. Human Kinetics.
34. Schwartzman, R. (2008). Neurologic examination, 1/e. John Wiley & Sons.
35. Ellis, E. (2005). Science-based rehabilitation: theories into practice, 1/e. Elsevier Health Sciences.
36. Miller, F. (Ed.). (2007). Physical therapy of cerebral palsy. Springer Science & Business Media.
37. Barnes, M. P., & Johnson, G. R. (Eds.). (2008). Upper motor neurone syndrome and spasticity: clinical management and neurophysiology, 2/e.Cambridge University Press.
38. Schmidt, R. A., Lee, T. D., Winstein, C., Wulf, G., &Zelaznik, H. N. (2018). Motor control and learning: A behavioural emphasis, 4/e. Human kinetics.
39. Schmidt, R. A., &Wrisberg, C. A. (2008). Motor learning and performance: A situation-based learning approach, 4/e. Human kinetics
40. Brooks-Scott, S. (1999). Handbook of Mobilization in the Management of Children with Neurologic Disorders.Butterworth Heinemann: Boston.
41. Holmes, G. L., Jones, H. R., &Moshé, S. L. (2006). Clinical neurophysiology of infancy, childhood, and adolescence, 1/e. Elsevier Inc.
42. Cowden, J. E., Sayers, L. K., & Torrey, C. C. (1998). Paediatric adapted motor development and exercise: An innovative multisystem approach for professionals and families. Charles C Thomas Pub Limited.
43. Vergara, E., &Bigsby, R. (2004). Developmental and therapeutic interventions in the NICU. Brookes Pub.
44. Capute, A. J., &Accardo, P. J. (1991). Developmental disabilities in infancy and childhood. Paul H Brookes Pub Co.
45. Kenner, C., & McGrath, J. (Eds.). (2004). Developmental care of new- borns& infants: A guide for health professionals. Mosby Incorporated.
46. Piper, M. C., Darrah, J., Maguire, T. O., & Redfern, L. (1994). Motor assessment of the developing infant. Philadelphia: Saunders.
47. Polin, R. A., Fox, W. W., &Abman, S. H. (2011). Fetal and Neonatal Physiology: Expert Consult-Online and Print, Vol. 1. Elsevier Sciences.
48. Jaeger, L. (1987). Home program instruction sheets for infants and young children. Therapy Skill Builders.
49. Armstrong, N. (Ed.). (2007). Paediatric exercise physiology. Elsevier Health Sciences.
50. Singh, M. (2017). Care of the new born, 8/ed. CBS Publishers & Distributors Private Limited.
51. Rennie, J. M., Hagmann, C. F., & Robertson, N. J. (2008). Neonatal cerebral investigation. Cambridge University Press
52. Umphred, Darcy Ann, Rolando T. Lazaro, Margaret Roller, and Gordon Burton, eds. (2013). Neurological rehabilitation, 6/e. Elsevier Health Sciences.

53. Lee, H. J., &DeLisa, J. A. (2005). Manual of nerve conduction study and surface anatomy for needle electromyography, 3/e. Lippincott Williams & Wilkins.
54. Taly, A. B., Nair, K. S., & Murali, T. (2001). Neurorehabilitation Principles & Practice, 2/e. Ahuja Book Company Pvt. Ltd.
55. Herdman, S. J., &Clendaniel, R. (2014). Vestibular rehabilitation, 2/e. FA Davis.
56. Patten, J. (1996). Neurological differential diagnosis, 2/e. Springer Science & Business Media.
57. Shacklock, M. (2005). Clinical neurodynamics: a new system of neuromusculoskeletal treatment. Elsevier Health Sciences.
58. Gillen, G. (2008). Cognitive and perceptual rehabilitation: Optimizing function. Elsevier Health Sciences.
59. Christa Einspieler (Author), Heinz R. F. Prechtl (2008) Prechtl's Method on the Qualitative Assessment of General Movements in Preterm, Term and Young Infants (Clinics in Developmental Medicine) Mac Keith Press
60. Karen Marcdante MD (Editor), Robert M. Kliegman MD. Nelson Essentials of Paediatrics: Elsevier India

C- NEURO-SCIENCES
PHYSIOTHERAPY IN SPECILITY AREA (NEURO-SCIENCES)

On Completion of this course, the post graduate will be able to –

- Exercise professional autonomy based on sound knowledge, skills and discipline at par with global standards in prevention, management and rehabilitation of patients with neuro medical and neuro-surgical conditions
- Practice within the professional code of ethics and conduct, and the standards of practice within legal boundaries
- Identify and analyse specific risks and dysfunction related to neurological conditions in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning
- Work with integrity and autonomy in an interdisciplinary team
- Involve in undergraduate and post graduate teaching with competence
- Carryout Evidence based practice (EBP) with recent advances
- Conduct research activities and utilize findings for professional development and lifelong learning

23MPT1N1 Physiotherapy perspective in Neurology.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Acquire knowledge on evolution of the nervous system, sequential developmental changes of a child, neurophysiology of neuromusculoskeletal function, neuroplasticity, effects of exercise on neuromusculoskeletal system etc
2. Understand the clinical manifestation in the field of Neuro- Physiotherapy using skills and knowledge on neuro-anatomy, pathophysiology of the nervous system and associated pathomechanical changes
3. Understand motor control and motor learning

COURSE CONTENT:

1. Anatomy and Physiology of nervous system
   a. Central nervous system,
   b. Peripheral nervous system and
   c. Autonomic Nervous system
2. Growth and development of child with emphasis on genetic embryological and ontological aspects. Physiology of CSF, cerebral circulation.
3. Normal sequential behavioral and physiological changes throughout the developmental arc.
4. Neurophysiology of balance, coordination and locomotion.
5. Motor control and theories of learning
   a. Physiology of Motor control [Movement organization at a cortical level, contributory role of cerebellum, basal ganglia and other subcortical structures]
   b. Theories of Motor Control [Reflex Theory, Hierarchical Theory, Systems Theory, Dynamical systems theory, Equilibrium point theory, Ecological Theory, Uncontrolled Manifold Theory]
   c. Kinematic and Kinetic Motor Control variables

6. Evolution of A.N.S dysfunction with reference to psycho-physiological testing, Biofeedback trailing.
7. Pathology and clinical features of nervous system disorders
   Pathological changes and clinical features in progressive and non- progressive disorders of Central and peripheral nervous system causing movement dysfunction.
8. Motor Development
   a. Motor development [Reflex, Gross Motor, Fine Motor]
   b. Sensory development
   c. Cognitive development
   d. Social development
9. Motor behaviour of basic tasks
   [Walking, Postural control and Object interaction with hands]
   a. Goal and description of motor tasks
   b. Development and variation of motor tasks across different age groups
   c. Neural control of motor tasks
   d. Biomechanics of motor tasks
   e. Role of environment variables in task performance across different stages of development
10. Motor learning and principles of promoting neuroplasticity
    a. Physiology of Motor learning
    b. Stages of Learning
    c. Classification of Motor Tasks
    d. Practice and feedback for motor tasks
    e. Measurement of Motor Learning
11. Exercise promotion and disease prevention
    a. Concept of Health, disease, disability and neuro-rehabilitation care delivery within the Indian context incorporating caregiver education and training
    b. Need for motivation in neurological patients
    c. Defining and describing health behaviour
    d. Causes of positive and negative health behaviours
    e. Theories of behaviour and behaviour change for exercise health behaviour
    f. Measurement of behaviour and behaviour change supported by modern technology
    g. Application of basic Behaviour change
    h. Techniques for promoting positive healthy lifestyle behaviour.
12. Reorganization and recovery
    a. Neural Plasticity
    b. Adaptation across musculoskeletal system in nervous system disorders
    c. Genetic and metabolic influences on neural plasticity
    d. Effect of Neuropharmacology on exercise, recovery and reorganization

23MPT2N2 Physiotherapy Assessment in Neurology.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Elicit and interpret clinical signs and symptoms of diseases commonly seen in Neurology and interpret clinical tests and special investigations commonly used in the diagnosis of these conditions
2. Generate a primary physical diagnosis and a list of differential diagnoses consistent with typical presentations
3. Identify and analyse normal and pathological anatomy on diagnostic images and arrive at an appropriate hypothesis based on sound clinical reasoning
4. Demonstrate a broad range of technical skills in diagnosing neurology conditions related to physiotherapy
5. Practice recent advances in assessing and diagnosing any neurological system disorders in physiotherapeutic perspective on the basis of EVP

COURSE CONTENT:

1. Various scales and assessment method used in neurological rehabilitation
2. Electrodiagnosis:
    a. Neurophysiology of nerve condition studies and electromyography
    b. Instrumentation of electrical stimulator, EMG, SFEMG, NCC (Nerve Condition Studies)
    c. Electrical study of reflexes (H-Reflex, Axon reflex, F-response, blink reflex, jaw jerk, Tonic vibration Reflex)
    d. Repetitive nerve stimulator
    e. Evoked potentials (SSEP, MEP, BAERA, and VER)
3. Interpretation on neurophysiologic responses in neuropathy, myopathy and neuromuscular Principles of clinical neuro-diagnosis and investigation
4. Disability evaluation, functional analysis indices and relevant provisions in prevent law.
5. Energy conservation, vocational fitness program, job analysis based on the ergonomics principles.
6. Physiological aspects and adjustments during rehabilitation of the disabled
7. Body Structure and Function Assessment in neurological disorders
    a. Assessment of Cerebral Cortical function [Such as Consciousness, Higher Functions, Sensory functions, Perception, Motor functions, Synergy, Speech, Vision etc]
    b. Assessment of cerebral cortical dysfunction in Progressive and Non- progressive disorders of Central Nervous System
    c. Assessment of Basal Ganglia functions [Motor planning, Movement initiation and control, Muscle Tone]
    d. Assessment of dysfunction in movement disorders
    e. Assessment of Cerebellar functions [Such as Motor coordination, Sensory integration of visual, vestibular and proprioceptive systems]
    f. Assessment of movement dysfunction in cerebellar disorders
    g. Assessment of Spinal Cord & Brainstem functions [Such as Muscle functions, Sensory functions, Reflexes and Autonomic functions]
    h. Assessment of movement dysfunction in Progressive and Non- progressive disorders of spinal cord

i. Assessment of Peripheral nervous system including Muscle and Neuromuscular junction functions [Such as Motor, sensory and peripheral autonomic functions]
j. Assessment of sensory, motor and autonomic dysfunction in peripheral nerve injuries, polyneuropathies, neuromuscular junction and muscle disorders
k. Screening and Assessment for Primary prevention and Risk reduction of secondary impairments in all neurological disorders. [Such as musculoskeletal, cardiopulmonary, integumentary and vascular system functions]
l. Assessment for primary prevention and Risk reduction such as Falls in conditions such as senility, prolonged inactivity, dementia, depression, polypharmacy, vestibular pathology, Fall history etc

8. Neurological investigations
    a. Electrophysiological investigations [EMG, SD curve and FG Test, Nerve conduction studies and Evoked Potentials]
    b. Neuroimaging [Ultrasound, CT, MRI, FMRI, PET, TMS, EEG]
    c. Biochemical [CSF, Muscle and Nerve Biopsy]
9. Motor Behaviour Assessment
    a. Motor Control and Motor Behaviour Assessment in clinical and natural environment
        I. Postural control assessment
        II. Gait assessment and Other Gross movement assessment
        III. Reach, Grasp and manipulation Assessment
        IV. Motor control and Motor Learning Assessment of motor tasks and functional activities utilizing performance measures and energetics
        V. Kinematic and kinetic analysis of motor tasks and functional activities and retention measures
    b. Physical assessment of functions in clinical and natural environment
        I. Assessment of Activities and Instrumental activities of daily function
        II. Assessment of Health Behaviours and Exercise adherence
        III. Assessment of Environmental Barriers and Facilitators
        IV. Assessment of Personal Barriers and Facilitators
10. Activity limitation and Participation Restriction assessment using Functional Outcome Measures
    a. Generic outcome measures
        I. Activities of Daily Living
        II. Instrumental Activities of Daily Living
        III. International Classification of Functioning Outcome measure
        IV. Participation Level Measure
        V. Quality of Life Measures
    b. Disease Specific Measures relevant to Activity and Participation
        I. CNS Disorder including Movement Disorders and Cerebellar Disorders
        II. Spinal Disorders
        III. Peripheral Nerve and Muscle Disorders
    c. Goal setting in progressive and non-progressive neurological disorders across ICF domain outcomes based on rate of prognosis.
    d. Assessment for assistive technological interventions

23MPT2N3 Assessment & Diagnosis of Neurology.

COURSE OUTCOME -
On Completion of this course, the post graduate will be able to –

1. Search and apply the available evidences for the management of various neurological disorders
2. Plan and execute evidence-based practice for neuro-rehabilitation program with recent advances and advancing technology
3. Discuss the common exercise prescriptions and their clinical use

COURSE CONTENT:

1. Treatment of Body structure and Function impairments in neurological disorders.
    a. Treatment of cerebral cortical dysfunction impairments affecting movement in Progressive and Non-progressive disorders of Central Nervous System.
        I. Assisting and leading exercise, teaching, enhancing and developing skills of functions of the brain including Global and Specific mental functions.
        II. Practice Training of caregivers for Practical and Emotional support with mental functions
        III. Training motor planning and control.
        IV. Assisting and leading exercise for movement functions.
        Supporting or guiding exercise focusing on functions of motor reflex, involuntary movement reaction, control of voluntary movement, gait pattern functions and sensations related to muscles and movement functions
    b. Treatment of movement dysfunction and in movement disorders and cerebellar disorders
        I. Assisting, Training and development of exercises for inhibiting involuntary movement dysfunction and incoordination.
        II. Supporting or guiding exercise focused on functions of unintentional, non- or semi - purposive involuntary movements
        III. Supporting or guiding exercise focused on initiating and controlling functions of voluntary movements such as cueing
    c. Treatment of sensory, motor and autonomic dysfunction in Progressive and non-progressive disorders of spinal cord, peripheral nerves, muscles and neuromuscular junction.
        I. Training for touch, temperature and other stimuli
        II. Teaching, enhancing or developing skills - of sensory functions of sensing surfaces and their texture or quality, sensing temperature, vibration, pressure and noxious stimulus through practice.
        III. Education and advice about touch functions, Stimulation of touch functions.
        IV. Training for Proprioceptive functions
        V. Teaching, enhancing or developing skills - of sensory functions of sensing the relative position of body parts - through practice
        VI. Assisting and leading exercise for Proprioceptive functions
        VII. Training muscle functions
        VIII. Training, Supporting or guiding exercise-focusing functions related to muscle power, muscle tone and muscle endurance
        IX. Electrical stimulation of muscle functions
        X. Training Autonomic functions

XI. Training control of central and peripheral sympathetic and parasympathetic functions through exercises and biofeedback

d. Treatment for Risk reduction of secondary impairments in all neurological disorders. Such as musculoskeletal, cardiopulmonary, integumentary and vascular system functions
   I. Supporting, Guiding, Educating and Training for the following exercises: Functional Strength Training, Stretching Exercise, Aerobic exercise Planning and prescription, Wound management, Managing DVT, Relaxation Training.

e. Treatment for Risk reduction such as Falls in conditions such as senility, prolonged inactivity, dementia, depression, polypharmacy, vestibular pathology, Fall history etc.

2. Neurological Approaches and Technology enabled treatment techniques in retraining CNS and PNS disorders.
   a. Understanding of Classical Approaches such as Rood, Bobath, NDT, Brunnstrom, PNF, Sensory Integration and their merits and demerits.
   b. Retraining with Technology Based Interventions:
      I. Artificial Intelligence (AI)
      II. Virtual Reality
      III. Robotic Therapy
      IV. Functional Electrical Stimulation,
      V. Brain and Spinal cord Stimulation,
      VI. Brain computer interface training
      VII. Neuro biofeedback therapy
      VIII. Assistive technology

3. Functional Interventions for Promoting Neuroplasticity for improving Motor Behaviour in various clinical disorders
   a. Principles of Neuroplasticity and Motor learning
   b. Motor Relearning Program
   c. Systems Model of retraining postural control, locomotion and upper limb activities.
   d. Task oriented and Functional Training for carrying out General tasks such as lifting and carrying objects, Mobility, self-care, domestic life, and Major life activities.
   e. Action Observation training and Mirror Therapy

4. Interventions for activity promotion and Participation Facilitation in various neurological disorders
   a. Behaviour Change Techniques for promoting positive health behaviour
      I. Training to influence health behaviours and exercise adherence
      II. Education to influence health behaviours and exercise adherence.
      III. Advocacy, Advising, counselling and emotional support for health behaviours
   b. Environmental Enrichment
      I. Prescription, Education, Advice, Training in and deconditioning from the use of products and technology those adapted or specially designed to assist functioning such as orthotic and assistive devices and technology.
      II. Capacity building interventions targeting aspects of natural environment and human-made changes to environment such as environmental remodelling in their home environment.
   c. Social Environment Enrichment
      I. Providing education and advice about practical, physical or emotional support provided by people, to encourage a change of functioning, environment, attitude or behaviour in relation to health (or risks)

5. Community Based Rehabilitation in Neurological Rehabilitation

6. Recent advances in Neuro-Physiotherapy

Recommended Books:

1. American Psychological Association. Publication manual of the American Psychological Association. Washington, DC: Author.
2. Chichester, UK: John Wiley. Domholdt, E. Physical therapy research: Principles and applications, WB Saunders, Philadelphia, USA.
3. Kuzma, J. W., & Bohnenblust, S. E. Basic statistics for the health sciences. Boston: McGraw Hill.
4. Munro, B. H. Statistical methods for health care research. Philadelphia: Lippincott.
5. Coakes, S. J., & Steed, L. G. SPSS: Analysis without anguish: Version 11.0 for Windows. Milton, Australia: John Wiley & Sons Inc. Jenkins, S.,
Price CJ, &Straker L.
6. The researching therapist. A practical guide to planning, performing and communicating research. Edinburgh: Churchill Livingstone.
7. Campbell, M.J., &Machin, D. Medical statistics: A commonsense approach . Chichester, UK: John Wiley.
8. Domholdt, E. Physical therapy research: Principles and applications. Philadelphia: WB Saunders.
9. Gowitzke,Williams and Wilkins.Scientific Basis of Human Movement .Baltimore..
10. Handbook of Physiology in Aging- Masoro, C.R.C. Press.
11. Hicks C:Research of Physiotherapists. Chrchhill Living stone, Edingburgh
12. Polgar S.: Introduction to Research in Health Sciences. Livingstone London.
13. Currier D.P: Elements of Research Physical Therapy. Williams & Wilkins, Baltimore.
14. Sproull: Hand Book of Research method. Scarecrow Press
15. Wilenski, Hale &Iremonger: Public Power and Administration.
16. Hickik Robert J: Physical Therapy Administration and management.
17. Nosse Lorry J: Management Principles for Physiotherapists.
18. Carpenter M.B: Human Neuroanatomy. Williams & Wilkins, Baltimore, n
19. Fraser: Physical Management of Multiple Handicapped. William & Wilkins, Baltimore
20. Aisen: Orthotics in neurological rehabilitation. Demos Publication, New York
21. Delisa: Manual of nerve conduction velocity techniques. Raven press, New York,
22. Kimura J, F.A Davis: Electrodiagnosis in diseases of nerve and muscle. Philadelphia,
23. O' Sullivan, F. A Davis: Physical rehabilitation: Assessment and treatment. Philadelphia,
24. Farber: Neuro – rehabilitation. W.B. Saimders , Philadelphia
25. Kerb D: Bio- Feedback – A practitioner's guide. Guiford press.
26. Black I: The neural basis of motor control. Churchill, Livingstone, London -
27. Turnbull Gerode I: Physical therapy management of Parkinson's disease. Churchill, Livingstone, London
28. Bobath B: Abnormal postural reflex activity caused by Brain Lesions. Aspen publications, Rockville
29. Eagel: Disorders of Voluntary Muscle. Churchill, Living stone Edingburgh
30. Knot M. and Voss: Proprioception, neuro muscular facilitation techniques. Harper and Row, New York456
31. Laidler, Capman and Hall: Stroke rehabilitation. London
32. Carr J.H, Shephered R.B: Motor relearning programme for stroke. Aspen publication, Rock Ville,
33. Bobath B. Heinmann: Adult hemiplegia evaluation and treatment: London
34. Brombley: Paraplegia and tetraplegia. Churchill, Livingstone, Edingburgh
35. Measurement in Physical therapy – Churchill, Livingstone, London
36. Maria stokes: Physical management neurological rehabilitation, Elsevier,Mosby.
37. Misra U.K, Kalita J: Clinical Neurophysiology NCV, EMG, Evoked Potentials, Elsevier, New Delhi,

38. Joel A Delisa, Gans B.M: Rehabilitation medicine principles and practice, revan, Philadelphia, New York,
39. Robert Gunzbng, MarekSzpalski: Whiplash Injuries, current concepts in prevention diagnosis and treatment, Lippincot Williams & wilkins.
40. Krusen's: Hand book of physical rehabilitation, kottke, lehmann, Saunder's Publications,
41. Ropper A.H, Brown R.H: Adam and victors' principle of neurology, Mcgraw – hill companies USA
42. Richard S. Snell: Clinical Neuroanatomy for medical students, Lippincott Williams &wilkins
43. Martha Freeman Somers: Spinal cord injury functional rehabilitation
44. David S Butler: Mobilisation of the nervous system Churchill Livingstone, New York.
45. Darcy A. Umphred: Neurological rehabilitation, Mosby, Sydney,
46. Kenneth W. Lindsay, Ian Bone: Neurology & Neurosurgery illustrated,
47. M Flint Beal, Anthony.E. Lang, Albert Ludolph: Neurodegenerative Diseases, Cambridge University Publication, USA
48. Jose.I. Suarez: Critical Care Neurology and Neurosurgery, HUMANA PRESS PUBLICATIONS, USA.
49. David.R. Lynch: Neurogenetics-Scientific& Clinical Advances, Taylor& Francis Group Publication New York
50. Asbury, Mckann, Medonald: Diseases of Nervous System- Vol. I and Vol II, Mcarthur public, 3rd edition.

C- CARDIOPULMONARY SCIENCES
PHYSIOTHERAPY IN SPECILITY AREA (CARDIOPULMONARY SCIENCES)

On Completion of this course, the post graduate will be able to –

- Exercise professional autonomy based on sound knowledge, skills and discipline at par with global standards in prevention, management and rehabilitation of subjects with general medical, surgical, cardiovascular, pulmonary conditions
- Practice within the professional code of ethics and conduct, and the standards of practice within legal boundaries
- Identify and analyse specific risks and dysfunction related to general medical, surgical, cardiovascular, pulmonary conditions within the boundaries of physiotherapy practice and arrive at an appropriate hypothesis based on sound clinical reasoning
- Work with integrity and autonomy in an interdisciplinary team
- Involve in undergraduate and postgraduate teaching with competence
- Carryout Evidence based practice (EBP) with recent advances
- Conduct research activities and utilize findings for professional development and lifelong learning

23MPT1C1 Physiotherapy perspective in Cardio-Pulmonary Disorder.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to -

1. Understand the clinical manifestation in the field of Cardiopulmonary Physiotherapy using skills and knowledge on respiratory biomechanics and pathophysiology of cardiovascular system
2. Interpret the influence of exercise on cardiopulmonary system

COURSE CONTENT:

1. Applied Anatomy, Physiology, and Biomechanics of Respiratory System
    a. Applied Anatomy, developmental anatomy and physiology of the
    b. respiratory system in health and its application in various respiratory
    c. dysfunctions across lifespan.
    d. Regulation of respiration
    e. Biomechanics of respiration
    f. Bronchial circulation
    g. Pathomechanics in respiratory dysfunction and thorax throughout lifespan.
    h. Effect of Body positioning on pulmonary functions.
    i. Pathology, Pathophysiology of various acute and chronic diseases affecting the respiratory systems.
2. Applied Anatomy and Physiology of Cardiovascular System
    a. Applied Anatomy, developmental anatomy and physiology of the cardiovascular dysfunction across lifespan
    b. Effect of Body positioning on Cardiovascular system
    c. Cardiovascular Control Mechanism
    d. Pathology, Pathophysiology of various acute and chronic diseases affecting the cardio vascular systems.
3. Applied Anatomy and Physiology of Integumentary System
    a. Applied Anatomy,

b. Developmental anatomy,
c. Physiology of Integumentary system
d. Physiological variations, responses and adaptations (age/gender) of cardiovascular and respiratory system to different types of exercise and training.
e. Environmental influence on exercise performance including impact of pollution on exercise training

4. Exercise Physiology in Health and Disease across lifespan
   a. Exercise physiology and exercise intolerance in cardiopulmonary, vascular and metabolic disease.
   b. Biochemical primers in exercise and exercise intolerance and Genetic and metabolic on exercise and exercise intolerance.
   c. Exercise intolerance in health (across lifespan) and various non- communicable diseases

23MPT2C2 Physiotherapy Assessment in Cardio-Pulmonary Disorder.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to -

1. Identify and analyse Cardiorespiratory dysfunction in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning
2. Practice EBP and recent advances in assessing and diagnosing any cardiorespiratory system disorders in physiotherapeutic perspective by eliciting and interpreting clinical signs and symptoms of cardiopulmonary diseases and special investigations used in cardiopulmonary system dysfunction
3. Generate a primary diagnosis and a list of differential diagnosis consistent with typical presentations
4. Document the assessment report for patients under critical care with recent advances in physiotherapeutic perspective
5. Evaluate pain and conduct exercise testing for population with different conditions

1. Assessment, Monitoring and Outcome measures in Critical Care Rehabilitation
    a. Evaluation in the critically ill patient
    b. Weaning Criteria
    c. Documentation
    d. ICU Equipment& Monitoring
    e. Critical care complications
    f. Outcome measures used in critical care
2. Critical care investigations and its implications for physiotherapy
    a. Investigations like ECG, Arterial blood gas, Electrolytes, Biochemical markers,
    b. Haematological and biochemical values and interpretations
    c. Chest radiographs, ultra-sonography and echocardiography
    d. Early intervention priorities based on physical examination and investigations
3. Investigative procedures used in Respiratory System
    a. Physical examination of Respiratory system
    b. Pulmonary function Test (PFT)
    c. ABG, Echo, Radiology (X-ray and CT scan& MRI)
    d. Evaluation of Respiratory muscle strength & endurance in chronic respiratory
    e. disorders.
    f. POMR – problem oriented medical records and documentation methods
    g. Outcome measures used in Respiratory disorders.
4. Investigative procedures used in Cardiovascular System
    a. Physical examination of Cardiac System
    b. Clinical evaluations – Auscultation, ECG, Holter Monitoring, Echo, Doppler, X-ray, /Angiogram/IABP, ECMO
    c. POMR – problem oriented medical records and documentation methods
    d. Outcome measures used in Cardiac dysfunction.
    e. Cardiopulmonary and metabolic system – Cardiopulmonary exercise testing (CPET) /Stress testing in various cardiovascular disorders.
5. ANS Dysfunction and Testing
6. Assessment of Renal Dysfunction
7. Cardiopulmonary Rehabilitation (OPD Setting)
    a. Health related fitness assessment (endurance, strength, flexibility and body composition) through various methods in various cardiovascular and pulmonary disease

b. Risk Stratification
c. Exercise Tolerance Test- (Advanced and traditional methods)
d. Monitoring Systems: Basic (Manual Measurements), Advanced (Technology)
e. Evaluating physical activity (subjective and objective) through appropriate outcome measures

8. Peripheral Vascular Disorders
   a. Assessment and special tests of Arterial, Venous and Lymphatic systems
   b. Assessment of wound and Ulcer
   c. Assessment of edema
9. Integumentary System
   a. Screening, evaluation and Assessment of skin conditions
   b. Screening, evaluation and Assessment of burns
   c. Assessment of Wound healing
10. Oncology
   a. Physical examination and screening of different types of cancer
   b. Special emphasize on cancer affecting head and neck, thorax and abdomen
   c. Cancer evaluation methods, outcome measures, functional evaluation
11. Pain Assessment & Evaluation
   Evaluation of Pain in general medical, surgical, Cardio-vascular & respiratory conditions and cancer
12. Exercise Testing in Different population (including metabolic syndromes, renal failure, obesity)
   a. Methods to analyse body composition
   b. Exercise testing (aerobic, strength, flexibility)
   c. Definition of physical activity, its importance in health and disease
   d. Assessment of physical activity (subjective and objective) through appropriate outcome measures
13. Evaluation and Diagnostic tool/ Equipment's used to assess fatigue
14. Recent advances of assessment and diagnostic approaches in Cardiopulmonary Physiotherapy

23MPT2C3 Assessment & Diagnosis of Cardio-Pulmonary Disorder.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to -

1. Develop and execute management plan for cardiopulmonary disorders in physiotherapeutic perspective on the basis of EBP and recent advances
2. Provide CPR if situation demands
3. Work in the interdisciplinary team inside an ICU and critical care set up

COURSE CONTENT:

1. Cardio-pulmonary resuscitation, CPR- BLS Training
2. Acute and Critical Care Settings - Comprehensive management of adults
    a. Acute care setting – environment, equipment and monitoring
    b. Body Mechanics and Positioning
    c. Care of the patient with artificial Airway
    d. Management of ventilated conscious, ventilated unconscious, and patient not on ventilator
    e. Weaning of Ventilation
    f. Preventive Measures and Evidence based Practice
3. Intensive Care Management of Individuals with Primary Cardiovascular and Pulmonary dysfunction
4. Principles and physical therapy management for:
    a. COPD and RLD
    b. Status Asthmaticus
    c. Coronary artery disease and Open-Heart Surgery
    d. Respiratory failure and Heart failure
5. Intensive Care Management of Individuals with Secondary Cardiovascular and Pulmonary dysfunction

    Principles and physical therapy management for:
    a. Obesity
    b. Neuromuscular conditions
    c. Musculoskeletal trauma
    d. Head Injury
    e. Spinal Cord Injury
    f. Organ Transplantation

6. Intensive Care Management of Medical and Surgical Complications (special emphasis on management of patients with burns, upper abdominal surgery, minimally invasive abdominal surgery)
7. Critical care management of Neonates, Infants and Paediatric Patients
    a. General Management of the critically ill Neonate: Bronchial Hygiene Therapy, Neonatal Resuscitation, Airway Management
    b. Medical and physiotherapy techniques in critically ill neonates, Infants and Paediatric patients
    c. Physiotherapy interventions in the management of neonates, infants and Pediatric patients with Primary and Secondary Cardiopulmonary,
8. Musculoskeletal and Neurological dysfunctions in Critical Care unit

9. Cardiovascular and Pulmonary Physical Therapy in stable and chronic conditions
   Principles of physical therapy management for:
   a. Acute Medical Conditions
   b. Surgical Conditions & Chronic primary and Secondary cardiovascular and pulmonary dysfunction
10. Cardio respiratory Physiotherapy Skills & Therapeutics
   a. Lung expansion therapy –methods and techniques to improve lung volumes and capacities
   b. Bronchial Hygiene therapy – methods and techniques to clear secretions
   c. Methods and techniques to decrease work of breathing
   d. Endurance promotion activities
   e. Energy conservation techniques
   f. Oxygen therapy and hyperbaric oxygen therapy
   g. Methods to increase exercise capacity
   h. Pharmacotherapy
   i. Airway Pharmacology
   j. Impact of Pharmacotherapeutics in Cardiovascular and Respiratory conditions and its relevance in exercise prescription and rehabilitation.
11. Cardio Pulmonary Rehabilitation
   a. Elements of International standards for a Cardiac/ Pulmonary rehabilitation Program: historic perspective, Definition and Goals, Physical reconditioning, scientific basis, Benefits and potential hazards, Patients evaluation and selection criteria and Recent Advances.
   b. Smoking cessation and other risk factor modifications
12. Prevention of Cardiovascular, Endocrine, Metabolic and Pulmonary Diseases
   a. Primary prevention of various Cardiovascular, Endocrine, Metabolic and Pulmonary diseases
   b. Public health programs for cardiovascular and pulmonary diseases globally and in India.
13. Diseases of Peripheral Vascular and Lymphatic system
   a. Evidence based management of patients with Arterial, Venous and Lymphatic diseases.
   b. Ulcer and wound management
14. Pain
   a. Pain management in post-surgical conditions.
   b. Therapeutic modalities in pain management

15. Exercise Prescription for The People with Primary Cardiovascular And Pulmonary And Endocrine Conditions
   a. Exercise prescription and evidence-based strategies for promoting and maintaining health, physical activity and exercise in above conditions.
   b. Exercise Prescription for the People with Non-Primary Cardiovascular and Pulmonary and Endocrine Conditions
   c. Neuromuscular conditions
   d. Collagen/Connective tissue conditions
   e. Chronic renal insufficiency
   f. Overweight and Obesity
16. Oncology
   a. Physiotherapy management of different types of tumors

   b. special emphasize on head, neck, lung and mediastinal tumors
   c. Cancer rehabilitation and palliative care
17. Physiotherapy Management of Integumentary System
   a. Prevention and management of skin conditions
   b. Use of Therapeutic agents to facilitate wound repair
   c. Prevention of ulcers in patients with desensitized skin
   d. Appropriate exercises during different phases of Burn care
   e. Scar Management and Outpatient rehabilitation for Burns
18. Preventive and Long-Term Care
19. Patient education and Caregiver education
20. Health promotion and risk minimization strategies
21. Recent advances in management strategies for Cardiopulmonary Physiotherapy

Recommended Books –

1. Froelicher /Myers-"Exercise and heart' Saunders publication.
2. Jean Jobin et al. Advances in Cardio-Pulmonary Rehabilitation"
3. Scot Irvin,Lan Stiphen Tecklin-"Cardio-Pulmonary physical therapy-a guide to practice", Mosby
4. Frances J Brannon,Margaret W Foley,Julie Ann Stars,Lauren M Saul "Cardio-Pulmonary Rehabilitation-Basic Theory and Application",F A Davis Company.
5. Cynthia Coffin Zadai-"Pulmonary management in Physical therapy",Churchill Livingstone.
6. Barbara A Webber and Jennifer A Pryor-"Physiotherapy for respiratory and cardiac problems", Churchill Livingstone.
7. George G.Burton,John E Hodgin,Jeffrey J Ward-"Respiratory Care-A Guide to Clinical Practice" 4th edition, Lippincott Williams and Wilkins,
8. Robert MBerne, Matthew N Levy-"Cardio-vascular physiology", Mosby.
9. John B.West-"Respiratory Physiology-the essentials", Lippincott Williams and Wilkins.
10. Macleod's Clinical Examination.
11. Andrews Davies and Carl Moores-"The Respiratory System", illustrated by Robert Britton, Churchill Livingstone.
12. George G.Burton,John E Hodgin,Jeffrey J Ward-"Respiratory Care-A Guide to Clinical Practice", Lippincott Williams and Wilkins,
13. Richard d Branson/Robert L Chatburn-"Respiratory Care Equipment",J B Lippincott Company.
14. N R Malentyre/R D Branson-"Mechanical Ventilation",Saunders.
15. Joanne Watchie-"Cardio-Pulmonary Physical Therapy",Saunders.
16. Hillegass and Sadowsky."Essentials of Cardio-Pulmonayr Physical Therapy",Saunders,Elseviers.
17. Michael L.Pollock and Donald H Schmidt-"Heart disease and Rehabilitation".
18. Scot Irvin, Lan Stiphen Tecklin."Cardio-Pulmonary physical therapy-a guide to practice", Mosby.
19. Frances J Brannon, Margaret W Foley, Julie Ann Stars, Lauren M Saul
20. Cardio-Pulmonary Rehabilitation-Basic Theory and Application". F A Davis Company

E- SPORTS PHYSIOTHERAPY

On Completion of this course, the post graduate will be able to –

- Exercise professional autonomy based on sound knowledge, skills and discipline at par with global standards in sports injury, prevention, management and rehabilitation.
- Practice within the professional code of ethics and conduct, and the standards of practice within legal boundaries
- Identify and analyse sports specific risk, dysfunction and injury in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning on the field and in an institution
- Work with integrity and autonomy in an interdisciplinary Sports team
- Involve with competence in academic sports specific areas
- Carryout Evidence based practice (EBP) with recent advances
- Conduct research activities and utilize findings for professional development and lifelong learning

23MPT1S1 Physiotherapy perspective in Sports Science.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to -

1. Identify and analyze sports specific risk, dysfunction and injury in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning on the field and in an institution
2. Work with integrity and autonomy with an interdisciplinary sports team

COURSE CONTENT:

1. Applied and Functional Anatomy
    a. Growth & maturation of systems involved in performance
    b. Human movement control

2. Exercise Physiology in Sports
    a. Neurophysiology of various sporting activities like balance, coordination, reaction etc.
    b. Exercise physiology of various sporting activities
3. Pathomechanics of bones, joints and soft tissues during sporting activities and injuries
4. Biomechanics and Kinesiology of different sporting activities

5. Sports Nutrition:
    a. Well–balanced diet,
    b. Increasing and decreasing weight in wrestlers,
    c. Sugar before and after competition
    d. Optimum nutrition for exercise, nutrition for physical performance, pre-game meal
    e. Carbohydrate loading
    f. Food for various athletic events,
    g. Fluid and energy replacement in prolonged exercise
6. Sports and health promotion
7. Sports pharmacology and ergogenics
8. Anti-doping:
    a. (NADA, WADA)

b. Promotion of fair play.

9. Role of a Sports physiotherapist as an administrator and team collaborator
10. Concept of Sports Medicine and Sports Traumatology
11. Principles of Training and exercise conditioning
12. Thermoregulation
13. Altitude, body fluids
14. Body composition
15. Medical conditions: Diabetes, Hypertension, COPD, NCDs
16. Ergogenic aids
17. Sports Psychology
18. Emergency Care in Sports
19. Medicolegal issues in Sports
20. Concept of Olympism

23MPT2S2 Physiotherapy Assessment in Sports Science.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to -

1. Assess and evaluate Sports injuries and Trauma occurred in Sports
2. Screen an athlete for physical and functional fitness during talent scouting
3. Conduct Performance Mapping of an athlete with respect to Sports specific physical and functional fitness and advice for specific skill training to the other team members like strength and conditioning experts, coaches etc
4. Provide fitness certificate to an athlete to participate in competitive sports
5. Plan pre-habilitation and re-habilitation training program for an athlete

ASSESSMENT, INJURY EVALUATION AND SPORTS TRAUMATOLOGY

1. Assessment and Evaluation
    a. Methods of evaluation: Interview, Clinical Examination,
    b. Batteries used in Sports and performance testing
    c. Reliability & Validity of the tests,
    d. Investigative Procedures,
    e. Field Tests and Laboratory tests
    f. Evaluation of motor skills (fundamental and sports specific skills)
2. Clinical Bio-psychosocial approach to sports injury evaluation.
3. Evaluation of Physical Fitness: Health and skill related fitness tests
4. Functional assessment
5. Musculoskeletal screening
6. Myofascial considerations and evaluation in somatic dysfunction
7. Investigation methods/Diagnostic Imaging used
8. On and Off-field assessment, pre-participation evaluation.
9. Sports specific assessment of lower limb complex:
10. Sports specific assessment of upper limb complex:
11. Sports specific assessment of spinal column
12. Sports specific assessment of Gait deviations
13. Criteria for return to sports
14. Advanced evaluation methods:
    a. Isokinetic, Myometers, Force plates & 3D analysis
    b. Sports movement analysis
    c. Fatigue assessment: lactate analyser
    d. Kinesiological EMG
    e. Kin anthropometric evaluation

23MPT2S3 Assessment & Diagnosis of Sports Science.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to -

1. Involve with competence in academic sports specific areas
2. Execute Sports specific fitness training program for an athlete
3. Execute Recovery training protocol for athletes
4. Provide on-field injury management and emergency management with in shortest possible time and execute referral system as and when required
5. Conduct pre-habilitation and rehabilitation program
6. Train and treat athletes of special population
7. Aware of medicolegal issues in Sports
8. Execute recent advances in Sports Physiotherapy and rehabilitation
9. Conduct research activities and utilize findings for professional development and lifelong learning

1. Principles of Prevention of Sports Injuries:
    a. Protective devices
    b. Technique
    c. Play area and play surface
    d. Shoes
2. Common sports injuries, mechanisms (causation), prevention and management:
    a. Soft tissue:
        I. Ligament
        II. Muscle
        III. Tendon
    b. Hard tissue:
        I. Bone
        II. Articular cartilage
3. Sports emergency and first aid management.
4. Sports specific Injuries in different sports categories
    a. Individual Sports
    b. Partner Sports
    c. Team Sports
    d. Extreme Sports
5. Advanced Physiotherapy Intervention Techniques used in the Management of Sports Specific Injuries: Techniques
6. Sports injury prevention and management for special population:
    a. Children
    b. Women
    c. Elderly
    d. Differently abled and Para Sports
7. Guidelines and protocols for Return to sports following injury, conservative and surgical management
8. SPECIAL TOPICS
    a. Medico legal issues in sports
    b. Fitness and exercise prescription for special population
    c. Effects of exercise on various hormones in the body.

d. Exercise and Menstrual cycle.
e. Female athlete triad
f. Exercises for mood enhancement and anxiety.
g. Sports and fitness in paediatrics.
h. CPR and shock management during off and on field.
i. Sports specific fitness training
j. Ergonomics for sport
k. Fitness programming for healthy adults and special population

9. Management strategies in Traumatology in Sports
10. Sports Rehabilitation
11. Recovery in Sports
12. Recent advances in Sports physiotherapy and rehabilitation

Recommended Books –

1. Chew, F. (110107). Skeletal radiology: The bare bones (2nd ed.). Baltimore, MD: Williams & Wilkins.
2. Eisenberg, R. L., & Johnson, N. M. (2003). Comprehensive radiographic pathology (3rd ed.). St Louis, MO: Mosby.
3. Hughes, J., & Hughes, M. (110107). Imaging: Picture tests. Edinburgh: Churchill Livingstone.
4. Mace, J. D., &Kowalczyk, N. (110104). Radiographic pathology for technologists (2nd ed.). St Louis, MO: Mosby.
5. Redhead, D. N. (110105). Imaging: Colour guide. Edinburgh: Churchill Livingstone.
6. Yochum, T. R., & Rowe, L. R. (2005). Yochum and Rowe's essentials of skeletal radiology (3rd ed., Vols. 1-2). Baltimore, MD: Lippincott Williams & Wilkins.
7. Nolte, J., & Angevine, Jr. J. B. (2000). The human brain in photographs and diagrams (2nd ed.). St Louis, MO: Mosby.
8. Wicke, L. (110107). Atlas of radiologic anatomy (6th ed.). Munich, Germany: Lea &Febiger.
9. Seidel, H. (110105). Mosby's guide to physical examination. St Louis, MO: C.V. Mosby.
10. Cailliet, R. Neck and arm pain Philadelphia: FA Davis.
11. Cailliet, R. Shoulder pain Philadelphia: FA Davis.
12. Cailliet, R. Knee pain and disability Philadelphia: FA Davis.
13. Cailliet, R. Hand pain and impairment Philadelphia: FA Davis.
14. Cailliet, R. Low back pain syndrome Philadelphia: FA Davis.
15. Cailliet, R. Soft tissue pain and disability Philadelphia: FA Davis
16. O'Sullivan, F.A. Davis, Philadelphia 110104. Physical rehabilitation: assessment and treatment.
17. Kuprian: Physical Therapy for Sports, W.B. Saunders
18. Malone: Orthopeadic and Sports Physical Therapy, C.V. Mosby.
19. Zulunga et al: Sports Physiotherapy, W.B. Saunders.
20. Reed: Sports Injuries – Assessment and Rehabilitation, W.B. Saunders.
21. Gould: Orthopaedic Sports Physical Therapy, Mosby.
22. C. Norris: Sports Injuries – Diagnosis and Management for Physiotherapists, Heinmann.
23. Gait analysis – Perry J., Black Thorofare, New Jersy, 110102.
24. Mc Ardle, Katch, Katch: Exercise Physiology Edition IV.
25. Era Volinski: Nutrition and exercise in Sports - CRC Press, New York.
26. George A. Brooks, Thomas D. Fahey: Exercise Physiology – Human Bioenergetics and its applications 11084, John Wiley & Sons, New York.
27. Astrand&Rodahl: Text Book of Work Physiology, McGraw Hill.

28. .Fox and Mathews - The Physiological Basis of Physical Education and athletics – Holt Saunders.
29. Erston and Reilly - Kinanthropometry and Exercise Physiology Laboratory Manual tests, Procedures and Data - F & FN Spon Madras.
30. Rowland - Developmental Exercise Physiology - Human Kinetics.
31. Clarke - Exercise Physiology - Prentice Hall.475
32. Gardiner M. Dena: The Principles of Exercise Therapy - CBS Publishers Delhi.
33. Kisner and Colby: Therapeutic Exercises – Foundations and Techniques, F.A. Davis.
34. Basmajian John V.: Therapeutic Exercise, Williams & Wilkins.
35. Wood & Baker: Beard's Massage, W.B. Saunders.
36. William E. Prentice: Rehabilitation Techniques - Mosby.
37. Werner Kuprian: Physical Therapy for Sports, W.B. Saunders.
38. Kennedy: Mosby's Sports Therapy Taping Guide
39. Malone: Orthopeadic and Sports Physical Therapy, C.V. Mosby
40. William E. Prentice: Therapeutic Modalities in Sports Medicine - Mosby.
41. William E. Prentice: Rehabilitation Techniques - Mosby.
42. O' Sullivan, Schmitz: Physical Rehabilitation – Assessment and Treatment - F.A. Davis.
43. John Low & Reed: Electrotherapy Explained, Butterworth.
44. Meryl Roth Gersh: Electrotherapy in Rehabilitation, FA Davis.
45. Joseph Kahn: Principles and Practice of Electrotherapy, Churchill Livingstone.
46. Harrelson and Andrews: Physical Rehabilitation of Injured Athlete.
47. Nelson and Currier: Clinical Electrotherapy, Prentice Hall.
48. Greenman: Principles of Manual medicine, William and Wilkins.
49. Kuprian: Physical Therapy for Sports, W.B. Saunders.
50. . Bates: Aquatic Exercise Therapy, W.B. Saunders.
51. Michlovitz - Thermal agents in Rehabilitation - F.A. Davis.
52. Lehmann - Therapeutic Heat and Cold - Williams & Wilkins
53. Morgan and King: Introduction to Psychology - Tata McGraw Hill.
54. Suinn: Psychology in Sports: Methods and applications, Surjeet Publications.
55. Grafiti: Psychology in contemporary sports, Prentice Hall.
56. Manual of nerve conduction velocity techniques – De Lisa, Raven press, New York, 11082.
57. Physical rehabilitation: assessment and treatment – O'Sullivan, F.A. Davis, Philadelphia 110104.
58. Bio-feedback – A practitioners guide – Kerb D, Guiford press
59. James G. Hay – The Biomechanics of Sports Techniques, Prentice Hall. Brunnstrom - Clinical Kinesiology, F.A. Davis.
60. Luttgens K., Hamilton N.: Kinesiology – Scientific Basis of Human Motion, Brown & Benchmark.
61. Kreighbaum E., Barthels K.: Biomechanics – A Qualitative approach for studying Human Motion, MacMillan.
62. Rasch and Burk: Kinesiology and Applied Anatomy, Lee and Fabiger.
63. White and Punjabi - Biomechanics of Spine - Lippincott.
64. .Norkin&Levangie: Joint Structure and Function - A Comprehensive Analysis - F.A. Davis.
65. Kapandji: Physiology of Joints Vol. I, II & III, W.B. Saunders.
66. Northrip et al: Analysis of Sports Motion: Anatomic and Biomechanic perspectives, W.C. Brown Co., IOWA
67. Leveac B.F.: Basic Biomechanics in Sports and Orthopeadic Therapy, C.V. Mosby.
68. Morris B. Mellion: Office Sports Medicine, Hanley & Belfus.
69. Richard B. Birrer: Sports Medicine for the primary care Physician, CRC Press.
70. Torg, Welsh &Shephard: Current Therapy in Sports Medicine III - Mosby.

71. Zulunga et al: Sports Physiotherapy, W.B. Saunders.
72. Brukner and Khan: Clinical Sports Medicine, McGraw Hill.
73. Reed: Sports Injuries – Assessment and Rehabilitation, W.B. Saunders.
74. Gould: Orthopaedic Sports Physical Therapy, Mosby.
75. C. Norris: Sports Injuries – Diagnosis and Management for Physiotherapists, Heinmann.
76. D. Kulund: The Injured Athlete, Lippincott.
77. Nicholas Hershman:
    Vol. I The Upper Extremity in Sports Medicine.
    Vol. II The Lower Extremity and Spine in Sports Medicine.
    Vol. III The Lower Extremity and Spine in Sports Medicine. Mosby.
78. Lee & Dress: Orthopaedic Sports Medicine - W.B Saunders.
79. Fu and Stone: Sports Injuries: Mechanism, Prevention and Treatment, Williams and Wilkins.
80. Scuderi, McCann, Bruno: Sports Medicine – Principles of Primary Care, Mosby.
81. First Aid to Injured: St. John's Ambulance Association.
82. Andrea Bates and Norm Hanson: Aquatic Exercise Therapy, W.B. Saunders.
83. Dvir: Isokinetics: Muscle Testing, Interpretation and Clinical Applications,
84. W.B. Saunders.
85. Hartley: Practical Joint Assessment, A Sports Medicine Manual, upper and lower quadrants, C.V. Mosby.
86. Albert: Eccentric Muscle Training in Sports and Orthopedics, W.B. Saunders.
87. Voss et al - Proprioceptive Neuromuscular Facilitation - Patterns & Techniques - Williams & Wilkins
88. Torg, Welsh andShephard: *Current Therapy in Sports Medicine III* - Mosby.
89. Reed: *Sports Injuries – Assessment and Rehabilitation,* W.B. Saunders.
90. Nordinand Frankel:*Basic Biomechanics of Muscular Skeletal System:* Williams and Wilkins.
91. Mc Ardle, Katch, Katch: *Exercise Physiology.*
92. Brukner and Khan: *Clinical Sports Medicine,* McGraw Hill.
93. O'Leary: Drugs and doping in sports.
94. Wilson, A. Effective management of musculoskeletal injury: A clinical ergonomics approach to prevention. Churchill Livingstone.
95. Lee and Dress: Orthopaedic Sports Medicine - W.B Saunders

F-BIOMECHANICS

PHYSIOTHERAPY IN SPECILITY AREA (BIOMECHANICS)

On Completion of this course, the post graduate will be able to –

- Independently assess and conduct Biomechanical analysis and performance mapping to plan the training or rehabilitation program to prescribe movement related information and exercise prescription
- Understand clinical manifestations for various types of movement dysfunctions and apply biomechanical analysis for suitable management based on recent trends and EBP for movement remediation
- Identify and analyse specific risks and dysfunction related to neurological conditions in physiotherapeutic perspective and arrive at an appropriate hypothesis based on sound clinical reasoning
- Undertake independent research in Biomechanics and Movement Science
- Demonstrate following competencies: Decision making, Communication, Skills, Safety, Ethics
- Carryout Evidence based practice (EBP) with recent advances
- Conduct research activities and utilize findings for professional development and lifelong learning

23MPT1B1 Physiotherapy perspective in Biomechanics.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Acquire knowledge on applied anatomy and physiological basis of movement, biophysics of connective tissues
2. Acquire knowledge on motor control influence on movement
3. Understand movement adaptations with age and environment

COURSE CONTENT:

1. Applied anatomy and physiological basis of movement
    a. Growth and development of all systems
    b. Anatomy – embryology, gross anatomy
    c. Functional anatomy and physiology related to nerve, cardio vascular, respiratory, gastro intestinal, renal, endocrine, CNS, motor system etc
    d. Energy systems
    e. Biochemical processes involving energy systems, nutrition and its role in health, oxygen transport, aerobic and anaerobic systems.
    f. Physical and anatomical parameters of movement during function and physical activity.
2. Biophysics of connective tissue – ligament, cartilage, tendon, muscle, neural tissues, vessels & bone – response to mechanical loading
3. Motor control and its influence on movement
    a. Motor control and development, and degeneration in health and disease
    b. Nature and control of movement- theories.
    c. Physiological basis of motor learning and function.
    d. Postural control.

e. Control of mobility.
f. Reach, grasp and manipulation.
g. Movement within the framework of motor control theories and their application to function, learning, occupations and physical activity
h. Motor control theories as applied to movement dysfunction and remediation in function, physical activity and occupation.

4. Growth development and degeneration of movement
   a. Aging and its effect on all systems and the impact on movement and physical activity and exercise.
   b. Theories and application of motor control and learning lifespan perspective in order to identify normal maturation and aging versus dysfunction.
   c. Movement development based on environmental influences and growth and development.
   d. Movement adaptations with aging and anthropometry and environmental influences including work
5. Exercise physiology, Electrophysiology
   a. Nutrition and energy transfer mechanism
   b. Physiological processes during exercise/ physical activity in
   c. Pulmonary system
   d. Cardiovascular system
   e. Neuromuscular system
   f. Endocrine system

23MPT2B2 Physiotherapy Assessment in Biomechanics.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Independently assess and conduct Movement analysis of based on EBP and recent advances
2. Conduct exercise testing and prescription with clinical reasoning
3. Use technology in biomechanical assessment and documentation with recent advances

COURSE CONTENT:

1. Exercise testing, prescription, determinants and reasoning.
    a. Exercise training and adaptations in functional capacity
    b. Factors affecting function, performance- evaluation and analysis using laboratory tests and field tests, interpretation based on age, gender, race and other factors
    c. Reasoning for relevant tests and methods
    d. Understanding of potential safety concerns and precautions
2. Biomechanics and kinesiology
    a. Biomechanical adaptations to exercise/ aging
    b. Testing and analysis of kinetic, spatial, temporal and kinematic parameters and energetics using instrumented methods, scales
    c. Reasoning for choice of tests and methods of tests
    d. Analysis of fundamental movement skills
3. Application in complex functions
    a. Analysis of posture,
    b. Gait analysis
    c. Balance Assessment
    d. Higher motor activities using instrumented and self-reported measures- choice and interpretations of methods and tests
4. Ergonomic evaluation
5. Biomechanical Assessment with advancing technology like – Artificial Intelligence, Wearable and nonwearable devices, Force platform etc
6. Recent advances in Biomechanical assessment

23MPT2B3 Assessment & Diagnosis of Biomechanics.

COURSE OUTCOME -

On Completion of this course, the post graduate will be able to –

1. Apply biomechanical analysis for suitable management based on recent trends and EBP for movement remediation
2. Undertake independent research in Biomechanics and Movement Science
3. Demonstrate following competencies: Decision making, Communication, Skills, Safety, Ethics

COURSE CONTENT:

1. Psycho-social aspects of exercise and movement – culture, preferences, societal barriers etc
    a. Ecological adaptations and maladaptation: influences of beliefs, culture, life roles and societal influences
    b. Health habits and cultural diversity in India influencing physical activity (changes according to geography, gender, ability, age etc)
    c. Counselling methods of psycho social aspects of movement and exercise
2. Occupational biomechanics
    a. Epidemiology of occupational disorders- various groups of disorders – manual material handling, sedentary work, prolonged postures etc
    b. Occupational biomechanical modelling- using existing models that predict low back pain, neck pain, and other work-related musculoskeletal disorders
        I. Planar Static Biomechanical Models: - Single-Body-Segment Static Model, Two-Body-Segment Static Model, Static Planar Model of Nonparallel Forces, Planar Static Analysis of Internal Forces and Multiple-link Coplanar Static Modelling.
        II. Three-dimensional Modelling of Static Strength
        III. Dynamic Biomechanical Models: -Single-Segment Dynamic Biomechanical Model, Multiple-Segment Biodynamic Model of Load Lifting and Coplanar Biomechanical Models of Foot Slip Potential while pushing a cart.
        IV. Special-purpose Biomechanical Models of Occupational Task: -Low-Back Biomechanical Models, Biomechanical Models of the Wrist and Hand and Modelling Muscle Strength.
    c. Methods of evaluating work capacity - Instrumented and Self- reported methods
        I. Introduction.
        II. Joint Motion: Methods and Data, Methods of Measuring Joint Motion, Normal Ranges of Joint Motion and Factors Affecting Range-of-Motion Data.
        III. Muscle Strength Evaluation: Definition of Muscular Strength, Static and Dynamic Strength-Testing Methods, Population Muscle Strength Values and Personal Factors Affecting Strength.
        IV. Limitations of Mechanical Work-Capacity Data
    d. Anthropometry and its role in work- assessment and matching with job description methods- instrumentation
    Measurement of Physical Properties of different Body Segments:
        I. Length Measurement Methods.
        II. Volume and Weight measurement
        III. Locations of Centre of Mass

IV. Methods for measuring Inertial Property of body segments

Anthropometric Data for Biomechanical Studies in Industry:

I. Length, Weight, Location of Centre of Mass, Movement of Inertia, Radius of Gyration

e. Bio-instrumentation in occupation with relevance to manual material handling, sedentary and prolonged postures
   I. Introduction
   II. Human Motion Analysis Systems: Basis for Measuring Human Motion.
   III. Muscle Activity Measurement: Applied Electromyography, Mechanomyography and Intra Muscular Pressure.
   IV. Muscle Strength Measurement Systems: Localized Static Strength Measurement Systems, Whole-body Static Strength Measurement System and Whole-body Dynamic Strength Measurement System.
   V. Intradiscal Pressure Measurement: Measurement Concept, Intradiscal Pressure Measurement System and Applications and Limitations in Occupational Biomechanics.
   VI. Intra-abdominal (Intragastric) Measurements: - Measurement Development, Measurement System, Applications and Limitations in Occupational Biomechanics.
   VII. Seat Pressure Measurement Systems
   VIII. Stature Measurement System
   IX. Force Platform System.
   X. Foot and Hand Force Measurement Systems
   XI. Measurement of Vibration in Humans.
f. Workplace design- principles of occupational and cognitive ergonomics
g. Hand tool design- design principles for user comfort and efficiency
   I. The Need for Biomechanical Concepts in Designing

h. Product design: ergonomics principles of user comfort
i. Personal protective equipment, training and selection of workers-principles and reasoning parameters to prevent injury and increase efficiency

3. Movement remediation methods in disease and dysfunction
   a. Health beliefs and participatory methods of movement remediation
   b. Cognitive behavioural therapy in movement dysfunction
   c. Physical activity promotion methods to remediate movement dysfunction
   d. Methods of integrating fundamental movement skills

Recommended Books:

1. Anthropology and public health: bridging differences in culture and society. Hahn & Inhorn, 2nd ed. Oxford University press,2009.
2. Essential ultrasound anatomy. Loukas & Burns. Wolters Kluver 2019.
3. Performance psychology: a practitioner's guide. Richards & Abbot. Churchill Livingstone 2011.
4. Comparative Quantification of Health Risks Global and Regional Burden of Disease Attributable to Selected Major Risk Factors Volume 1 Edited by Majid Ezzati, Alan D. Lopez, Anthony Rodgers and Christopher J.L. Murray. WHO 2004.
5. Biochemistry primer for exercise science. Houston. Human Kinetics 2006.
6. Motor control: translating research into clinical practice. Shumway-Cook &Woollacott. 5th ed. Lippincott Williams& Wilkins. 2016.
7. Exercise physiology nutrition energy and human performance. McArdle. 8ed, Lippincott Williams& Wilkins. 2015.

8. Methods for Community-Based Participatory Research for Health. Israel, Eng , Schulz, Parker, editors; 2nd Ed. Jossey-Bass 2012.
9. Qualitative Methods in Public Health: A Field Guide for Applied Research. Tolley, Ulin, Mack, Robinson , Succop. 2nd Ed. Jossey-Bass. 2016.
10. Biomechanical analysis of fundamental human movements. Chapman. Human Kinetics 2008.
11. Principles of Biomechanics & Motion Analysis. Griffiths. Lippincott Williams& Wilkins 2005.
12. Joint Structure and Function: A Comprehensive Analysis. Pamela K. Levangie Cynthia C. Norkin. 6th edition;
13. Burnstrom's Clinical Kinesiology. Peggy A. Houglum and Dolores B. Bertoti ;6th edition ;2011
14. Basic Biomechanics of the Musculoskeletal System.MargaretaNordin , Victor H. Frankel. Wolters Kluwer; 4 editions.2012
15. Kinesiology-The Mechanics And Pathomechanics Of Human Movement" Carol.A.Oatis, Lippincott Williams and Wilkins; 3rd edition edition 2016
16. Biomechanics and Motor Control of Human Movement.David A. Winter; John Wiley & Sons; 4th edition; 2009
17. Motor Control and Learning: A Behavioral Emphasis. Richard A. Schmidt, Tim Lee, Carolee Winstein , Gabriele Wulf, Howard N. Zelaznik ; 6th Edition
18. Clinical Exercise Physiology. Jonathan K Ehrman, Paul M. Gordon,
19. Exercise Physiology: Theory and Application to Fitness and Performance: Edward T. Howley Scott K. Powers
20. Exercise Physiology: Nutrition, Energy, and Human Performance. McArdle PhD, William D., Katch, Frank I., Katch, Victor L.
21. Exercise Physiology for Health Fitness and Performance. Sharon Plowman and Denise Smith
22. Physiology of Sport and Exercise + Web Study Guide. W. Larry Kenney, Jack Wilmore,et
23. Advanced Fitness Assessment and Exercise Prescription. Ann L. Gibson, Dale R. Wagner , Vivian H. Heyward , Eighth Edition
24. ACSM's Guidelines for Exercise Testing and Prescription by American College of Sports Medicine ORDINANCE GOVERNING MASTER OF PHYSIOTHERAPY (MPT) COURSE – 2020 – RGUHS 111
25. Principles of Exercise Testing and Interpretation: Including Pathophysiology and Clinical Applications by Karlman Wasserman MD PhD, James E. Hansen MD, et al.
26. Exercise Testing and Interpretation: A Practical Approach. Christopher B. Cooper and Thomas W. Storer
27. Occupational Biomechanics. Don B. Chaffin, Gunnar B. J. Andersson, et al.
28. Tissue Mechanics; Stephen C. Cowin and Stephen B. Doty
29. Biomechanics in Ergonomics. Shrawan Kumar
30. Ergonomics: How to Design for Ease and Efficiency. K.H.E. Kroemer, H.B. Kroemer, et al
31. Working Postures and Movements: Tools for Evaluation and Engineering (Ergonomics and Human Factors). Nico J. Delleman, Christine M. Haslegrave, et al.
32. Introduction to Ergonomics- R.S.Brdger CRC press