



# Curriculum Handbook

PHYSIOTHERAPY – DRAFT VERSION

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## List of Abbreviations

AED	Automated External Defibrillator
AHP	Allied Health Professional
BLS	Basic Life Support
BSc	Bachelor of Science
CATS	Credit Accumulation and Transfer System
CBCS	Choice-Based Credit System
CbD	Case-based Discussion
CBSE	Central Board of Secondary Education
CNS	Central Nervous System
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
ECTS	European Credit Transfer System
HSSC	Healthcare Sector Skill Council
ICT	Information & Communication Technology
JCI	Joint Commission International
LAN	Local Area Network
MoHFW	Ministry of Health and Family Welfare
NABH	National Accreditation Board for Hospitals & Healthcare Providers
NCRC	National Curricula Review Committee
NIAHS	National Initiative for Allied Health Sciences
NSDA	National Skills Development Agency
NSQF	National Skills Qualification Framework
TSU	Technical Support Unit
UGC	University Grants Commission
UHC	Universal Health Coverage
WHO	World Health Organization
WWW	World Wide Web

# Chapter 1

## Introduction to the Handbook

## Chapter 1: Introduction to the Handbook

The report ‘From Paramedics to Allied Health Professionals: Landscaping the Journey and Way Forward’ that was published in 2012, marked the variance in education and training practices for the allied health courses offered by institutions across the country. This prompted the Ministry of Health and Family Welfare to envisage the creation of national guidelines for education and career pathways of allied health professionals, with a structured curriculum based on skills and competencies. Thus, this handbook has been designed to familiarize universities, colleges, healthcare providers as well as educators offering allied health courses with these national standards.

Individually created for different professional groups of allied health, this handbook aims to reduce the variation in education by comprising of a standardized curriculum, career pathways, nomenclature and other details for each profession. The change from a purely didactic approach will create better skilled professionals and improve the quality of overall patient care. In the absence of a national standard-setting authority, this handbook can also guide the thousands of young adults who choose healthcare as a profession – not as doctors or nurses but to play several other critical support roles – on the appropriate course of action to enable them to be skilled allied health professionals of the future.

### Who is an Allied Health Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the following definition of an allied health professional based on the afore-mentioned report:

*‘Allied health professionals includes individuals involved with the delivery of health or related services, with expertise contributing in therapeutic, diagnostic, curative, preventive and rehabilitative interventions. They work in interdisciplinary health teams including physicians(all medical professionals including specialists), nurses and public health officials to promote, protect, treat and/or manage a person(s) physical, mental, social, emotional, environmental health and holistic well- being.’<sup>1</sup>*

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of “allied health professionals”. In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for more than 60 professions is absent. Currently, the Government is considering these 60 professions (listed Annex-1) under the ambit of the allied health system. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

### Scope and need for allied health professionals in the Indian healthcare system

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.<sup>1</sup> Professionals that can competently handle sophisticated machinery

and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied health professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia's health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.<sup>ii,iii</sup>

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied health professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.<sup>ii</sup> Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied health practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

### Learning goals and objectives for allied health professionals

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas:



1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher level- PhD)
9. Lifelong learning

### **1. Clinical Care<sup>iv</sup>**

Using a patient/family-centered approach and best evidence, each student will organize and implement the prescribed preventive, investigative and management plans; and will offer appropriate follow-up services. Program objectives should enable the students to:

- Apply the principles of basic science and practice evidence-based medicine
- Use appropriate investigations as needed
- Identify the indications for basic medical procedures and perform them in an appropriate manner
- Provide care to patients – efficiently and in a cost-effective way – in a range of settings, and maintain foremost the interests of individual patients
- Identify the influence of biological, psychosocial, economic, and spiritual factors on patients’ well-being and act in an appropriate manner
- Incorporate strategies for health promotion and disease prevention with their patients

### **2. Communication<sup>iv,v</sup>**

The student will learn how to communicate with patients/clients, care-givers, other health professionals and other members of the community effectively and appropriately. Communication is a fundamental requirement in the provision of health care services. Program objectives should enable the students to:

- Provide sufficient information to ensure that the patient/client can participate as actively as possible and respond appropriately to the information
- Clearly discuss the diagnosis and options with the patient, and negotiate appropriate treatment plans in a sensitive manner that is in the patient’s and society’s best interests
- Explain the proposed healthcare service – its nature, purpose, possible positive and adverse consequences, its limitations, and reasonable alternatives wherever they exist
- Use effective communication skills to gather data and share information including attentive listening, open-ended inquiry, empathy and clarification to ensure understanding
- Appropriately communicate with, and provide relevant information to, other stakeholders including members of the healthcare team
- Use communication effectively and flexibly in a manner that is appropriate for the reader or listener
- Explore and consider the influence that the patient’s ideas, beliefs and expectations have during interactions with them, along with varying factors such as age, ethnicity, culture and socioeconomic background

- Develop efficient techniques for all forms of written and verbal communication including accurate and timely record keeping
- Assess their own communication skills, develop self-awareness and be able to improve their relationships with others
- Possess skills to counsel for lifestyle changes and advocate health promotion

### **3. Membership of a multidisciplinary health team<sup>vi</sup>**

The student will put a high value on effective communication within the team, including transparency about aims, decisions, uncertainty and mistakes. Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively to accomplish shared goals within and across settings to achieve coordinated, high quality care. Program objectives will aim at making the students being able to:

- Recognize, clearly articulate, understand and support shared goals in the team that reflect patient and family priorities
- Possess distinct roles within the team; to have clear expectations for each member's functions, responsibilities, and accountabilities, which in turn optimizes the team's efficiency and makes it possible for them to use division of labor advantageously, and accomplish more than the sum of its parts
- Develop mutual trust within the team to create strong norms of reciprocity and greater opportunities for shared achievement
- Communicate effectively so that the team prioritizes and continuously refines its communication channels creating an environment of general and specific understanding
- Recognize measurable processes and outcomes, so that the individual and team can agree on and implement reliable and timely feedback on successes and failures in both the team's functioning and the achievement of their goals. These can then be used to track and improve performance immediately and over time.

### **4. Ethics and accountability**

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as physicians. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice of medicine
- Employ professional accountability for the initiation, maintenance and termination of patient-physician relationships
- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

### **5. Commitment to professional excellence<sup>vii</sup>**

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-

discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare. Program objectives will aim at making the students being able to:

- Demonstrate distinctive, meritorious and high quality practice that leads to excellence and that depicts commitment to competence, standards, ethical principles and values, within the legal boundaries of practice
- Demonstrate the quality of being answerable for all actions and omissions to all, including service users, peers, employers, standard-setting/regulatory bodies or oneself
- Demonstrate humanity in the course of everyday practice by virtue of having respect (and dignity), compassion, empathy, honour and integrity
- Ensure that self-interest does not influence actions or omissions, and demonstrate regards for service-users and colleagues

## **6. Leadership and mentorship<sup>viii</sup>**

The student must take on a leadership role where needed in order to ensure clinical productivity and patient satisfaction. They must be able to respond in an autonomous and confident manner to planned and uncertain situations, and should be able to manage themselves and others effectively. They must create and maximize opportunities for the improvement of the health seeking experience and delivery of healthcare services. Program objectives should enable the students to:

- Act as agents of change and be leaders in quality improvement and service development, so that they contribute and enhance people's wellbeing and their healthcare experience
- Systematically evaluate care; ensure the use of these findings to help improve people's experience and care outcomes, and to shape clinical treatment protocols and services
- Identify priorities and effectively manage time and resources to ensure the maintenance or enhancement of the quality of care
- Recognize and be self-aware of the effect their own values, principles and assumptions may have on their practice. They must take charge of their own personal and professional development and should learn from experience (through supervision, feedback, reflection and evaluation)
- Facilitate themselves and others in the development of their competence, by using a range of professional and personal development skills
- Work independently and in teams. They must be able to take a leadership role to coordinate, delegate and supervise care safely, manage risk and remain accountable for the care given; actively involve and respect others' contributions to integrated person-centered care; yet work in an effective manner across professional and agency boundaries. They must know when and how to communicate with patients and refer them to other professionals and agencies, to respect the choices of service users and others, to promote shared decision-making, to deliver positive outcomes, and to coordinate smooth and effective transition within and between services and agencies.

## **7. Social Accountability and Responsibility<sup>ix</sup>**

The students will recognize that allied health professionals need to be advocates within the health care system, to judiciously manage resources and to acknowledge their social accountability.<sup>x</sup> They have a mandate to serve the community, region and the nation and will hence direct all research and service

activities towards addressing their priority health concerns. Program objectives should enable the students to:

- Demonstrate knowledge of the determinants of health at local, regional and national levels and respond to the population needs
- Establish and promote innovative practice patterns by providing evidence-based care and testing new models of practice that will translate the results of research into practice, and thus meet individual and community needs in a more effective manner
- Develop a shared vision of an evolving and sustainable health care system for the future by working in collaboration with and reinforcing partnerships with other stakeholders, including academic health centres, governments, communities and other relevant professional and non-professional organizations
- Advocate for the services and resources needed for optimal patient care

#### **8. Scientific attitude and Scholarship<sup>x</sup>**

The student will utilize sound scientific and/or scholarly principles during interactions with patients and peers, educational endeavors, research activities and in all other aspects of their professional lives.

Program objectives should enable the students to:

- Engage in ongoing self-assessment and structure their continuing professional education to address the specific needs of the population
- Practice evidence-based medicine by applying principles of scientific methods
- Take responsibility for their educational experiences
- Acquire basic skills such as presentation skills, giving feedback, patient education and the design and dissemination of research knowledge; for their application to teaching encounters

#### **9. Lifelong learning<sup>xi</sup>**

The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology. Program objectives will aim at making the students being able to:

- Perform objective self-assessments of their knowledge and skills; learn and refine existing skills; and acquire new skills
- Apply newly gained knowledge or skills to patient care
- Enhance their personal and professional growth and learning by constant introspection and utilizing experiences
- Search (including through electronic means), and critically evaluate medical literature to enable its application to patient care
- Develop a research question and be familiar with basic, clinical and translational research in its application to patient care
- Identify and select an appropriate, professionally rewarding and personally fulfilling career pathway

## Introduction of new elements in allied health education

### Competency-based curriculum

A significant skill gap has been observed in the professionals offering healthcare services irrespective of the hierarchy and level of responsibility in the healthcare settings. The large variation in the quality of services is due to the diverse methodologies opted for healthcare education and the difference in expectations from a graduate after completion of a course and at work. What one is expected 'to perform' at work is assumed to be learned during the course, however, the course design focuses on what one is expected 'to know'. The competency-based curriculum thus connects the dots between the 'know what' and 'do how'.

The efficiency and effectiveness of any educational programme largely depends on the curriculum design that is being followed. With emerging medical and scientific knowledge, educators have realized that learning is no more limited to memorizing specific lists of facts and data; in fact, by the time the professional aims to practice in the healthcare setting, the acquired knowledge may stand outdated. Thus, competency-based education is the answer; a curricular concept designed to provide the skills that professionals need. A competency-based program is a mix of skills and competencies based on individual or population needs (such as clinical knowledge, patient care, or communications approaches), which is then developed to teach relevant content across a range of courses and settings. While the traditional system of education focuses on objectives, content, teacher-centric approach and summative evaluation; competency-based education has a focus on competencies, outcomes, performance and accomplishments. In such a case, teaching activities are learner-centered, and evaluation is continuous and formative in structure. The competency-based credentials depend on the demonstration of a defined set of competencies which enables a professional to achieve targeted goals. Competency frameworks comprise of a clearly articulated statement of a person's abilities on the completion of the credential, which allows students, employers, and other stakeholders to set their expectations appropriately.<sup>xii xiii</sup>

Considering the need of the present and future healthcare delivery system, the curriculum design depicted in this handbook thus will be based on skills and competencies.

### Promoting self-directed learning of the professionals

The shift in the focus from traditional to competency-based education has made it pertinent that the learning processes may also be revisited for suitable changes. It is a known fact that learning is no more restricted to the boundaries of a classroom or the lessons taught by a teacher. The new tools and technologies have widened the platform and introduced innovative modes of how students can learn and gain skills and knowledge. One of the innovative approaches is learner-centric and follows the concept of **self-directed learning**.

*Self-directed learning, in its broadest meaning, describes a process in which individuals take the initiative with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing learning strategies and evaluating learning outcomes (Knowles, 1975).<sup>xiv</sup>*

In self-directed learning, learners themselves take the initiative to use resources rather than simply reacting to transmissions from resources, which helps them learn more in a better way.<sup>xv</sup> Lifelong, self-directed learning (SDL) has been identified as an important ability for medical graduates (Harvey,

2003)<sup>xvi</sup> and so is applicable to other health professionals including AHPs. It has been proven through many studies worldwide that the self-directed method is better than the teacher-centric method of learning. Teacher-directed learning makes learners more dependent and the orientation to learning becomes subject-centred. If a teacher provides the learning material, the student is usually satisfied with the available material, whereas if a student is asked to work on the same assignment, he or she invariably has to explore extensive resources on the subject.<sup>xv</sup>

Thus the handbook promotes self-directed learning, apart from the usual classroom teaching and opens the platform for students who wish to engage in lifelong learning.

### **Credit hours vs traditional system**

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance.<sup>xvii</sup> All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programmes', 'joint degrees' and 'study abroad' programmes.<sup>xviii</sup>

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller modules with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

### **Integrated structure of the curriculum**

Vertical integration, in its truest sense, is the interweaving of teaching clinical skills and knowledge into the basic science years and, reinforcing and continuing to teach the applications of basic science concepts during the clinical years. (Many efforts called 'vertical integration' include only the first half of the process).

Horizontal integration is the identification of concepts or skills, especially those that are clinically relevant, that cut across (for example, the basic sciences), and then putting these to use as an integrated focus for presentations, clinical examples, and course materials. e.g. Integration of some of the basic science courses around organ systems, e.g., human anatomy, physiology, pathology; or incorporating ethics, legal issues, finance, political issues, humanities, culture and computer skills into different aspects of a course like the Clinical Continuum.

The aim of an integrated curriculum is to lead students to a level of scientific fluency that is beyond mere fact and concept acquisition, by the use of a common language of medical science, with which they can begin to think creatively about medical problems.<sup>xix</sup>

This innovative new curriculum has been structured in a way such that it facilitates horizontal and vertical integration between disciplines; and bridges the gaps between both theory & practice, and between hospital-based practice and community practice. The amount of time devoted to basic and

laboratory sciences (integrated with their clinical relevance) would be the maximum in the first year, progressively decreasing in the second and third year of the training, making clinical exposure and learning more dominant.<sup>xi</sup> However it may differ from course to course depending on the professional group.

### Introduction of foundation course in the curriculum

The foundation course for health professions is an immersive programme designed to impart the required knowledge, skills and confidence for seamless transition to the second semester of a professional allied health course. Post admission, the foundation course will be conducted for 6 months to prepare a student to study the respective allied health course effectively and to understand the basics of healthcare system. This period aims to orient the student to national health systems and the basics of public health, medical ethics, medical terminologies, communication skills, basic life support, computer learning, infection prevention and control, environmental issues and disaster management, as well as orientation to the community with focus on issues such as gender sensitivity, disability, human rights, civil rights etc.

### Learning methodologies

With a focus on self-directed learning, the curriculum will include a foundation course that focuses on communication, basic clinical skills and professionalism; and will incorporate clinical training from the first year itself. It is recommended that the primary care level should have sufficient clinical exposure integrated with the learning of basic and laboratory sciences. There should also be an emphasis on the introduction of case scenarios for classroom discussion/case-based learning.

Healthcare education and training is the backbone of an efficient healthcare system and India's education infrastructure is yet to gain from the ongoing international technological revolution. The report '*From Paramedics to Allied Health: Landscaping the Journey and way ahead*', indicates that teaching and learning of clinical skills occur at the patient's bedside or other clinical areas such as laboratories, augmented by didactic teaching in classrooms and lecture theatres. In addition to keeping up with the pace of technological advancement, there has been a paradigm shift to outcome-based education with the adoption of effective assessment patterns. However, the demand for demonstration of competence in institutions where it is currently limited needs to be promoted. The report also mentions some of the allied health schools in India that have instituted clinical skill centres, laboratories and high-fidelity simulation laboratories to enhance the practice and training for allied health students and professionals. The report reiterates the fact that simulation is the replication of part or all of a clinical encounter through the use of mannequins, computer-assisted resources and simulated patients. The use of simulators addresses many issues such as suboptimal use of resources and equipment, by adequately training the manpower on newer technologies, limitations for imparting practical training in real-life scenarios, and ineffective skills assessment methods among others.<sup>i</sup> The table mentioned below lists various modes of teaching and learning opportunities that harness advanced tools and technologies.

**Table 1 Clinical learning opportunities imparted through the use of advanced techniques<sup>i,xx</sup>**

Teaching modality	Learning opportunity examples
Patients	Teach and assess in selected clinical scenarios
	Practice soft skills
	Practice physical examination
	Receive feedback on performance
Mannequins	Perform acquired techniques
	Practice basic procedural skills
	Apply basic science understanding to clinical problem solving
Simulators	Practice teamwork and leadership
	Perform cardiac and pulmonary care skills
	Apply basic science understanding to clinical problem solving
Task under trainers	Practice phlebotomy, lumbar puncture, etc.

### Assessment methods

Traditional assessment of students consists of the yearly system of assessments. In most institutions, assessments consist of internal and external assessments, and a theory examination at the end of the year or semester. This basically assesses knowledge instead of assessing skills or competencies. In competency-based training, the evaluation of the students is based on the performance of the skills as per their competencies. Hence, all the three attributes – knowledge, skills, and attitudes – are assessed as required for the particular competency.

Several new methods and tools are now readily accessible, the use of which requires special training. Some of these are given below:

- Objective Structured Clinical Examination(OSCE), Objective Structured Practical Examination (OSPE), Objective Structured Long Examination Record(OSLER)
- Mini Case Evaluation Exercise(CEX)
- Case-based discussion(CBD)
- Direct observation of procedures(DOPs)
- Portfolio
- Multi-source feedback
- Patient satisfaction questionnaire

An objective structured clinical examination (OSCE) is used these days in a number of allied health courses, e.g. Orthotics, optometry, physiotherapy, and radiography. It tests the performance and competence in communication, clinical examination, and medical procedures/prescriptions. In physiotherapy, orthotics, and occupational therapy, it tests exercise prescription, joint mobilization/manipulation techniques; and in radiography it tests radiographic positioning, radiographic image evaluation, and interpretation of results. The basic essential elements consist of functional analysis of the occupational roles, translation of these roles (“competencies”) into outcomes, and assessment of trainees' progress in these outcomes on the basis of demonstrated performance. Progress is defined solely by the competencies achieved and not the underlying processes or time served in formal educational settings. Most methods use predetermined, agreed



assessment criteria (such as observation check-lists or rating scales for scoring) to emphasize on frequent assessment of learning outcomes. Hence, it is imperative for teachers to be aware of these developments and they should suitably adopt them in the allied health education system.<sup>xxi</sup>

### **Objective Structured Clinical Examination (OSCE)**

An OSCE usually comprises a circuit of short (the usual is 5–10 minutes although some use up to 15 minutes) stations, in which each candidate is examined on a one-to-one basis with one or two impartial examiner(s), and either real or simulated patients (actors or electronic patient simulators). Each station has a different examiner, as opposed to the traditional method of clinical examinations where a candidate would be assigned to an examiner for the entire examination. Candidates rotate through the stations, completing all the stations on their circuit. In this way, all candidates take the same stations. It is considered to be an improvement over traditional examination methods because the stations can be standardized enabling fairer peer comparison and complex procedures can be assessed without endangering patient's health.<sup>xxii</sup>

## Chapter 2

# Methodology of Curriculum Development

## Chapter 2: Methodology of curriculum development

With the release of the report ‘From Paramedics to Allied Health: Landscaping the journey and the way ahead’, the Ministry of Health and Family Welfare prioritized the key recommendations and concerns raised by various allied health professionals groups and experts as indicated in the report. One of the major recommendations in the report was the need for standardization of curriculum and pedagogic requirements for the major allied health professional courses.

The MoHFW has identified 12 priority professional streams in the phase-I for the purpose of standardization. The expertise of over 50 leading public and private allied health educational institutions for 12 different disciplines has been sought as part of this exercise. Additionally, international experts from Canada, Sweden, USA and UK are also being roped in, to arrive at a comprehensive and globally acceptable set of educational standards based on a skills and competencies approach.

The National Skills Development Agency (NSDA) has also developed the National Skills Qualification Framework (NSQF). Under the aegis of the NSDA, the Healthcare Sector Skill Council (HSSC) has undertaken a similar process for a few entry level allied health courses. The processes and byproducts developed by both these bodies will also be considered to preempt duplication of efforts and arrive at a comprehensive set of minimum standards for the allied health professions and the health system as a whole. This would ensure that the key considerations and obligations of both the public and the private sector are adequately addressed.

In view of the above, the Ministry of Health and Family Welfare instituted 12 National Curricula Redesign Taskforce groups comprising of academicians and professionals from the best institutes and colleges across the country. These people served as subject experts and redesigned the curricula based on a standardized framework developed by the NIAHS TSU (National Initiative for Allied Health Sciences-Technical Support Unit), which is the technical arm supporting this project. The final curriculum has been reviewed and approved by the National Curricula Review Committee (NCRC), (constituted by the MoHFW), that consists of experts with versatile and immense experience in their respective streams, to assess the applicability of the curricula drafted.

Steps undertaken in the curricula review process –

- a) Curricula were sought from various States and institutions across the country in response to which the NIAHS TSU reviewed–
  - 118 curricula of allied health courses (different levels) from 10 states across the country;
  - 133 curricula of various allied health courses collected during phase-I of the NIAHS project.
- b) Literature review – a comprehensive literature review was undertaken resulting in a detailed curriculum of the allied health courses, which included competency and skills-based models followed nationally as well as internationally, methodologies of curriculum development, assessment protocols, and many such aspects of curriculum development. The literature review helped the TSU to develop a reference document that comprised of a standard framework for a competency-based curriculum to be followed for the curricula review and

redesign. A detailed mapping of all the resources was undertaken and shared with the taskgroup experts via email.

- c) Constitution of the National Curricula Redesign Taskforces for various professional groups – Specific taskforces were then instituted comprising of technical as well as subject experts who were engaged in the process of redesigning the curriculum.
- d) Constitution of the National Curricula Review Committee (NCRC) – The NCRC comprising of experts with versatile and immense experiences of their respective streams, was then constituted for final review and approval on the curriculum drafted by the taskforce and NIAHS TSU.
- e) National Curricula Redesign Taskforce Consultations– a series of consultations were conducted with subject experts including both regional and national taskgroup experts to develop a ‘skill and competency’ framework for education and career pathways. The consultations were facilitated by the NIAHS TSU members and were led by the chairperson of the group. Post this, the draft version and recommendations were then compiled by the TSU members and sent to the experts for final review and consent.
- f) Local consultations – These were also conducted in different hospitals and other healthcare settings to get suggestions, feedbacks and ideas from the subject experts for their respective curricula.
- g) Response draft – Comments and suggestions were received on the draft and a response draft curriculum was prepared, which was then re-circulated for final consent and validation by the taskgroup experts.
- h) Submission and approval of draft curriculum – The final draft of the curriculum handbook was then submitted by the taskforce chairman to the National Curricula Review Committee for approval and final sign-off.
- i) Public opinion – The handbook has been uploaded to seek public opinion from national and international experts, students, faculty, and practitioners of the respective professional groups.
- j) Final approval by the NCRC- The comments and suggestions by the public will then be reviewed and if appropriate will be incorporated. The final authority for the approval of the content and structure stays with the NCRC.
- k) Dissemination- The final handbook is envisaged to be disseminated by the Ministry of Health and Family Welfare for adoption and incorporation by institutes as applicable.

## Chapter 3

# Background of the profession

## Chapter 3: Background of the profession

### Statement of Philosophy– Why this profession holds so much importance<sup>xxiii</sup>

Physical therapy practice spans the continuum from health promotion to prevention to rehabilitation for individuals and populations throughout the lifespan. Physical therapists diagnose movement dysfunctions based on skillful examination and evaluation regardless of the cause or etiology and provide skilled therapeutic intervention to foster improvement in physical functioning and maximizing overall quality of life. Physical therapists provide the initial access into the health care system for persons with impairments and functional limitations amenable to physical therapy and engage in collegial referral relationships with other health care professionals.

Physical therapist's role also includes that of case manager, teacher, researcher, and consultant. The faculty believes the first priority of education is to prepare people for a well-rounded, balanced life with broad social and cultural interests and as involved, active citizens of our country.

Physical therapists must have commitments to lifelong learning and to search for the evidence that supports and advances practice. Critical thinking, problem solving, intellectual perseverance and courage are all essential characteristics of the successful physical therapist.

### About Physiotherapy

Physiotherapists are health care professionals with a significant role in health promotion and treatment of injury and disease. They combine their in-depth knowledge of the body and how it works with specialized hands-on clinical skills to assess, diagnose and treat symptoms of illness, injury or disability.

All physiotherapists registered to practice are qualified to provide safe and effective physiotherapy. They have met national entry-level education and practice standards, and have successfully passed a standardized physiotherapy competence examination.

### Scope of practice

Physiotherapists plan and administer physiotherapy/ rehabilitation treatments with consultation with medical physicist (Orthopaedician, Neurologist, Cardiologist, Pediatrician etc.) to patients in most developed and developing countries including the United Kingdom, Australia, most European countries, Canada and India where the minimum education requirement is often a baccalaureate degree or postgraduate degrees in Physiotherapy. The therapist works closely with the Medical Physicists and other members of the health care team. They effectively design and treat the course of radiation treatment, in addition to managing the patient's well-being.<sup>xxiv</sup> In India, the scope of practice is rather limited but with the increase of the chronic diseases like non communicable diseases and increasing demand for these professionals, the government aims to undertake steps to improve the scope of professional reach into the system.

### Recognition of Title and qualification

Within the multidisciplinary team, the professional responsible for administering physiotherapy treatment also at times referred to as the physical therapist. The terminology Physiotherapist is an internationally adopted nomenclature and all thus should also be applicable in Indian context.

The recommended title thus stands as the **Physiotherapist with the acronym - PT** for this group of professionals.<sup>xxv</sup>

It is a known fact that with the career advancement, the nomenclature will also vary and will also depend on the sector and profile of the professional. Considering the 10 NSQF levels designed by the NSDA, the following level progression table has been proposed by the taskforce to map the nomenclature, career pathways and progression in different sectors of professional practice for Physiotherapist. **The proposed progression is for further discussion and deliberation, the implementation time of the same may vary depending on the current system and regulations in place.**

The table 2 below indicates the various channels of career progression in three distinct sectors such as clinical setting, academic and industry (management/sales or technical) route. It is envisaged that the physiotherapist will have two entry pathways – students with diploma or baccalaureate. The level of responsibility will increase as the career progresses and will starts with level four (4) for diploma holders and level five (5) for baccalaureate holders. The table also indicates the corresponding level of qualification with experience required by the professional to fulfill the requirements of each level. Considering the degree of patient dealing in case of physiotherapist and such other professions, government aims to phase out the Diploma and PG Diploma level courses and promote Bachelor and Master degree courses. In the academic front, as per UGC guidelines, to work at the position of a Lecturer/Assistant Professor the candidate must attain master degree. The table also indicates that career progression of physiotherapist is upto the level 10, however it needs to be stated that the ultimate signatory authority on patient prescription stands with the physician on role such as MD with physical therapy, the director of the physiotherapy unit (clinical route) will be the ultimate authority for the management responsibilities, the final authority for the clinical decisions will be with the physician.

**Table 2 Nomenclature based on career progression for Physiotherapist (Proposed)**

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	Academic	Industry	
Level 4	Physiotherapy Technician		Technical Associate	<ul style="list-style-type: none"> <li>Diploma PT with 0 - 5 years post Diploma PT experience</li> </ul>
Level 5	Junior Physiotherapist	Demonstrator	Junior Physiotherapist	<ul style="list-style-type: none"> <li>Bachelor in PT with 0-5 years post Bachelor PT</li> <li>Diploma PT with 6-10 years post DPT (only for Industry pathway)</li> </ul>
Level 6	Physiotherapist	Tutor	Physiotherapist	<ul style="list-style-type: none"> <li>MPT with 0-5 years post MPT</li> <li>BPT with 6-10 post BPT</li> <li>Diploma PT 11-15 years' experience with General B.Sc (only for Industry pathway)</li> </ul>
Level 7	Senior Physiotherapist	Assistant Professor /Lecturer (PG only)	Senior Physiotherapist	<ul style="list-style-type: none"> <li>MPT with 6-10 years post MPT</li> <li>BPT with 11-15 years (Only clinical/industry role) post BPT</li> </ul>
Level 8	Chief Physiotherapist	Associate Professor	Chief Physiotherapist	<ul style="list-style-type: none"> <li>MPT with 11-15 years post MPT</li> <li>BPT with 16-20 years (only clinical/industry role) post BPT</li> </ul>
Level 9	Additional Physiotherapy	Professor	Additional Physiotherapy	<ul style="list-style-type: none"> <li>MPT with 16-20 years post MPT</li> <li>BPT with 21-25 years (only clinical/industry role) post BPT</li> </ul>
Level 10	Director Physiotherapy	Principal	Director Physiotherapy	<ul style="list-style-type: none"> <li>MPT with 21-25 years post MPT</li> </ul>

Career progression

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## Definition of Physiotherapist (PT)

*The Physiotherapist (PT) is a member of the multidisciplinary team comprised primarily of the clinician (Orthopaedician, MD - Physical Medicine etc.) and support staff as considered necessary in the local setting. They are the professionals with direct responsible for the daily administration of physiotherapy treatment to the patients for their good health and wellbeing.*

This include treatment preparation, planning, treatment delivery, clinical and rehabilitative care of the patient on a daily basis during treatment and immediate post treatment review. However, the role of the PT always encompasses the safe and accurate delivery of the physiotherapy treatment. As the professional in daily contact with the patient it also includes monitoring of daily improvement of the patient according to his/her condition. Furthermore the PTs liaise with all the other associated professionals in ensuring that the needs of the patient are met.

## Education of the physiotherapist

When developing any education programme it is necessary that programme planning should be outcome-based, meeting local and national manpower requirements, personal satisfaction and career potential for the professionals with supporting pathway in the development of the profession. One of the major changes is the shift from a focus based on traditional theoretical knowledge and skills to competency based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a given situation.

Thus, the following curriculum aims to focus on skills and competencies based approach for learning and is designed accordingly. The curriculum is prescriptive and is designed with an aim to standardize the content across the nation.

## Entry requirements

The students entering the PT programme should have completed the recognized secondary school studies as the qualification stipulated for physiotherapy course (diploma/degree) is **10+2 or equivalent examination with science subject** from a recognized university or board which would provide the foundation for and prepare them for higher education studies.<sup>xxvi</sup>

## Course duration

It is recommended that any programme developed from this curriculum should have a minimum of the following duration to qualify as an entry level professional in physiotherapy -

- **2.5 year programme (including 6 months of clinical training/internship)- Diploma level**
- **4<sup>1/2</sup> year programme (including six months of clinical training /internship)- Bachelor's degree level**
- **2 year programme – Master's degree level**



The emphasis initially should be on the academic content establishing a strong scientific basis and in the later year on the application of theory to clinical/reflective practice. In Bachelor degree programme minimum one year should be devoted to clinical practice and this should be on a continuum of rotation from theory to practice over the programme. The aim of the 4 and 1/2 year degree programme is to enable the development of the PT as a key member of the multidisciplinary team and to enable him/her to execute advanced preparation/ planning/delivery of physiotherapy treatment as well as quality assurance.

With the change in the disease dynamics and multifold increase in the cases needing physiotherapy treatment, it is imperative that a well-structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession. Thus, **a master's degree programme is recommended with minimum of two years of education in specialized field of physiotherapy.** The post graduate students can contribute significantly in research and academics.

PhD also play a significant role in the academic system of physiotherapy, however the curriculum has not indicated any prescriptive guidelines for that level apart from mapping it on the career and qualification map.

### Teaching faculty and infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.

Teaching areas should facilitate different teaching methods. Large lecture theatres may be appropriate, but smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches.

It is recommended that a faculty and student ratio of **1:10** to be followed.

**Job availability-** As per ILO documentation, employers worldwide are looking for job applicants who not only have technical skills that can be applied in the workplace, but who also can communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work.<sup>xxvii</sup> Graduates can expect to be employed in hospitals and private practices as physiotherapists. A career in research, following the completion of a higher degree such as a PhD, is an option chosen by some graduates. Graduates are eligible for employment overseas where their qualifications, training and experience are highly regarded.

Graduates have good employment prospects, and will enter a field in which the demand for professionals has increased in recent years and will keep on increasing due to chronic conditions, lifestyle change. An ageing population requiring increased medical rehabilitation services, together with the continuing introduction of hi-tech equipment, ensures strong demand for future graduates.

# Chapter 4

## Curriculum of Physiotherapy courses

## Chapter 4: Curriculum

### Background

The need for quality in treatment is a critical component of physiotherapy and requires knowledge and understanding of the basic sciences as well as the interaction between the techniques and procedures used in physiotherapy. In an era of greater complexity of technology and techniques, the role of the physiotherapist (PT) and his/her level of responsibility is continually evolving and expanding. Given the complexity of modern physiotherapy, the recognition of the profession of PT and development of dedicated education programmes specific to that profession must be addressed. Education programmes should provide the PT with the scientific theoretical foundation of the profession and enable them, as practitioners, to be able to synthesize, evaluate and apply their knowledge in a clinical setting.

The aims of the recommended curriculum are to produce PTs who are

- Technically and clinically competent;
- Aware of patient conditions and treatment along with the importance of quality assurance;
- Understand the theoretical basis for evidence based practice;
- Effective members of the multidisciplinary team;
- Prepared to participate in or initiate research into practice;

All aspects of physiotherapy have been considered in the development of this curriculum together with the identification of the roles expected for different levels of physiotherapists based on their qualification and experience. The need for connecting the dots between the education and employment practices has been the road map for devising this curriculum.

The National Curriculum Taskforce on Physiotherapy and NIAHS TSU has successfully designed the career and qualification map indicating the growth opportunities for a professional in the career pathway based on the level as indicated in the National Skills Qualification Framework (NSQF). The career pathway indicates **level 4 as the entry level** after the completion of a minimum 2.5 years of diploma level programme on physiotherapy (Diploma in physiotherapy) as well as **level 5 as the entry level** after completion of a minimum 4 and 1/2 years of Baccalaureate level programme on physiotherapy (Bachelor in physiotherapy). The component of the programmes starting from diploma and above has been detailed out in the coming chapters.

Foundation course has also been designed to bring all the students at the same level of understanding with respect to basic healthcare related norms before the start of a career in a healthcare professional course. The foundation course is mandatory for all the allied health professional courses and for both entry level courses – diploma as well as degree. If a diploma holder has completed the foundation course and is willing to pursue the degree course, the candidate will directly get entry for next semester, however a pre-qualifier skill test will have to be satisfactorily completed, if not, then the candidate will have to undergo the first semester of foundation course again.

## 4.1 Diploma in Physiotherapy

### Introduction:

**Learning Objectives:** At the completion of this course, the student should be -

1. Able to understand and execute all routine physiotherapeutic procedures as per prescription and direction of the physician (MD Physical Medicine/ MD Orthopaedics/ MD Neurology).
2. Able to operate and maintain physiotherapy equipment used in treatment of patients.
3. Able to provide adequate knowledge and can demonstrate simple physiotherapy techniques to the patients.

**Expectation from the future diploma holders <sup>xxx</sup>:**

1. The coursework is designed to train students to work in conjunction with a multidisciplinary team including medical doctors, nurses, nutritionist, General duty assistant and other members.
2. Course work includes anatomy, physiology, medicine, therapeutics etc. The student will be skilled in treatment management, administration of prescribed physiotherapy treatment and provision of patient support.
3. Provide patient/family education and support.
4. Participate in program/ treatment planning with the multidisciplinary team.
5. Diploma holder is encouraged to pursue further qualification to attain senior position in the professional field, also to keep abreast with the advance and new technology, the professional should opt for continuous professional education credits offered by national and international institutes.

### Eligibility for admission:

#### Selection procedure:

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%) in Physics, Chemistry, Biology/Mathematics.
2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology and English up to 12<sup>th</sup> Standard level.
3. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.
  - a. English, Physics, Chemistry, Botany, Zoology
  - b. English, Physics, Chemistry, Biology and any other language
4. He/she has attained the age of 17 years as on - (current year) & maximum age limit is 30 years.
5. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.

### **Duration of the course**

Duration of the course is of 2.5 years or 5 semesters (inclusive of six months of internship) with 910 hours of Theory & 1250 hours of Practical Classes and another 720 hours dedicated for internship.

Total number of hours – 2880 for the total course

### **Medium of instruction:**

English shall be the medium of instruction for all the subjects of study and for examination of the course.

### **Attendance:**

A candidate has to secure minimum -

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

### **Assessment:**

Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated.

## Curriculum Outline

### First Semester– Foundation Course

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DPT-001	Introduction to Healthcare Delivery System in India	60	0	60
DPT-002	Basic computers and information Science	10	40	50
DPT-003	Communication and soft skills	20	10	30
DPT-004	Medical Terminology and Record keeping (including anatomical terms)	40	0	40
DPT-005	Medical Law and Ethics	40	0	40
DPT-006	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)	40	60	100
DPT-007	Professionalism and values	20	0	20
DPT-008	Research Methodology and Biostatistics	40	20	60
DPT-009	Principals of Management	40	0	40
DPT-010	Community orientation and clinical visit (including related practical to course 001)*	0	100	100
<b>TOTAL</b>		310	230	540

### Second Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DPT-011	Anatomy	30	10	40
DPT-012	Physiology	60	60	120
DPT-013	Physics including Biomechanics & Kinesiology	20	40	60
DPT-014	Physics related to Electrotherapy & Actinotherapy		20	80
DPT-015	Physics related to Cryotherapy , Hydrotherapy	40	20	60
DPT-016	Basic Exercise Therapy	40	20	60
		-	120	120
<b>TOTAL</b>		250	290	540

### Third Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DPT-017	Therapeutic Exercise, Massage, Movements & Manipulation	60	40	100
DPT-018	Electrotherapy, Actinotherapy, Cryotherapy & Hydrotherapy	40	20	60
DPT-019	Physiotherapy in Medical, Surgical, orthopedic, Gynecological and other Special conditions.	50	50	100
DPT-020	Basic of Pathology, Microbiology, Psychology including principle of Orthotics & Prosthetics & Concepts of Rehabilitation.	40	40	80
DPT-021	Basics of Budget, Planning & Administration	40	20	60
		-	140	140
<b>TOTAL</b>		230	310	540

### Fourth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DPT-022	Pharmacology	20	60	80
DPT-023	Massage manipulation, exercises and physical drill and yoga	40	60	100
DPT-024	Medical subjects	60	20	80
	PT Directed Clinical Education – (studentship)	-	280	280
<b>TOTAL</b>		120	420	540

### Fifth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
	DPT Internship		720	720



### **Introduction to National Healthcare System**

The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
  - a. Healthcare delivery system in India at primary, secondary and tertiary care
  - b. Community participation in healthcare delivery system
  - c. Health system in developed countries.
  - d. Private Sector
  - e. National Health Mission
  - f. National Health Policy
  - g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.
3. Introduction to AYUSH system of medicine
  - a. Introduction to Ayurveda.
  - b. Yoga and Naturopathy
  - c. Unani
  - d. Siddha
  - e. Homeopathy
  - f. Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics-
  - a. Demography – its concept
  - b. Vital events of life & its impact on demography
  - c. Significance and recording of vital statistics
  - d. Census & its impact on health policy
6. Epidemiology
  - a. Principles of Epidemiology
  - b. Natural History of disease
  - c. Methods of Epidemiological studies
  - d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

### **Medical terminologies and record keeping**

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.<sup>xxxv</sup> Topics to be covered under the subject are as follows:

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals.

4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medical orders/reports.
9. Data entry and management on electronic health record system.

### **Basic computers and information science**

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operating system.
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
12. Application of Computers in clinical settings.

Practical on fundamentals of computers -

1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
2. To install different software.
3. Data entry efficiency

## Medical law and ethics

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.<sup>xxxii</sup>

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".<sup>xxxii</sup> Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

## Communication and soft skills

Major topics to be covered under Communication course<sup>xxxiii</sup> –

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

## Introduction to Quality and patient safety

1. Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.

- Concepts of Quality of Care
  - Quality Improvement Approaches
  - Standards and Norms
  - Quality Improvement Tools
  - Introduction to NABH guidelines
2. Basics of emergency care and life support skills - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:
- Vital signs and primary assessment
  - Basic emergency care – first aid and triage
  - Ventilations including use of bag-valve-masks (BVMs)
  - Choking, rescue breathing methods
  - One- and Two-rescuer CPR
  - Using an AED (Automated external defibrillator).
  - Managing an emergency including moving a patient

At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

3. Bio medical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
- Definition of Biomedical Waste
  - Waste minimization
  - BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
  - Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
  - BMW Management & methods of disinfection
  - Modern technology for handling BMW
  - Use of Personal protective equipment (PPE)
  - Monitoring & controlling of cross infection (Protective devices)
4. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –
- Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
  - Prevention & control of common healthcare associated infections,
  - Components of an effective infection control program, and

- Guidelines (NABH and JCI) for Hospital Infection Control
5. Antibiotic Resistance-
    - History of Antibiotics
    - How Resistance Happens and Spreads
    - Types of resistance- Intrinsic, Acquired, Passive
    - Trends in Drug Resistance
    - Actions to Fight Resistance
    - Bacterial persistence
    - Antibiotic sensitivity
    - Consequences of antibiotic resistance
    - Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals
  6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-
    - Fundamentals of emergency management,
    - Psychological impact management,
    - Resource management,
    - Preparedness and risk reduction,
    - Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

### **Professionalism and values**

The module on professionalism will deliver the concept of what it means to be a professional and how a specialized profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

1. Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
2. Personal values- ethical or moral values
3. Attitude and behavior- professional behavior, treating people equally
4. Code of conduct , professional accountability and responsibility, misconduct
5. Differences between professions and importance of team efforts
6. Cultural issues in the healthcare environment

### **Research Methodology and Biostatistics**

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Biostatistics
6. Types of Data

7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal

### **Principals of Management**

The course is intended to provide a knowledge about the basic principles of Management.

1. Introduction to management
2. Strategic Management
3. Foundations of Planning
4. Planning Tools and Techniques
5. Decision Making, conflict and stress management
6. Managing Change and Innovation
7. Understanding Groups and Teams
8. Leadership
9. Time Management
10. Cost and efficiency

### **Community orientation and clinical visit**

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations. <sup>xxxiv</sup>

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical college, private hospitals, dispensaries and clinics.
2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

## Second Semester

### Anatomy

General Anatomy of different regions of body – Cells, Tissues, Organs and system of the body, Co-relation of structure and function.

*Bones* : Classification, Composition, Vascular supply, Function, Ossification and Repair, Muscular and Ligamentous attachments. General features of skull, names and positions of skull bones.

*Joints* : Classification, Gross structure of each joint, Movements in joint. and their limitations, Synovial Joint in detail including applied anatomy, Arches of foot.

*Muscles*: Classification, Details of skeletal Muscles, their attachments, Functional Groups, Abdominal Muscles, Pelvic floor Muscles; Facial Muscles & Muscles of Mastication ( names and nv. supply only)

*CVS* : General outline of Heart, Arterial, Venous and Lymphatic system.

*CNS* : General Anatomy of Brain, Sinuses, Cranial Nerves (Details of 7th Cranial Nerve), Spinal Cord, Chief Tracts (ding & Descending) and Connections, Peripheral Nerves & Nerve Plexuses, Circle of Willie's.

*RS* : Structure, General Relation & Position of air passage, Lungs, Lobes, Broncho-Pulmonary segment, Pleurae, Mediastinum, Mechanism (Anatomical) of Respiration.

*Abdomen*: General Anatomy of Liver, Kidney, Urinary Bladder, Ureter, Parts of Alimentary Canal with relations, Gross Anatomy of Male / Female reproductive organs.

Demonstration: Of Viscera & Bones.

### Physiology:

Introduction, Cell & its structure, properties and functions including cell division. Various Tissues & their functions.

*Blood* : Composition, General functions of plasma, Blood Cells, Blood coagulation, Blood Group & their significance, ESR, Hb.

*C.V.S* : Muscular structure of Heart, Conducting system, Pulse – (Significance), Cardiac out-put, Heart Rate & its regulation, Blood Pressure & its regulation.

*R. S* : Mechanism of Respiration & its regulation, Different volumes, Gaseous Exchange, Transport of O<sub>2</sub> & CO<sub>2</sub>. Definitions of Hypoxia, Apnea, Tracheapnia.

*Digestive System:*

Process of Digestion, Absorption, Structure & Physiological functions of stomach, Intestine, Salivary glands, Pancreas, Liver & Gall Bladder. Definition and causes of Jaundice. Nutrition and Vitamins.

*Genito-Urinary System:*

Structure & Functions of Kidney, Process of Urination, Menstrual Cycle. Endocrine system – Position, structure & functions of Pituitary, Thyroid, Adrenals, Ovaries, Testis, Pancreas. (Brief Knowledge)

Difference between Exocrine & Endocrine Glands.

*Temperature* – Maintenance and Regulation of Body Temperature. Structure of skin and its function.

*Neuro Muscular System:*

Gross structure of Muscle tissues, Muscle contraction – Types, Muscle Tone, Motor Units & its properties, Clonus, Tetany, Fatigue, All or Non Law.

Gross and Microscopic structure of nervous tissues, Neurone, Action potential, Nerve impulse-Conduction. Degeneration and Regeneration of Peripheral nerves, Synapse, Reflex arc, Pyramidal & Extra-Pyramidal system, Functions of Cerebral Cortex, Cerebellum, Basal Ganglia. Posture & its control. Physiology of pain & its control.

*Exercise Physiology:*

Respiratory and Circulatory changes during exercise.

*Demonstration:* Of recording blood pressure, Heart Sounds, Testing Peripheral Sensation, Superficial & Deep Reflexes, Test for Cerebral & Cerebellar functions.

*Physics & Basic Electrotherapy:*

Basic Physics in Medical Electronics: Electrical Fundamentals (molecule, atom, photon, neutron, electron, current & static electricity, PD, EMF). Definition of intensity, resistance, density and units of measurements, electron tubes, power supply, earthing & safety devices. Electrical shock, Amplifiers, Oscillators, Transistors, Transducers, Radiation. Heat, Transmission of Heat, Latent Heat.

*Bio Mechanics & Kinesiology in Exercise Therapy:*

Definition of Kinesiology & Bio-Mechanics, General Principles Leverage, Angle of pull, Force, Gravity, Line of Gravity, C.G., Base, Equilibrium, Movements, Axes & Planes, Mechanical Principles of Lever, Orders of Lever, Pendulum and Spring, Laws of Motion, Normal humane posture & gait, Bio-mechanics of Spine & Locomotion. Group action of muscles, Eccentric & Concentric contraction, Kinetic chain.



*Low Frequency Electrical Currents:*

Definition, Types, Diagrammatic representation, Physical properties, Production and Physiological effects. Modification of currents, Surging, Basic principle of TENS & Ionto-phoresis. Technique of application, apparatus care & maintenance, Indications & Contraindications dangers.

*Medium Frequency currents:*

Concepts & application of IFT, its Indications & Contraindications. High Frequency Therapeutic Currents:

Definition, General Principles, Diagrammatic representation, Physical properties, production and physiological effects, Indications, Contraindication & Danger of -

Short- Wave Diathermy,

Micro-Wave Diathermy, Ultra-Sound,

LASER and their technique of application, apparatus care & maintenance.

*Actinotherapy:*

Electro-Magnetic spectrum, IR Generators, Types, Construction and operation. U.Vgenerators, Types, Construction & Operation. Their indications, contra-indications and dangers.

*Hydrotherapy:*

Properties of Water, Principle of Under-Water Re-education, effects, time and temperature of Pool Therapy, Precaution and Indication, Contra-indication.

*Cryotherapy:*

Basic principles of physiological effects, Procedures & Clinical applications, Indication, Contra-indication.

*Wax Therapy:*

Principles, Constituents, procedures of applications, Indication & Contra-indication

*Exercise Therapy:* Basics of exercise Therapy

Introduction & aims of Exercise Therapy -

Fundamentals of Therapeutic Exercises- Starting Positions, Derived Positions from different starting positions. Muscle work for all the fundamental starting positions. Classification of movements in detail. Active voluntary movements, Passive movements, Free Exercises, Range of Movements in relation to different joints and muscles responsible for those movements (for upper & lower limbs) for spines only movements.

***Pathology & Microbiology:***

Aims & Objectives of study of Pathology. General idea about etiology, pathogenesis, lesion. Various causes of diseases & an approach to Lab studies. Parasitic infestation and diseases caused by them. Outline of Hypertrophy, Atrophy, Inflammation, Reaction to Injury, Resolutions and Repair, Degeneration, edema, necrosis, gangrene, Neoplasia & Metastasis.

***Psychology:***

Nature of Psychology: Behavior & Experience – conscious, sub-conscious and unconscious mind. Motivation – Physiological, Psychological interest & Attitude, Emotions, Control of Emotions, Role of Learning in human life. Types of Learning, Types of Memory, Attention, Perception & Illusion. Concept of Mental Health, I. Q., Physiotherapist's role in the society of Disabled.

***Medical, Surgical, Orthopedic, Gynecological and other Specialized Condition -***

Medical:

Hemiplegia, Paraplegia, C. P., Parkinson's disease, Demyelinating Disease, Syringomyelia, Herpes, Myelitis, Ataxia, M.N.D., Poliomyelitis, Peripheral Neuritis, Nerve Injury, Chorea, Vitamin Deficiency Diseases, Nutritional disability, Myocardial Infarction, Valvular Diseases,

Peripheral Vascular disease, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Pneumonia, Lung Abscess, Nephritis, Nephrotic Syndrome, Muscular Dystrophies.

Traumatology & Orthopedics:

General Physiotherapeutic approach for the management of Trauma Fractures, Dislocations, Union, Non-union & Mal-union, VIC, Stiff Joints, Dupuytran's Contracture, No-articular Rheumatism,

Acute & Chronic Infective Arthritis, Osteomyelitis, Osteo-Chondritis, R.A., O.A., A.S., Postural & Structural Deformities and their complications, Soft Tissue Rheumatism, Teno-Synovitis, Sinovitis, Separation of Epyphysis, Dislocation, P.I.V., Spondylosis, Spondylolysthesis, Spodyllysis, Amputation & Stump Care.

General Surgical Conditions - Pre-Operative and Post-Operative Physiotherapy, Care of Back and Pressure sores.

Gynecological Conditions - Antenatal & Post-natal Physiotherapeutic Training, Prolapsed Uterus, General Idea about Hysterectomy, Muscular Weakness of Pelvic Floor.

Reconstructive Surgery & Cardio-thoracic Surgery - Idea of Tendon Lengthening, Tendon Transfer, Corrective Surgery, General Idea of Cardio-thoracic Surgery. Patient Care at bed, Burn, its Complications & Physiotherapeutic Management. Postural Drainage, Respiratory Physiotherapy.

***Pharmacology –***

- Weights and measures
- Routes and Modes of transmission
- Forms of Medicament – powder, pills and lotion.
- Common drugs used in OPDs and Wards.
- Drug Pharmacokinetics, Pharmacology-adverse reaction, factors modifying drug effects.
- Drug Activity of CNS : Introduction, Alcohols, Sedatives & Hypnotics, Anti- convulsants.
- Drugs acting on peripheral nervous system: Adrenergic, Cholinergic.
- Drug therapy in Parkinsonism
- Skeletal muscle relaxants
- Vitamin D, Calcium, Phosphorus, Magnesium.
- Analgesics & Drugs used in Gout & Rheumatoid Arthritis
- Psycho Therapeutics.
- General anaesthetic, Local anaesthetic.

***Medical subjects***

- (i) General psychology and child psychology.
- (ii) Postures, gaits and analysis of different movements
- (iii) Disease of nervous system-Frenkel's exercises for tabes dorsalis, Weit-Mitchell treatment of neurasthenia
- (iv) Diseases of heart and circulatory system-anatomy of heart, compensation, how to obtain compensation by carefully graduated schemes of exercises and contraindications.
- (v) Diseases of respiratory system-anatomy of respiratory system, chest exercises for the different respiratory conditions, chest clapping, unilateral breathing exercises for empyema and emphysema.
- (vi) Abdominal conditions-treatment by massage, exercises and treatment of atonic muscles by Faradism and contraindication.
- (vii) Deformities- treatment of early deformities in children by fixation massage and manipulation, post operative treatment of severe cases, examination of spine-postural and structural scoliosis mobility exercises in the treatment of postural scoliosis, active and passive corrective exercises in the treatment of structural scoliosis, self corrective exercises and use of mirrors to help in self correction.
- (viii) Diseases of bones, joints and synovial sheaths and bursae and bursae-treatment by heat, light and medical electricity.
- (ix) Muscle dystrophies-amyotonic and myasthenic reactions to faradic current.
- (x) Diseases of nervous system-treatment of conditions by means of low-tension current and contra-indications.
- (xi) Functional disease-treatment of hysterical paralysis by Faradic Stimulation and suggestion.

## Skills based outcomes and monitorable indicators for Diploma in physiotherapy

### Competency statements

1. Understands the place of treatment planning in the physiotherapy process and operates the treatment planning system (TPS)
2. Communicates relevant information to other members and completes accurate documentation
3. Demonstrates ability to correctly position the patient
4. Demonstrates ability to prepare the patient before treatment
5. Demonstrates ability to carry out the daily organization of the treatment unit
6. Demonstrates knowledge of accurate position
7. Practices accurate treatment documentation
8. Demonstrates ability to interpret, apply and disseminate information as a member of the physiotherapy team
9. Demonstrates professional behavior
10. Demonstrates a sensitive and caring attitude towards the patient
11. Knowledge of all electrotherapy and exercise therapy equipment and know how to operate them.

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
1	Understand the place of treatment planning in the physiotherapy process and to operate the treatment planning system (TPS)	Be familiar with the TPS used	Prepare suitable plans/treatments for standard techniques	200
		Know the protocols used in the department	Interpret and understand all planning techniques for the clinical site/s	
2	Be able to transfer all relevant information and complete accurate documentation	Recognize the importance of accurate transfer of information to allow for accurate treatment set-up according to the treatment plan and prescription	Arrange and operate the most appropriate device for the individual patient within the context of the protocol or as advised by the physician.	200
		Know what should be included	Apply the necessary precautions in operating the equipment and look after the patient safety.	

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
		Know to whom or where the documentation and information should be sent	Implement correct QC measures.	
3	Be able to correctly position the patient	Define the common patient conditions that patients suffers and need physiotherapy intervention.	Understand the patient conditions and the treatment protocol for the same.	200
		Be familiar with the techniques and equipment used	Analyze the information and integrate to define the optimal patient position used	
		Know the protocols used in the department		
4	Be able to prepare the patient and able to operate all the physiotherapy equipment.	Know the appropriate positions for the patients during treatment.	Prepare the most appropriate equipment for the individual patient within the context of the protocol	150
		Know how to use the electrotherapy and exercise therapy equipment.	Apply the necessary precautions during the treatment period.	
		Recognize the associated health and safety issues	Implement correct QC and maintain the proper treatment protocol.	
5	Be able to demonstrate the exercise techniques to the patients as prescribed by the physician/ HOD.	Be familiar with the exercise techniques and frequency.	Prepare the patient for exercise therapy according to departmental protocols.	50
6	Be able to carry out the daily organization of the treatment unit	Recognize the importance of team interactions	Participate in the organization of the daily work schedule to maximize efficiency	100
		Explain the principles of effective communication		

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
7	Be able to accurately position and immobilize all patients as per instructions	Be familiar with the treatment plans for all patients on the treatment unit	Prepare the equipment as per instructions	100
		Identify the co-morbidities that will impact on patient position	Identify the patient in accordance with recognized procedures and consistent with the department protocol	
		Recognize the signs and symptoms associated with treatment in different sites		
8	Be able to complete accurate treatment documentation	Recognize the importance of accurate documentation	Complete the treatment documentation accurately	50
		Know what should be included		
9	Be able to interpret, apply and disseminate information as a member of the physiotherapy team.	Define and explain the data that must be disseminated	Identify the appropriate personnel to whom specific information should be disseminated	50
			Communicate the correct, relevant and appropriate information	
10	Be able to demonstrate professional behavior	Explain the ethical guidelines related to the profession	Practice in accordance with legislation regulations and ethical guidelines	100
		Be aware of your own competency levels	Promote collaborative practice	
		Identify the elements that reflect professional appearance and manner		
11	Be able to demonstrate a sensitive and caring attitude	Explain the components of good communication	Self-awareness of their own personality traits	50

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
	to patients	Be aware of the patient' gender, age, cultural background, educational level and social situation	Analyze how the differences in personality influence approach	
	Total			1250

## 4.2 Bachelor in Physiotherapy



### Introduction:

**Learning Objectives:** At the completion of this course, the student should be -

1. Able to execute all routine physiotherapeutic procedures as per the treatment protocol.
2. Able to operate and maintain physiotherapy equipment used in treatment of patient, physiotherapy treatment planning (both electrotherapy and exercise therapy) & procedures under the guidance of Medical Physicist or independently or along with the interdisciplinary team.
3. Able to provide adequate knowledge about the exercise therapy techniques to the patient and its benefits.

**Expectation from the future graduate in the providing patient care.**

1. The coursework is designed to train students to work in conjunction with physiotherapy team including Medical Physicist (MD Physical Medicine, Orthopaedician, Neurologist, Cardiologist etc.), Nurses, Dietician, Orthotist and Prosthetist, Physiotherapy Assistant, General Duty Assistant and other members in the application of physiotherapy treatment protocol.
2. Course work includes anatomy, physiology, electrotherapy, exercise therapy, biomechanics, pharmacology etc. The student will be skilled in treatment planning, management, administration of physiotherapy treatment and provision of patient support.
3. Employment opportunities can be found in hospitals and nursing homes in both private and public sectors as well as in independent physiotherapy clinics.
4. Bachelor of Physiotherapy (BPT) graduate is encouraged to pursue further qualification to attain senior position in the professional field, also to keep abreast with the advance and new technology, the professional should opt for continuous professional education credits offered by national and international institutes.

### Eligibility for admission:

**Selection procedure:**

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%) in physics, chemistry, biology/mathematics.  
OR  
Diploma in Physiotherapy after completing 12th class/ 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics, chemistry and biology provided the candidate has passed in each subject separately.
2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the

eligibility and must have passed in the subjects: Physics, Chemistry, Biology and English up to 12th Standard level.

3. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.
  - a. English, Physics, Chemistry, Botany, Zoology
  - b. English, Physics, Chemistry, Biology and any other language
4. He/she has attained the age of 17 years as on - (current year) & maximum age limit is 30 years.
5. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
6. Admission to Bachelor of Physiotherapy course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.
  - a. Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme of CBSE, subject-wise distribution of questions will be as 40% in Physics, 25% in biology, 15% in Chemistry, 10% in English (Language & Comprehension) and 10% in General Awareness about health related methods.
  - b. Successful candidates on the basis of written Test will be called for the interview & shall have face an interview board. The interview board will include the Head of the Department of Physiotherapy (Chairman of the Board) along with the Senior Medical Physicist apart from other nominees, whose recommendations shall be final for the selection of the students.
  - c. During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.
  - d. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.
  - e. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

**Provision of Lateral Entry:**

Lateral entry to second year for allied health science courses for candidates who have passed diploma program from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only if the same subject have been studied at diploma level.

**Duration of the course**

Duration of the course: 4 years or 8 semesters. (1950 hours of Theory & 2780 hours of Practical Classes) and 720 hours (minimum) of internship

Total hours - 5450

**Medium of instruction:**

English shall be the medium of instruction for all the subjects of study and for examination of the course.

**Attendance:**

A candidate has to secure minimum-

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

**Assessment:**

Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated.

## Curriculum Outline

### First Semester– Foundation Course

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-001	Introduction to Healthcare Delivery System in India	60	0	60
BPT-002	Basic computers and information Science	10	40	50
BPT-003	Communication and soft skills	20	10	30
BPT-004	Medical Terminology and Record keeping (including anatomical terms)	40	0	40
BPT-005	Medical Law and Ethics	40	0	40
BPT-006	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)	40	60	100
BPT-007	Professionalism and values	20	0	20
BPT-008	Research Methodology and Biostatistics	40	20	60
BPT-009	Principals of Management	40	0	40
BPT-010	Community orientation and clinical visit (including related practical to course 001)*	0	100	100
<b>TOTAL</b>		310	230	540

### Second Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-011	Anatomy	80	100	180
BPT-012	Physiology	60	40	100
BPT-013	Biochemistry	30	20	50
BPT-014	Biomechanics	60	80	140
	BPT Directed Clinical Education – part I (studentship)	-	120	120
<b>TOTAL</b>		230	360	590

### Third Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-015	Psychology	60	40	100
BPT-016	Sociology	60	40	100
BPT-017	Pathology	80	60	140
BPT-018	Microbiology	80	60	140
	BPT Directed Clinical Education – part II (studentship)	-	100	100
	<b>TOTAL</b>	280	300	580

### Fourth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-019	Pharmacology	50	50	100
BPT-020	Exercise Therapy	90	100	190
BPT-021	Electrotherapy	90	100	190
	BPT Directed Clinical Education – part II (studentship)	-	100	100
	<b>TOTAL</b>	230	350	580

### Fifth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-022	General Medicine	80	60	140
BPT-023	General Surgery	80	60	140
	BPT Directed Clinical Education – part III (studentship)	-	300	300
	<b>TOTAL</b>	160	420	580

### Sixth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-024	Orthopedics & Traumatology	100	80	180
BPT-025	Orthopedics and Sports Physiotherapy	100	80	180
	BPT Directed Clinical Education – part IV (studentship)		200	200
	<b>TOTAL</b>	200	360	560

### Seventh Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-026	Cardio Respiratory and General Physiotherapy	100	80	180
BPT-027	Neurology and Neuro Surgery	100	80	180
	BPT Directed Clinical Education – part IV (studentship)		200	200

	<b>TOTAL</b>	200	360	560
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### Eighth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BPT-028	Community Medicine	40	20	60
BPT-029	Neuro Physiotherapy	150	90	240
BPT-030	Community Based Rehabilitation	150	90	240
	BPT Directed Clinical Education – part V (studentship)		200	200
	<b>TOTAL</b>	340	400	740

### Ninth Semester

**INTERNSHIP** – minimum 720 hours (calculated based on 8 hours per day, if 90 working days in six month span)

### **Introduction to National Healthcare System**

The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
  - a. Healthcare delivery system in India at primary, secondary and tertiary care
  - b. Community participation in healthcare delivery system
  - c. Health system in developed countries.
  - d. Private Sector
  - e. National Health Mission
  - f. National Health Policy
  - g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.
3. Introduction to AYUSH system of medicine
  - a. Introduction to Ayurveda.
  - b. Yoga and Naturopathy
  - c. Unani
  - d. Siddha
  - e. Homeopathy
  - f. Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics-
  - e. Demography – its concept
  - f. Vital events of life & its impact on demography
  - g. Significance and recording of vital statistics
  - h. Census & its impact on health policy
6. Epidemiology
  - i. Principles of Epidemiology
  - j. Natural History of disease
  - k. Methods of Epidemiological studies
  - l. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

### **Medical terminologies and record keeping**

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.<sup>xxxii</sup> Topics to be covered under the subject are as follows:

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals.



4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medical orders/reports.
9. Data entry and management on electronic health record system.

### **Basic computers and information science**

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operating system.
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
12. Application of Computers in clinical settings.

Practical on fundamentals of computers -

1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
2. To install different software.
3. Data entry efficiency

## Medical law and ethics

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.<sup>xxxii</sup>

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".<sup>xxxii</sup> Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

## Communication and soft skills

Major topics to be covered under Communication course<sup>xxxiii</sup> –

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

## Introduction to Quality and patient safety

1. Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.

- a. Concepts of Quality of Care
  - b. Quality Improvement Approaches
  - c. Standards and Norms
  - d. Quality Improvement Tools
  - e. Introduction to NABH guidelines
2. Basics of emergency care and life support skills - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:
- a. Vital signs and primary assessment
  - b. Basic emergency care – first aid and triage
  - c. Ventilations including use of bag-valve-masks (BVMs)
  - d. Choking, rescue breathing methods
  - e. One- and Two-rescuer CPR
  - f. Using an AED (Automated external defibrillator).
  - g. Managing an emergency including moving a patient

At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

3. Bio medical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
- a. Definition of Biomedical Waste
  - b. Waste minimization
  - c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
  - d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
  - e. BMW Management & methods of disinfection
  - f. Modern technology for handling BMW
  - g. Use of Personal protective equipment (PPE)
  - h. Monitoring & controlling of cross infection (Protective devices)
4. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –
- a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
  - b. Prevention & control of common healthcare associated infections,
  - c. Components of an effective infection control program, and
  - d. Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance-
  - a. History of Antibiotics
  - b. How Resistance Happens and Spreads
  - c. Types of resistance- Intrinsic, Acquired, Passive
  - d. Trends in Drug Resistance
  - e. Actions to Fight Resistance
  - f. Bacterial persistence
  - g. Antibiotic sensitivity
  - h. Consequences of antibiotic resistance
  - i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals
  
6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-
  - a. Fundamentals of emergency management,
  - b. Psychological impact management,
  - c. Resource management,
  - d. Preparedness and risk reduction,
  - e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

### **Professionalism and values**

The module on professionalism will deliver the concept of what it means to be a professional and how a specialized profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

1. Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
2. Personal values- ethical or moral values
3. Attitude and behavior- professional behavior, treating people equally
4. Code of conduct , professional accountability and responsibility, misconduct
5. Differences between professions and importance of team efforts
6. Cultural issues in the healthcare environment

### **Research Methodology and Biostatistics**

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Biostatistics
6. Types of Data
7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal

## **Principals of Management**

The course is intended to provide a knowledge about the basic principles of Management.

1. Introduction to management
2. Strategic Management
3. Foundations of Planning
4. Planning Tools and Techniques
5. Decision Making, conflict and stress management
6. Managing Change and Innovation
7. Understanding Groups and Teams
8. Leadership
9. Time Management
10. Cost and efficiency

## **Community orientation and clinical visit**

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations.<sup>xxxiv</sup>

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical college, private hospitals, dispensaries and clinics.
2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

## **Anatomy**

Course Description - It is designed to provide students with the working knowledge of the structure of the human body which is essential foundation for their clinical studies. Studies are concerned with the topographical and functional anatomy of the limbs and thorax. Particular attention is paid to the muscles, bones and joints of the regions. The abdomen, pelvis, perineum, head and neck and central nervous system (CNS) are studied with particular reference to topics of importance to physiotherapists. The study of the CNS includes detailed consideration of the control of motor function.

### **Theory –**

#### 1. Histology

General Histology, study of the basic tissues of the body;

Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS, Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue, Skin and its appendages.

#### 2. Embryology

- a) Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.
- b) Development of skin, Fascia, blood vessels, lymphatic,
- c) Development of bones, axial and appendicular skeleton and muscles,
- d) Neural tube, brain vessels and spinal cord,
- e) Development of brain and brain stem structures

#### 3. Regional Anatomy

Thorax:

- a) Cardio – Vascular System Mediastinum: Divisions and contents

Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.

- b) Respiratory system

Outline of respiratory passages

Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on bronchopulmonary segments.

Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.

Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action.

Abdomen:

- a. Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.
- b. Large blood vessels of the gut.
- c. Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver, spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

Pelvis:

- a. Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.

Endocrine glands:

- a. Position, shape, size, function, blood supply and nerve supply of the following glands : Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus.

4. Musculo Skeletal Anatomy - (All the topics to be taught in detail)

- a. Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc)
- b. Connective tissue classification.
- c. Bones- Composition & functions, classification and types according to morphology and development.
- d. Joints- definition- classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.
- e. Muscles – origin, insertion, nerve supply and actions

f. Upper Extremity :

1. Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
2. Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.
3. Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
4. Arches of hand, skin of the palm and dorsum of hand.

g. Lower Extremity

1. Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
2. Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of



the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.

3. Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.

h. Trunk & Pelvis:

1. Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
2. Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Inter-vertebral disc.
3. Pelvic girdle and muscles of the pelvic floor.

i. Head and Neck:

1. Osteology: Mandible and bones of the skull.
2. Soft parts : Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck.
3. Gross anatomy of eyeball, nose, ears and tongue.

Neuro Anatomy - Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system

Cranial nerves

Peripheral nervous system

Peripheral nerve

Neuromuscular junction

Sensory end organs

Central Nervous System

Spinal segments and areas

Brain Stem

Cerebellum

Inferior colliculi

Superior Colliculi

Thalamus

Hypothalamus

Corpus striatum

Cerebral hemisphere

Lateral ventricles

Blood supply to brain

Basal Ganglia

The pyramidal system

Pons, medulla, extra pyramidal systems

Anatomical integration

## PRACTICAL -

### List of Practical / Demonstrations \*

#### Topics

1. Upper extremity including surface Anatomy.
2. Lower extremity including surface Anatomy.
3. Head & Spinal cord and Neck and Brain including surface Anatomy.
4. Thorax including surface anatomy, abdominal muscles joints.
5. Histology-Elementary tissue including surface Anatomy.
6. Embryology-models, charts & X-rays.

## Physiology –

### Subject Description

The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body.

The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; sensory receptors; special senses; motor unit; spinal cord; control of movement; hypothalamic functions; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Practical classes include hematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.

## Theory

### General Physiology

- Cell: Morphology. Organelles: their structure and functions
- Transport Mechanisms across the cell membrane
- Body fluids: Distribution, composition.

### Blood

- Introduction: Composition and functions of blood.
- Plasma: Composition, formation, functions. Plasma proteins.
- RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticulo-endothelial system (in brief) Haemoglobin - Anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.
- WBC: Classification. Morphology, functions, count, its variation of each. Immunity
- Platelets: Morphology, functions, count, its variations
- Hemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders.

Anticoagulants.

- Blood Groups: Landsteiner's law. Types, significance, determination, Erythroblastosis foetalis.
- Blood Transfusion: Cross matching. Indications and complications.
- Lymph: Composition, formation, circulation and functions.

#### Nerve Muscle Physiology

- Introduction: Resting membrane potential. Action potential – ionic basis and properties.
- Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibres. Nerve injury – degeneration and regeneration.
- Neuroglia: Types and functions.
- Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction : Structure. Neuromuscular transmission, myasthenia gravis. Excitation- Contraction coupling. Rigomortis.

## Cardiovascular System

- Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organisation of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties.
- Conducting system: Components. Impulse conduction Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character. ECG: Definition. Different types of leads. Waves and their causes. P-R interval. Heart block.
- Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation. Their variations
- Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance. Regulation of BP.
- Arterial pulse.
- Shock – Definition. Classification–causes and features
- Regional Circulation: Coronary, Cerebral and Cutaneous circulation.
- Cardiovascular changes during exercise.

## Respiratory System -

- Introduction: Physiological anatomy – Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system. Respiratory muscles.
- Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Chest expansion. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions. RDS
- Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.
- Dead Space: Types and their definition.
- Pulmonary Circulation. Ventilation-perfusion ratio and its importance.
- Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Factors affecting it. P50, Haldane and Bohr effect. Carbon dioxide transport: Different forms, chloride shift.
- Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation.
- Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygen therapy. Acclimatization Hypercapnoea. Asphyxia. Cyanosis – types and features. Dysbarism
- Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea, tachypnoea. periodic breathing – types
- Artificial respiration
- Respiratory changes during exercise.

## Digestive System -

- Introduction: Physiological anatomy and nerve supply of alimentary canal. Enteric nervous system
- Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication (in brief)
- Swallowing: Definition. Different stages. Function.
- Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.
- Pancreatic Secretion: Composition, production, function. Regulation.
- Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions.
- Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation.
- Mechanism of Defaecation.

## Renal System -

- Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxtaglomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.
- Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.
- Tubular Reabsorption: Reabsorption of  $\text{Na}^+$ , glucose,  $\text{HCO}_3^-$ , urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance:  $T_mG$ . Renal threshold for glucose.
- Tubular Secretion: Secretion of  $\text{H}^+$  and  $\text{K}^+$ . PAH clearance.
- Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.
- Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.
- Acid-Base balance (very brief)
- Artificial Kidney: Principle of haemodialysis.
- Skin and temperature regulation.

## Endocrine System -

- Introduction: Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones
- Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.
- Pituitary-Hypothalamic Relationship.
- Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxoedema, Cretinism, Grave's disease.
- Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.
- Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of
- Aldosterone, Cortisol, Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome. Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Pheochromocytoma.
- Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.
- Calcitonin, Thymus and Pineal gland (very brief).
- Local Hormones. (briefly) .

## Reproductive System -

- Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder
- Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.
- Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: oestrogen and progesterone-action. regulation of secretion. Menstrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods

## Special Senses -

- Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.
- Visual Pathway and the effects of lesions.
- Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.
- Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation. Color vision – color blindness. Nyctalopia.
- Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.
- Taste: Taste buds. Primary tastes. Gustatory pathway.
- Smell: Olfactory membrane. Olfactory pathway.
- Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders

## Nervous System -

- Introduction: Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.
- Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. tabes dorsalis, sensory ataxia.
- Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.
- Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex– structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL
- Spinal cord Lesions: Complete transection and Hemisection of the spinal cord.
- Cerebellum: Functions. Cerebellar ataxia.

- Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.
- Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome
- Reticular Formation and Limbic System: Components and Functions.
- Basal Ganglia: Structures included and functions. Parkinson's disease.
- Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.
- EEG : Waves and features. Sleep: REM and NREM sleep.
- CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.
- ANS: Features and actions of parasympathetic and sympathetic nervous system.

#### Physiology of Exercise -

##### A. Effects of acute and chronic exercise on

- O<sub>2</sub> transport
- Muscle strength/power/endurance
- B.M.R./R.Q.
- Hormonal and metabolic effect
- Cardiovascular system
- Respiratory system
- Body fluids and electrolyte

##### B. Effect of gravity / altitude /acceleration / pressure on physical parameters

##### C. Physiology of Age

#### Applied Physiology -

More detailed study of the physiology and practical applications of the following selected topics with emphasis on aspects, which should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy.

##### a. Pulmonary Functions

1. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
2. Respiratory adjustments in exercises.
3. Artificial respiration
4. Breath sounds.

##### b. Cardio vascular Functions

1. Blood flow through arteries, arterioles, capillaries, veins and venuoles.
2. Circulation of Lymph, Oedema
3. Factors affecting cardiac output.
4. Circulatory adjustment in exercise and in postural and gravitational changes,
5. Pathophysiology of fainting and heart failure.

##### c. Muscles and Nervous System Functions



1. Peripheral nervous system, Neuromuscular transmission, Types of nerve fibres.
2. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV
3. Degeneration and regeneration of nerve, Reactions of denervations.
4. Synaptic transmission, Stretch reflex- Mechanism and factors affecting it.
5. Posture, Balance and Equilibrium/Coordination of voluntary movement.
6. Voluntary motor action, clonus, Rigidity, Discordination,
7. Special senses- Vision, taste, hearing, vestibular, Olfaction
8. Sympathetic and Parasympathetic regulation, Thermoregulation.

d. Blood functions

1. Thalassemia Syndrome, Hemophilia, VWF
2. Anemia, Leucocytosis
3. Bone marrow transplant

e. Metabolic Functions

Diabetes Mellitus, Physiological basis of Peptic Ulcer, Jaundice, GIT disorders and Dietary fiber, Thyroid functions, Vitamins deficiency.

## PRACTICAL

### I. Haematology

To be done by the students

1. Study of Microscope and its uses
2. Determination of RBC count
3. Determination of WBC count
4. Differential leukocyte count
5. Estimation of hemoglobin
6. Calculation of blood indices
7. Determination of blood groups
8. Determination of bleeding time
9. Determination of clotting time

Demonstrations only

1. Determination of ESR
2. Determination of PCV

### II. Clinical Examination

1. Examination of Radial pulse.
2. Recording of blood pressure
3. Examination of CVS
4. Examination of Respiratory system
5. Examination of Sensory system
6. Examination of Motor System
7. Examination of reflexes
8. Examination of cranial nerves

### III. Amphibian Experiments – Demonstration and Dry charts Explanation.

1. Instruments used for frog experiments. Kymograph, heart liver, Muscle trough, stimulator.
2. Simple muscle curve.
3. Effect of increasing the strength of the stimuli
4. Effect of temperature on muscle contraction
5. Effect of two successive stimuli.
6. Effect of Fatigue.
7. Effect of load on muscle contraction
8. Genesis of tetanus and clonus.
9. Velocity of impulse transmission.
10. Normal cardiogram of amphibian heart.
11. Properties of Cardiac muscle
12. Effect of temperature on cardiogram.

### IV. Recommended Demonstrations

1. Spirometry
2. Artificial Respiration
3. ECG
4. Perimetry
5. Mosso's Ergometry

## **Biochemistry –**

### Theory

1. Nutrition -  
Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food.  
Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person  
  
Balanced diet  
Recommended dietary allowances  
Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers Role of lipids in diet  
Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non essential amino acids. Nitrogen balance, Nutritional disorders.
2. Carbohydrate Chemistry -  
Definition, general classification with examples, Glycosidic bond  
Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides.  
Glycosaminoglycans (mucopolysaccharides)
2. Lipid Chemistry -

Definition, general classification  
Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol  
Essential fatty acids and their importance  
Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies

4. Amino-acid Chemistry -

Amino acid chemistry: Definition, Classification, Peptide bonds  
Peptides: Definition, Biologically important peptides  
Protein chemistry: Definition, Classification, Functions of proteins,

5. Enzymes -

Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)

6. Nucleotide and Nucleic acid Chemistry -

Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.  
Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.

7. Digestion and Absorption -

General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance,

8. Carbohydrate Metabolism -

Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation.  
Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle  
Hormonal regulation of glucose, Glycosuria, Diabetes mellitus.

9. Lipid Metabolism -

Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids,  
Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues  
Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test.  
Cholesterol metabolism: synthesis, degradation, cholesterol transport  
Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases)  
Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver

10. Amino acid and Protein Metabolism -

Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle  
Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.

11. Vitamins -

Definition, classification according to solubility,  
Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.

12. Mineral Metabolism-

Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.

13. Cell Biology -

Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton.

14. Muscle Contraction -

Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.

15. Biochemistry of Connective tissue -

Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.

16. Hormone Action -

Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.

17. Acid-Base balance -

Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance.

18. Water balance -

Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre.

19. Electrolyte balance -

Osmolarity. Distribution of electrolytes.

Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF.

20. Clinical Biochemistry -

Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.

**Biomechanics -**

Biomechanics involves the study of basic concepts of human movement, and application of various biomechanical principles in the evaluation and treatment of disorders of Muskuloskeletal system. Students are taught to understand the various quantitative methods of movement. Mechanical principles of various treatment methods are studied. Study of posture and gait are also included.

THEORY

## 1. Basic Concepts in Biomechanics: Kinematics and Kinetics

- a) Types of Motion
- b) Location of Motion
- c) Direction of Motion
- d) Magnitude of Motion
- e) Definition of Forces
- f) Force of Gravity
- g) Reaction forces
- h) Equilibrium
- i) Objects in Motion
- j) Force of friction
- k) Concurrent force systems
- l) Parallel force system
- m) Work
- n) Moment arm of force
- o) Force components
- p) Equilibrium of levers

## 2. Joint structure and Function -

- a) Joint design
- b) Materials used in human joints
- c) General properties of connective tissues
- d) Human joint design
- e) Joint function
- f) Joint motion
- g) General effects of disease, injury and immobilization.

## 3. Muscle structure and function -

- a) Mobility and stability functions of muscles
- b) Elements of muscle structure
- c) Muscle function
- d) Effects of immobilization, injury and aging

## 4. Biomechanics of the Thorax and Chest wall -

- a) General structure and function
- b) Rib cage and the muscles associated with the rib cage
- c) Ventilatory motions: its coordination and integration
- d) Developmental aspects of structure and function
- e) Changes in normal structure and function in relation to pregnancy, scoliosis and COPD

## 5. The Temporomandibular Joint-

- a) General features, structure, function and dysfunction

## 6. Biomechanics of the vertebral column -

- a) General structure and function
- b) Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region
- c) Muscles of the vertebral column
- d) General effects of injury and aging

## 7. Biomechanics of the peripheral joints -

- a) The shoulder complex: Structure and components of the shoulder complex and their integrated function
- b) The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury.
- c) The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; prehension; functional position of the the wrist and hand.
- d) The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur:
- e) The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease.
- f) The ankle and foot complex.: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot, deviations from normal structure and function – Pes Planus and Pes Cavus

#### 8. Analysis of Posture and Gait –

Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; general features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait; Movement Analysis : ADL activities like sitting – to standing, lifting, various grips , pinches.

**Practical** shall be conducted for various joint movements and analysis of the same. Demonstration may also be given as how to analyze posture and gait.

The student shall be taught and demonstrated to analysis for activities of daily living – ADL – (like sitting to standing, throwing, lifting etc.) The student should be able to explain and demonstrate the movements occurring at the joints, the muscles involved, the movements or muscle action produced, and mention the axis and planes through which the movements occur. The demonstrations may be done on models or skeleton.

### *Third Semester*

#### **Psychology & Sociology**

Course description -

Human Psychology involves the study of various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups.

Sociology will introduce student to the basic sociology concepts, principles and social process, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

The study of these subjects will help the student to understand their clients while assessment and while planning appropriate treatment methods.

### **Theory -**

1. Introduction to Psychology
  - a. Schools: Structuralism, functionalism, behaviorism, Psychoanalysis.
  - b. Methods: Introspection, observation, inventory and experimental method.
  - c. Branches: pure psychology and applied psychology
  - d. Psychology and physiotherapy
  
2. Growth and Development
  - a. Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age).
  - b. Heredity and environment: role of heredity and environment in physical and psychological development, “Nature v/s Nurture controversy”.
  
3. Sensation, attention and perception
  - a. Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense.
  - b. Attention: Types of attention, Determinants of attention (subjective determinants and objective determinants).
  - c. Perception: Gestalt principles of organization of perception (principle of figure ground and principles of grouping), factors influencing perception (past experience and context).
  - d. Illusion and hallucination: different types
  
4. Motivation
  - a. Motivation cycle (need, drive, incentive, reward).
  - b. Classification of motives.
  - c. Abraham Maslow’s theory of need hierarchy
  
5. Frustration and conflict
  - a. Frustration: sources of frustration.
  - b. Conflict: types of conflict.
  - c. Management of frustration and conflict
  
6. Emotions
  - a. Three levels of analysis of emotion (physiological level, subjective state, and overt behavior).
  - b. Theories of emotion
  - c. Stress and management of stress.
  
7. Intelligence
  - a. Theories of intelligence.
  - b. Distribution of intelligence.
  - c. Assessment of intelligence

## 8. Thinking

- a. Reasoning : deductive and inductive reasoning
- b. Problem solving: rules in problem solving (algorithm and heuristic)
- c. Creative thinking: steps in creative thinking, traits of creative people

## 9. Learning

- a. Factors effecting learning.
- b. Theories of learning: trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory.
- c. The effective ways to learn: Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.

## 10. Personality

- a. Approaches to personality: type & trait, behavioristic, psychoanalytic and humanistic approach.
- b. Personality assessment: observation, situational test, questionnaire, rating scale, interview, and projective techniques.
- c. Defense Mechanisms: denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out.

## 11. Social psychology

- a. Leadership: Different types of leaders. Different theoretical approaches to leadership.
- b. Attitude: development of attitude. Change of attitude .

## **Sociology -**

### **Theory -**

#### Introduction:

1. Meaning- Definition and scope of sociology
2. Its relation to Anthropology, Psychology, Social Psychology.
3. Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.
4. Importance of its study with special reference to Health Care Professionals.

#### Social Factors in Health and disease situations:

1. Meaning of social factors
2. Role of social factors in health and illness

#### Socialization:

1. Meaning and nature of socialization.
2. Primary, Secondary and Anticipatory socialization.
3. Agencies of socialization.



#### Social Groups:

Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

#### Family:

1. The family, meaning and definitions.
2. Functions of types of family
3. Changing family patterns
4. Influence of family on the individuals health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy.

#### Community:

1. Rural community: Meaning and features –Health hazards of ruralities, health hazards to tribal community.
2. Urban community: Meaning and features- Health hazards of urbanities.

#### Culture and Health :

1. Concept of Health
2. Concept of Culture
3. Culture and Health
4. Culture and Health Disorders

#### Social change :

1. Meaning of social changes.
2. Factors of social changes.
3. Human adaptation and social change
4. Social change and stress.
5. Social change and deviance.
6. Social change and health programme
7. The role of social planning in the improvement of health and rehabilitation.

#### Social Problems of disabled:

Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems.

1. Population explosion
2. Poverty and unemployment
3. Beggary
4. Juvenile delinquency
5. Prostitution
6. Alcoholism
7. Problems of women in employment
8. geriatric problems
9. Problems of underprivileged.

#### Social Security:

Social security and social legislation in relation to the disabled.

Social worker:

1. Meaning of Social Work
2. The role of a Medical Social Worker.

## **Pathology –**

### Subject Description

This subject follows the basic subjects of Anatomy, Physiology and Biochemistry and it forms a vital link between preclinical subjects and clinical subjects. Pathology involves the study of causes and mechanisms of diseases. Microbiology involves the study of common organisms causing diseases including nosocomial infections and precautionary measures to protect one from acquiring infections. The knowledge and understanding of Microbiology & Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

### **Theory – General Pathology**

#### 1. Introduction to Pathology.

#### 2. Cell injuries -

Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure. Reversible cell injury : Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoïd changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations,

Pigments - Melanin / Hemosiderin.

Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.

#### 3. Inflammation and Repair -

Acute inflammation: features, causes, vascular and cellular events.

Inflammatory cells and Mediators. Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples.

Repair, Wound healing by primary and secondary union, factors promoting and delaying the process.

Healing in specific site including bone healing.

#### 4. Immunopathology -

Immune system: General concepts.

Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. . Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification, SLE.

AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

5. Infectious diseases -

Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.

Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.

Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Ricktsia, Chlamydial infection, HIV infection.

Fungal disease and opportunistic infections.

Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

6. Circulatory Disturbances -

Hyperemia/Ischemia and Haemorrhage Edema: Pathogenesis and types. Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology Thrombosis and Embolism: Formation, Fate and Effects.

Infarction: Types, Common sites.

Shock: Pathogenesis, types, morphologic changes.

7. Growth Disturbances and Neoplasia [3 Hours]

Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.

Precancerous lesions.

Neoplasia: Definition, classification, Biological behaviour : Benign and Malignant, Carcinoma and Sarcoma.

Malignant Neoplasia: Grades and Stages, Local & Distant spread.

Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer.

Benign & Malignant epithelial tumours Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours Eg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma.

8. Nutritional Disorders -

Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples.

9. Genetic Disorders -

Basic concepts of genetic disorders and some common examples and congenital malformation.

## Systemic pathology

### 10. Hematology -

Constituents of blood and bone marrow, Regulation of hematopoiesis. Anemia: Classification, clinical features & lab diagnosis.

Nutritional anemias: Iron deficiency anemia, Folic acid, Vit. B 12 deficiency anemia including pernicious anemia. Hemolytic Anaemias: Classification and Investigations. Hereditary hemolytic anaemias: Thalessemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies.

Acquired hemolytic anaemias

- i. Alloimmune, Autoimmune
- ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia.

Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis. Coagulopathies –  
(i) Inherited (ii) Acquired with lab diagnosis.

Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.

Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Multiple myeloma and disproteinemias.

Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis.

### 11. Respiratory System

Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases

### 12. Cardiovascular Pathology

Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus.

Endocarditis. Rheumatic Heart disease.

Vascular diseases: Atherosclerosis, monckeberg's medial calcification, Aneurysm and Arteritis and tumours of Blood vessels.

Ischemic heart Disease: Myocardial infarction. Hypertension and hypertensive heart Disease.

### 13. Alimentary tract :

Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumour of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumours.

Stomach : Gastritis, Ulcer & Tumours.

Tumours and tumour like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma.

Pancreatitis and pancreatic tumours : i) Exocrine, ii) Endocrine Salivary gland tumours : Mixed, Warthin's

14. Hepato – biliary pathology. Jaundice: Types, aetio-pathogenesis and diagnosis. Hepatitis: Acute, Chronic, neonatal.

Alcoholic liver disease

Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumours of Liver

15. Lymphatic System

Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma. Lymphadenitis - Non specific and granulomatous. Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non hodgkin's Lymphomas, Metastatic Tumours. Causes of Splenic Enlargements.

16. Musculoskeletal System

Osteomyelitis, acute, chronic, tuberculous, mycetoma

Metabolic diseases: Rickets/Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease.

Tumours Classification: Benign, Malignant, Metastatic and synovial sarcoma. Arthritis:

Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous.

17. Endocrine pathology

Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis.

Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.

18. Neuropathology

Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess

Tuberculosis, Cysticercosis

CNS Tumors, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma

19. Dermatopathology

Skin tumors : Squamous cell carcinoma, Basal cell carcinoma, Melanoma

Practical

Demonstration of Slides – The students may be demonstrated the common histopathological, hematological and cytological slides and specimens and charts and their interpretations.



## Microbiology –

### Theory –

#### 1. General Microbiology -

Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.

Normal flora of the human body.

Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections.

Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence, associated.

Physiology: Essentials of bacterial growth requirements.

Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.

Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

#### 2. Immunology -

Basic principles of immunity immunobiology : lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.

Humoral immunity and its role in immunity Cell mediated immunity and its role in immunity. Immunology of hypersensitivity, Measuring immune functions.

#### 3. Bacteriology -

To be considered under the following headings

Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports.

Staphylococci, Streptococci and Pneumococci.

Mycobacteria: Tuberculosis, M.leprae, atypical mycobacteria, Enterobacteriaceae,

Vibrios : V. cholerae and other medically important vibrios, Campylobacters and Helicobacters, Pseudomonas.

Bacillus anthracis, Sporing and non-sporing anaerobes: Clostridia, Bacteroides and Fusobacteria.



#### 4. General Virology -

General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections. Immunity and prophylaxis of viral diseases. Principles of laboratory diagnosis of viral diseases. List of commonly used antiviral agents.

#### 5. Mycology -

General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mycoses opportunistic infections including Mycotoxins, systemic mycoses. General principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples. Antifungal agents.

#### 6. Clinical/Applied Microbiology -

Streptococcal infections: Rheumatic fever and Rheumatic heart disease, Meningitis.

Tuberculosis,

Pyrexia of unknown origin, leprosy,

Sexually transmitted diseases, Poliomyelitis,

Hepatitis,

Acute-respiratory infections, Central nervous System infections, Urinary tract infections,

Pelvic inflammatory disease, Wound infection, Opportunistic infections, HIV infection,

Malaria,

Filariasis, Zoonotic diseases.

#### Practical -

1. Demonstration of Microscopes and its uses
2. Principles, uses and demonstration of common sterilization equipment
3. Demonstration of common culture media
4. Demonstration of motility by hanging drops method
5. Demonstration of Gram Stain, ZN Stain
6. Demonstration of Serological test: ELISA
7. Demonstration of Fungus

## *Fourth Semester*

### **Pharmacology –**

#### Course Description -

This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body. The student will be aware of the contribution of both drug and physiotherapy factors in the outcome of treatment.

#### 1. General Pharmacology -

Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration, Distribution of drugs, Metabolism and Excretion of drugs Pharmacokinetics, Pharmacodynamics, Factors modifying drug response, Adverse effects.

#### 2. Autonomic Nervous system -

General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System

Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.

#### 3. Cardiovascular Pharmacology -

Drugs Used in the Treatment of Heart Failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors  
Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors,  
Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators

#### Antiarrhythmic Drugs

Drugs Used in the Treatment of Vascular Disease and Tissue Ischemia : Vascular Disease,  
Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics  
Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers, Cerebral Ischemia  
Peripheral Vascular Disease.

#### 4. Neuropharmacology -

Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines

Antianxiety Drugs: Benzodiazepines, Other Anxiolytics

Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic

Antidepressants, Atypical Antidepressants, Lithium

Antipsychotic drugs

#### 5. Disorders of Movement -

Drugs used in Treatment of Parkinson's Disease

Antiepileptic Drugs

Spasticity and Skeletal Muscle Relaxants

6. Inflammatory/Immune Diseases -

Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs

Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids

Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout

Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematosus, Scleroderma, Demyelinating Disease

Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis

7. Digestion and Metabolism -

Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemics

8. Geriatrics -

Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension.

## Exercise Therapy

### Course Description

In this course, the students will learn the principles and effects of exercise as a therapeutic modality and will learn the techniques in the restoration of physical functions.

### Theory –

#### 1. Introduction to Exercise Therapy

The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment

#### 2. Methods of Testing

##### a) Functional tests

b) Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints

##### c) Tests for neuromuscular efficiency

- Electrical tests
- Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group & individual muscles : Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine.
- Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf
- Static power Test
- Dynamic power Test
- Endurance test
- Speed test

##### d) Tests for Co-ordination

##### e) Tests for sensation

##### f) Pulmonary Function tests

##### g) Measurement of Limb Length: true limb length, apparent limb length, segmental limb length

##### h) Measurement of the angle of Pelvic Inclination

#### 3. Relaxation

Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation-Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.

#### 4. Passive Movements

Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses , Techniques of giving passive movements.

#### 5. Active Movements

Definition of strength, power & work, endurance, muscle actions.

Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fiber type, motor unit, force gradation.

Causes of decreased muscle performance

Physiologic adaptation to training: Strength & Power, Endurance.

Types of active movements

Free exercise: Classification, principles, techniques, indications, contraindications, effects and uses

Active Assisted Exercise: principles, techniques, indications, contraindications, effects and uses

Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses

Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses

Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise,

Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

Specific exercise regimens

Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training

Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle Isometrics Isokinetic regimens

#### 6. Proprioceptive Neuromuscular Facilitation

Definitions & goals

Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb

Procedure: components of PNF

Techniques of facilitation

Mobility: Contract relax, Hold relax, Rhythmic initiation

Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization

Stability: Alternating isometric, rhythmic stabilization

Skill: timing for emphasis, resisted progression Endurance: slow reversals, agonist reversal

## 7. Suspension Therapy

Definition, principles, equipments & accessories, Indications & contraindications, Benefits of suspension therapy

Types of suspension therapy: axial, vertical, pendular Techniques of suspension therapy for upper limb Techniques of suspension therapy for lower limb

## 8. Functional Re-education

Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lowerlimb and Upperlimb activities.

## 9. Aerobic Exercise

Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.

## 10. Stretching

Definition of terms related to stretching; Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.

## 11. Manual Therapy & Peripheral Joint Mobilization

Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan

Biomechanical basis for mobilization, Effects of joint mobilisation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

## 12. Balance

Definition

Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output

Components of balance (sensory, musculoskeletal, biomechanical)

Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types

Balance retraining

### 13. Co-ordination Exercise

Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination, Inco-ordination

Causes for Inco-ordination, Test for co-ordination: equilibrium test, non equilibrium test

Principles of co-ordination exercise.

Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.

### 14. Posture

Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.

### 15. Walking Aids

Types: Crutches, Canes, Frames; Principles and training with walking aids

### 16. Massage

History and Classification of Massage Technique

Principles, Indications and Contraindications

Technique of Massage Manipulations

Physiological and Therapeutic Uses of Specific Manipulations

### 17. Hydrotherapy

Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipments, techniques, Effects and uses, merits and demerits

### 18. Individual and Group Exercises

Advantages and Disadvantages, Organisation of Group exercises, Recreational Activities and Sports

### 19. Introduction to Yoga

Asanas – Principles and elements;

Pranayamas – Principles, Methods and Techniques

## Practicals

The students of exercise therapy are to be trained in Practical Laboratory work for all the topics discussed in theory. The student must be able to evaluate and apply judiciously the different methods of exercise therapy techniques on the patients. They must be able to

1. Demonstrate the technique of measuring using goniometry
2. Demonstrate muscle strength using the principles and technique of MMT
3. Demonstrate the techniques for muscle strengthening based on MMT grading
4. Demonstrate the PNF techniques
5. Demonstrate exercises for training co-ordination – Frenkel's exercise
6. Demonstrate the techniques of massage manipulations
7. Demonstrate techniques for functional re-education
8. Assess and train for using walking aids
9. Demonstrate mobilization of individual joint regions
10. Demonstrate to use the technique of suspension therapy for mobilizing and strengthening joints and muscles
11. Demonstrate the techniques for muscle stretching
12. Assess and evaluate posture and gait
13. Demonstrate to apply the technique of passive movements
14. Demonstrate various techniques of Active movements
15. Demonstrate techniques of strengthening muscles using resisted exercises
16. Demonstrate techniques for measuring limb length and body circumference.

## Electrotherapy

### Course Description -

In this course the student will learn the Principles, Techniques, Effects, Indication, Contra-Indication. and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function. The objective of this course is that after 240hrs. of lectures, demonstration, practical and clinics the student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

### Theory –

#### Introductory Physics – Section 1

1. Electricity definition, types.



## 2. Static electricity.

- a. Production of electrical charges.
- b. Characteristics of charged body.
- c. Characteristics of lines of forces.
- d. Potential difference and EMG.

## 3. Current Electricity

- a. Units of Electricity, faraday, volt, ampere, coulomb, watt.
- b. Resistance in series and parallel.
- c. Ohms law and its application to DC/AC.
- d. Fuse.
- e. Shock: Micro/ Macro shocks, safety precaution and management, earthing techniques & precautions.
- f. Burns: electrical & chemical burns, prevention and management.
- g. Condensers: definition, principles, types construction, working and uses.

## 4. Magnetism: Definition, properties, electro-magnetic induction, electro- magnetic spectrum.

## 5. Valves, transformers, types, principles, construction and working.

## 6. Ionization: Principles, effects of various technique of medical ionization. [1 Hour]

## Section II – Therapeutic Electricity

### Section II A - Low frequency Currents

#### 1. Basic types of current

- a. Direct Current: types, physiological & therapeutic effects.
- b. Alternating Current

#### 2. Types of Current used in Therapeutics

##### Modified D.C

- Faradic Current
- Galvanic Current

##### Modified A.C

- Sinusoidal Current
- Diadynamic Current.

#### 3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.

4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.
5. Sinusoidal Current & Diadynamic Current in Brief.
6. HVPGS – Parameters & its uses
7. Ionization / Iontophoresis : Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, wound healing.
8. Cathodal / Anodal galvanism.
9. Micro Current & Macro Current
10. Types of Electrical Stimulators
  - NMES- Construction component.
  - Neuro muscular diagnostic stimulator- construction component.
  - Components and working Principles
11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair.
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

### ***Section II B - Electro-diagnosis***

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.
3. Nerve conduction velocity studies
4. EMG: Construction of EMG equipment.
5. Bio-feed back.

## **Section II C - Medium Frequency**

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications.
2. Russian Current
3. Rebox type Current

## **Section III - Thermo & Actinotherapy (High Frequency Currents)**

1. Electro Magnetic Spectrum.
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters.
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME.
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD. [2 Hours]
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, Commonly used drugs, Uses. Dosages of US. [8 Hours]
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication. [2 Hours]
7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel,

PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp [8 Hours]

8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density [8 Hours]

#### Section IV – Superficial heating Modalities

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.
2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications.
3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications.
4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications.
5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications.
6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications.
7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication.
8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages.

#### Practical

The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.

1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.
2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.
3. Demonstrate placement of electrodes for various electrotherapy modalities
4. Electrical stimulation for the muscles supplied by the peripheral nerves
5. Faradism under Pressure for UL and LL
6. Plotting of SD curve with chronaxie and rheobase

7. Demonstrate FG test
8. Application of Ultrasound for different regions-various methods of application
9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
  
11. Demonstrate treatment method using IFT for various regions
12. Calculation of dosage and technique of application of LASER
13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
14. Demonstrate the treatment method using whirl pool bath
15. Winding up procedure after any electrotherapy treatment method.

## **General Medicine –**

### Subject Description

This subject follows the basic science subjects to provide the knowledge about relevant aspects of general medicine. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various medical conditions.

1. Infection : Effects of Infection on the body – Pathology – source and spread of infection – vaccinations – generalized infections – rashes and infection – food poisoning and gastroenteritis – sexually transmitted diseases – HIV infections and Aids.
2. Poisoning: Clinical features – general management – common agents in poisoning – pharmaceutical agents – drugs of misuse – chemical pesticides – Envenomation.
3. Food and Nutrition: Assessment – Nutritional and Energy requirements; Deficiency diseases – clinical features and treatment; Protein – Energy Malnutrition: Clinical features and treatment; Obesity and its related disorders: Causes – Complications – benefits of weight loss – management of Obesity – diet, exercise and medications.
4. Endocrine diseases: Common presenting symptoms of Endocrine disease – common classical disease presentations, clinical features and its management; Diabetes Mellitus: Etiology and pathogenesis of diabetes – clinical manifestations of the disease – management of the disease – Complications of diabetes.
5. Diseases of the blood: Examinations of blood disorders – Clinical manifestations of blood disease; Anemia – signs and symptoms – types and management ; Hemophilia - Cause – clinical features severity of disease – management – complications due to repeated haemorrhages – complications due to therapy.
6. Diseases of the digestive system : Clinical manifestations of gastrointestinal disease – Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achlasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Infections of Alimentary Tract ; Clinical manifestations of liver diseases - Aetiology, clinical features, diagnosis, complications and treatment of the following

conditions : Viral Hepatitis, Wilson's Disease, Alpha1-antitrypsin deficiency, Tumors of the Liver, Gall stones, Cholecystitis.

7. Cardiovascular Disease : Examination of the Cardiovascular System – Investigations : ECG, Exercise Stress Testing, Radiology ; Clinical manifestations of Cardiovascular disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases and disorders of the heart : Pericarditis, Myocarditis, Endocarditis, Rheumatic Fever – resulting in valve disorders, Ischemic Heart Disease, Coronary Valve Disease, Congenital disorders of the Heart, Cardiac Arrest ; Examination and Investigations of diseases of arteries and veins ; Hypertension : Definition, causes, classification, types, assessment, investigations and management.

8. Respiratory Disease : Examination of the Respiratory System – Investigations : Chest Radiographs, Pulmonary Function Testing, Arterial Blood Gas Analysis ; Clinical manifestations of Lung disease ; Patterns of lung disease – Chronic Obstructive Lung Disease and Restrictive Lung Disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following lung diseases : Chronic Bronchitis, Emphysema, Asthma, Bronchiectasis, Cystic Fibrosis, Upper Respiratory Tract Infections, Pneumonia, Tuberculosis, Fungal Diseases, Interstitial Lung Diseases, Diseases of the pleura, diaphragm and chest wall ; Respiratory failure – Definition, types, causes, clinical features, diagnosis and management.

9. Diseases of the Skin : Examination and clinical manifestations of skin diseases ; Causes, clinical features and management of the following skin conditions : Leprosy, Psoriasis, Pigmentary Anomalies, Vasomotor disorders, Dermatitis, Coccal and Fungal Parasitic and Viral infections.

10. Pediatrics : Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ; Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child.

11. Psychiatric Disorders: Classifications, Causes, Clinical manifestations and treatment methods used in Psychiatry.

## **General Surgery –**

### Subject Description

This subject follows the basic science subjects to provide the knowledge about relevant aspects of general surgery. The student will have a general understanding of the surgical conditions the

therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the indications for surgery, etiology, clinical features and surgical methods for various conditions.

1. Fluid, Electrolyte and Acid-Base disturbances – diagnosis and management ; Nutrition in the surgical patient ; Wound healing – basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, Scars – types and treatment. Hemostasis – components, hemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion ; Surgical Infections ; General Post – Operative Complications and its management.
2. Reasons for Surgery ; Types of anaesthesia and its affects on the patient ; Types of Incisions ; Clips Ligatures and Sutures ; General Thoracic Procedures – Radiologic Diagnostic procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery.
3. Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pnuemothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions.
4. Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer.
5. Disorders of the Chest Wall, Lung and Mediastinum – Definition, Clinical features, diagnosis and choice of management for the following disorders – chest wall deformities, chest wall tumors, Spontaneous Pneumothorax, Pleural Effusion, Empyema Thoracis, Lung abscess, Bronchiectasis, Tuberculosis, Bronchogenic Carcinoma, Bronchial Adenomas, Metastatic tumors of the Lung, tracheal Stenosis, Congenital tracheomalacia, Neoplasms of the trachea, Lesions of the Mediastinum. Carcinoma of the female breast.
6. Disorders of the Heart – Definition, Clinical features, diagnosis and choice of management for the following disorders : Congenital Heart diseases – Acyanotic congenital heart disease & Cyanotic congenital heart disease : Patent Ductus Arteriosus, Coarctation of Aorta, Atrial Septal Defect, Ventricular Septal Defect, Tetralogy of Fallot, Transposition of Great Vessels ; Acquired Heart Disease – Mitral Stenosis & Insufficiency, Aortic Stenosis and Insufficiency, Ischemic Heart Disease – Coronary Artery Disease, Cardiac tumors.
7. Thoracic surgeries – Thoracotomy – Definition, Types of Incisions with emphasis to the site of insision, muscles cut and complications. Lung surgeries : Pnumonectomy, Lobectomy, segmentectomy – Indications, Physiological changes and Complications ; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung. Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extracardiac Operations, Closed Heart surgery, Open Heart surgery. Transplant Surgery – Heart, Lung and Kidney – Indications, Physiological changes and Complications.



8. Diseases of the Arteries and Veins : Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases : Arteriosclerosis, Atherosclerosis, Aneurysm, Buerger's disease, Raynaud's Disease, Thrombophlebitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins.
  
9. Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Nephrectomy, Prostatectomy.
  
10. Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps.
  
11. Womens Health : Menstrual cycle and its disorders. Hormonal disorders of females- obesity and female hormones. Cancer of the female reproductive organs-management Infections and sexually transmitted disease in female Menopause - its effects on emotions and musculoskeletal system. Malnutrition and deficiencies in females. Sterility-pathophysiology- investigations-management. Maternal physiology in pregnancy. Musculo skeletal disorders during pregnancy. Prenatal complications-investigations- management. Child birth- Stages - complications-investigations-management – Pain relief in labour - Puerperium - Post Natal care. Surgical procedures involving child birth. Incontinence – Types, Causes, Assessment and Management. Definition, Indications and Management of the following surgical procedures – Hysterosalpingography, Dilatation and Curettage, Laparoscopy, Colposcopy, Hysterectomy.
  
12. ENT: Common problems of ear, otitis media, Otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy.
  
13. Ophthalmology: Ophthalmologic surgical conditions, refraction's, conjunctivitis, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra-ocular muscles-surgical management.

## **Orthopedics & Traumatology -**

### Subject Description

This subject follows the basic science subjects to provide the knowledge about Orthopedic conditions the therapist would encounter in their practice. The objective of this course is that after completion of the lectures and discussion the student will be able to demonstrate an understanding of orthopedic conditions causing disability, list the etiology, clinical features and methods of investigations and management.

#### 1. Introduction

Introduction to orthopaedics. Clinical examination in an Orthopedic patient. Common investigative procedures. Radiological and Imaging techniques in Orthopaedics. Inflammation and repair, Soft tissue healing.

#### 2. Traumatology

Fracture: definition, types, signs and symptoms. Fracture healing. Complications of fractures. Conservative and surgical approaches. Principles of management – reduction (open/closed, immobilization etc). Subluxation/ dislocations – definition, signs and symptoms, management (conservative and operative).

#### 3. Fractures and Dislocations of Upper Limb

Fractures of Upper Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:  
Fractures of clavicle and scapula. Fractures of greater tuberosity and neck of humerus. Fracture shaft of humerus. Supracondylar fracture of humerus. Fractures of capitulum, radial head, olecranon, coronoid, and epicondyles. Side swipe injury of elbow. Both bone fractures of ulna and radius. Fracture of forearm – Monteggia, Galeazzi fracture – dislocation. Chauffeur's fracture. Colle's fracture. Smith's fracture. Scaphoid fracture. Fracture of the metacarpals. Bennett's fracture. Fracture of the phalanges. (Proximal and middle.)

Dislocations of Upper Limb - Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher's and Hippocrates maneuver), surgical management (putti plat, bankart's) etc. Recurrent dislocation of shoulder. Posterior dislocation of shoulder – mechanism of injury, clinical features and management. Posterior dislocation of elbow – mechanism of injury, clinical feature, complications & management.

#### 4. Fracture of Spine

Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications (quadriplegia); Management- immobilization (collar, cast, brace, traction); Management for stabilization, management of complication (bladder and bowel, quadriplegia). Clay shoveller's fracture. Hangman's fracture. Fracture odontoid. Fracture of atlas.

Fracture of Thoracic and Lumbar Regions - Mechanism of injury, clinical features, management—conservative and surgical of common fractures around thoracic and lumbar regions. Fracture of coccyx.

Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum.

#### 5. Fractures and Dislocations of Lower Limb

Fracture of Pelvis and Lower Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:  
Fracture of pelvis. Fracture neck of femur – classification, clinical features, complications, management - conservative and surgical. Fractures of trochanters. Fracture shaft femur—clinical features, mechanism of injury, complications, management-conservative and surgical.  
Supracondylar fracture of femur. Fractures of the condyles of femur. Fracture patella. Fractures of tibial condyles. Both bones fracture of tibia and fibula. Dupuytren's fracture Maisonneuve's fracture. Pott's fracture – mechanism of injury, management. Bimalleolar fracture Trimalleolar fracture Fracture calcaneum – mechanism of injury, complications and management. Fracture of talus. Fracture of metatarsals—stress fractures jone's fracture. Fracture of phalanges.

Dislocations of Lower Limb - mechanism of injury, clinical features, complications, management of the following dislocations of lower limb.

Anterior dislocation of hip. Posterior dislocation of hip. Central dislocation of hip. Dislocation of patella. Recurrent dislocation of patella.

6. Soft Tissue Injuries - Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis.

Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries: Meniscal injuries of knee. Cruciate injuries of knee. Medial and lateral collateral injuries of knee. Lateral ligament of ankle. Wrist sprains. Strains- quadriceps, hamstrings, calf, biceps, triceps etc. Contusions- quadriceps, gluteal, calf, deltoid etc. Tendon ruptures-Achilles, rotator cuff muscles, biceps, pectorals etc.

7. Hand Injuries - mechanism of injury, clinical features, and management of the following - Crush injuries. Flexor and extensor injuries. Burn injuries of hand.

8. Amputations - Definition, levels of amputation of both lower and upper limbs, indications, complications.

9. Traumatic Spinal Cord Injuries - Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia.

10. Deformities - clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.

Congenital Deformities - CTEV. CDH. Torticollis. Scoliosis. Flat foot. Vertical talus. Hand anomalies- syndactyly, polydactyly and ectrodactyly. Arthrogryposis multiplex congenita (amyoplasia congenita). Limb deficiencies- Amelia and Phocomelia. Klippel feil syndrome. Osteogenesis imperfecta (fragile ossium). Cervical rib.

Acquired Deformities - Acquired Torticollis. Scoliosis. Kyphosis. Lordosis. Genu varum. Genu valgum. Genu recurvatum Coxa vara. Pes cavus. Hallux rigidus. Hallux valgus. Hammer toe. Metatarsalgia.

11. Disease of Bones and Joints : Causes, Clinical features, Complications, Management- medical and surgical of the following conditions :

- Infective conditions: Osteomyelitis (Acute / chronic). Brodie's abscess. TB spine and major joints like shoulder, hip, knee, ankle, elbow etc.
- Arthritic conditions: Pyogenic arthritis. Septic arthritis. Syphilitic infection of joints.
- Bone Tumors: classification, clinical features, management - medical and surgical of the following tumors : Osteoma. Osteosarcoma, Osteochondroma. Enchondroma. Ewing's sarcoma. Giant cell tumor. Multiple myeloma. Metastatic tumors.
- Perthes disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis.
- Metabolic Bone Diseases: Rickets. Osteomalacia, Osteopenia. Osteoporosis.

12. Inflammatory and Degenerative Conditions : causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions :

Osteoarthritis. Rheumatoid arthritis. Ankylosing spondylitis Gouty arthritis. Psoriatic arthritis. Hemophilic arthritis. Still's disease (juvenile rheumatoid arthritis). Charcot's joints.

Connective Tissue Disorders- Systemic Lupus Erythematosus, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue Disease (MCTD)

13. Syndromes : Causes, Clinical features, complications, management- conservative and surgical of the following :

Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costo clavicular syndrome. Levator scapulae syndrome. Piriformis syndrome.

14. Neuromuscular Disorders : Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions : Cerebral palsy. Poliomyelitis. Spinal Dysraphism. Leprosy.

15. Cervical and Lumbar Pathology : Causes, clinical feature, patho-physiology, investigations, management-Medical and surgical for the following : Prolapsed intervertebral disc (PID), Spinal Canal Stenosis. Spondylosis (cervical and lumbar) Spondylolysis. Spondylolisthesis. Lumbago/ Lumbosacral strain. Sacralisation. Lumbarisation. Coccydynia. Hemivertebra.

16. Orthopedic Surgeries : Indications, Classification, Types, Principles of management of the following Surgeries : Arthrodesis. Arthroplasty (partial and total replacement). Osteotomy , External fixators. Spinal stabilization surgeries(Harrington's, Luque's, Steffi plating) etc , Limb re-attachments.

17. Regional Conditions: Definition, Clinical features and management of the following regional conditions

- Shoulder: Periarthritic shoulder (adhesive capsulitis). Rotator cuff tendinitis. Supraspinatus Tendinitis. Infraspinatus Tendinitis. Bicipital Tendinitis. Subacromial Bursitis.
- Elbow: Tennis Elbow. Golfer's Elbow. Olecranon Bursitis (student's elbow ). Triceps Tendinitis.
- Wrist and Hand: De Quervain's Tenosynovitis. Ganglion. Trigger Finger/ Thumb. Mallet Finger, Carpal Tunnel Syndrome, Dupuytren's Contracture.
  
- Pelvis and Hip : IT Band Syndrome. Piriformis Syndrome. Trochanteric Bursitis.
  
- Knee: Osteochondritis Dissecans. Prepatellar and Suprapatellar Bursitis. Popliteal Tendinitis. Patellar Tendinitis. Chondromalacia Patella. Plica Syndrome. Fat Pad Syndrome (Hoffa's syndrome).
- Ankle and Foot: Ankle Sprains. Plantar Fasciitis / Calcaneal Spur. Tarsal Tunnel Syndrome. Achilles Tendinitis. Metatarsalgia. Morton's Neuroma.

## Orthopedics & Sports Physiotherapy –

### Subject Description

The subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to musculoskeletal dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.

1. PT assessment for Orthopedic conditions - SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment- intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental , girth measurement, muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination-dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follow up.
2. Fractures - types, classification, signs and symptoms, complications. Fracture healing - factors affecting fracture healing. Principles of fracture management - reduction - open and closed, immobilization - sling, cast, brace, slab, traction - manual, mechanical, skin, skeletal, lumbar and Cervical traction, external fixation, functional cast bracing. PT management in complications - early and late - shock, compartment syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short and long term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period.
3. Specific fractures and dislocations : PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvis. PT assessment and management spinal fractures.
4. Selection and application of physiotherapeutic techniques, maneuver's, modalities for preventive, curative and rehabilitative means in all conditions.
5. Principles of various schools of thought in manual therapy. (Briefly Maitland and McKenzie).
6. Degenerative and Inflammatory conditions: Definition, signs and symptoms, clinical features, path physiology, radiological features, deformities, medical, surgical management. Describe the PT assessment and management and home program for the following conditions –

Osteoarthritis - emphasis mainly on knee, hip and hand, Rheumatoid Arthritis, Ankylosing spondylitis, Gout, Perthes disease, Periarthritic shoulder.

7. Infective conditions: Definition, signs and symptoms, clinical features, pathophysiology, radiological features, medical, surgical management. Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, Pyogenic arthritis, TB spine and major joints - knee and hip.
8. Define, review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program.
9. Deformities: Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions : Congenital : CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum.
10. Cerebral palsy: Definition, etiology, classification, clinical features, complications, deformities, medical and surgical management and home program with special emphasis on carrying techniques. PT management after surgical corrections.
11. Poliomyelitis: Definition, etiology, types, pathophysiology, clinical features, deformities, medical and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program.
12. Leprosy: Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively.
13. Amputations: Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management.
14. Spinal conditions: Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis, Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta.
15. Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction.
16. Osteoporosis- causes, predisposing factors, investigations and treatment.
17. Orthopedic surgeries: Pre and post operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplasty-partial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy.

18. Shoulder joint: Shoulder instabilities, TOS, RSD, Impingement syndrome - conservative and Post operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears-conservative and surgical repair. Subacromial decompression - Post operative PT management.
19. Elbow and forearm: Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management.
20. Wrist and Hand: Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.
21. Hip: Joint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - Management.
22. Knee: Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome- conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy- rehabilitation.
23. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management.
24. Introduction to Bio-Engineering; Classification of Orthoses and prostheses; Biomechanical principles of orthotic and prosthetic application; Designing of upper extremity, lower extremity and spinal orthosis, indications and check out; Designing of upper extremity and lower extremity prostheses, indications and check out; Psychological aspects of orthotic and prosthetic application; prescription and designing of footwear and modifications; Designing and construction of adaptive devices.
25. Sports Physiotherapy : Physical fitness. Stages of soft tissue healing. Treatment guidelines for soft tissue injuries- Acute, Sub acute and chronic stages. Repair of soft tissues- rupture of muscle, tendon and Ligamentous tears. Soft tissue injuries- prevention and rehabilitation of, Lateral ligament sprain of ankle. Rotator cuff injuries. Collateral and Cruciate injuries of knee. Meniscal injuries of knee. Supraspinatus and Bicipital tendonitis . Pre patellar and Subacromial bursitis. Tennis and Golfer's elbow. Hamstring strains, Quadriceps contusion, TA rupture. Dequervain's tenosynovitis. Trigger and Mallet finger. Plantar fasciitis. Wrist sprains.
26. Applied Yoga in orthopedic conditions.

**Practical** - Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions
2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.



**Cardio-Respiratory & General Physiotherapy –**

Subject Description

The subject is designed to provide knowledge in assessing and planning physiotherapy interventions for various General, Medical and Surgical conditions. The student must be able to reassess the patient as necessary, to monitor the patient in regard to treatment, to monitor the patient's vital signs, and to provide appropriate interventions to the patient.

**Theory -**

1. Anatomical and Physiological differences between the Adult and Pediatric lung.
2. Bedside assessment of the patient-Adult & Pediatric.
3. Investigations and tests – Exercise tolerance Testing – Cardiac & Pulmonary, Radiographs, PFT, ABG, ECG, Hematological and Biochemical Tests.
4. Physiotherapy techniques to increase lung volume – controlled mobilization, positioning, breathing exercises, Neurophysiological Facilitation of Respiration, Mechanical aids - Incentive Spirometry, CPAP, IPPB.
5. Physiotherapy techniques to decrease the work of breathing – Measures to optimize the balance between energy supply and demand, positioning, Breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP.
6. Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercises, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning.
7. Drug therapy – Drugs to prevent and treat inflammation, Drugs to treat Bronchospasm, Drugs to treat Breathlessness, Drugs to help sputum clearance, Drugs to inhibit coughing, Drugs to improve ventilation, Drugs to reduce pulmonary hypertension, Drug delivery doses, Inhalers and Nebulisers.
8. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars-U.V.R and other electro therapeutics for healing of wounds, prevention of Hypergranulated Scars Keoloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues.
9. Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhidrosis. Massage maneuvers for cosmetic

purpose of skin; use of specific oil as medium; Care of anesthetic hand and foot; Evaluation, planning and management of leprosy-prescription, fitting and training with prosthetic and orthotic devices.

10. Neonatal and Pediatric Physiotherapy – Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit.
11. Physiotherapy in Obstructive lung conditions.
12. Physiotherapy in Restrictive lung conditions.
13. Management of breathlessness.
14. Pulmonary Rehabilitation.
15. Physiotherapy following Lung surgeries
16. Respiratory failure – Oxygen Therapy and Mechanical Ventilation.
17. Introduction to ICU : ICU monitoring –Apparatus, Airways and Tubes used in the ICU - Physiotherapy in the ICU – Common conditions in the ICU – Tetanus, Head Injury, Lung Disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock; Dealing with an Emergency Situation in the ICU.
18. Burns management - Role of physiotherapy in the management of burns, post grafted cases-Mobilization and Musculo-skeletal restorative exercises following burns.
19. Physiotherapy management following cardiac surgeries.
20. Cardiac Rehabilitation.
21. Physiotherapy management following PVD.
22. Abdominal Surgeries - Management of Pulmonary Restorative Dysfunction following Surgical procedures on Abdomen and Thorax.
23. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes.
24. Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases.

25. Home program and education of family members in patient care.
26. Physiotherapy in Obstetrics – Antenatal Care, Antenatal Education, Postnatal Care. Electrotherapy and Exercise Therapy measures for the re-education of Ano-Urethral sphincters.
27. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity.
28. Health Fitness and Promotion : Fitness Evaluation, Analysis of Body composition, Evaluation and prescription of Exercise, Factors affecting exercise Performance, Exercise Prescription for Specific groups : Elderly, Women and Children.
29. Applied Yoga in Cardio-respiratory conditions.

**Practical:**

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions
2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

**Neurology & Neurosurgery –**

Subject Description

This subject follows the basic science subjects to provide the knowledge about relevant aspects of neurology & neurosurgery. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various neurological conditions.

1. Disorders of function in the context of Pathophysiology, Anatomy in Neurology and Cortical Mapping.
2. Classification of neurological involvement depending on level of lesion.
3. Neurological assessment: Principles of clinical diagnosis, higher mental function, assessment of brain & spinal cord function, evaluation of cranial nerves and evaluation of autonomic nervous system.

4. Investigations: principles, methods, views, normal/abnormal values/features, types of following investigative procedures- skull x-ray, CT, MRI, evoked potentials, lumbar puncture, CSF examination, EMG, NCV.
5. Neuro-ophthalmology: Assessment of visual function – acuity, field, colour vision, Pupillary reflex, accommodation reflex, abnormalities of optic disc, disorders of optic nerve, tract, radiation, occipital pole, disorders of higher visual processing, disorders of pupil, disorders of eye movements, central disorders of eye movement.
6. Deafness, vertigo, and imbalance: Physiology of hearing, disorders of hearing, examination & investigations of hearing, tests of vestibular function, vertigo, peripheral vestibular disorders, central vestibular vertigo.
7. Lower cranial nerve paralysis – Etiology, clinical features, investigations, and management of following disorders - lesions in trigeminal nerve, trigeminal neuralgia, trigeminal sensory neuropathy, lesions in facial nerve, facial palsy, bell's palsy, hemi facial spasm, Glossopharangeal neuralgia, lesions of Vagus nerve, lesions of spinal accessory nerve, lesions of hypoglossal nerve. Dysphagia – swallowing mechanisms, causes of dysphagia, symptoms, examination, and management of dysphagia.
8. Cerebro-vascular diseases: Define stroke, TIA, RIA, stroke in evolution, multi infarct dementia and Lacunar infarct. Classification of stroke – Ischemic, hemorrhagic, venous infarcts. Risk factors, cause of ischemic stroke, causes of hemorrhagic stroke. Classification of hemorrhagic stroke, classification of stroke based on symptoms, stroke syndrome, investigations, differential diagnosis, medical and surgical management.
9. Head injury: Etiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications.
10. Higher cortical, neuro psychological and neurobehavioral disorders: Causes of blackouts, physiological nature of Epilepsy, classification, clinical features, investigations, medical& surgical management of following disorders – Non-epileptic attacks of childhood, Epilepsy in childhood, Seizures, and Epilepsy syndromes in adult. Classification and clinical features of Dyssomnias, Parasomnias, Dementia, Obsessive-compulsive disorders. Neural basis of consciousness, causes & investigations of Coma, criteria for diagnosis of Brain death. Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Perceptual disorders and Speech disorders.
11. Movement disorders: Definition, etiology, risk factors, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson's disease, Dystonia, Chorea, Ballism, Athetosis, Tics, Myoclonus and Wilson's disease.

12. Cerebellar and coordination disorders: Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich's ataxia, Ataxia telangiectasia, Metabolic ataxia, Hereditary cerebellar ataxia, Tabes dorsalis and Syphilis.
13. Spinal cord disorders: Functions of tracts, definition, etiology, risk factors, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Spinal cord injury, Compression by IVD prolapse, Spinal epidural abscess, Transverse myelitis, Viral myelitis, Syringomyelia, Spina bifida, Sub acute combined degeneration of the cord, Hereditary spastic paraplegia, Radiation myelopathy, Progressive encephalomyelitis, Conus medullaris syndrome, Bladder & bowel dysfunction, and Sarcoidosis.
14. Brain tumors and spinal tumors: Classification, clinical features, investigations, medical and surgical management.
15. Infections of brain and spinal cord: Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Meningitis, Encephalitis, Poliomyelitis and Post-polio syndrome. Complications of systemic infections on nervous system – Septic encephalopathy, AIDS, Rheumatic fever, Brucellosis, Tetanus, and Pertussis.
16. Motor neuron diseases: - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications of following disorders - Amyotrophic lateral sclerosis, Spinal muscular atrophy, Hereditary bulbar palsy, Neuromyotonia and Post-irradiation lumbosacral polyradiculopathy.
17. Multiple sclerosis - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications.
18. Disorders of neuromuscular junction – Etiology, classification, signs & symptoms, investigations, management, of following disorders Myasthenia gravis, Eaton-Lambert syndrome, and Botulism.
19. Muscle diseases: Classification, investigations, imaging methods, Muscle biopsy, management of muscle diseases, genetic counselling. Classification, etiology, signs & symptoms of following disorders – Muscular dystrophy, Myotonic dystrophy, myopathy, Non-dystrophic myotonia.
20. Polyneuropathy – Classification of Polyneuropathies, Hereditary motor sensory neuropathy, Hereditary sensory and Autonomic neuropathies, Amyloid neuropathy, Acute idiopathic Polyneuropathies. Guillain-Barre syndrome – Causes, clinical features, management of GBS, Chronic Idiopathic Polyneuropathies, diagnosis of polyneuropathy, nerve biopsy.

21. Focal peripheral neuropathy: Clinical diagnosis of focal neuropathy, neurotmesis, Axonotmesis, Neuropraxia. Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – RSD, Nerve tumors, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & Intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, Sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, Pudental nerve palsy.
22. Paediatric neurology: Neural development, Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders - Cerebral palsy, Hydrocephalus, Arnold-chiari malformation, Basilar impression, Klippel-Feil syndrome, Achondroplasia, Cerebral malformations, Autism, Dandy walker syndrome and Down's syndrome.
23. Toxic, metabolic and environmental disorders: Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – Encephalopathy, Alcohol toxicity, Recreational drug abuse, Toxic gases & Asphyxia, Therapeutic & diagnostic agent toxicity, Metal toxicity, Pesticide poisoning, Environmental & physical insults, Plant & Fungal poisoning, Animal poisons, & Complications of organ transplantation.
24. Introduction, Indications and Complications of following Neuro surgeries: Craniotomy, Cranioplasty, Stereotactic surgery, Deep brain stimulation, Burr-hole, Shunting, Laminectomy, Hemilaminectomy, Rhizotomy, Microvascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery - Thalamotomy and Pallidotomy, Coiling of aneurysm, Clipping of aneurysm, and Neural implantation.

## **Neuro-Physiotherapy –**

### Subject Description

The subject serves to integrate the knowledge gained by the students in neurology and neurosurgery with skills to apply these in clinical situations of dysfunction and neurological pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to neurological dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore neurological function.

1. Neurological Assessment: Required materials for examination, Chief complaints, History taking – Present, Past, medical, familial, personal histories, Observation, Palpation, Higher mental function – Consciousness, Orientation, Wakefulness, memory, Speech, Reading, Language, Writing, Calculations, Perception, Left right confusion, Reasoning, and Judgment, Motor Examination – Muscle power, Muscle tone, Spasticity, Flaccidity, Reflexes – Developmental reflexes, deep tendon reflexes, Superficial reflexes, Sensory examination – Superficial, Deep and Cortical sensations, Special tests – Romberg’s, Kernig’s sign, Brudzinksi sign, Tinels’s sign, Slum test, Lehermitte’s sign, Bells Phenomenon, Gower’s sign, Sun set sign, Battle’s sign, Glabellar tap sign, etc, Balance examination, coordination examination, Gait analysis – Kinetics & Kinematics (Quantitative & Qualitative analysis), Functional Analysis, Assessment tools & Scales – Modified Ashworth scale, Berg balance scale, FIM, Barthel index, Glasgow coma scale, Mini mental state examination, Rancho Los Amigos Scale for Head injury, APGAR score, ASIA scale, Reflex Grading. Differential diagnosis.
2. Neuro physiological Techniques – Concepts, Principles, Techniques, Effects of following Neurophysiological techniques: NDT, PNF, Vojta therapy, Rood’s Sensory motor Approach, Sensory Integration Approach, Brunnstorm movement therapy, Motor relearning program, Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy.
3. Paediatric Neurology: Paediatric Examination, Developmental milestones, developmental reflexes, Neuro developmental screening tests. Evaluation & Management - History, Observation, Palpation, Milestone Examination, developmental reflex Examination, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches & Modalities in Risk babies, Minimum brain damage, Developmental disorders,

Cerebral palsy, Autism, Down's Syndrome, Hydrocephalus, Chorea, Spina bifida, and syringomyelia.

4. Evaluation and Management of Brain and Spinal Cord Disorders : History, Observation, Palpation, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Cerebro vascular Accident, Meningitis, Encephalitis, Head Injury, Brain Tumors, Perceptual disorders, Amyotrophic lateral sclerosis, and Multiple sclerosis.
5. Evaluation and Management of Cerebellar, Spinal Cord and Muscle Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Ataxia, Sensory Ataxia, Parkinson's disease, Muscular dystrophy (DMD), Myasthenia Gravis, Eaton-Lambert Syndrome, Spinal tumors, Spinal cord injury, Transverse myelitis, Bladder & Bowel Dysfunction, Spinal muscular atrophies, Poliomyelitis, Post Polio Syndrome.
6. Evaluation and Management of Peripheral Nerve Injuries and Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Hereditary motor sensory neuropathy, Guillain-Barre syndrome, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, and Pudental nerve palsy.
7. Assessment and management of Neurological gaits: Quantitative and Qualitative (Kinetic & Kinematics) analysis, List of Problems, short & Long Term goals, Management of following Neurological Gaits - Hemiplegic gait, Parkinson gait, High step gait, Hyperkinetic gait, Hypokinetic gait, Waddling gait, Scissoring gait, Spastic gait, Choreaform Gait, Diplegic Gait, and Myopathic Gait.
8. Pre and Post surgical assessment and treatment following conditions - Spinal disc herniation, Spinal stenosis, Spinal cord trauma, Head trauma, Brain tumors, Tumors of the spine, Spinal cord and peripheral nerves, Cerebral aneurysms, Subarachnoid hemorrhages, epilepsy, Parkinson's disease, Chorea, Hemiballism, Psychiatric disorders, Malformations of the nervous system, Carotid artery stenosis , Arteriovenous malformations, and Spina bifida.



9. Applied Yoga in Neurological conditions.

Practical: Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions
2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

### **Community Medicine –**

#### Subject Description

This subject follows the basic science subjects to provide the knowledge about conditions the therapist would encounter in their practice in the community. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to demonstrate an understanding of various aspects of health and disease list the methods of health administration, health education and disease preventive measures.

1. Health and Disease: Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, The role of socio-economic and cultural environment in health and disease.
2. Epidemiology, definition and scope. Principles of Epidemiology and Epidemiological methods: Components and Aims, Basic measurements, Methods, Uses of Epidemiology, Infectious disease epidemiology, Dynamics and modes of disease transmission, Host defenses and Immunizing agents, Hazards of Immunization, Disease prevention and control, Disinfection. Screening for Disease: Concept of screening, Aims and Objectives, Uses and types of screening.
3. Epidemiology of communicable disease: Respiratory infections, Intestinal infections, Arthropod-borne infections, Zoonoses, Surface infections, Hospital acquired infections  
Epidemiology of chronic non-communicable diseases and conditions: Cardio vascular diseases: Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, Obesity, Blindness, Accidents and Injuries.
4. Public health administration- an overview of the health administration set up at Central and state levels. The national health programme-highlighting the role of social, economic and cultural factors in the implementation of the national programmes. Health problems of vulnerable groups- pregnant and lactating women, infants and pre-school children, occupational groups.
5. Health programmes in India: Vector borne disease control programme, National leprosy eradication programme, National tuberculosis programme, National AIDS control programme, National programme for control of blindness, Iodine deficiency disorders (IDD) programme,

Universal Immunisation programme, Reproductive and child health programme, National cancer control programme, National mental health programme. National diabetes control programme, National family welfare programme, National sanitation and water supply programme, Minimum needs programme.

6. Demography and Family Planning: Demographic cycle, Fertility, Family planning-objectives of national family planning programme and family planning methods, A general idea of advantage and disadvantages of the methods.
7. Preventive Medicine in Obstetrics, Paediatrics and Geriatrics: MCH problems, Antenatal, Intranatal and post natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare programmes for women and children, Preventive medicine and geriatrics.
8. Nutrition and Health: Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition programmes.
9. Environment and Health: Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, Medical entomology.
10. Hospital waste management: Sources of hospital waste, Health hazards, Waste management.
11. Disaster Management: Natural and man made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness.
12. Occupational Health: Occupational environment, Occupational hazards, Occupational diseases, Prevention of occupational diseases. Social security and other measures for the protection from occupational hazard accidents and diseases. Details of compensation acts.
13. Mental Health: Characteristics of a mentally healthy person, Types of mental illness, Causes of mental ill health, Prevention, Mental health services, Alcohol and drug dependence. Emphasis on community aspects of mental health. Role of Physiotherapist in mental health problems such as mental retardation.
14. Health Education: Concepts, aims and objectives, Approaches to health education, Models of health education, Contents of health education, Principles of health education, Practice of health education.

### **Community Based Rehabilitation –**

#### Subject Description

The subject serves to integrate the knowledge gained by the students in community medicine and other areas with skills to apply these in clinical situations of health and disease and its prevention. The objective of the course is that after the specified hours of lectures and demonstrations the

student will be able to identify rehabilitation methods to prevent disabilities and dysfunctions due to various disease conditions and plan and set treatment goals and apply the skills gained in rehabilitating and restoring functions.

1. Rehabilitation: Definition, Types.
2. Community: Definition of Community, Multiplicity of Communities, The Community based approach, Community Entry strategies, CBR and Community development, Community initiated versus community oriented programme, Community participation and mobilization.
3. Introduction to Community Based Rehabilitation: Definition, Historical review, Concept of CBR, Need for CBR, Difference between Institution based and Community based Rehabilitation, Objectives of CBR, Scope of CBR, Members of CBR team, Models of CBR.
4. Principles of Community based Rehabilitation. W.H.O.'s policies-about rural health care-concept of primary /tertiary health centers-district hospitals etc-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 , Agencies involved in rehabilitation of physical handicapped - Legislation for physically handicapped. Concept of multipurpose health worker. Role of family members in the rehabilitation of a physically handicapped.
5. Planning and management of CBR Programmes, CBR Programmed planning and management, Ownership and Governance, Decentralization and CBR, Management of CBR, Programmed sustainability, Communication and Coordination, Community participation, mobilization and awareness, CBR programme influence on promoting and developing public policies.
6. Disability: Definition of Impairment, Handicap and Disability, Difference between impairment, handicap and disability, Causes of disability, Types of disability, Prevention of disability, Disability in developed countries, Disability in developing countries.Disability Surveys: Demography. Screening: Early detection of disabilities and developmental disorders, Prevention of disabilities- Types and levels.
7. Disability Evaluation: Introduction, What, Why and How to evaluate, Quantitative versus Qualitative data, Uses of evaluation findings.
8. Role of Government in CBR: Laws, Policies, Programmes, Human Rights Policy, Present rehabilitation services, Legal aspects of rehabilitation.
9. Role of Social work in CBR: Definition of social work, Methods of social work, History of social work, Role of social worker in rehabilitation.
10. Role of voluntary Organizations in CBR: Charitable Organizations, Voluntary health agencies – National level and International NGO's, Multilateral and Bilateral agencies. International Health Organizations: WHO, UNICEF, UNDP, UNFPA, FAO, ILO, World bank, USAID, SIDA, DANIDA, Rockfeller, Ford foundation, CARE, RED CROSS.

11. National District Level Rehabilitation Programme: Primary rehabilitation unit, Regional training center, District rehabilitation center, Primary Health center, Village rehabilitation worker, Anganwadi worker
12. Role of Physiotherapy in CBR: Screening for disabilities, Prescribing exercise programme, Prescribing and devising low cost locally available assistive aids, Modifications physical and architectural barriers for disabled, Disability prevention, Strategies to improve ADL, Rehabilitation programmes for various neuromusculoskeletal and cardiothoracic disabilities.
13. Screening and rehabilitation of paediatric disorders in the community: Early detection of high risk babies, Maternal nutrition and education, Rehabilitation of Cerebral Palsy, Polio, Downs Syndrome, Muscular Dystrophies etc., Prevention and rehabilitation of mental retardation and Behavioural disorders, Immunization programmes, Early intervention in high risk babies, Genetic counselling.
14. Extension services and mobile units: Introduction, Need, Camp approach.
15. Vocational training in rehabilitation: Introduction, Need, Vocational evaluation, Vocational rehabilitation services.
16. Geriatrics - Physiology of Aging /degenerative changes-Musculoskeletal /Neuromotor /cardio – respiratory-/Metabolic, Endocrine, Cognitive, Immune systems. Role of Physio Therapy in Hospital based care, Half-way homes, Residential homes, Meals on wheels etc. Home for the aged, Institution based Geriatric Rehabilitation. Few conditions:- Alzheimer's disease, Dementia, Parkinson's Disease, Incontinence, Iatrogenic drug reactions, etc. Ethics of Geriatric Rehabilitation.
17. Industrial Health & Ergonomics [10 hours] - Occupational Hazards in the industrial area -- Accidents due to
  1. Physical agents-e.g.-Heat/cold, light, noise, Vibration, U.V. radiation, Ionizing radiation,
  2. Chemical agents-Inhalation, local action, ingestion,
  3. Mechanical hazards-overuse/fatigue injuries due to ergonomic alteration & ergonomic evaluation of work place-mechanical stresses per hierarchy –
    - i. sedentary table work –executives, clerk,
    - ii. inappropriate seating arrangement- vehicle drivers
    - iii. constant standing- watchman- Defense forces, surgeons,
    - iv. Over-exertion in laborers,-common accidents –Role of P.T.-Stress management,
  4. Psychological hazards- e.g.-executives, monotonicity & dissatisfaction in job, anxiety of work completion with quality, Role of P.T. in Industrial setup & Stress management-relaxation modes.

## 5. Biological Hazards

### **Practical:**

This will consist of Field visits to urban and rural PHC's., Visits to regional rehabilitation training center, Regular mobile camps, Disability surveys in villages, Disability screening, Demonstration of Evaluation and Physiotherapy prescription techniques for musculoskeletal, neuromuscular, cardio-respiratory, paediatric, gynecological and geriatric problems in community, Demonstration of evaluation and prescription techniques for ambulatory and assistive devices, Fabrication of low cost assistive devices with locally available materials.

## *Ninth Semester*

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning, intermediate, and advanced procedures in both areas. Students will participate in advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 8 hours per day.

## Skills based outcomes and monitorable indicators for Physiotherapist

### Competency statements

1. Demonstrate knowledge to interpret and evaluate a treatment protocol.
2. Communicates relevant information to other members and completes accurate documentation
3. Demonstrates knowledge of accurate position and ability to immobilize all patients as per instructions
4. Demonstrates ability to prepare the physiotherapy equipment.
5. Conducts the simulation and mark-up procedure for all standard treatment techniques
6. Demonstrates ability to carry out the daily organization of the treatment unit
7. Practices accurate treatment documentation
8. Demonstrates ability to interpret, apply and disseminate information as a member of the physiotherapy team
9. Demonstrates professional behavior
10. Demonstrates a sensitive and caring attitude towards the patient
11. Demonstrates ability to accurately and consistently set-up and treat the patient
12. Demonstrates ability to prepare the patient for their specific physiotherapy treatment.
13. Evaluates and monitors the patient performance status
14. Monitors, manages and records the patient's progress/ status throughout the course of treatment
15. Advises patient on appropriate exercise, rest and other symptoms.
16. Demonstrates skill to support and care for the patient during physio rehab procedure.
17. Demonstrates ability to carry out treatment verification.
18. Demonstrates ability to carry out corrective actions as per instructions.
19. Implements health and safety procedures
20. Demonstrates ability to interpret, apply and disseminate information as a member of the physiotherapy team
21. Demonstrates knowledge and skills to carry out the daily/weekly Quality Control (QC) checks.

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
1	Be able to interpret and evaluate a treatment protocol	Knowledge of patient's condition and treatment.	Perform therapeutic and exercise techniques as per the treatment protocol.	200
		Knowledge regarding treatment procedure and equipment to be used in the specific treatment.	Perform required task as per expected within the interdisciplinary team.	
2	Be able to conduct the patient evaluation and assessment as per condition.	Quantify the practical problems associated with physiotherapy equipment.	Create and evaluate treatment plans after consultation with the multidisciplinary team and as per patient condition.	200
		Be familiar with different assessment techniques and protocols.	Perform patient assessment technique to know the condition and to gather information about his/her ailment.	
		Analyze the information to prepare the patient for treatment according to departmental protocols		
		Know the protocols used in the department.	Perform assessment procedure safely and accurately	
			Implement correct QC, procedures.	
3	Understand the objective of treatment planning in the physiotherapy process and to operate the treatment planning system (TPS)	Be familiar with the TPS used	Prepare suitable plans/treatments for standard techniques	200
		Know the protocols used in the department	Interpret and understand all planning techniques for the clinical site/s	

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
4	Be able to transfer all relevant information and complete accurate documentation	Recognize the importance of accurate transfer of information to allow for accurate treatment set-up according to the treatment plan and prescription	Identify the most appropriate device for the individual patient within the context of the protocol	100
		Know what should be included	Apply the necessary precautions in production	
		Know to whom or where the documentation and information should be sent	Implement correct QC, storage and handling procedures for the equipment.	
		Be aware of the ethical issues relating to documentation		
5	Be able to prepare the patient (physically and emotionally) and as well as the equipment to be used as per treatment plan	Know the patient mental and physical condition	Operate the most appropriate equipment for the individual patient within the context of the protocol.	100
		Know how to use the physiotherapy equipments	Apply the necessary precautions during treatment.	
		Recognize the associated health and safety issues	Implement correct QC.	
6	Be able to carry out the daily organization of the treatment unit	Recognize the importance of team interactions	Participate in the organization of the daily work schedule to maximize efficiency	50
		Explain the principles of effective communication	Inform the patient about the procedure	
		Review the individual patient requirements		
7	Be able to accurately explain the treatment plans and able to demonstrate and teach self exercises	Discuss the importance of exercises and how it should be carried out	Interpret the treatment plan and use the equipment accordingly	100
		Be familiar with the treatment plans for all patients on the treatment unit	Teach patients the exercise procedures and methods of doing them.	



Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
		Identify the co-morbidities that will impact on patient condition	Evaluate the patient's general condition prior to commencing the exercises.	
		Recognize if any adverse reactions is occurring	Analyze the information and integrate to define the optimal patient condition.	
8	Be able to accurately and consistently treat the patient and do the follow ups as per patient progression.	Able to interpret the patient's reports and condition.	Interpret the treatment plan and modifications in the plan (if any) and set-up the patient accordingly	200
		Discuss the current patient condition among interdisciplinary team.	Work in a team to check setup and treatment parameters and to avoid random errors	
		Be familiar with the treatment plans and techniques for all patients on the treatment unit.	Monitor the patient during each treatment	
9	Be able to explain the benefit of the treatment to patient's family members.	Be familiar with the treatment plan	Inform and educate the patient as to the treatment procedures and their family.	30
		Know how to make good rapport with the patient.	Identify and explain the possible side effects to each patient and their family.	
		Have good communication skills.	Assess the physical and psychological status of the patient and explain it to family members.	
10	Be able to complete accurate treatment documentation	Recognize the importance of accurate documentation	Complete the treatment documentation accurately	50
		Know what should be included	Ensure all ethical requirements have been met	
		Be aware of the ethical issues relating to treatment documentation		

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
11	Be able to evaluate the patient performance status	Identify the systems used for evaluation of performance status	Assess the patient performance status in view of their diagnosis and comorbidities according to institutional guidelines	50
12	Be able to monitor, manage and record the patient's side effects throughout the course of treatment	Identify the side effects associated with the individual treatment	Assess the daily physical and psychological status of the patient prior to treatment	50
		Define the effects of concomitant treatment	Record all side effects and any intervention recommended	
		Be familiar with the follow up procedures		
		List support groups that might benefit patients		
13	Advise patient on appropriate nutrition, exercises, rest, relaxation other issues	Explain the impact of exercise and nutritional status of patient during treatment	Assess the patient's status after exercise and proper diet.	50
14	Be able to support and care for the patient during a rehabilitation procedure	Be familiar with the psychological status of the patient	Inform and educate the patient as to the treatment procedure	50
		Knowledge of few counselling procedures.	Identify and explain the possible side effects to each patient	
		Know what patient care is relevant for the procedure	Assess the physical and psychological status of the patient	
15	Be able to carry out the necessary data transfer checks	Define and explain the data that must be transferred	Check and verify all treatment parameters	50
			Confirm approval and signatures	

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
16	Be able to check and monitor the treatment delivered	Sound knowledge about decided/ prescribed treatment for the individual patients.	Carry out random checks to identify loopholes (if any).	50
			Evaluate results and take corrective action as per protocol	
17	Be able to implement health and safety procedures	Explain the health and safety issues for patients and staff	Assess the safety features to ensure they are in place and adhered to.	50
18	Be able to interpret, apply and disseminate information as a member of the physiotherapy team	Define and explain the data that must be disseminated	Identify the appropriate personnel to whom specific information should be disseminated	50
			Communicate the correct, relevant and appropriate information	
19	Be able to demonstrate professional behaviour	Explain the legal and ethical guidelines related to the profession	Practice in accordance with legislation regulations and ethical guidelines	200
		Be aware of your own competency levels	Promote collaborative practice	
		Identify the elements that reflect professional appearance and manner		
20	Be able to demonstrate a sensitive and caring attitude to patients	Explain the components of good communication	Self-awareness of their own personality traits	50
		Describe the main personality types	Analyze how the differences in personality influence approach	
		Be aware of the patient' gender, age, cultural background, educational level and social situation		
21	Be able to carry out the daily/weekly Quality Control (QC) checks	Explain Quality Management System (QMS), Quality Assurance (QA) and Quality Control (QC)	Perform the daily/weekly/monthly QC procedures	50
22	Be able to review the	Define search terms for	Identify the appropriate	30

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
	literature	specific treatment sites	literature in the area of interest	
23	Be able to suggest implementation of research findings	Identify relevant sources of Research	Evaluate research with respect to current departmental practice	10
24	Be able to suggest/initiate topics for physiotherapy research	Identify literature to support research proposal	Review the literature in the area	10
		Define the necessary steps in preparing and carrying out research	Formulate a research question	

**Total Hours- 1980**

## 4.3 Master in Physiotherapy

## Introduction:

**Learning Objectives:** At the completion of this course, the student should be -

1. Able to execute all routine physiotherapeutic procedures.
2. Able to be a prominent member of the interdisciplinary physiotherapy team and treat all the conditions which need physiotherapeutic procedures.
3. Able to provide adequate knowledge about the treatment procedures and its benefit.
4. Able to transfer knowledge and skills to students as well young professionals.
5. Able to undertake independent research in the field of physiotherapy.

**Expectation from the future graduate in the providing patient care.**

1. The coursework is designed to train students to work in conjunction with physiotherapy team including orthopaedician, neurologist, cardiologist, any other medical physicists and other members, in the application of decided treatment protocol as per patient condition.
2. Course work includes exercise physiology, principles of physiotherapy practice, electrophysiology and electives (during 2<sup>nd</sup> year of MPT). The student will be skilled in treatment planning, management, administration of physiotherapy treatment and provision of patient support.
3. The student will also perform independent research within the department and help the department and the team for treatment planning of the patient.
4. Employment opportunities can be found in hospitals in both private and public sectors as well as in independent physiotherapy clinics and as well as teaching institutes.
5. PT post-graduate is encouraged to pursue further qualification to attain senior position in the professional field, also to keep abreast with the advance and new technology, the professional should opt for continuous professional education credits offered by national and international institutes.

## Eligibility for admission:

**Selection procedure:**

1. He/she has passed the BSc in Physiotherapy / Bachelor of Physiotherapy or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%).
2. He/she has to furnish at the time of submission of application form, a certificate of physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
3. Admission to M.Sc. Physiotherapy or Masters of Physiotherapy course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

- a. Entrance test, to be conducted by the university as per the syllabus.
- b. Successful candidates on the basis of written test will be called for the interview & shall have face an interview board. The interview board will include the Head of the Department of Physiotherapy (Chairman of the Board) along with the Senior Medical Physicist apart from other nominees, whose recommendations shall be final for the selection of the students.
- c. During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.
- d. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.
- e. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

### **Duration of the course**

Duration of the course: 4 semesters/ 2 Years

Total hours – 3840 (including 2740 hours of practical)

### **Medium of instruction:**

English shall be the medium of instruction for all the subjects of study and for examination of the course.

### **Attendance:**

A candidate will be permitted to appear for the University Examination for any semester if he / she secure not less than 75% of attendance in the number of instructional days/ practical at industry during the calendar year, failing which he / she should complete the number of days/hours and undergo the next semester/final examination conducted by the university.

### **Assessment:**

The examination to the first/second year shall be open to a student who:

Has remained on the rolls of the course concerned for full on academic year preceding the examination and having attendant not less than 75% of the full course of lectures and 80% practical separately held for the purpose in each year.

## Curriculum Outline

### First Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
MPT-001	Principles of Physiotherapy Practice	60	80	140
MPT-002	Research Methodology and Bio Statistics	60	80	140
MPT-003	Biomechanics	100	200	300
	Residency – part I		100	100
<b>TOTAL</b>		220	460	680

### Second Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
MPT-004	Exercise Physiology	80	100	180
MPT-005	Electrophysiology	80	100	180
MPT-006	Physical and Functional Diagnosis	60	80	140
MPT-007	Physiotherapeutics	60	80	140
	Residency – part II		120	120
<b>TOTAL</b>		280	480	760

**Elective Subjects for Third and Fourth Semester (Only one Subject to be Chosen by the Students/ Candidates).**

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
MPT- 008	Musculoskeletal Disorders and Sports	600	800	1400
MPT-009	Neurological and Psychosomatic Disorders	600	800	1400
MPT-010	Cardio-Respiratory Disorders	600	800	1400
MPT-011	Community Rehabilitation	600	800	1400
MPT -012	Pediatrics	600	800	1400
	Residency – part III + IV (Combined for both semester)		1000	1000
<b>TOTAL for each electives</b>		600	1800	2400

***Principles of Physiotherapy Practice -***

1. Development of Physiotherapy Profession
2. Ethical issues in practice of physiotherapy-Clinical, Research and Academics. Administration, legislation, rules and regulations governing physiotherapy practice- National & International (WCPT and IAP). Scope of Physiotherapy in Hospital, Community & Industry.
3. History taking, assessment, tests, Patient communication, documentation of findings, treatment organization and planning/execution for intervention.
4. Documentation of rehabilitation assessment and management using International Classification of Functioning Disability and Health (ICF)
5. Standardized tests and scales used in various types of cases for assessment and interpretation in Physiotherapy practice.

***Research Methodology and Biostatistics –***

1. Introduction to biostatistics and research methodology.
2. Basic probability and sampling distributions.
3. Processing and analysis of data.
4. Tests of Analysis of variance & co-variance.
5. Significance based on parametric and non-parametric tests
6. Research process and criteria of good research
7. Sampling and Sample size determination.
8. Various epidemiological study designs.
9. Validity and reliability evaluation.
10. Format of scientific documents. (structure of protocols, formats reporting in scientific journals, systematic reviews and meta analysis).

***Biomechanics –***

1. Biomechanics of Tissues and structures of the musculoskeletal system.
2. Normal and applied Biomechanics of Spine, Upper extremity and Lower extremity.
3. Biomechanics of posture.
4. Biomechanics of respiration, circulation, hand function and gait.
5. Methods of kinetics and kinematics investigation



6. Patient Positioning, Body Mechanics and Transfer Techniques
7. Ergonomic Approach to lifting and handling, workspace and Environment

#### Residency part –I

In the residency the professional is expected to work and contribute in the physiotherapy unit.

### *Second Semester*

#### **Exercise Physiology**

1. Sources of Energy, Energy Transfer and Energy Expenditure at rest and various physical activities.
2. Physiology of Movement
3. Responses and Adaptations of various systems to Exercise and training.
4. Environmental influence on Performance.
5. Special aids to performance and conditioning.
6. Body consumption, nutrition and caloric balance.
7. Considerations of age and sex in exercise and training.
8. Exercise prescription for health and fitness with special emphasis to cardiovascular disease, Obesity and Diabetes.
9. Fatigue assessment and scientific organization of work-rest regimes to control fatigue.

#### **Electrophysiology -**

1. Characteristics and components of Electro therapeutic stimulation systems and Electro physiological assessment devices.
2. Instrumentation for neuromuscular electrical stimulation.
3. Anatomy and physiology of peripheral nerve, muscle and neuromuscular junction.
4. Electrical properties of muscle and nerve.
5. Muscles plasticity in response to electrical stimulation.
6. Electrical stimulation and its effects on various systems.
7. Clinical Electro physiological testing.

#### **Physical & Functional Diagnosis -**

1. Clinical examination in general and detection of movement dysfunction.
2. Principles of pathological investigations and imaging techniques related to neuromuscular,

skeletal and cardiopulmonary disorders with interpretation.

3. Developmental screening, motor learning –motor control assessment.
4. Anthropometric measurements.
5. Physical fitness assessment by Range of motion, Muscle strength, endurance and skills, Body consumption, Fitness test for sports.
6. Evaluation Methods, Special tests and Scales used in Musculoskeletal, Neurological and Cardiopulmonary disorders.
7. EMG and Biofeedback.
8. Biophysical measurements, physiotherapy modalities, techniques and approaches.
9. Evaluation of aging.
10. Aids and appliances, adaptive functional devices to improve movement dysfunction.
11. Exercise ECG testing and monitoring.
12. Pulmonary function tests and Spirometry.
13. Physical disability evaluation and disability diagnosis.
14. Gait analysis and diagnosis.

### **Physiotherapeutics -**

1. Pain ( neurobiology , various theories , modulation and management of pain)
2. Maternal and child care in general physiotherapy.
3. Theories of motor control and motor learning.
4. Theories of aging.
5. Cardiopulmonary medications and their effect on activity performance.
6. Exercise planning and prescription.
7. Use of Exercise therapy techniques and application on various types of cases.
8. Application of electrotherapy techniques on patients, monitoring of dosages and winding up procedure.
9. Ergonomic aspects of exercise on oxygen, energy consumption MET value of various exercises and activity.
10. Effect of aerobic, anaerobic as well as Isometric and Isokinetic exercises on cardiac function.
11. Physiotherapy in psychiatric conditions.
12. Massage, Mobilization and Manipulation
13. Manual therapy – different schools of thought
14. Principles of Neurological approaches.
15. Facilitation and inhibition techniques.

16. General Guidelines to be followed in Cardiac Rehabilitation, Pulmonary Rehabilitation, Burns Rehabilitation and Cancer Rehabilitation Protocol.
17. CPR, monitoring systems and defibrillators and artificial respirators.
18. Physiotherapy in common conditions of skin.
19. Physiotherapy following Plastic Surgery.
20. Physiotherapy Following Obstetric and Gynecological Disorders.
21. Yoga

Concept of Yogic Practices – Kinds of Yogic Practices; Asana, Pranayama, Kriya, Mudra, Bandha, Dhyana.

Asana: Definition, Scope and Limitations of Asanas – Classification of Asanas – Safety Measures and Precautions while performing Asanas

Pranayama: Meaning – Different Phases in Pranayama Practice Safety Measures and Precautions.

Meaning & benefits of Bandha – Different Bandhas. Meaning of Mudra – Types of Mudra

Practicing methods and benefits of Kriyas – Meaning – Types of Kriyas; Neti; Dhauthi.

Meaning & concept of Meditation – Yogic practices and physical exercise. Yoga Practices and Other Systems of Exercises – Asanas Vs. Muscular Exercises – Pranayama Vs Deep Breathing Exercises – Importance of Nerve Culture in Yoga - Yoga and Competition – Yoga and Modern Educa

## **Residency part –II**

In the residency the professional is expected to work and contribute in the physiotherapy unit.



## Elective Subjects

### ***Musculoskeletal Disorders and Sports –***

1. Applied anatomy with emphasis on Biomechanics & Kinesiology of Human motion and Work Physiology
2. Clinical assessment and rationale of Laboratory investigations along with differential diagnoses.
3. Clinical Symptomatology, Pathophysiology and Patho-mechanics of musculoskeletal conditions
4. Physiotherapy management following fractures, dislocations and their complications, Amputations, cumulative trauma disorders and Burns.
5. Physiotherapy management in degenerative disorders and allied conditions.
6. Physiotherapy in post operative management of metabolic, hormonal, neoplastic and infective conditions of bones and joints.
7. Physiotherapy following arthroplasty, implants and soft tissue repairs.
8. Pre & post operative physiotherapy in tendon transfer. Electrical stimulation and biofeedback procedures.
9. Kinetic and kinematics analysis for various functional activities.
10. Functional assessment (Hand function, Gait, Posture A.D.L; occupational work).
11. Hand Rehabilitation.
12. Assessment of locomotor impairments, disabilities and disability evaluation.
13. Physiotherapy management of locomotor disorder, principles of medical and surgical aspects, sports psychology and retraining.
14. Neurological complications of locomotor disorders.
15. Analysis and classification of sports and sports specific injuries and its management.
16. Management of sport injuries, sports fitness
17. Principles of Injury Prevention

18. Medico legal issues in sports, Sports Psychology, Sports Nutrition and Sports pharmacology.
19. Rehabilitation of paediatric musculoskeletal disorders.
20. Orthopaedic implants-designs, materials, indications, post-operative assessment and training.
21. External aids, appliances, adaptive self-help devices; prescription, biomechanical compatibility, check-out and training.
22. Manual therapy: soft tissue manipulations and mobilization, neural mobilization, acupressure.(Cyriax, Maitland, Butler, McKenzie, Kaltenborn, Mulligan)
23. Pilates-school of thought, Chiropractic school of thought, Osteopathic school of thought
24. Myofascial Release technique and Muscle Energy technique
25. Joint manipulation – peripheral joints and vertebral joints.
26. Neuromuscular Taping Techniques
27. Electro diagnosis: Electromyography and evoked potential studies.
28. Community based rehabilitation in musculoskeletal disorders.
29. Recent Advances in Musculoskeletal Disorders and Sports Physiotherapy.

### ***Neurological and Psychosomatic Disorders***

1. Anatomy and Physiology of Nervous System.
2. Normal sequential behavioral and Physiological changes throughout the developmental arc.
3. Neurophysiology of balance, coordination and locomotion.
4. Clinical symptomatology and Pathophysiology of the neurological disorders

5. Principles of clinical neuro diagnosis and investigation.
6. Various Evaluation Scales and Assessment methods used in neurological rehabilitation.
7. Electrodiagnosis:
  - a. Neurophysiology of Nerve conduction studies and Electromyography.
  - b. Instrumentation of Electrical stimulator, EMG, SFEMG, NCS (Nerve Conduction Studies).
  - c. Electrical study of reflexes ( H- reflex, Axon reflex, F- response, Blink reflex, Jaw jerk, Tonic Vibration Reflex).
  - d. Repetitive nerve stimulation.
  - e. Evoked potentials (SSEP, MEP, BAERA, and VER).
  - f. Interpretation of neurophysiologic responses in Neuropathy, myopathy and neuromuscular disorders.
8. Evaluation of A.N.S dysfunction with reference to psycho-physiological testing.  
Biofeedback training
9. Neuro-psychological functions. Perception testing and training.
10. Theories of motor control and theories of motor learning, its application in physiotherapy.
11. Common facilitatory and inhibitory techniques.
12. Treatment approaches in neurological rehabilitation: Bobath, NDT, SI, Brunnstrom, Roods, PNF, Vojta, MRP, MFR
13. Musculoskeletal treatment concept applied to neurology: Adverse neural tissue tension tests in upper limb and lower limb.
14. Pathophysiology and Management of tonal abnormalities ( Spasticity, Rigidity, Hypotonia, and Dystonia)
15. Medical and Physiotherapy management following Cerebrovascular accidents.
16. Traumatic Brain Injury. ( ICU management, Coma stimulation, Restoration of motor control, Rehabilitation and community integration)
17. Traumatic spinal cord injuries. ( ICU management, Coma stimulation, Restoration of motor control, Rehabilitation and community integration)
18. Physical therapy management of demyelinating, inflammatory, infectious, degenerative and metabolic diseases of the nervous system.

19. Physical therapy management of Motor neuron diseases, neuromuscular junction disorders, Brain tumor, and Neuro cutaneous disorders
20. Diseases of spinal cord, peripheral nerves and cranial nerves
21. Physiotherapy management for neuromuscular disorders.
22. Paediatric neurology (Cerebral Palsy, Developmental disorders, Neuropsychiatric disorders, Cerebral & Craniovertebral anomalies & metabolic disorders of nervous system).
23. Cognitive disorders and its rehabilitation.
24. Oromotor rehabilitation.
25. Vestibular disorders and its rehabilitation.
26. Bladder and Bowel dysfunction and its rehabilitation.
27. Assessment and management of various neurological gaits.
28. Rehabilitation following disorders of Special Senses, Speech. Language and Perception.
29. Associated functional disturbances of higher functions and their testing and training.
30. Application of Functional electrical stimulation and Bio-feedback in neurological rehabilitation.
31. Learning skills, A.D.L and functional activities.
32. Aids and appliances in neurological disorders. Prescriptions, testing and training.
33. Basic knowledge of drugs used for neurological conditions.
34. Assessment of fitness and exercise prescription for special neurological population – Stroke, Paraplegia, TBI, Multiple Sclerosis, MND, Parkinsonism, & Ataxia.
35. Community based rehabilitation for neurological dysfunction. Disability evaluation and management.
36. Recent Advances in Neurological Rehabilitation.

### ***Cardio-Respiratory Disorders***

1. Anatomy and physiology of cardio-vascular and respiratory systems.



2. Biomechanics of respiration.
3. Intrauterine development of cardiopulmonary system and difference between the adult and pediatric cardiopulmonary system.
4. Epidemiology, Symptomatology and pathophysiology of the cardio-respiratory disorders.
5. Clinical assessment, rationale of laboratory investigations and differential diagnosis,
6. Evaluation of respiratory dysfunctions, lung function tests – volumetric, analysis of blood gases, X-ray chest.
7. Evaluation cardiac dysfunction. [ECG, exercise ECG testing, Holter monitoring etc., Echo-cardiogram, X-Ray, Imaging techniques etc.]
8. Evaluation of peripheral vascular disorders: clinical, blood flow studies, temperature plethysmography. A.N.S dysfunction testing.
9. Risk factors and preventive measures in cardio respiratory conditions
10. Cardio-respiratory emergencies and management principles – medication, critical care, indications of surgical intervention, stabilization of vital functions defibrillation.
11. Intensive care unit – Concept and set-up, equipment for advanced methods of resuscitation, monitoring and patient management: artificial airways, ventilators, pulse –oxymetry etc
12. Oxygen therapy.
13. Cardio-pulmonary resuscitation.
14. Respiratory physiotherapy techniques – Techniques to improve lung volume; techniques to reduce the work of breathing and techniques to clear secretions.
15. Physiotherapy management for common conditions in the ICU
16. Poisoning, Drug overdose, and Drowning.
17. Physiotherapy management following general Medical & Surgical conditions
18. Physiotherapy management of peripheral vascular disorders
19. Exercise testing, planning and prescription: aerobic and anaerobic exercise training.
20. Respiratory Pharmacology
21. Physiotherapy management in Obstructive and restrictive lung disorders
22. Pulmonary Rehabilitation

23. Physiotherapy management following congenital and acquired heart diseases
24. Cardiac rehabilitation – Conservative and post-operative management.
25. Physiotherapy modalities used for wound healing
26. Exercise Prescription for health promotion and fitness for special populations- DM, Obesity, IHD, COPD, HTN
27. C.B.R in Cardio-vascular and respiratory conditions.
28. Recent advances in Cardio respiratory physiotherapy.

### ***Community Rehabilitation -***

1. Health and Illness; Levels of Healthcare & Fitness
2. Basic Concepts of rehabilitation and foundations of rehabilitation
3. Institute based rehabilitation services and multi-disciplinary approach.
4. Methodology of CBR with reference to National Health Delivery system.
5. Role of National Institutes, District Rehabilitation Centre and Primary Health Centre (with appropriate exposure).
6. Public awareness to the various disabilities. Communications. Message generation and dissipation.
7. Persons with disability; Act – 1995 and related Government infrastructure.
8. Role of Government in CBR, inter-sectoral programs and co-ordination. Implementation of the Act.
9. Role of Non-Government organizations in CBR.
10. Scope of community physiotherapy.
11. Disability detection and early intervention.
12. Physical fitness, stress management through yoga and psychosomatic approaches.
13. Home exercise programs for various classifications of disabilities.
14. Physiotherapist as a Master Trainer in CBR.
15. Physiotherapy in maternal and child health care.

16. Evaluation and theories of aging; Assessment of the elderly; Exercise prescription for the elderly; Psychosocial and safety issues in elderly
17. Geriatric Rehabilitation
18. Holistic physiotherapy for the aged.
19. Occupational Health, Occupational Hazards, Industrial Hygiene, Vulnerable workers group and labor law;
20. Industrial therapy, Injury prevention and returning the worker to productivity
21. Ergonomics, Principles, Issues related to hand tools, posture, material handling and lifting
22. Prevention of work related Injuries and redesigning workspace, Designing auditory and visual displays for workers; Occupational stress; Environmental Pollution – noise, vibration etc.
23. Physiotherapy role in industry – preventive, intervention, ergonomic and rehabilitative.
24. Women's, Health : Women's reproductive health and health care; Exercise prescription in pre and post natal stage;
25. Diagnosis and treatment of musculoskeletal pain and dysfunction during pregnancy and post menopause.
26. Treatment of Incontinence and Pelvic floor dysfunction; Special problems related to women.
27. Recent Advances in Community Physiotherapy.

### ***Paediatrics***

1. Normal motor development ( development during Prenatal, Infancy, and child hood)
2. Reflex maturation.
3. Developmental assessment and diagnosis.
4. Developmental screening using various scales.
5. Genetic basis of paediatric disorders. Embryology & genetic counseling.
6. Cardio-respiratory assessment of neonate and infant and related paediatric disorder.
7. Principles of laboratory investigations for differential diagnosis.

8. Clinical symptomatology and patho-physiology of locomotor and cardiopulmonary disorders.
9. Growth and development of a child and its disorders
10. Maturation, Pathophysiological and recovery process in the CNS.
11. Assessment of progressive locomotor disorders – Neuropathic and Myopathic.
12. Early intervention- high risk babies, Neonatal care and management
13. Management of congenital locomotor disorders including the prosthetic and orthotic management.
14. Analysis of fitness and exercise prescription for special pediatric populations – cerebral palsy, down's syndrome, polio, muscular dystrophy, juvenile diabetes and obesity.
15. Management of neuro pediatric patients.
16. Motor learning process – Theory and Techniques.
17. Disorders of perception and sensory integration.
18. Integrated approach in management of pediatric disorders.
19. Pediatric surgeries and its post-operative management.
20. Adaptive equipment for physically challenged children.
21. Physical therapy in public schools.
22. Sports and fitness in paediatrics.
23. CBR in pediatric conditions.
24. Recent Advances in Pediatric Physiotherapy

### **Residency part –III + IV**

In the residency the professional is expected to work and contribute in the radiation therapy unit

**Dissertation:**

Each candidate will have to carry out of a dissertation on the related subject. The dissertation will be guided by one or two members of the faculty or medical Physicists of the department. The dissertation will be evaluated by the External/Internal Examiners. The final dissertation duly approved by the External/Internal examiners will be submitted to the Dean's office with the result. The dean's office will send the dissertation to the library for record.

## Skills based outcomes and monitorable indicators for Senior Physiotherapist

### Competency statements

1. Demonstrate knowledge to interpret and evaluate a treatment protocol
2. Understands the place of treatment planning in the physiotherapy process and operates the treatment planning system (TPS)
3. Communicates relevant information to other members and completes accurate documentation
4. Demonstrates knowledge of accurate treatment procedure
5. Demonstrates ability to carry out the daily organization of the treatment unit
6. Practices accurate treatment documentation
7. Demonstrates ability to interpret, apply and disseminate information as a member of the physiotherapy team
8. Demonstrates professional behavior
9. Demonstrates a sensitive and caring attitude towards the patient
10. Demonstrates ability to accurately and consistently treat the patient
11. Demonstrates ability to prepare the patient for their first treatment
12. Evaluates and monitors the patient performance status
13. Monitors, manages and records the patient's side effects throughout the course of treatment
14. Advises patient on appropriate nutrition, exercises, rest.
15. Demonstrates ability to carry out the necessary data transfer checks
16. Demonstrates ability to carry out treatment verification
17. Demonstrates ability to carry out corrective actions as per instructions
18. Demonstrates knowledge to check the dose delivered
19. Implements health and safety procedures
20. Demonstrates ability to interpret, apply and disseminate information as a member of the physiotherapy team
21. Demonstrates knowledge and skills to carry out the daily/weekly Quality Control (QC) checks
22. Participates in research activities

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
1	Be able to interpret, evaluate and plan a treatment protocol	Identify the plan for treatment.	Discuss the patient's condition in the context of treatment	10
		Identify the conditions associated with patients	Create and evaluate treatment plans	
2	Understand the benefit of treatment planning in the physiotherapy techniques and to operate the treatment planning system (TPS)	Be familiar with the TPS used	Prepare suitable plans/treatments for standard techniques	20
		Know the protocols used in the department	Interpret and understand all planning techniques for the clinical site/s	
3	Be able to transfer all relevant information and complete accurate documentation	Recognize the importance of accurate transfer of information to allow for accurate treatment set-up according to the treatment plan and prescription	Instruct the most appropriate device for the individual patient within the context of the protocol	20
		Know what should be included	Apply the necessary precautions in production	
		Be aware of the ethical issues relating to documentation	Implement correct Quality Control.	
4	Be able to instruct/ guide correctly on how to treat the patient	Be familiar with the techniques and equipment used	Evaluate the patient condition and the limitations that may result from any co-morbid conditions	10
		Know the protocols used in the department	Analyze the information and integrate to define the optimal patient position	
		Know how to use these devices	Apply the necessary precautions in production	
		Recognize the associated health and safety issues	Implement correct QC.	

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
5	Be able to instruct on how to carry out the daily organization of the treatment unit	Recognize the importance of team interactions	Plan and instruct in the organization of the daily work schedule to maximize efficiency	30
		Explain the principles of effective communication	Inform the patient about the procedure	
		Review and explain the individual patient requirements		
6	Be able to ensure complete accurate treatment documentation	Be aware of the ethical issues relating to treatment documentation	Ensure all ethical requirements have been met	10
7	Be able to evaluate the patient performance status	Identify the systems used for evaluation of performance status	Assess the patient performance status in view of their diagnosis and progress.	50
8	Be able to carry out corrective actions	Recognize the critical conditions of patients	Critically evaluate the serious patients	50
		Identify the correct treatment protocol	Make corrections in accordance with the protocol	
			Record any alteration in the treatment.	
9	Be able to check the treatment delivered	Knowledge about accurate treatment protocol as per patient condition	Monitor the patients treatment procedures.	50
			Evaluate results and take corrective action as per protocol	
			Report any inconsistency	
10	Be able to implement health and safety procedures	Explain the health and safety issues for patients and staff	Assess the safety features to ensure they are in place and adhered to	50
11	Be able to interpret, apply and disseminate information as a member of the Physiotherapy team	Define and explain the data that must be disseminated	Identify the appropriate personnel to whom specific information should be disseminated	50
			Communicate the correct, relevant and appropriate information	



Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
12	Be able to transmit knowledge to new professionals, patients and families	Critique and summarise new information from reputable sources	Critically evaluate new information and distil it down to relevant components for the specific audience	50
13	Be able to demonstrate professional behaviour	Explain the legal and ethical guidelines related to the profession	Practice in accordance with legislation regulations and ethical guidelines	50
		Be aware of your own competency levels	Promote collaborative practice	
		Identify the elements that reflect professional appearance and manner		
14	Be able to demonstrate a sensitive and caring attitude to patients	Explain the components of good communication	Self-awareness of their own personality traits	50
		Describe the main personality types	Analyze how the differences in personality influence approach	
		Be aware of the patient' gender, age, cultural background, educational level and social situation		
15	Be able to carry out best practice at all times	Be familiar with current literature and evidence based best practice	Critically evaluate and apply knowledge gained	50
			Apply problem solving techniques in the workplace	
16	Be able to carry out the daily/weekly Quality Control (QC) checks	Explain Quality Management System (QMS), Quality Assurance (QA) and Quality Control (QC	Perform the daily/weekly/monthly QC procedures	50
			Analyze and record the results and report any deviations	
17	Be able to report incidents and near misses	Be familiar with the reporting system and reporting protocols	Report incidents and near misses according to the protocol of the department	50
			Examine any incidents or near incidents and how they can be prevented in the future	

Sl no	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
18	Be able to review the literature	Define search terms for specific treatment sites	Identify the appropriate literature in the area of interest	100
19	Be able to suggest implementation of research findings	Identify relevant sources of Research	Evaluate research with respect to current departmental practice	100
20	Be able to suggest/ initiate topics for physiotherapy research	Identify literature to support research proposal	Review the literature in the area	100
		Define the necessary steps in preparing and carrying out research	Formulate a research question	

**TOTAL – 950 Hours**



# Chapter 5

## Job description



## Chapter 5: Job Description for all levels (Proposed)

A brief overview of the proposed job description is mentioned below for various levels, however this may be customized based on different work settings.

### Level 4

- Patient identification and verification of the patient and assisting in treatment implementation.
- Basic knowledge in Physiotherapy protocol
- Treatment preparation
- Data entry including treatment recording
- General knowledge pertaining to biomedical waste disposal
- Familiarization with physiotherapy equipment
- Knowledge of patient transport and physiotherapy equipment management.

### Level 5

In addition the above mentioned responsibilities-

- Physiotherapy Equipment preparation for the simulation and treatment
- Basic Knowledge of exercise therapy and electrotherapy and its implementation.
- Information management / communication for inter disciplinary

### Level 6

In addition the above mentioned responsibilities-

- Supervision of the physiotherapy procedure , health and safety
- Professional responsibility including quality check on treatment delivery, chart verification
- Special procedures for treatment and assessment including MMT, different mobilization etc.

### Level 7

- Professional developmental skill
- Special manipulation treatment skill
- Ability to critically evaluate practice
- Verifies the accuracy of the patient physiotherapy procedure before and after the treatment
- Monitors the patients for clinical reaction for all the patients

### Level 8

- Consult and discuss with appropriate health physicians when immediate clinical response is necessary based on emergency and for critical patient condition.

### Level 9

- Standardizing the teaching skills and developing a curriculum for the teaching program.
- Involvement in research and development



**Level 10**

- Setting the guidelines
- Judgment on all aspects of physiotherapy work
- Protocol development on treatment delivery and Quality Assurance
- Involvement on departmental up gradation programme
- Assesses service procedure and environment to meet established guidelines for proper working and adjust the action plan as per clinical compliance



## Allied Health Courses and Professions

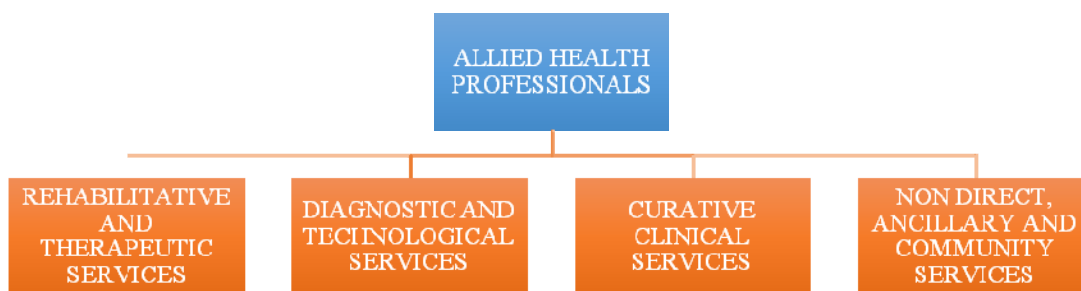
*“Allied health professionals include individuals involved with the delivery of health or related services, with expertise in therapeutic, diagnostic, curative, preventive and rehabilitative interventions. They work in interdisciplinary health teams including physicians, nurses and public health officials to promote, protect, treat and/or manage a person(s) physical, mental, social, emotional, environmental health and holistic well-being”*

The wide variation in the understanding of the concept of allied health professional, better known as ‘paramedic’, the nomenclature, and functions has led to the poor image of allied health sciences in India. The use of the word paramedic itself limits the activities of AHPs in the system. Hence, it is imperative to adequately compensate these professionals based on their qualifications and specialties.

Despite a huge demand for services from this sector, allied health science is highly fragmented. As per the report ‘From Paramedics to Allied Health Sciences’, in total 138 courses of varied levels were identified during the process. Although it is estimated that there may be many more courses which are yet to be identified.

A list of 60 professions has been indicated below **(The list is illustrative of the allied health professions. In future there may be addition or removal of certain professions based on the state of their regulation and standardization). It also needs a mention that most of these professions are not restricted to the professional groups under which they have been categorized, their role may extend to other professional services too. Similarly, the categorization is an indicative categorization, however this may evolve over time based on deeper understanding of the roles and responsibilities of each professional group.**

The allied health professions have been divided in four major groups (indicative only) –



### List of allied health professionals

#### A. REHABILITATIVE AND THERAPEUTIC SERVICES

1. Audiologist
2. Community based rehabilitation therapist
3. Hearing aid and ear mould technician
4. Occupational therapist
5. Physiotherapist
6. Prosthetist and Orthotist
7. Rehabilitation therapist
8. Speech-language therapist

B. DIAGNOSTIC AND TECHNOLOGICAL SERVICES

9. Blood bank technician and technologist
10. Cardiovascular technologist
11. Cyto- technician and technologist
12. Cytogenetic technician and technologist
13. Dermatology/STD /leprosy lab technician and technologist
14. Diagnostic medical sonographer/ Ultrasound technician and technologist
15. Hemato technician and technologist
16. Histopatho-technician and technologist
17. Medical and clinical lab technician and technologist
18. Medical Biochemistry technician and technologist
19. Medical Microbiology technician and technologist
20. Molecular technologist
21. Neuro lab technologist
22. Phlebotomist
23. Radiographer
24. Radiologic /Imaging technician and technologist
25. Sleep lab technician and technologist

C. CURATIVE CLINICAL SERVICES

26. Anaesthesia assistants technician and technologist
27. Critical care/ICU technician
28. Dental assistant and technician
29. Dental Hygienist
30. Dialysis therapist
31. ECG technician
32. EEG/EMG/ END technician
33. Emergency medical technician (paramedic)
34. Endoscopy technician
35. Medical assistant
36. Medical dosimetrist
37. Mental health counselor
38. Nuclear medicine therapist
39. Ophthalmic assistant
40. Optometrist
41. OT technician/Surgical technician
42. Perfusionists
43. Physician assistant
44. Pulmonary function (PFT) technician
45. Radiation therapist
46. Respiratory therapist
47. Urology technician

D. NON DIRECT, ANCILLARY AND COMMUNITY SERVICES

48. Biomedical technician
49. Biostatistician
50. CSSD technician/assistant
51. Dark room assistant
52. Dietician

53. Forensic technologist
54. Health sanitary inspector
55. Medical physicists
56. Medical record officer and technician
57. Medical secretaries
58. Medical transcriptionist
59. Mortuary technician
60. Nutritionist

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