JHARKHAND
Rai University
UGC RECOGNISED UNIVERSITY
ACCREDITED BY NAAC

JHARKHAND RAI UNIVERSITY

Bachelor of Physiotherapy (BPT)

FOURTH SEMESTER SYLLABUS

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DEPARTMENT OF PHYSIOTHERAPY (BPT)

Duration: Four years Six months
Academic Year: 2022 – 2026
Syllabus

COURSE SCHEME											
BATCH 2022-2026											
BACHELOR OF PHYSIOTHERAPY											
CHOICE BASED CREDIT SYSTEM											
SEMESTER IV											
S.No	**CODE**	**COURSE TITLE**	**Periods**			**Evaluation Scheme**				**Subject Total**	**Credit**
			L	**T**	**P**	**Assignment**	**TA**	**Total**	**ESE**		
1	23A401	PHARMACOLOGY	4	0	0	20	10	30	70	100	4
2	23A402	BIOMECHANICS -II	3	0	0	20	10	30	70	100	3
3	23A403	ADVANCE EXERCISE THERAPY - II	4	0	0	20	10	30	70	100	4
4	23A404	PRINCIPLES OF BIOELECTRICAL MODALITIES - II	4	0	0	20	10	30	70	100	4
5	40BPT.252	UNIVERSAL HUMAN VALUES	2	0	0	20	10	30	70	100	0
PRACTICAL/SESSIONAL											
1	23A402P	BIOMECHANICS - II	0	0	2			30	20	50	1
2	23A403P	ADVANCE EXERCISE THERAPY - II	0	0	4			30	20	50	2
3	23A404P	PRINCIPLES OF BIOELECTRICAL MODALITIES - II	0	0	4			30	20	50	2
4	23A406P	RADIOLOGY	0	0	3			30	20	50	1
								TOTAL		**700**	**21**

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Pharmacology
Course Code: 23A401

L	T	P	Credits
4	0	0	4

COURSE LEARNING OBJECTIVE:

CLO1: To acquire the knowledge of pharmacological effects of commonly used drugs by patients referred for physiotherapy.

CLO2: To make the student aware of adverse reactions, precautions to be taken, contraindications of various drugs, formulation and root of administration.

CLO3: Get the awareness of other essential and commonly used drugs by patients.

COURSE OUTCOME:

At the end of the course candidate will able to

CO1: Describe Pharmacological effects of commonly used drugs by patients referred for Physiotherapy, list their adverse reactions, precautions to be taken & contraindications, Formulation & route of administration.
CO2: Identify whether the pharmacological effect of the drug interferes with the Therapeutic response of Physiotherapy & vice-versa.
CO3: Indicate the use of analgesics & anti-inflammatory agents with movement disorders with consideration of cost, efficiency & safety for individual needs.
CO4: Get the awareness of other essential & commonly used drugs by patients. The bases for their use & common as well as serious adverse reaction.

UNIT 1: General Pharmacology (brief description only): Introduction & general concepts, Pharmaco-kinetics (routes of administration, metabolism & elimination), Pharmaco-dynamics (mechanism of drug action, therapeutic & side effects, toxicity).

UNIT 2: Autonomic Nervous System: Brief outline of Sympathetic-parasympathetic nervous system, Therapeutic agents-uses, effects and interaction with physical therapy. **Central Nervous System:** Anaesthetic agents- uses, side effects and interaction with physical therapy, Sedatives and hypnocs - uses, side effects and interaction with physical therapy, Anti - epileptic drugs- uses, side effects and interaction with physical therapy.

UNIT 3: **Analgesics** - Uses, side effects and interaction with physical therapy, Anti-inflammatory drugs- uses, side effects and interaction with physical therapy, Psychotherapeutic agents- uses, side effects and interaction with physical therapy, Alcoholism and drug dependence and interaction with physical therapy, Therapeutic agents used for movement disorders- uses, side effects and interaction with physical therapy.

UNIT 4: Cardio-vascular System: Therapeutic agents (classification, effects on cardio-vascular system, uses & adverse reactions), Drugs used in cardiac failure, hypertension & arrhythmias and interaction with physical therapy, Drug therapy in vascular disease & ischaemia and interaction with physical therapy.

UNIT 5: Respiratory system: Therapeutic agents - uses, side effects and interaction with physical therapy; **Gastrointestinal system:** Therapeutic agents in Peptic ulcer, Diarrhoea- uses, side effects and interaction with physical therapy.

UNIT 6: Endocrinal hormones: Thyroid, adrenal, parathyroid hormones – uses, side effects and interaction with physical therapy; **Diabetes mellitus:** Drug therapy and its interaction with physical therapy; **Geriatrics:** Pharmacological challenges in geriatric age group and its effects on physical therapy.

Suggested Readings:

Text Books:

1. S Tripathi, K.D. Essential of Medical Pharmacology, New Delhi, 1985
2. Laurence, D.R.Clinical Pharmacology ELBS, London 1975

Reference Book

1. Eddy, Lynne, Physical Therapy pharmacology, Mosby, London 1992
2. Barbar, F.S.K.Essential. of Pharmacotherapeutics S. Chand, New Delhi 200

Note: Latest editions of all the suggested books are recommended.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Biomechanics – II
Course Code: 23A402

L	T	P	Credits
3	0	0	3

COURSE LEARNING OBJECTIVE:

CLO1: The primary purpose of this paper is understanding basic biomechanics of human body different joints.

CLO2: To acquire the knowledge of normal and abnormal gait**.**

CLO3: To gain knowledge about posture and ergonomics and its correction.

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Analysis different movement in shoulder joint, elbow joint, wrist joint, hip joint, knee joint, ankle and foot joint.
CO2: Understand kinematics and kinetics in vertebral column.
CO3: Differentiate normal and abnormal gait pattern.
CO4: Analysis work environment and apply knowledge of biomechanics in planning correction of angle of muscle action.

UNIT 1: Regional Structure and Function of Joints-I: Shoulder complex, Elbow complex, Wrist and Hand complex**.**

UNIT 2: Recall anatomy and study the biomechanics of the spine, shoulder girdle, joints of the upper extremity, pelvic girdle and the joints of the lower extremity.

UNIT 3: Regional Structure and Function of Joints-II: The vertebral column, Hip complex, Knee complex, Ankle and Foot complex.

UNIT 4: Gait: Description of normal gait, determinants of gait, spatiotemporal features, and analysis. Gait division: Types, causative factors and analysis. Ergonomics- Definition, Physiological and biomechanical risk factors, Visual display terminal and workstation ergonomics, Ergonomics in home activity, Leisure activity prevention, modification and rehabilitation of work related issues.

Suggested Readings:

Text Books:

1. Norkin & Levange, Joint Structure and Function-A comprehensive Analysis, F.A Davis.

2. Norkins & White, Measurement of joint motion-A guide to goiniometry, F.A Davis.

Reference Books:

1. Smith, *Brunnstrom's clinical kinesiology,* F.A Davis.

Note: Latest editions of all the suggested books are recommended.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Advance Exercise Therapy – II
Course Code: 23A403

L	T	P	Credits
4	0	0	4

COURSE LEARNING OBJECTIVE:

CLO1: The primary purpose of this paper is to impart advanced knowledge about hydrotherapy, aerobic exercise**.**

CLO2: Understanding of the skill of use of advanced concepts & techniques like gait training, breathing exercise etc.

CLO3: To makes student ready for future to practice as a qualified Physiotherapist.

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Students will understand and explain the various therapeutic equipment for the improvement in muscle strength, mobility, endurance, ambulation etc.
CO2: Apply principles and procedures, indications, contraindications and precautions, appropriate methods of application of each of the assessment strategy and treatment techniques hands on and on models. Aerobic Exercise, Hydrotherapy, Breathing Exercise etc.
CO3: Demonstrate Various Yogic Posture.

UNIT 1: Aerobic Exercises – Definitions, Physiological response to Aerobic Exercise, Evaluation of aerobic capacity – exercise testing, Determinant of Aerobic Exercise, Physiological Changes with Aerobic Training, Aerobic Exercise Program, Applications of Aerobic Program in patients with chronic illness.

UNIT 2: Hydrotherapy: Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Therapeutic Exercises in Hydrotherapy, Special equipments used. **Soft Tissue Injury**: General Description of Inflammation and repair, Acute, Sub Acute, and Chronic stage, General Treatment Guidelines.

UNIT 3: Breathing Exercises: Aims and Goals of Breathing Exercises, Procedures of Diaphragmatic Breathing, Segmental Breathing, Pursed-Lip Breathing, Preventing and Relieving Episodes of Dyspnea.

UNIT 4: Positive Expiratory Pressure Breathing, Respiratory Resistance Training, Glossopharyngeal Breathing. Exercises to mobilize the chest, Postural Drainage, Manual Technique used in Postural Drainage, Postural Drainage Positions, Modified Postural Drainage.

UNIT 5: Gait Training: Definition, Different methods of Gait Training, Gait Training in Parallel Bars, Walking Aids: Types: Crutches, Canes, Frames; Principles and training with walking aids**. Yoga**: History, Introduction, Classification, Various Asanas.

UNIT 6: Therapeutic Gymnasium: Set-up of gymnasium & its importance**,** Various equipment in the gymnasium**,** Operational skills, effects & uses of each equipment**,** Posture: Normal Postural Control, Postural Alignment, Postural Stability, Postural Impairment and Mal-Alignment, Postural Training.

Suggested Readings:

Text Books:

1. Kisner & Colby, *Therapeutic Exercises Foundations and Techniques*, F A Davis.
2. Gardiner, *Principle of Exercise Therapy*, C.B.S Delhi.

Reference Books:

1. Vos et al, *Propoceptive Neuromuscular Facilitation*, Williams &Wilkins.
2. Hollis, *Practical Exercise Therpy*, Blackwell Scientific Publications.

Note: Latest editions of all the suggested books are recommended.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Principles of Bioelectrical Modalities – II
Course Code: 23A404

L	T	P	Credits
4	0	0	4

COURSE LEARNING OBJECTIVE:

CLO1: To acquire the skills to practice various medium and high frequency current.

CLO2: To impart basic knowledge and understanding of superficial heat, cryotherapy, actinotherapy etc.

CLO3: To give basic idea about NCV, EMG and biofeedback.

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Describe medium frequency current and application in human.
CO2: Demonstrate high frequency current like SWD, MWD, UST and its application.
CO3: Demonstrate various Actinotherapy procedure using LASER, UVR, IRR.
CO4: Describe and apply various therapeutic heat and cold apparatus.
CO5: Use and apply diagnostic instrument like EMG, NCV, Biofeedback etc.

UNIT 1: Introduction to Therapeutic currents -II: Medium frequency currents (Interferential Therapy)-conceptual framework of medium Frequency current therapy production, biophysical effects, types, therapeutic effects, Techniques of application, indication, contraindication, precautions, operational skill and patient preparation.

UNIT 2: High frequency currents (SWD and MWD)- Production, biophysical effects, types, therapeutic effects, techniques of application, indications, contraindications precautions, operational skills and patient preparation. **High frequency sound waves (Ultrasound)-**Production, biophysical effects, types, therapeutic effects, techniques of application, indication, contraindications, precaution operational skill and patient preparation. **Traction**: Effect, Types, Modes, Indications, Contraindications, Dosage.

UNIT 3: Agents of Electrotherapy : Therapeutic Light Physiotherapy (LASER) & Actinotherapy (IRR & UVR) Definition, Wavelength, frequency, types & sources of generation, techniques, physical principles, biophysical effects, types, production, therapeutic effects, techniques of application, Indications, contraindications precautions operational skill and patient preparation**.**

UNIT 4: Therapeutic mechanical pressure (Intermittent compression therapy)-Principles, biophysical effects, types, therapeutic effects, indications, contraindication, precautions, operational Skill

and patient preparation. **Therapeutic cold (cryotherapy)** –source, biophysical effects, types, therapeutic effects, Indications, contraindications, precaution, application, techniques and patient preparation.

UNIT 5: Therapeutic heat therapy(Paraffin wax bath, Moist heat, Electrical heating pads and Fluidotherapy, Contrast bath)- Mechanism of production, Mode of heat transfer, Physiological & therapeutic effects, Indications, contraindications, precautions, operational skills of equipment & patient preparation.

UNIT 6: Electrical Reactions and Electro –diagnostic tests Type of lesion and development of reaction of degeneration. **E.M.G. and NCV** –Instrumentation, definition & basic techniques of E.M.G. and .NCV. **Bio-feedback** –Instrumentation, principles, therapeutic effects, indications, contraindication Limitations, precautions, operational skill and patient preparations.

Suggested Readings:

Text Books:

1. *Froster, A. and Palastanga, N*, Clayton's Electrotherapy:Theory and Practice, AITBS, Delhi 1999.
2. Singh, Jagmohan, *Textbook of Electrotherapy*, Jaypee, New Delhi.

Reference Books:

1. Jhon, Low & Ann, Reed Butterworth Heine, *Electrotherapy Explained: Principles,* Oxford 2000.

Note: Latest editions of all the suggested books are recommended.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Universal Human Values
Course Code: 40BPT.252

L	T	P	Credits
2	0	0	0

Objective: ***The present course deals with meaning, purpose, and relevance of universal human values and how to inculcate and practice them consciously to be a good human being and realise one's potentials.***

COURSE OUTCOME:

At the end of the course candidate will able to

CO1: Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.

CO2: Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.

CO3: Become conscious practitioners of human values.

CO4: Realise their potential as human beings and conduct themselves properly in the ways of the world.

Module 1: Love & Compassion

- Introduction: What is love? Forms of love—for self, parents, family, friend, spouse, community, nation, humanity and other beings, both for living and non-living.
- Love and compassion and inter-relatedness.
- Love, compassion, empathy, sympathy and non-violence.
- Individuals who are remembered in history for practicing compassion and love.
- Narratives and anecdotes from history, literature including local folklore.
- Practicing love and compassion: What will learners learn gain if they practice love and compassion? What will learners lose if they don't practice love and compassion?
- Sharing learner's individual and/or group experience(s).
- Simulated Situations.
- Case studies.

Module 2: Truth

- Introduction: What is truth? Universal truth, truth as value, truth as fact (veracity, sincerity, honesty among others).
- Individuals who are remembered in history for practicing this value.
- Narratives and anecdotes from history, literature including local folklore.
- Practicing Truth: What will learners learn/gain if they practice truth? What will learners lose if

they don't practice it?
• Learners' individual and/or group experience(s).
• Simulated situations.
• Case studies.

Module 3: Non-Violence

• Introduction: What is non-violence? Its need. Love, compassion, empathy sympathy for others as pre-requisites for non-violence.
• Ahimsa as non-violence and non-killing.
• Individuals and organisations that are known for their commitment to nonviolence.
• Narratives and anecdotes about non-violence from history, and literature including local folklore.
• Practicing non-violence: What will learners learn/gain if they practice nonviolence? What will learners lose if they don't practice it?
• Sharing learner's individual and/or group experience(s) about non-violence.
• Simulated situations.
• Case studies.

Module 4: Righteousness

• Introduction: What is righteousness?
• Righteousness and *dharma*, Righteousness and Propriety.
• Individuals who are remembered in history for practicing righteousness.
• Narratives and anecdotes from history, literature including local folklore.
• Practicing righteousness: What will learners learn/gain if they practice righteousness? What will learners lose if they don't practice it?
• Sharing learners' individual and/or group experience(s).
• Simulated situations.
• Case studies.

Module 5: Peace

• Introduction: What is peace? Its need, relation with harmony and balance.
• Individuals and organisations that are known for their commitment to peace.
• Narratives and Anecdotes about peace from history, and literature including local folklore.
• Practicing peace: What will learners learn/gain if they practice peace? What will learners lose if they don't practice it?
• Sharing learner's individual and/or group experience(s) about peace.
• Simulated situations.
• Case studies.

Module 6: Service

- Introduction: What is service? Forms of service, for self, parents, family, friend, spouse, community, nation, humanity and other beings—living and non-living, persons in distress or disaster.
- Individuals who are remembered in history for practicing this value.
- Narratives and anecdotes dealing with instances of service from history, literature including local Folklore.
- Practicing service: What will learners learn/gain gain if they practice service? What will learners lose if they don't practice it?
- Sharing learners' individual and/or group experience(s) regarding service
- Simulated situations.
- Case studies.

Module 7: Renunciation (Sacrifice)

- Introduction: What is renunciation? Renunciation and sacrifice. Self-restrain and Ways of overcoming greed. Renunciation with action as true renunciation.
- Individuals who are remembered in history for practicing this value.
- Narratives and anecdotes from history and literature, including local folklore about individuals who are remembered for their sacrifice and renunciation.
- Practicing renunciation and sacrifice: What will learners learn/gain if they practice Renunciation and sacrifice? What will learners lose if they don't practice it?
- Sharing learners' individual and/or group experience(s).
- Simulated situations.
- Case studies.

Suggested Readings:

1. Mookerji Radha Kumud, Ancient Indian Education, Motilal Banarasidass.

2. Saraswati Swami Satyananda, Asana Pranayama Mudra Bandha, Bihar School of yoga Joshi Kireet, Education for Character Development, Dharma Hinduja Center of Indic Studies Joshi Rokeach (1973). The Nature of Human Values. New York: The Free Press.

3. Ghosh, Sri Aurobindo. 1998. The Foundations of Indian Culture. Pondicherry: Sri Aurobindo Ashram.

4. Basham A.L., The Wonder That was India, London: Picador Press.

5. Patra, Avinash (2012), The Sprirtual Life and Culture of India, Oxford University Press.

6. Shanti Kumar Ghosh, Universal Values. The Ramakrishna Mission, Kolkata, 2004.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Biomechanics - II
Course Code: 23A402P

L	T	P	Credits
0	0	2	1

COURSE LEARNING OBJECTIVE:

CLO1: The primary purpose of this paper is understanding basic biomechanics of human body different joints.

CLO2: To acquire the knowledge of normal and abnormal gait.

CLO3: To gain knowledge about posture and ergonomics and its correction**.**

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Analysis normal and abnormal gait pattern

CO2: Can differentiate various types of joint motion & movement.

1. Gait – kinematics and kinetics of gait, gait in running and stair climbing.
2. Joint structures and functions of different joints.

Note: Student must maintain a logbook. The duly completed logbook should be submitted during practical examination.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Advanced Exercise Therapy – II
Course Code: 23A403P

L	T	P	Credits
0	0	4	2

COURSE LEARNING OBJECTIVE:

CLO1: To acquire the skills to practice advanced concepts like Hydrotherapy, aerobic exercise, etc

CLO2: To skills in various physiotherapy technique like breathing exercise, gait training, postural drainage etc.

CLO3: To build student as a qualified Physiotherapist and to justify their work**.**

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Do posture analysis and correctional exercise and able to train individual for balance and equilibrium.

CO2: Apply traction manually as well as mechanically and demonstrate yogic posture

CO3: Calculate and demonstrate warm up. Aerobic exercise and cool down exercise method.

CO4: Students will understand and explain the various therapeutic equipment for the improvement in muscle strength, mobility, endurance, etc

CO5: Demonstrate Gait and different gait pattern using various walking aids.

1. Normal and abnormal posture & practice various corrective techniques.
2. Equilibrium/balance & practice various to improve balance.
3. Structure and functions of hydrotherapy equipment and their applications.
4. Various traction techniques, including manual, mechanical & electrical procedures.
5. Basic Yogic postures: Padahastasana /Padangusthanasana, Trikonasana, Utkatasana, admasana, Siddhasana,/Sukhasana, Bhujangasana, ArdhaSalabhasana, Paschimottanasana, Savasana, Dhanurasana, Ardha Halasana, Yogamudrasana, Uttanasana, Virasana,Vajrasana, SetuBandhasana, Gomukhasana, Pavan-Muktasana, Halasana, Sarvangasana, Naukasana.
6. Warm up exercises, aerobics–cool down exercises.
7. Structure and functions along with application of various equipment in a gymnasium.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Principles of Bioelectrical Modalities – II
Course Code: 23A404P

L	T	P	Credits
0	0	4	2

COURSE LEARNING OBJECTIVE:

CLO1: To provide exposure to students & gain skilled knowledge of therapeutic agents used in rehabilitation.

CLO2: To acquire the skills to interpret EMG, NCV reports etc.

CLO3: To makes student ready for future to practice as a qualified Physiotherapist.

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Apply bioelectrical principles knowledge in electro therapy.

CO2: Demonstrate electrotherapy instruments, principles of their functioning, usage, choice of dosage and safety implications for human beings. US, SWD, IRR, MWD.

CO3: Demonstrate the different technique of UVR exposure, calculate test dose.

CO4: Calculate dosage and technique of application of LASER.

CO5: Perform different technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy.

1. Demonstration of electrotherapy instruments, principles of their functioning, usage, choice of dosage and safety implications for human beings.UST, SWD, IRR, MWD.
2. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose.
3. Calculation of dosage and technique of application of LASER Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy.
4. Placement of electrodes in IFT with dosimeter for various indications.
5. To observe various Electro Myography (EMG) procedures.
6. To observe various Nerve Conduction Velocity (NCV) procedures.
7. To study a Bio feedback unit, its operation and different methods of application – region wise.

Program: Bachelor of Physiotherapy (BPT)
Semester: Fourth
Course: Radiology
Course Code: 23A406P

L	T	P	Credits
0	0	3	1

COURSE LEARNING OBJECTIVE

CLO1: To provide exposure and to gain knowledge about X ray plate and reading it.
CLO2: To give general idea about bronchography, CT scan, MRI etc.
CLO3: To build student as a qualified Physiotherapist and to justify their work.

COURSE OUTCOME

At the end of the course candidate will able to

CO1: Identify different bone and abnormality in the x-ray.

CO2: Identify pathology in CT Scan, MRI, USG.

CO3: Correlate bronchograpy with patient condition.

CO4: Analysis macroradiograph, KV Technique.

1. Upper extremity - basic views.

2. Lower extremity (including pelvis) - basic views.

3. Chest including thoracic age and sternum.

4. Spine - Cervical, dorsal, lumbar, lumbo-sacral (including functional views).

5. Skull – including trauma cases.

6. Facial bones (nasal bones, zygoma, orbits, maxilla).

7. Mandible, Temporo-Mandibular Joints, Mastoids, petrous temporal bones.

8. Abdomen - erect, supine, lateral decubitus.

9. Soft tissue radiography: Larynx, pharynx, nasopharynx, thoracic inlet.

10. Dental radiography.

11. General Paediatric Radiography.

12. Foreign body localization.

13. High kV technique.

14. Macroradiography.

15. Screening-bronchography.

16. Basic principle of C.T Scan and M.R.I.

17. Ultrasonograph- Basic Principles.

18. Radiology as therapeutic mode.