



MANIPAL

ACADEMY of HIGHER EDUCATION

(Deemed to be University under Section 3 of the UGC Act, 1956)

Manipal College of Health Professions

(Mangaluru Campus)

Manipal Academy of Higher Education, Manipal

Outcome-Based Education (OBE) Framework

Two Years Full Time

Postgraduate Program

(Choice - Based Credit System)

Master of Physiotherapy (Neurosciences)

MPT (Neurosciences)

With effect from July 2021

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Head of the Department

Dean

Deputy Registrar - Academics

Registrar

1. NATURE AND EXTENT OF THE PROGRAM

Background and need of the program:

Physiotherapy in India has a history of over 70 years. It is a changing and evolving profession which encompasses the concepts of public health and primary/secondary prevention, rehabilitation and fitness for work, self-management of long term conditions and the provision of palliative care for all ages. The physiotherapist works in a complex environment and with multidisciplinary teams in primary healthcare industry, schools, hospitals and private practices. This work takes place in diverse communities and cultures. In a climate of changing health needs and healthcare provision, the physiotherapist requires skills in leadership and decision making. Lifestyle changes over the years resulted in an increase in the problems of neurological, musculoskeletal and cardiopulmonary systems. This means that the services of physiotherapists are in greater demand. Here at MAHE, we constantly upgrade our education and clinical skills to keep up with the current needs. The infrastructure at Kasturba Hospital Udupi, Manipal, and Mangalore and Manipal Hospital Bangalore provide an almost unending canvas to work on.

Duration of the Program: Two years

- Four Semesters (Two years) of academic program

Aim of the Program:

- To provide an opportunity for qualified physiotherapists with an undergraduate degree to practice as Neuro-Physiotherapists.
- To educate and empower the students to be independent practitioners using an advanced body of knowledge in a competent manner towards those who need such services, using evidence based practice with autonomy in quality assurance while maintaining the humanitarian approach of service.
- To acquire skills required to be an effective theoretical & clinical teacher in physiotherapy, be proficient in research methods and apply these in the pursuance of research in physiotherapy.
- To learn elements of administration in order to be an effective physiotherapy manager.

- v. To practice life-long learning, professional development, for the benefit of students, the profession and to increase the effectiveness of health and social care delivery.

Entry level Qualification:

- i. The candidate must have passed Bachelor of Physiotherapy from any recognized University in India or abroad.
- ii. The candidate should have obtained an aggregate of 50% in all subjects of Bachelor of Physiotherapy

Scope of the Program:

On completion of the M.P.T. program, the graduates will be a competent physiotherapy specialist having heightened ethical and moral responsibilities as a health professional, demonstrating strong clinical reasoning skills with evidence-based approach in assessment, clinical diagnosis and intervention of a wide range of diseases and dysfunctions in nervous system. Postgraduates will have job opportunities in various acute hospitals, rehabilitation centers, multispecialty hospitals, special schools, geriatric centers, private organizations, non-government organizations and government institutions.

- Postgraduates can also pursue doctoral studies in clinical areas of their interest and become teaching faculty in the academic institutions.
- Postgraduates may also undertake research in Physiotherapy.

2. PROGRAM EDUCATION OBJECTIVES (PEOs)

The overall objective of the learning outcome-based curriculum framework (LOCF) for MPT (Neurosciences) are as follows:

PEO No.	Education Objective
PEO 1	Students will be able to apply advanced body of knowledge and clinical competency with evidence based practice in Physiotherapy to achieve professional excellence.
PEO 2	Students will execute high order skills in analysis, critical evaluation and/or professional application of clinical and practical skills in Physiotherapy
PEO 3	Students will practice the profession by ethical norms and communicate effectively with the multi-disciplinary team.
PEO 4	Students will acquire creative proficiency in interpersonal and collaborative skills to identify, assess and formulate problems and execute the solution.
PEO 5	Students will synthesize research ideas, develop innovations, incubate new concepts and encourage entrepreneurship.
PEO 6	Students will display lifelong learning process for a highly productive career and will be able to relate the concepts of Physiotherapy towards serving the cause of the society.

3. GRADUATE ATTRIBUTES

S No.	Attribute	Description
1.	Professional Knowledge	Critically appraise scientific knowledge and integrate evidence based practice as a health care professional
2.	Clinical / practical skills	Apply clinical / practical skills to prevent, assess and manage quality health care services
3.	Communication	Displays empathetic and professional communication skills to patients/clients, care-givers, other health professionals and other members of the community
4.	Cooperation/Team work	Ability to practice collaboratively and responsibly with multidisciplinary team members to deliver high quality health care
5.	Professional ethics	Ability to resolve ethical issues and practice the ethical values in the professional life
6.	Research / Innovation-related Skills	Ability to generate and investigate research questions and translate the evidence into clinical practice.
7.	Critical thinking and problem solving	Ability to reason and judge critically and provide solutions for real life situations
8	Reflective thinking	Employ reflective thinking along with sense of awareness of one self and society
9	Information/digital literacy	Excel in use information communication and technology in ongoing learning situations
11.	Multi-cultural competence	Ability to effectively lead and respond in a multicultural society
12.	Lifelong Learning	Demonstrate the ability to acquire knowledge and skills that are necessary for participating in learning activities throughout life, through self-

S No.	Attribute	Description
		paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to demands of work place through knowledge/skill development/reskilling.

4. QUALIFICATION DESCRIPTORS:

- a. Apply (i) Advanced and up-to-date knowledge and excel in the academic field of study as a whole and its applications, and links to related disciplinary areas/subjects of study; including a critical understanding of the established theories, principles and concepts, and of a number of advanced and emerging issues in the field of Physiotherapy (ii) Procedural knowledge that creates different types of professionals related to the Physiotherapy, including research and development, teaching and in government and public service; (iii) Professional and communication skills in the domain of Physiotherapy, including a critical understanding of the latest developments, and an ability to use established techniques in the domain of Physiotherapy.
- b. Possess comprehensive knowledge about Physiotherapy, including current research, scholarly, and/or professional literature, relating to essential and advanced learning areas pertaining to the field of study, and techniques and skills required for identifying problems and issues.
- c. Proficient skills in i) identifying the issues in health care needs; ii) collection of quantitative and/or qualitative data relevant to client's needs and professional practice; iii) analysis and interpretation of data using methodologies as appropriate for formulating evidence based hypotheses and solutions.
- d. Apply knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to Physiotherapy in various specialties.
- e. Communicate efficiently with all stakeholders, and provide relevant information to the members of the healthcare team.
- f. Optimize one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials based on new frontiers of knowledge.
- g. Execute one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyse problems and issues and seek solutions to real-life problems.

5. PROGRAM OUTCOMES (POs):

After successful completion of Master of Physiotherapy (Neurosciences) program, students will be able to:

PO No.	Attribute	Competency
PO 1	Professional knowledge	Apply current evidence and scientific knowledge to work as an expert member of health care system
PO 2	Clinical/ Technical skills	Employ clinical skills to provide quality health care services
PO 3	Team work	Empower the team with shared goals with the interdisciplinary health care team to improve societal health
PO 4	Ethical value & professionalism	Impart ethical values and professionalism within the legal framework of the society
PO 5	Communication	Communicate professionally with the multidisciplinary health care team and the society
PO 6	Evidence based practice	Appraise and adopt high quality evidence based practice that leads to excellence in professional practice
PO 7	Life-long learning	Advance knowledge and skills with the use of recent technology for the continual improvement of professional practice
PO 8	Entrepreneurship, leadership and mentorship	Build entrepreneurship, leadership and mentorship skills to practice independently as well as in collaboration with the multidisciplinary health care team

6. COURSE STRUCTURE, COURSE WISE LEARNING OBJECTIVE, AND COURSE OUTCOMES (COs)

SEMESTER - I

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
ABS6101	Advanced Biostatistics & Research Methods	3	1	-	-	4	30	70	100
PTH6001	Principles of Physiotherapy Practice	1	2	-	-	3	100	-	100
PTH6003	Clinical Practice in Physiotherapy	-	-	-	36	12	100	-	100
PTH6570	Research Proposal in Neurosciences Physiotherapy	-	-	4	-	2	100	-	100
Total		4	3	4	36	21	330	70	400
Note: ABS6101 will be conducted for 50 marks and normalized to 70 marks									

SEMESTER - II

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
EPG6201	Ethics and Pedagogy	1	1	-	-	2	100	-	100
PTH6502	Foundations of Physiotherapy in Neurosciences	1	2	-	-	3	50	50	100
PTH6504	Physiotherapy Clinical Practice in Neurosciences - I	-	-	-	36	12	100	-	100
PTH6580	Research Progress in Neurosciences - I	-	-	4	-	2	100	-	100
Total		2	3	4	36	19	350	50	400
Note: PTH6502 will be conducted for 100 marks and normalized to 50 marks.									

SEMESTER - III

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
PTH7501	Physiotherapy in General Neurosciences	1	2	-	-	3	50	50	100
PTH7503	Physiotherapy Clinical Practice in Neurosciences -II	-	-	-	36	12	50	50	100
PTH7505	Evidence Based Physiotherapy Practice in Neurosciences	1	1	-	-	2	100	-	100
PTH7570	Research Progress in Neurosciences - II	-	-	6	-	3	100	-	100
Total		2	3	6	36	20	300	100	400
Note: PTH7501 will be conducted for 100 marks and normalized to 50 marks PTH7503 will be conducted for 100 marks and normalized to 50 marks									

SEMESTER – IV
Program Electives

The student may choose from anyone options from the list of Program Elective combinations provided in the table below.

Option-1: Elective in Neurological Physiotherapy

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
PTH7512	Physiotherapy in Neurological Conditions	1	2	-	-	3	50	50	100
PTH7514	Clinical Practice in Neurological Physiotherapy	-	-	-	36	12	50	50	100
PTH7580	Research Project in Neurosciences	-	-	10	-	5	50	50	100
Total		1	2	10	36	20	150	150	300
Note: PTH7512 will be conducted for 100 marks and normalized to 50 marks PTH7514 will be conducted for 100 marks and normalized to 50 marks									

Option-2: Elective in Neurosurgical Physiotherapy

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
PTH7522	Physiotherapy in Neurosurgical Conditions	1	2	-	-	3	50	50	100
PTH7524	Clinical Practice in Neurosurgical Physiotherapy	-	-	-	36	12	50	50	100
PTH7580	Research Project in Neurosciences	-	-	10	-	5	50	50	100
Total		1	2	10	36	20	150	150	300

Note:
 PTH7522 will be conducted for 100 marks and normalized to 50 marks
 PTH7524 will be conducted for 100 marks and normalized to 50 marks

OVERALL CREDIT DISTRIBUTION

Semester	Credit distribution					Marks Distribution		
	L	T	P	CL	CR	IAC	ESE	Total
I - SEMESTER	4	3	4	36	21	330	70	400
II - SEMESTER	2	3	4	36	19	350	50	400
III - SEMESTER	2	3	6	36	20	300	100	400
IV - SEMESTER	1	2	10	36	20	150	150	300
Grand Total	9	11	24	144	80	1130	370	1500

INTERNAL ASSESSMENT COMPONENT (IAC) WEIGHTAGE DISTRIBUTION

Theory		Practical		Research	
Components	%	Components	%	Components	%
Mid semester exam	50	Case presentation	50	Performance evaluation	50
Class seminar	30	Clinical performance	50	Presentation/ Report submission	50
Assignments	20				

SEMESTER - I

COURSE CODE	:	COURSE TITLE
ABS6101	:	Advanced Biostatistics & Research Methodology
PTH6001	:	Principles of Physiotherapy Practice
PTH6003	:	Clinical Practice in Physiotherapy
PTH6570	:	Research Proposal in Neurosciences Physiotherapy

Manipal College of Health Professions	
Name of the Department	Physiotherapy
Name of the Program	Master of Physiotherapy (Neurosciences)
Course Title	Advanced Biostatistics & Research Methodology
Course Code	ABS6101
Academic Year	First
Semester	I
Number of Credits	04
Course Prerequisite	Students should have basic knowledge of research and statistical tools
Course Synopsis	This course enables the student to understand the basics of research methods and design a research protocol for their research question. Additionally the course also enables the student to estimate sample size for their study, use statistical tests to analyse the results of the study and make meaningful interpretations.

Course Outcomes (COs): At the end of the course student shall be able to:

CO1	Define the terms related to statistics and research methods (C1)
CO2	List and explain the research designs and sampling techniques (C2)
CO3	Explain, calculate and interpret the measures of central tendency (C4)
CO4	Determine sample size for the studies using means and proportions formula (C5)
CO5	Analyse and interpret the outputs of parametric and non-parametric tests (C4)

Mapping of Course Outcomes (COs) to Program Outcomes (POs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x							
CO2	x					x		
CO3	x							
CO4	x						x	
CO5	x							

Course Content and Outcomes:

Content	Competencies	Number of Hours
Unit 1	1. Define statistics (C1) 2. List the uses of statistics in health science research. (C1) 3. Explain the role of Statistics in clinical and preventive Medicine. (C2) 4. Differentiate qualitative and quantitative variables with examples. (C3)	4

Content	Competencies	Number of Hours
	5. Differentiate discrete and continuous variables with examples. (C4) 6. List the properties of various scales of measurement with example. (C1) 7. Define central tendency, measure of central tendency. (C1) 8. Define arithmetic mean, median and mode. List the properties, situation for use, and examples. (C1) 9. Determine the three measures from raw data. (C5)	
Unit 2:		
	1. Define and calculate quartiles and percentiles. (C4) 2. Define measures of dispersion (C1) 3. Define, calculate and interpret range, quartile deviation, interquartile range, standard deviation, variance and coefficient of variation.(C4) 4. Give the situation for the use of these measures (C2).	4
	1. Describe the properties of Normal and Standard Normal Distribution with sketch (C2) 2. List the applications.(C1) 3. Calculate probabilities recollecting the coverage of the intervals $\text{mean} \pm \text{SD}$, $\text{mean} \pm 2\text{SD}$, $\text{mean} \pm 3\text{SD}$ (C4) 4. Define skewness and list the characteristics with sketch.(C1) 5. Define kurtosis and list the characteristics with sketch.(C1) 6. Define and differentiate parameter and statistic with examples (C4). 7. Define the basic terms-population, sample, sampling, parameter, statistic, estimate and estimator. (C1) 8. Define Point estimate (C1) 9. Define and Differentiate standard deviation and standard error (C4) 10. Define sampling distribution (C1) 11. Describe the importance of sampling distributions of different statistics.(C2) 12. Determine the sampling distribution of sample mean, sample proportion, difference between two means, difference between two proportions (Large sample approximation (CLT)).(C5) 13. Calculate the standard error of mean, proportion, difference between two means, and difference between two proportions. (Large sample approximation (CLT)). (C4)	5
	1. Construct and interpret confidence interval for mean, difference between two means, proportion, difference between two proportions (large sample approximation) (C5)	3

Content	Competencies	Number of Hours
Unit 3:		
	<ol style="list-style-type: none"> 1. Define /explain with example the concept of null hypothesis, alternative hypothesis, type I and type II errors. (C2) 2. Define level of significance, power of the test and p-value (C1) 3. Explain the difference between one sided and two-sided test (C2) 4. Give the situation for non-parametric tests. (C2) 5. List the differences, merits and demerits of non-parametric over parametric tests. (C1) 	4
	<ol style="list-style-type: none"> 1. Explain the situation, hypothesis tested, assumptions and example for paired and unpaired t-test. (C2) 2. Interpret the output of paired and unpaired t-test (C4) 3. Explain the situation, hypothesis tested, assumptions and example for one-way and repeated measures ANOVA (C2) 	3
	<ol style="list-style-type: none"> 1. Explain the situation, hypothesis tested, assumptions and example for : Mann-Whitney U-test, Wilcoxon signed rank test, Kruskal-Wallis ANOVA and Friedman's ANOVA (C2) 2. Explain the situation, hypothesis tested, assumptions and example for Chi square test association/independence and McNemar's test for association (C2) 3. Computation and interpretation of chi-square test (2 x2 table) and McNemar's test result (C2) 	4
	<ol style="list-style-type: none"> 1. Give example for positive and negative correlations. (C2) 2. Explain different types of correlation with the help of scatter diagrams. (C2) 3. Give the assumptions, properties, and interpretation of correlation coefficient.(C4) 4. Explain the situation for the computation of Pearson's and Spearman's correlation coefficient. (C2) 5. Interpret coefficient of determination.(C4) 6. Explain the situation, example, application and assumptions for linear and multiple regression.(C2) 7. Interpret regression coefficients in simple and multiple regression.(C4) 8. Explain the need for sample size computation.(C2) 9. Given the situation/ingredients, should be able to determine sample size for estimating mean and proportion, testing of difference in means and proportions of two groups.(C5) 	4

Content	Competencies	Number of Hours
	<ol style="list-style-type: none"> 1. Explain the difference between rate, ratio, and proportion with example. (C2) 2. Calculate rate, ratio, and proportion (C4) 3. Define and calculate Incidence and prevalence rates(C4) 4. Explain the design, merits and demerits of Case report, case series analysis, prevalence studies and ecological studies with example (C2) 	3
	<ol style="list-style-type: none"> 1. Explain the design, analysis (2x2 table and odds ratio), merits and demerits ((unmatched and 1:1 matched design) of case control study with example.(C2) 2. Explain the design, analysis (2x2 table and relative risk), merits and demerits of cohort study with example.(C2) 	3
	<ol style="list-style-type: none"> 1. Explain confounding with example. (C2) 2. List the methods to deal with confounding at design and analysis stage.(C1) 3. Explain the design, analysis, merits and demerits of RCT with example. (C2) 4. Explain the need of simple, block and stratified randomization with example.(C2) 5. Explain the need and type of blinding with example (C2) 	4
	<ol style="list-style-type: none"> 1. Explain the situation for the use of logistic regression and survival analysis with example.(C2) 	3
	<ol style="list-style-type: none"> 1. Define Population, sample, sampling, and sampling frame. Give one example each.(C1) 2. List the characteristics of a good sample.(C1) 3. Differentiate and list the advantages and disadvantages of random and non- random sampling techniques.(C4) 4. Explain simple, stratified, systematic, cluster and multistage random sampling techniques with examples. List the merits and demerits of each of them.(C2) 5. Explain Convenience, quota, judgment and snowball sampling with examples. List the merits and demerits of each of them.(C2) 6. Explain the difference between sampling and non-sampling errors. Give example for sampling and non-sampling errors. List the methods to minimize these errors.(C2) 	4
	<ol style="list-style-type: none"> 1. Define Sensitivity, specificity, PPV and NPV. (C1) 2. Explain with example method of computation and interpretation. (C4) 3. Explain with example, the situation for the application of Bland Altman plot, Kappa statistic. (C2) 4. Explain the interpretation of Kappa Statistics. (C2) 5. Explain the format of various research documents. (C2) 	4
Total		52

Learning Strategies, Contact Hours and Student Learning Time (SLT)					
Learning Strategies	Contact Hours	Student Learning Time (SLT)			
Lecture	42	84			
Tutorial	4	8			
Self-directed learning (SDL)	6	12			
Total	52	104			
Assessment Methods					
Formative			Summative		
Assignments/Presentations/Quiz			Mid Semester Exam		
			End Semester Exam		
Mapping of Assessment with COs					
Nature of Assessment	CO1	CO2	CO3	CO4	CO5
Mid Semester Examination	x	x	x		
Quiz / Assignment				x	x
End Semester Exam	x	x	x	x	x
Feedback Process	Mid-Semester Feedback				
	End-Semester Feedback				
Main Reference	<ol style="list-style-type: none"> 1. Research for Physiotherapists: Project Design and Analysis - Caroline Hicks. (1995) 2. Tests, Measurements and Research in Behavioural Sciences by A K Singh (1986) 3. Rehabilitation Research - E-Book: Principles and Applications by Russell Carter, Jay Lubinsky, et al. (2015) 4. Foundations of Clinical Research by Leslie Gross Portney (2020) 5. Essentials of Research Methodology for all Physiotherapy and Allied Health Sciences Students by Ramalingam Thangamani A (2018) 				

Manipal College of Health Professions								
Name of the Department	Physiotherapy							
Name of the Program	Master of Physiotherapy (Neurosciences)							
Course Title	Principles of Physiotherapy Practice							
Course Code	PTH6001							
Academic Year	First							
Semester	I							
Number of Credits	03							
Course Prerequisite	Students should have basic knowledge and skills in physiotherapy practice							
Course Synopsis	The course will provide information about principles of evaluation and management of people with musculoskeletal, neurological, cardiorespiratory, paediatric, women health and geriatric disorders to apply basic and applied sciences in the evaluation and management. This course will also help the students to gain insights regarding standards of physiotherapy practice in the institution and community healthcare settings. This course will be delivered in the form of lectures, tutorials, and self-directed learning. Theory examination will be used to assess the students' transferable skills and the learning outcomes.							
Course Outcomes (COs)								
At the end of the course student shall be able to:								
CO1	Outline the guidelines for standards of physiotherapy practice (C4)							
CO2	Explain disability, models of disability and disability evaluation (C4)							
CO3	Explain the biomechanics, physiology and control of human movement (C4)							
CO4	Outline the principles of physiotherapy evaluation and treatment in various diseases and disorders relevant to physiotherapy practice (C4)							
CO5	Explain the process of clinical reasoning and decision making in physiotherapy practice (C4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x							x
CO2	x							
CO3	x							
CO4	x					x		
CO5	x					x		

Course Content and Outcomes:

Content	Competencies	Number of Hours
Unit 1		
Standards of physiotherapy practice	1. Outline the national and international guidelines for standards of physiotherapy practice (C4)	01
Unit 2		
Disability and evaluation	1. Explain disability (C4) 2. Distinguish between different models of disability (C4) 3. Explain disability evaluation (C4)	02
Unit 3		
Development of Posture and Movement across life span	1. Explain the development of postural control across life span (C4) 2. Explain the development of movement across life span (C4) 3. Explain the development and maturation of reflexes (C4)	02
Unit 4		
Biomechanics	1. Outline the biomechanics of TMJ, Joints of Thorax, Spine and Pelvis, Joints of Upper and Lower Extremity (C4)	01
Unit 5		
Exercise Physiology	1. Explain the acute responses and chronic adaptations to exercise (C4) 2. Explain the principles of exercise testing and prescription (C2)	03
Unit 6		
Pain	1. Explain the physiology of pain (C4) 2. Distinguish between different mechanisms of pain control (C4) 3. Categorize the strategies of pain management (C4)	01
Unit 7		
Neurophysiology of balance, coordination and locomotion	1. Explain the neurophysiology of balance and coordination (C4) 2. Explain the neurophysiology of locomotion (C4)	02
Unit 8		
Theories of Motor control and Motor Learning	1. Explain motor control (C4) 2. Compare and contrast between different theories of Motor control (C4)	02

Content	Competencies	Number of Hours
	3. Explain motor learning and theories of Motor Learning (C4)	
Unit 9		
Principles of physiotherapy evaluation	1. Outline the principles of musculoskeletal, neurological, and cardiopulmonary evaluation (C4) 2. Outline the special considerations for physiotherapy evaluation in children, women and older adults (C4) 3. Outline the evaluation protocols for physical fitness (C4) 4. Explain the principles of diabetic foot examination (C4)	08
Unit 10		
Gait	1. Distinguish between normal and pathological gait (C4) 2. Explain the methods of gait analysis (C4)	01
Unit 11		
Principles and applications of Electrodiagnosis	1. List the electrodiagnostic methods (C4) 2. Explain the principles of electrodiagnostic testing methods (C4) 3. Outline the clinical applications of electrodiagnostic methods (C4)	01
Unit 12		
Outcome Measures in Physiotherapy	1. Categorize the outcome measures based on body structure and function, activity and participation domains of ICF (C4) 2. Explain the psychometric properties of commonly used outcome measures (C4) 3. Explain the method of administration and interpretation of commonly used outcome measures (C4)	03
Unit 13		
Clinical investigations relevant to Physiotherapy practice	1. Choose the clinical investigations relevant to Physiotherapy practice (C3): Imaging; Biochemical; Electrophysiological; and systemic functional tests 2. Interpret the findings in clinical investigations relevant to Physiotherapy practice (C2)	02
Unit 14		
Physiotherapy treatment approaches	1. Outline the principles of physiotherapy treatment approaches including manual therapy, neurological, paediatric and	02

Content	Competencies	Number of Hours
	cardiopulmonary rehabilitation (C4)	
Unit 15		
Therapeutic electrophysical agents	1. Categorize therapeutic electrophysical agents (C4) 2. Explain the physiological and therapeutic uses, applications and rationale of electrophysical agents (C4)	01
Unit 16		
Community Based Rehabilitation	1. Explain the principles of Community Based Rehabilitation (C4)	01
Unit 17		
Clinical Reasoning / clinical decision making in physiotherapy practice	1. Outline the models of clinical reasoning (C2) 2. Explain the processes involved in clinical decision making (C2) 3. Explain the principles of evidence based practice in physiotherapy (C2)	02
Unit 18		
Universal Precautions	1. Apply the universal precautions for infection control in physiotherapy practice (C3)	01
Unit 19		
Wound care	1. Explain the principles of tissue healing & physiotherapy assessment and management for wound care (C4)	01
Unit 20		
Prosthetics and Orthotics	1. Explain the principles of prosthetic and orthotic prescription (C4) 2. List the types, uses, advantages and disadvantages of upper limb, lower limb and spinal orthosis and prosthesis (C4)	02
Total		39

Learning Strategies, Contact Hours and Student Learning Time (SLT)

Learning Strategies	Contact Hours	Student Learning Time (SLT)
Lecture	13	26
Seminar	26	52
Total	39	78
Assessment Methods		
Formative	Summative	
Presentations	Sessional Exam (theory)	

Mapping of Assessment with COs						
Nature of Assessment		CO1	CO2	CO3	CO4	CO5
Sessional Examination		X	X	X	X	X
Assignments/Presentations		X	X	X	X	X
Feedback Process	Mid-Semester Feedback					
	End-Semester Feedback					
Main Reference	<ol style="list-style-type: none"> 1. Albrecht GL, Seelman KD, Bury M, editors. Handbook of disability studies. Sage Publications; 2001 May 24. 2. Bélanger AY. Therapeutic electrophysical agents: evidence behind practice. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2010. 3. Boissonnault WG, editor. Examination in physical therapy practice: screening for medical disease. New York, NY: Churchill Livingstone; 1995 Jun. 4. Braddom's Physical Medicine and Rehabilitation by Cifu David X et al; 5th Ed, Elsevier (2016) 5. Brandt Jr EN, Pope AM. Models of disability and rehabilitation. 6. Cech DJ, Martin ST. Functional movement development across the life span. Elsevier Health Sciences; 2002 Mar 29. 7. Dittmar SS, Gresham GE, editors. Functional assessment and outcome measures for the rehabilitation health professional. Aspen Pub; 1997. 8. Enderby P, John A, Petheram B. Therapy outcome measures for rehabilitation professionals: speech and language therapy, physiotherapy, occupational therapy. John Wiley & Sons; 2013 May 31. 9. Essentials of Exercise Physiology by William McArdle et al; Wolters Kluwer Health Inc (2016) 10. Exercise Physiology: Energy, Nutrition and Human Performance by William McArdle, Frank I. Katch, Victor K. Katch; 7th edition (2010) 11. Hausdorff JM, Alexander NB, editors. Gait disorders: evaluation and management. Taylor & Francis US; 2005 Jul 15. 12. Haywood K, Getchell N. Life Span Motor Development 6th Edition. Human Kinetics; 2014 Jul 21. 13. Levangie PK, Norkin CC. Joint structure and function: a comprehensive analysis. FA Davis; 2011. 14. Magee DJ. Orthopedic physical assessment. Elsevier Health Sciences; 2014. 15. McMahon SB, Koltzenburg M, Tracey I, Turk D. Wall & Melzack's Textbook of Pain E-Book. Elsevier Health Sciences; 2013. 16. MCSP PM. Standards of Physiotherapy Practice. 17. Misra UK; et al. Principles of Neurophysiology. Elsevier Health Sciences; 2010 18. Neumann DA. Kinesiology of the Musculoskeletal System-E-Book: Foundations for Rehabilitation. Elsevier Health Sciences; 2013. 19. Nordin M, Frankel VH, editors. Basic biomechanics of the musculoskeletal system. Lippincott Williams & Wilkins; 2001. 20. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA 					

	<p>Davis; 2013 Jul 23.</p> <ol style="list-style-type: none">21. Perry J. Gait analysis. Normal and pathological function. 2010:19-47.22. Shumway-Cook A, Woollacott MH. Motor control: translating research into clinical practice. Lippincott Williams & Wilkins; 2007.23. Shurr DG, Michael JW, Cook TM. Prosthetics and orthotics. Upper Saddle River: Prentice Hall; 2002.24. Siegelbaum SA, Hudspeth AJ. Principles of neural science. Kandel ER, Schwartz JH, Jessell TM, editors. New York: McGraw-hill; 2000 Jan.25. Uustal H. Prosthetics and orthotics. In Essential Physical Medicine and Rehabilitation 2006 (pp. 101-118). Humana Press.26. Wadsworth H, Chanmugam AP. Electrophysical agents in physiotherapy: therapeutic & diagnostic use. Science Press; 1983.27. Woollacott MH, Shumway-Cook A. Changes in posture control across the life span—a systems approach. Physical therapy. 1990 Dec 1;70(12):799-807.28. World Confederation for Physical Therapy. WCPT guideline for standards of physical therapy practice.29. Related scientific publications <p>NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well</p>
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Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Clinical Practice in Physiotherapy						
Course Code		PTH6003						
Academic Year		First						
Semester		I						
Number of Credits		12						
Course Prerequisite		Students should have basic knowledge and skills in physiotherapy practice						
Course Synopsis		<p>The course will provide information about principles of evaluation and management of people with musculoskeletal, neurological, cardiorespiratory, paediatric, women health and geriatric disorders to apply basic and applied sciences in the evaluation and management. This course will also help the students to gain insights regarding standards of physiotherapy practice in the institution and community healthcare settings. This course will be delivered in the form of practical demonstrations, tutorials, self-directed learning, problem based learning and case based learning. Practical examination will be used to assess the students' transferable skills and the learning outcomes.</p>						
Course Outcomes (COs)								
At the end of the course student shall be able to:								
CO1	Perform physiotherapy assessment and evaluation in people with diseases and disorders (C4, P4, A2)							
CO2	Perform physiotherapy techniques in people with diseases and disorders to improve health and wellbeing (C4, P4, A2)							
CO3	Recognize and relate the processes involved in clinical decision making in physiotherapy evaluation and treatment (C4, P1, A1)							
CO4	Follow ethical and professional behavior (Autonomy, beneficence, justice) during clinical practice and demonstrates the ability to work as a team (A3)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		X		X				
CO2		X		X				
CO3		X				X		
CO4		X		X				

Course Content and Outcomes:

Content	Competencies	Number of Hours
Unit 1		
Physiotherapy evaluation in clinical practice	<ol style="list-style-type: none"> 1. Perform musculoskeletal, neurological, and cardiopulmonary physiotherapy evaluation (C4, P4, A2) 2. Explain the special considerations for physiotherapy evaluation in children, women and older adults and display the assessment techniques (C4, P3, A1) 3. Explain the evaluation protocols for physical fitness and measure physical fitness (C4, P3, A1) 4. Explain and demonstrate the components of diabetic foot examination (C4, P2, A1) 5. Explain the methods of analysis and perform posture, balance and gait evaluation (C4, P4, A1) 6. Examine pain and perform pain assessment (C4, P4, A2) 7. Explain and demonstrate the components of physiotherapy assessment in wound care (C4, P2, A1) 8. Choose the outcome measures based on Impairment, activity and participation domains of ICF in the clinical practice (C4, P1, A1) 9. Discuss and display the method of administration of the commonly used outcome measures and interpret it (C4, P3, A1) 10. Choose the clinical investigations relevant to Physiotherapy practice (C3, P1, A1): Imaging; Biochemical; Electrophysiological; and systemic functional tests 11. Identify and interpret the findings in clinical investigations relevant to Physiotherapy practice (C2, P1, A1) 12. Recognize and relate the processes involved in clinical decision making in physiotherapy evaluation (C4, P1, A1) 13. Explain health related information with clients, caregivers, peers and health care professionals and demonstrates the ability to work as a team during evaluation (C4, P5, A3) 14. Demonstrate ethical and professional behavior (Autonomy, beneficence, justice) during physiotherapy evaluation (A3) 	234

Content	Competencies	Number of Hours
Unit 2		
Physiotherapy management in clinical practice	<ol style="list-style-type: none"> 1. Perform physiotherapy techniques in clinical practice including musculoskeletal, neurological, and cardiopulmonary rehabilitation (C4, P4, A2) 2. Explain the special considerations for physiotherapy management in children, women and older adults and display the treatment techniques (C4, P3, A1) 3. Explain the protocols for maintaining and improving physical fitness (C4, P2, A1) 4. Explain the principles of diabetic foot management (C4, P2, A1) 5. Explain the principles of posture, balance and gait rehabilitation and perform treatment techniques to train posture, balance and gait (C4, P4, A1) 6. Categorize and perform the strategies of pain management (C4, P4, A2) 7. Display the method of application of therapeutic electrophysical agents in the clinical practice (C4, P4, A1) 8. Explain the principles of physiotherapy management in wound care (C4, P2, A1) 9. Follow the universal precautions for infection control in physiotherapy practice (C3, P3, A1) 10. Recognize and relate the processes involved in clinical decision making in physiotherapy management (C4, P1, A1) 11. Explain health related information with clients, caregivers, peers and health care professionals and demonstrates the ability to work as a team during treatment (C4, P5, A3) 12. Demonstrate ethical and professional behavior (Autonomy, beneficence, justice) during treatment (A3) 	234
Total		468

Learning Strategies, Contact Hours and Student Learning Time (SLT)					
Learning Strategies	Contact Hours	Student Learning Time (SLT)			
Self-directed learning (SDL)	36	72			
Case Based Learning (CBL)	28	56			
Clinic	360	-			
Practical	28	56			
Assessment	16	32			
Total	468	216			
Assessment Methods					
Formative		Summative			
Case Presentations		-			
Clinical performance		-			
Mapping of Assessment with COs					
Nature of Assessment		CO1	CO2	CO3	CO4
Assignments/Presentations		x	x	x	
Clinical competency		x	x	x	x
Feedback Process	Mid-Semester Feedback				
	End-Semester Feedback				
Main Reference	<p>Albrecht GL, Seelman KD, Bury M, editors. Handbook of disability studies. Sage Publications; 2001 May 24.</p> <ol style="list-style-type: none"> 1. Bélanger AY. Therapeutic electrophysical agents: evidence behind practice. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2010. 2. Boissonnault WG, editor. Examination in physical therapy practice: screening for medical disease. New York, NY: Churchill Livingstone; 1995 Jun. 3. Braddom's Physical Medicine and Rehabilitation by Cifu David X et al; 5th Ed, Elsevier (2016) 4. Brandt Jr EN, Pope AM. Models of disability and rehabilitation. 5. Cech DJ, Martin ST. Functional movement development across the life span. Elsevier Health Sciences; 2002 Mar 29. 6. Dittmar SS, Gresham GE, editors. Functional assessment and outcome measures for the rehabilitation health professional. Aspen Pub; 1997. 7. Enderby P, John A, Petheram B. Therapy outcome measures for rehabilitation professionals: speech and language therapy, physiotherapy, occupational therapy. John Wiley & Sons; 2013 May 31. 8. Essentials of Exercise Physiology by William McArdle et al; Wolters Kluwer Health Inc (2016) 9. Exercise Physiology: Energy, Nutrition and Human Performance by William McArdle, Frank I. Katch, Victor K. Katch; 7th edition (2010) 				

10. Hausdorff JM, Alexander NB, editors. Gait disorders: evaluation and management. Taylor & Francis US; 2005 Jul 15.
11. Haywood K, Getchell N. Life Span Motor Development 6th Edition. Human Kinetics; 2014 Jul 21.
12. Levangie PK, Norkin CC. Joint structure and function: a comprehensive analysis. FA Davis; 2011.
13. Magee DJ. Orthopedic physical assessment. Elsevier Health Sciences; 2014.
14. McMahon SB, Koltzenburg M, Tracey I, Turk D. Wall & Melzack's Textbook of Pain E-Book. Elsevier Health Sciences; 2013.
15. MCSP PM. Standards of Physiotherapy Practice.
16. Misra UK; et al. Principles of Neurophysiology. Elsevier Health Sciences; 2010
17. Neumann DA. Kinesiology of the Musculoskeletal System- E-Book: Foundations for Rehabilitation. Elsevier Health Sciences; 2013.
18. Nordin M, Frankel VH, editors. Basic biomechanics of the musculoskeletal system. Lippincott Williams & Wilkins; 2001.
19. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.
20. Perry J. Gait analysis. Normal and pathological function. 2010:19-47.
21. Shumway-Cook A, Woollacott MH. Motor control: translating research into clinical practice. Lippincott Williams & Wilkins; 2007.
22. Shurr DG, Michael JW, Cook TM. Prosthetics and orthotics. Upper Saddle River: Prentice Hall; 2002.
23. Siegelbaum SA, Hudspeth AJ. Principles of neural science. Kandel ER, Schwartz JH, Jessell TM, editors. New York: McGraw-hill; 2000 Jan.
24. Uustal H. Prosthetics and orthotics. In Essential Physical Medicine and Rehabilitation 2006 (pp. 101-118). Humana Press.
25. Wadsworth H, Chanmugam AP. Electrophysical agents in physiotherapy: therapeutic & diagnostic use. Science Press; 1983.
26. Woollacott MH, Shumway-Cook A. Changes in posture control across the life span—a systems approach. Physical therapy. 1990 Dec 1;70(12):799-807.
27. World Confederation for Physical Therapy. WCPT guideline for standards of physical therapy practice.
28. Related scientific publications

NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well

Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Research Proposal in Neurosciences Physiotherapy						
Course Code		PTH6570						
Academic Year		First						
Semester		I						
Number of Credits		02						
Course Prerequisite		Students should have basic knowledge in research methodology						
Course Synopsis		The course is designed to have the student understand the nuances in developing and presenting a research protocol. It will facilitate the student to inculcate skills essential to the identification of a research gap of clinical relevance through a systematic literature search. This course will facilitate the application of research methodology towards the development of a research plan and the use of appropriate outcomes to prove the hypothesis. The course will also equip the student with the knowledge on scientific approvals required prior to initiation of the study in accordance to current regulations for the conduct of the research project.						
Course Outcomes (COs)								
At the end of the course student shall be able to:								
CO1	Demonstrate literature search and develop need for the study (C5, P5)							
CO2	Prepare a research proposal and justifies its rationale (C5, P4, A3)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x	x						
CO2		x			x			

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Formulation of research question	1. Prepare search strategy and demonstrate Literature Search (C5, P5) 2. Critically appraise the literature, identify research gap and need for the study (C3, P4)	10

Content	Competencies	Number of Hours
Unit 2		
Method selection	1. Choose appropriate study design for the research question (C5, P1) 2. Organize procedural steps for implementing the study (C3, P4)	08
Unit 3:		
Outcome measures	1. Choose appropriate outcome measure based on research question and psychometric properties (C5, P1) 2. Comply with the process of obtaining permission to use outcome measures from sources/ developers (A2)	08
Unit 4		
Research proposal document	1. Prepare a research proposal document (P4) 2. Choose appropriate statistical tools and tests (C5)	13
Unit 5		
Scientific Approvals	1. Proposes research protocol to relevant scientific committee(s) (P5, A3) 2. Justifies the need and rationale for the study to the committee (C5,P4, A3)	13
Total		52

Learning Strategies, Contact Hours and Student Learning Time (SLT)		
Learning Strategies	Contact Hours	Student Learning Time (SLT)
Small Group Discussion (SGD)	06	12
Self-directed learning (SDL)	42	-
Assessment	04	08
Total	52	20
Assessment Methods		
Formative	Summative	
Research progress and conduct	-	
Presentation	-	
Mapping of Assessment with COs		
Nature of Assessment	CO1	CO2
Viva	x	x
Presentations	x	x
Clinical/Practical Log Book/ Record Book	x	x

Feedback Process	Presentation
Main References	<ol style="list-style-type: none"> 1. Research for Physiotherapists: Project Design and Analysis –Caroline Hicks. 2. Foundations of Clinical Research by Leslie Gross Portney 3. Tests, Measurements and Research in Behavioural Sciences by A K Singh 4. Physical Therapy Research: Principles and Applications by Elizabeth Domholdt 5. Rehabilitation Research - E-Book: Principles and Applications by Russell Carter, Jay Lubinsky, et al. 6. Essentials of Research Methodology for all Physiotherapy and Allied Health Sciences Students by Ramalingam Thangamani A <p>NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well</p>

SEMESTER - II

COURSE CODE	:	COURSE TITLE
EPG6201	:	Ethics and Pedagogy
PTH6502	:	Foundations of Physiotherapy in Neurosciences
PTH6504	:	Physiotherapy Clinical Practice in Neurosciences - I
PTH6580	:	Research Progress in Neurosciences - I

Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Ethics and Pedagogy						
Course Code		EPG6201						
Academic Year		First						
Semester		II						
Number of Credits		02						
Course Prerequisite		NIL						
Course Synopsis		<p>The ethics module will help the post graduate students in understanding the ethical principles, identifying the ethical issues and resolving ethical dilemmas in their professional practice with specific focus on clinical and research ethics.</p> <p>The pedagogy of the module will help the post graduate students in understanding the educational philosophy, teaching learning methods and learners' assessment. This module will be delivered in the form of didactic lectures in workshop format and small group learning tutorials, seminars, demonstrations during practical sessions, problem based learning & self-directed learning. Theory examination, assignments and demonstrations will be used to assess the student's transferable skills and learning outcomes.</p>						
Course Outcomes (COs): At the end of the course student shall be able to:								
CO1	Apply ethical principles in clinical and research practice (C3)							
CO2	Analyse ethical issues and resolve ethical dilemmas (C4)							
CO3	Integrate principles of adult learning and various roles of teacher in their academic practice (C2)							
CO4	Apply various teaching learning methods (C3, P4)							
CO5	Assess students' achievements based on learning outcomes (C3)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x			x				
CO2	x			x				
CO3	x			x				
CO4	x	x						
CO5	x			x				

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1: Ethics		
<p>Principles of ethics History and evolution of ethics - Helsinki declaration; Nuremberg Code; Principles of ethics and its importance - Autonomy, Beneficence, Non-maleficence, Justice</p>	<ol style="list-style-type: none"> 1. Outline the history and evolution of bioethics (C2) 2. Explain the cardinal principles of bioethics (C2) 3. Apply national and international bioethical principles (C3) 	2
<p>Ethics in professional practice Principles of practice in respective profession. Privacy, confidentiality, shared decision making, informed consent, equality and equity, justice</p>	<ol style="list-style-type: none"> 1. Outline the principles of ethics in professional practice - clinical, research, academics, administrative domains (C2) 2. Apply the principles of ethics in professional practice (C3) 	
<p>ICMR Guidelines General principles, Responsible conduct of research, Risk benefit assessment</p>	<ol style="list-style-type: none"> 1. Outline the general principles of ethics for conduct of research based on ICMR guidelines (C2) 2. Summarize the characteristics for responsible conduct of research (C2) 3. Identify potential ethical issues based on risk benefit analysis (C3) 	3
<p>Informed Consent Process Components of informed consent document, Procedure in obtaining informed consent, Special situations, waivers, and proxy consent</p>	<ol style="list-style-type: none"> 1. Explain the components and procedures of informed consent process (C2) 2. Apply suitable methods in obtaining informed consent (C3) 3. Distinguish special considerations of informed consent process for waivers and proxy consent (C4) 	
<p>Roles and Responsibilities of IEC Ethical Review process, Classification of projects for review, Roles and responsibilities of members, Communications with investigators and authorities</p>	<ol style="list-style-type: none"> 1. Outline the process of ethical review of research proposals (C2) 2. Relate the types of review based on the research project proposals (C2) 3. Summarize the roles and responsibilities of IEC and its members (C2) 4. Organize the mock ethical review meeting (C3) and examine the research proposal for ethical issues (C4) 	2

Content	Competencies	Number of Hours
<p>Ethics in Special and Vulnerable Populations Types of Vulnerability and vulnerable population, Challenges for research in vulnerable population, Guidelines for research in special and vulnerable population</p>	<ol style="list-style-type: none"> 1. Define and explain the types of Vulnerability (C2) 2. Outline the characteristics of special and vulnerable population (C2) 3. Summarize the challenges for research in vulnerable population (C2) 4. Apply the ICMR guidelines for research in special and vulnerable population (C3) 	2
<p>Conflict of Interest Definition and Types of Conflict of Interest, Identifying, mitigating and managing Conflict of Interest, Conflicts of interest in international collaborations</p>	<ol style="list-style-type: none"> 1. Define and explain the types of Conflict of Interest (C2) 2. Identify and solve potential Conflict of Interest (C3) 	3
<p>Publication Ethics Importance of publishing, Authorship guidelines according to ICMJE, Plagiarism</p>	<ol style="list-style-type: none"> 1. List the importance of publishing scholarly works (C4) 2. Examine the criteria of authorship based on ICMJE guidelines (C4) 3. Test the publication for plagiarism (C4) 	
Unit 2: Pedagogy		
<p>Principles of adult learning Systems approach in education; Curriculum - Definition, Components, Types of Curriculum (Outcomes-based, Competency-based, Performance-based, Objectives-based), Curricular alignment, Integrated Curriculum, Frameworks, Models (Harden's SPICES model) and approaches (problems-based learning, case-based learning).</p>	<ol style="list-style-type: none"> 1. Relate 'Systems Approach' in education (C2) 2. Define and explain the components of curriculum (C2) 3. Outline the types of curricular frameworks (C2) 4. Identify the characteristics of curricular frameworks (C3) 	2
<p>Taxonomy of learning Blooms Taxonomy: Knowledge, Psychomotor</p>	<ol style="list-style-type: none"> 1. Classify domains of learning (C2) 2. Distinguish the levels of mastery for each learning domains (C4) 	2

Content	Competencies	Number of Hours
and Affective domains, Specific Learning Objectives - Elements, construction, mapping of SLOs to course outcomes.	3. Outline the elements of specific learning objectives (C3) 4. Organize specific learning objectives based on domains of learning (C3)	
Teaching Methods Small Group Teaching: Group dynamics, Categories of SGT, Facilitating techniques, Generic & Specific SGT methods Large Group Teaching: Lectures	1. Outline small group teaching methods (C3) 2. Explain the generic and specific methods of small group teaching (C3) 3. Outline large group teaching methods (C3) 4. Explain the facilitation methods in large group lectures (C3) 5. Perform microteaching (P4)	5
Learner Assessment Principles, Characteristics and Types of assessment - Formative/Summative, Tools, Blueprinting	1. Outline the principles, characteristics and types of assessment (C3) 2. Identify appropriate tools for assessment. (C3) 3. Construct a blueprint of assessment for theory and practical exam (C3)	5
Total		26

Learning Strategies, Contact Hours and Student Learning Time (SLT)		
Learning Strategies	Contact Hours	Student Learning Time (SLT)
Lecture	13	26
Seminar	-	-
Small group discussion (SGD)	09	18
Assignment / Microteaching	04	08
Total	26	52

Assessment Methods					
Formative	Summative				
Unit A	Unit A				
Assignments – Clinical Ethics (10); Research Ethics (10);	Sessional Exam: 30 MCQs = 30 marks				
Unit B	Unit B				
Assignments – Blueprinting (10)	Sessional Exam: 20 MCQs = 20 marks				
Presentations – Microteaching sessions (20)					
Mapping of Assessment with COs					
Nature of Assessment	CO1	CO2	CO3	CO4	CO5
Mid Semester Examination	X	X	X	X	X
Assignments/Presentations	X	X	X	X	X

Feedback Process	Mid-Semester Feedback
	End-Semester Feedback
Main References	<p>UNIT 1: Ethics</p> <ol style="list-style-type: none"> 1. Beauchamp and Childress, Principles of Biomedical Ethics, Fourth Edition. Oxford. 1994. 2. Patricia A Marshall. Ethical challenges in study design and informed consent for health research in resource poor settings. World Health Organization. 2007. 3. National Ethical guidelines for Biomedical and Health Research involving human participants. Indian Council of Medical Research. 2017. <p>UNIT 2: Pedagogy</p> <ol style="list-style-type: none"> 1. ABC of Learning and Teaching in Medicine. Editor(s): Peter Cantillon, Diana Wood, Sarah Yardley. Ed: 3 2. Understanding Medical Education: Evidence, Theory, and Practice, Editor(s): Tim Swanwick Kirsty Forrest Bridget C. O'Brien. Ed 3 3. Principles of Medical Education. Editor(s): Tejinder Singh, Piyush Gupta, Daljit Singh. Jaypee Brothers. 2012. NewDelhi.
Additional References	NIL

Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Foundations of Physiotherapy in Neurosciences						
Course Code		PTH6502						
Academic Year		First						
Semester		II						
Number of Credits		03						
Course Prerequisite		Students should integrate basic neuroanatomy and neurophysiology knowledge in evaluation and management of people with neurological disorders.						
Course Synopsis		The course is designed to enable students to understand applied neuroanatomy and neurophysiology of central and peripheral nervous systems along with the mechanisms of control of movement, motor learning, neural plasticity and brain recovery. Additionally, the course emphasizes the pathophysiology of tonal dysfunctions and electrophysiology of neuromuscular system, as well as the investigations in neurological conditions.						
Course Outcomes (COs):								
At the end of the course student shall be able to								
CO1	Explain the applied neuroanatomy and neurophysiology of central and peripheral nervous systems and relate to the control of movement (C4)							
CO2	Explain the reflex maturation and neurodevelopment of milestones across life span (C4)							
CO3	Explain the mechanisms of neural plasticity and apply the motor control and motor learning principles in brain recovery (C4)							
CO4	Distinguish the pathophysiology of tonal dysfunctions and explain the electrophysiology of neuromuscular system (C4)							
CO5	Infer and Interpret various investigations used in neurological conditions and correlate to clinical findings (C4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x							
CO2	x							
CO3	x							
CO4	x							
CO5	x							

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Neuroanatomy and Neurophysiology of sensory system and special senses	<ol style="list-style-type: none"> 1. Classify sensory systems and explain the structure and function of each sensory system (C2) 2. Classify the special senses and explain the structure and function of each special sense (C2) 3. Relate the role of sensory system and special senses on the control of movement (C4) 	1
Unit 2		
Neuroanatomy and Neurophysiology of spinal cord and its connections	<ol style="list-style-type: none"> 1. Outline the gross anatomy, location of spinal cord and its connections (C2) 2. Illustrate the cross-sectional anatomy of spinal cord at cervical, thoracic and lumbar levels (C2) 3. Explain the structure and functions of grey matter and white matter of spinal cord (C2) 4. Summarise the structure and function of the reflex arc (C2) 5. Distinguish the structure and function of the ascending and descending tracts located in the white column (C4) 	1
Unit 3		
Neuroanatomy and Neurophysiology of Brainstem and its Connections	<ol style="list-style-type: none"> 1. Outline the gross anatomy and location of brainstem (C2) 2. Illustrate the cross-sectional anatomy of medulla, pons and midbrain (C2) 3. Identify the location and connections of cranial nerve nuclei, reticular nuclei, respiratory and cardiac centers at brainstem (C3) 4. Distinguish the pyramidal and extrapyramidal connections and its function in the brainstem (C4) 	1
Unit 4		
Neuroanatomy and neurophysiology of Cerebellum	<ol style="list-style-type: none"> 1. Outline the gross anatomy and location of cerebellum (C2) 2. Explain the structure and function of cerebellum (C2) 3. Identify the role of deep cerebellar nuclei on the control of movement (C3) 4. Outline the afferent and efferent connections of cerebellum and its function (C4) 	1

Content	Competencies	Number of Hours
Unit 5		
Neuroanatomy and neurophysiology of Cerebrum, Basal ganglia, Limbic system and Diencephalon	1. Explain the anatomy and function of cerebrum (C2) 2. Illustrate the structural and functional divisions of cerebral cortex 3. Explain the anatomy, and physiological connections of basal ganglia and internal capsule (C2) 4. Explain the anatomy and physiology of diencephalon (C2) 5. Outline the anatomy and physiology of limbic system (C2) 6. Outline the role of Cerebrum, Basal ganglia, Limbic system and Diencephalon on the control of movement (C4)	1
Unit 6		
Neuroanatomy and Neurophysiology of Cranial and Spinal Nerves	1. Identify the origin and course of cranial nerves and explain their function (C3) 2. Identify the origin and course of spinal nerves and explain their function (C3) 3. Illustrate the formation of brachial plexus and lumbar plexus and muscles supplied by the spinal nerves (C2)	1
Unit 7		
Neuroanatomy and Neurophysiology of Autonomic Nervous System	1. Explain the anatomy and physiological functioning of sympathetic and parasympathetic nervous system (C2) 2. Explain the role of ANS in cardiorespiratory system, bladder and bowel control (C2)	1
Unit 8		
Neuroanatomy and Neurophysiology of Circulation of Brain, Fluid Compartments and Fluid Balance in the Central Nervous System, and Blood Brain Barriers	1. Illustrate the carotid, basilar circulation, and formation of circle of Willis (C2) 2. Identify the areas of brain supplied by carotid and vertebro-basilar circulation (C3) 3. Explain the composition, production, circulation, absorption and function of cerebrospinal fluid (C2) 4. Explain the role of blood brain barriers (C2)	2
Unit 9		
Neural control of Posture, Voluntary movement and Locomotion	1. Explain the mechanism of normal postural control (C4) 2. Explain the neurophysiology of voluntary movement (C4)	4

Content	Competencies	Number of Hours
	3.Explain the neurophysiology of locomotion (C4) 4. Summarize the role of various systems on human locomotion (C4)	
Unit 10		
Neuroanatomy and Neurophysiology of Vestibular system	1. Outline the anatomy, and physiology of Vestibular system (C2) 2. Compare central and peripheral vestibular system (C2) 3. Illustrate the afferent and efferent connections of the vestibular nuclei (C2) 4. Explain the role of vestibular system on gaze stability and postural control (C4)	2
Unit 11		
Normal Neuromotor development across the life span	1. Summarise the intrauterine development of nervous system (C2) 2. Outline the theories of motor development (C4) 3. Outline the developmental milestones and its progression (C4)	4
Unit 12		
Reflex Maturation-Neurophysiological Basis	1. Identify the basic neonatal reflexes and their impact on milestone development (C3) 2. Infer and interpret the neonatal reflex integration (C2) 3. Examine the neuromotor development based on the reflex maturation (C4)	4
Unit 13		
Clinical applications of Motor Control and Motor Learning	1. Distinguish the theories of motor control and relate them to motor control dysfunctions(C4) 2. Apply the theories of motor learning for recovery of function (C3)	4
Unit 14		
Neural plasticity and Brain recovery mechanisms	1. Explain the mechanism of functional changes and brain recovery (C4) 2. Apply the principles of experience dependent brain plasticity and distinguish from spontaneous recovery (C4)	3
Unit 15		
Pathophysiology of tonal dysfunctions	1. Distinguish the physiology of normal and abnormal muscle tone (C4) 2. Compare and contrast the characteristics of tonal dysfunctions (C2) 3. Select the evaluation tool for measuring tonal dysfunction (C3)	3

Content	Competencies	Number of Hours
Unit 16		
Basics in Electrophysiology of nerve and muscle	1. Explain the properties and resting membrane potential of nerve and muscle (C2) 2. Illustrate the anatomy of neuromuscular junction and explain its synaptic transmission (C2) 3. Explain the generation, propagation of action potential across nerve, and sliding filament theory of muscle contraction (C2)	2
Unit 17		
Investigations in Neurology: Indications, Interpretations and correlation to clinical findings	1. Outline the indications and normal findings of investigation procedures used in neurological conditions (C4) 2. Infer and interpret the blood and cerebrospinal fluid (CSF) examination among neurological conditions (C4) 3. Infer and Interpret the radiographs, Computer Tomography (CT) and Magnetic Resonance Imaging (MRI) of brain and spinal cord (C4) 4. Infer the report of Electroencephalogram (EEG) (C4)	4
Total		39

Learning Strategies, Contact Hours and Student Learning Time (SLT)

Learning Strategies	Contact Hours	Student Learning Time (SLT)
Lecture	13	26
Seminar	8	16
Small group discussion (SGD)	12	24
Problem Based Learning (PBL)	2	4
Case Based Learning (CBL)	4	8
Total	39	78

Assessment Methods

Formative	Summative
Presentations (Seminars)	Mid Semester/Sessional Exam (Theory)
	End Semester Exam (Theory)

Mapping of Assessment with COs

Nature of Assessment	CO1	CO2	CO3	CO4	CO5
Mid Semester / Sessional Examination 1	x	x	x		
Presentations	x	x	x	x	
End Semester Exam	x	x	x	x	x

Feedback Process	Mid-Semester Feedback
	End-Semester Feedback
Main Reference	<ol style="list-style-type: none"> 1. Barnes MR, Crutchfield CA, Heriza CB, Herdman SJ. Reflex and vestibular aspects of motor control, motor development and motor learning. Atlanta, GA: Stokesville Publishing Company. 1990:250-3. 2. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005. 3. Carpenter MB. Core text of neuroanatomy. Williams & Wilkins; 1985. 4. Cech DJ, Martin ST. Functional movement development across the life span. Elsevier Health Sciences; 2002 Mar 29. 5. Connolly BH, Montgomery P. Therapeutic exercise in developmental disabilities. Slack Incorporated; 2005. 6. Fredericks CM. Pathophysiology of the motor systems: principles and clinical presentations. Fredericks CM, Saladin LK, editors. Philadelphia, PA: FA Davis; 1996 Jan. 7. Kimura J. Electrodiagnosis in diseases of nerve and muscle: principles and practice. Oxford university press; 2001 Mar 15. 8. Latash ML. Neurophysiological basis of movement. Human Kinetics; 2008. 9. Levitt S. Treatment of cerebral palsy and motor delay. John Wiley & Sons; 2013 May 9. 10. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug. 11. Mancall EL, Brock DG. Gray's Clinical Neuroanatomy E-Book. Elsevier Health Sciences; 2011 Mar 21. 12. Misra UK; et al. Principles of Neurophysiology. Elsevier Health Sciences; 2010 13. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.

Manipal College of Health Professions								
Name of the Department	Physiotherapy							
Name of the Program	Master of Physiotherapy (Neurosciences)							
Course Title	Physiotherapy Clinical Practice in Neurosciences - I							
Course Code	PTH6504							
Academic Year	First							
Semester	II							
Number of Credits	12							
Course Prerequisite	Students should integrate basic neuroanatomy and neurophysiology knowledge in evaluation and management of people with neurological disorders.							
Course Synopsis	This course will enable students to apply fundamental knowledge in physiotherapy assessment and management of patients with neurological disorders. They will be able to demonstrate comprehensive assessment techniques, interpret findings and formulate and treatment plan.							
Course Outcomes (COs):								
At the end of the course student shall be able to:								
CO1	Plan a skilled and effective subjective and physical examination, select outcome measures, demonstrate clinical decision making and perform physiotherapy management of the individuals with adult and paediatric neurological disorders (C3, P5, A3)							
CO2	Apply and choose the appropriate outcome measures in the evaluation and management of adult and paediatric neurological dysfunction (C3, P5, A3)							
CO3	Discuss health related information and display verbal and written communication with patients/ clients, caregivers, peers and health care professionals and ability to work as a team (C3, P5, A3)							
CO4	Practice ethical principles during assessment and treatment (A4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x	x						
CO2	x	x						
CO3			x		x			
CO4				x	x			

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Physiotherapy evaluation of paediatric neurological conditions	<ol style="list-style-type: none"> 1. Demonstrate the basic neonatal reflexes and righting reactions in paediatric neurological disorders (C3, P5, A3) 2. Justify and analyse the developmental milestones underlying the reflex maturation of brainstem and subcortical structures: (C4, P5, A3) 3. Choose outcome measures relevant to neonate, infant and children with neuromotor and learning disability (C3, P5, A2) 4. Discuss health related information with parents, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 6. Demonstrate the clinical reasoning and decision making process for the management of the child based on the evaluation (C3, P5, A3) 7. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during evaluation (A4) 	156
Unit 2		
Neurological examination of adult neurological conditions	<ol style="list-style-type: none"> 1. Explain and perform the bedside assessment of higher mental function (C2, P4, A3) 2. Explain and perform the bedside assessment of cranial nerves (C2, P4, A3) 3. Explain and perform the superficial, deep and cortical sensory examination (C2, P4, A3) 4. Explain and perform the bedside motor assessment of tone, voluntary movement control and synergy (C2, P4, A3) 5. Explain and perform the assessment of superficial and deep reflex testing (C2, P4, A3) 6. Explain and perform equilibrium and non-equilibrium tests (C2, P4, A3) 7. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 8. Demonstrate the clinical reasoning and decision making process for the management of the patient based on the evaluation (C3, P5, A3) 	156

Content	Competencies	Number of Hours
	9. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during evaluation (A4)	
Unit 3		
ICF framework based Outcome measures in neurological rehabilitation	<ol style="list-style-type: none"> 1. Identify the psychometric properties of validated clinical outcome measures (C3, P5, A2) 2. Choose and apply the impairment-based outcome measures used in neurological conditions (C3, P5, A2) 3. Choose and apply the activity-based outcome measures used in neurological conditions (C3, P5, A2) 4. Choose and apply the participation-based outcome measures used in neurological conditions (C3, P5, A2) 5. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 6. Display ethical and professional behavior (Autonomy, Beneficence and Justice) during evaluation (A4) 	78
Unit 4		
Clinical decision-making process for the management of patients with neurological disorders for e.g., Hypothesis-Oriented Algorithm for Clinicians II (HOAC)	<ol style="list-style-type: none"> 1. Plan a comprehensive physical examination, demonstrate the Hypothesis-Oriented Algorithm for Clinicians II (HOAC) in making a clinical decision for managing patients with neurological dysfunction (C3, P5, A3) 2. Construct problem list and plan short term and long-term goals based on the evaluation findings (C3, P5, A3) 3. Determine the factors affecting the true sensorimotor recovery, and also identify the predictors of recovery prognosis (C3, P5, A3) 4. Plan and take part in performing physiotherapy treatment techniques underlying the principles of motor control, learning and brain plasticity in neurological conditions (C3, P5, A3) 5. Organise selecting and revising the treatment regime according to the recovery prognosis of the patient (C3, P5, A3) 6. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 	78

Content	Competencies	Number of Hours
	7. Displays ethical and professional behavior (Autonomy, Beneficence) and Justice) during evaluation (A4)	
Total		468

Learning Strategies, Contact Hours and Student Learning Time (SLT)				
Learning Strategies	Contact Hours	Student Learning Time (SLT)		
Self-directed learning (SDL)	36	72		
Case Based Learning (CBL)	28	56		
Clinic	360	-		
Practical	28	56		
Assessment	16	32		
Total	468	216		
Assessment Methods				
Formative	Summative			
Case presentations	-			
Clinical performance	-			
Mapping of Assessment with COs				
Nature of Assessment	CO1	CO2	CO3	CO4
Case Presentations	x	x	x	x
Clinical performance	x	x	x	x
Feedback Process	Mid-Semester Feedback			
	End-Semester Feedback			
Main Reference	1. Barnes MR, Crutchfield CA, Heriza CB, Herdman SJ. Reflex and vestibular aspects of motor control, motor development and motor learning. Atlanta, GA: Stokesville Publishing Company. 1990:250-3. 2. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005. 3. Carpenter MB. Core text of neuroanatomy. Williams & Wilkins; 1985. 4. Cech DJ, Martin ST. Functional movement development across the life span. Elsevier Health Sciences; 2002 Mar 29. 5. Connolly BH, Montgomery P. Therapeutic exercise in developmental disabilities. Slack Incorporated; 2005. 6. Fredericks CM. Pathophysiology of the motor systems: principles and clinical presentations. Fredericks CM, Saladin LK, editors. Philadelphia, PA: FA Davis; 1996 Jan. 7. Kimura J. Electrodiagnosis in diseases of nerve			

	<p>and muscle: principles and practice. Oxford university press; 2001 Mar 15.</p> <ol style="list-style-type: none">8. Latash ML. Neurophysiological basis of movement. Human Kinetics; 2008.9. Levitt S. Treatment of cerebral palsy and motor delay. John Wiley & Sons; 2013 May 9.10. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug.11. Mancall EL, Brock DG. Gray's Clinical Neuroanatomy E-Book. Elsevier Health Sciences; 2011 Mar 21.12. Misra UK; et al. Principles of Neurophysiology. Elsevier Health Sciences; 201013. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.
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Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Research Progress in Neurosciences - I						
Course Code		PTH6580						
Academic Year		First						
Semester		II						
Number of Credits		02						
Course Prerequisite		Students should have basic knowledge in research methodology						
Course Synopsis		The course is designed to ensure the student is aware of the proper methods of data collection, monitoring and obtaining necessary documentation related to the study (i.e., informed consent). The course will facilitate certification in Good Clinical Practice to ensure research is conducted in accordance to the current regulations and requirements. The course will also motivate the student stay up-to-date with the research in the area of study through regular updates of the literature review.						
Course Outcomes (COs)								
At the end of the course student shall be able to:								
CO1	Explain and demonstrate good clinical practice during research (P5, A3)							
CO2	Demonstrate data collection procedures and document maintenance (P4, A4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1				x		x		
CO2		x	x					

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Good Clinical Practice	1. Explain components of Good Clinical Practice for conducting health related research based on ICMR guidelines (C2, P2, A1)	08
Unit 2		
Data collection	1. Perform data collection according to the procedure approved by the approval committees (P5, A3)	26

Content	Competencies	Number of Hours
Unit 3		
Document maintenance	1. Obtain, organize and store the documents relevant to the study e.g. Informed Consent document, Ethical approvals, data collection forms (P4, A4)	06
Unit 4		
Literature Review update	1. Perform literature search and update the review (P4)	12
Total		52

Learning Strategies, Contact Hours and Student Learning Time (SLT)		
Learning Strategies	Contact Hours	Student Learning Time (SLT)
Small Group Discussion (SGD)	10	20
Self-directed learning (SDL)	32	-
Practical	10	-
Total	52	20
Assessment Methods		
Formative	Summative	
Research progress and conduct		
Mapping of Assessment with COs		
Nature of Assessment	CO1	CO2
Assignments/Presentations		x
Clinical/Practical Log Book/ Record Book	x	
Feedback Process	Mid-Semester Feedback	
	End-Semester Feedback	
Main Reference	1. Research for Physiotherapists: Project Design and Analysis – Caroline Hicks. 2. Foundations of Clinical Research by Leslie Gross Portney 3. Tests, Measurements and Research in Behavioural Sciences by A K Singh 4. Physical Therapy Research: Principles and Applications by Elizabeth Domholdt 5. Rehabilitation Research - E-Book: Principles and Applications by Russell Carter, Jay Lubinsky, et al. 6. Essentials of Research Methodology for all Physiotherapy and Allied Health Sciences Students by Ramalingam Thangamani A NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well	

SEMESTER - III

COURSE CODE	:	COURSE TITLE
PTH7501	:	Physiotherapy in General Neurosciences
PTH7503	:	Physiotherapy Clinical Practice in Neurosciences - II
PTH7505	:	Evidence Based Physiotherapy Practice in Neurosciences
PTH7570	:	Research Progress in Neurosciences - II

Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Physiotherapy in General Neurosciences						
Course Code		PTH7501						
Academic Year		Second						
Semester		III						
Number of Credits		03						
Course Prerequisite		Students should have basic knowledge in applied neuroanatomy, neurophysiology and physiotherapeutic skills.						
Course Synopsis		<p>This course is designed to enable students to understand the theoretical framework and clinical practice of neuro-physiotherapy approaches and contemporary neuro-physiotherapy treatment techniques.</p> <p>Additionally, the course emphasizes on orthotic prescription, electrodiagnosis, evaluation and management of people with specific adult and paediatric neurological dysfunction.</p>						
Course Outcomes (COs):								
At the end of the course student shall be able to								
CO1	Explain the theoretical framework and principles of neuro-physiotherapy approaches and contemporary neuro-physiotherapy treatment techniques (C5)							
CO2	Outline the principles, planning, and prescription of orthotics including adaptive/assistive aids in neurological conditions (C4)							
CO3	Outline the physiotherapy management of neurological disorders in neonates and paediatric population (C4)							
CO4	Explain the assessment and treatment methods for tonal abnormalities, cognitive-perceptual dysfunctions, oromotor disorders, neurogenic bladder and implications of neuro-communication disorders in physiotherapy (C4)							
CO5	Explain the instrumentation, procedures, parameters and interpretation of electro diagnostic tests in neurological conditions (C4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x					x		
CO2	x							
CO3	x							
CO4	x							
CO5	x							

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Neuro-physiotherapy approaches	<ol style="list-style-type: none"> 1. Explain the theoretical framework of neuro-physiotherapeutic approaches (C2) <ul style="list-style-type: none"> • Roods approach, Bobath and Neuro Developmental Therapy (NDT), Brunnstorm Movement Therapy, Proprioceptive Neuromuscular Facilitation (PNF), Vojta, Sensory Integration Therapy (SI), Motor Relearning Program (MRP). 2. Compare and contrast the treatment principles of the neuro-physiotherapeutic approaches (C4) 3. Appraise the evidence supporting the neuro-physiotherapeutic approaches(C5) 	4
Unit 2		
Contemporary neuro-physiotherapy treatment techniques	<ol style="list-style-type: none"> 1. Explain the principles of contemporary neuro-physiotherapy techniques (C2) <ul style="list-style-type: none"> • Functional Electrical Stimulation, Body Weight Support Treadmill Training, Constraint Induced Movement Therapy, Task oriented training, LSVT BIG, Aquatic therapy, Mental imagery, Mirror therapy, Action observation Therapy, Biofeedback, Virtual reality, Robotics and non-invasive brain stimulation techniques 2. Compare and contrast the treatment principles of the contemporary neuro-physiotherapy techniques (C4) 3. Appraise the evidence supporting the contemporary neuro-physiotherapeutic techniques (C5) 	4
Unit 3		
Principles of neuromusculoskeletal treatment techniques	<ol style="list-style-type: none"> 1. Explain the theoretical framework of soft tissue and joint mobilization techniques (C2) 2. Explain the theoretical framework of neural mobilization techniques (C2) 3. Compare and contrast different neural mobilization techniques (C2) 	1
Unit 4		
Orthotics in Neurological Conditions	<ol style="list-style-type: none"> 1. Explain the design and principles of orthotics (C2) 2. Rationalise choosing appropriate orthotic devices including adaptive/assistive aids for 	2

Content	Competencies	Number of Hours
	different neurological conditions (C3) 3. Outline planning and prescription of wheelchair (C4)	
Unit 5		
Assessment and management of tonal abnormalities	1. Identify the tonal abnormalities and relate to functional movement limitations (C4) 2. Choose appropriate assessment tools and interpret (C3) 3. Plan physiotherapy management for tonal abnormalities (C3)	3
Unit 6		
Physiotherapy management of neonatal and Paediatric neurological conditions	1. Outline the etiology, pathophysiology and clinical features of neurological disorders in neonates and paediatric population with emphasis on Cerebral palsy, Down syndrome, Spinal dysraphism, TBI, and OBPI (C2) 2. Summarize the medical, and surgical management of neurological disorders in neonates and paediatric population (C2) 3. Outline the physiotherapy management of neurological disorders in neonates and paediatric population (C4)	4
Unit 7		
Oromotor Rehabilitation	1. Describe the anatomy and neurophysiology of oromotor system (C2) 2. Explain the pathophysiology, causes and the clinical features of oromotor dysfunctions (C2) 3. Summarise the assessment methods and plan a physiotherapy management for oromotor dysfunctions (C3)	2
Unit 8		
Neurogenic Bladder	1. Explain the causes, types and features of neurogenic bladders (C2) 2. Outline the assessment methods of neurogenic bladder (C2) 3. Summarise the medical and physiotherapy management of neurogenic bladder (C2)	2
Unit 9		
Basics of vestibular rehabilitation	1. Classify central and peripheral vestibular disorders (C2) 2. Outline the evaluation of persons with vertigo and list the relevant problems (C4) 3. Explain the principles of physiotherapy management for central and peripheral	2

Content	Competencies	Number of Hours
	vestibular dysfunction (C2)	
Unit 10		
Implications of neuro-communication disorders in physiotherapy	<ol style="list-style-type: none"> 1. Classify the neuro-communication disorders (C2) 2. Outline the causes and clinical presentations of aphasia, dysarthria and dysphonia (C2) 3. Outline the causes and clinical presentations of dyslexia and dysgraphia (C2) 4. Explain the assessment and management of neuro-communication disorders (C2) 5. Recognize the implications of neuro-communication disorders in physiotherapy (C2) 	2
Unit 11		
Cognitive and perceptual dysfunctions	<ol style="list-style-type: none"> 1. Classify cognitive and perceptual dysfunctions (C2) 2. Outline the causes and clinical presentations of cognitive and perceptual disorders (C2) 3. Explain the assessment methods and management of cognitive and perceptual dysfunctions (C4) 	2
Unit 12		
Gait assessment and retraining	<ol style="list-style-type: none"> 1. Outline the etiology and pathomechanics of gait in neurological conditions (C2) 3. Analyze the gait and interpret the deviations (C4) 3. Explain the methods for gait retraining in patients with neurological dysfunctions (C4) 	4
Unit 13		
Electrodiagnosis in Neurological conditions	<ol style="list-style-type: none"> 1. Illustrate the instrumentation of electroneuromyography (C2) 2. Explain the procedures, parameters and interpretation of Nerve Conduction Studies (NCS) (C4) 3. Explain the procedures, parameters and interpretation of Kinesiological and Diagnostic Electromyography (EMG) (C4) 4. Explain the procedures, parameters and interpretation of Repetitive Nerve Stimulation (RNS) & Single fiber EMG studies (C4) 5. Explain the procedures, parameters and interpretation of reflex studies and evoked potentials studies (C4) 	3

Content	Competencies	Number of Hours
	6. Explain the procedures and parameters for interpretation of electroencephalography (EEG) (C2)	
Unit 14		
Biofeedback in Neurological conditions	1. Classify the types of biofeedback and outline EMG biofeedback (C2) 2. Explain the instrumentation, indication, contraindication and uses of biofeedback (C2) 3. Outline the principles, procedure and techniques of EMG biofeedback (C2)	2
Unit 15		
ICP and Disorders of CSF Circulation	1. Explain factors influencing ICP (C2) 2. Summarise the disorders of CSF production, circulation and absorption (C2) 2. Outline the medical and surgical management of increased intracranial pressure and hydrocephalus (C2) 4. Plan physiotherapy management for complications in patients with raised ICP and hydrocephalus (C3)	2
Total		39

Learning Strategies, Contact Hours and Student Learning Time (SLT)					
Learning Strategies	Contact Hours	Student Learning Time (SLT)			
Lecture	13	26			
Seminar	8	16			
Small group discussion (SGD)	12	24			
Problem Based Learning (PBL)	2	4			
Case Based Learning (CBL)	4	8			
Total	39	78			
Assessment Methods					
Formative			Summative		
Presentations (Seminars)			Mid Semester/Sessional Exam (Theory)		
			End Semester Exam (Theory)		
Mapping of Assessment with COs					
Nature of Assessment	CO1	CO2	CO3	CO4	CO5
Mid Semester / Sessional Examination 1	x	x	x		
Presentations	x	x	x	x	x
End Semester Exam	x	x	x	x	x

Feedback Process	Mid-Semester Feedback
	End-Semester Feedback
Main Reference	<ol style="list-style-type: none"> 1. Adams RD, Victor M, 97:603-5. 2. Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Springer Science & Business Media; 2007 Dec 22. 3. Ayres AJ, Robbins J. Sensory integration and the child: Understanding hidden sensory challenges. Western Psychological Services; 2005. 4. Basmajian JV. Biofeedback: Principles and practice for clinicians. Williams & Wilkins; 1979. 5. Bobath B. Adult hemiplegia: evaluation and treatment. Elsevier Health Sciences; 1990. 6. Butler DS, Jones MA. Mobilisation of the nervous system. Elsevier Health Sciences; 1991. 7. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005. 8. Carr JH, Shepherd RB. A motor relearning programme for stroke. Aspen Pub; 1987. 9. Connolly BH, Montgomery P. Therapeutic exercise in developmental disabilities. Slack Incorporated; 2005. 10. Davies PM, Davies PM. Starting again. Springer-Verlag; 1994 May. 11. Davies PM. Right in the middle: selective trunk activity in the treatment of adult hemiplegia. Springer Science & Business Media; 1990 May 11. 12. Davies PM. Steps to follow: the comprehensive treatment of patients with hemiplegia. Springer Science & Business Media; 2000 May 8. 13. Fredericks CM. Pathophysiology of the motor systems: principles and clinical presentations. Fredericks CM, Saladin LK, editors. Philadelphia, PA: FA Davis; 1996 Jan. 14. Gjelsvik BE, Syre L. The Bobath concept in adult neurology. Thieme; 2016 Mar 16. 15. Herdman SJ, Clendaniel R. Vestibular rehabilitation. FA Davis; 2014 Jul 24. 16. Johnstone M, Barton E. Restoration of normal movement after Stroke. WB Saunders Company; 1995. 17. Kimura J. Electrodiagnosis in diseases of nerve and muscle: principles and practice. Oxford university press; 2001 Mar 15. 18. Levitt S. Treatment of cerebral palsy and motor delay. John Wiley & Sons; 2013 May 9. 19. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug. 20. Misra UK; et al. Principles of Neurophysiology. Elsevier Health Sciences; 2010

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23. Preston DC, Shapiro BE. Electromyography and Neuromuscular Disorders E-Book: Clinical-Electrophysiologic Correlations (Expert Consult-Online). Elsevier Health Sciences; 2012 Nov 1.
24. Tecklin JS, editor. Paediatric physical therapy. Lippincott Williams & Wilkins; 2008.
25. Umphred DA, Lazaro RT, Roller M, Burton G, editors. Neurological Rehabilitation-E-Book. Elsevier Health Sciences; 2013 Aug 7.
26. Wade DT. Measurement in neurological rehabilitation.
27. Wyan Parry CB, Salter M. M. Knott and DE Voss, Proprioceptive Neuromuscular Facilitation.
28. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials
2. NOTE: This is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well

Manipal College of Health Professions								
Name of the Department	Physiotherapy							
Name of the Program	Master of Physiotherapy (Neurosciences)							
Course Title	Physiotherapy Clinical Practice in Neurosciences - II							
Course Code	PTH7503							
Academic Year	Second							
Semester	III							
Number of Credits	12							
Course Prerequisite	Students should have basic knowledge in applied anatomy, physiology and physiotherapeutic skills							
Course Synopsis	This module will enable students to apply fundamental and advanced knowledge in physiotherapy assessment and management of patients with neurological disorders. They will be able to demonstrate comprehensive assessment techniques, interpret findings, formulate treatment plan and implement it on patients. They will be able to demonstrate sound clinical reasoning and evidence based practice.							
Course Outcomes (COs):								
At the end of the course student shall be able to:								
CO1	Demonstrate the neuro-physiotherapy approaches and contemporary neuro-physiotherapy treatment techniques in the clinical practice of neurological conditions (C4, P5, A3)							
CO2	Perform assessment procedures and physiotherapy interventions of neonatal, paediatric and adult neurological conditions (C3, P5, A3)							
CO3	Plan and prescribe an appropriate orthotic device and provide physiotherapy treatment for patients with tonal dysfunctions, oromotor and vestibular disorders (C3, P5, A3)							
CO4	Demonstrate assessment and retraining methods for people with balance, mobility and locomotor disorders in neurological conditions (C3, P5, A3)							
CO5	Practice ethical principles and discuss health related information and display verbal and written communication with patients/ clients, caregivers, peers and health care professionals and ability to work as a team (C3, P5, A3)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		X				X		
CO2		X				X		
CO3		X			X			
CO4		X			X			
CO5			X	X				

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Physiotherapy Assessment of Neurological conditions	1. Explain and perform detailed physiotherapy evaluation on a patient with neurological dysfunction with emphasis on tonal abnormalities, oromotor dysfunctions and gait abnormalities (C2, P4, A3) 2. Choose and perform appropriate outcome measure (C3, P4, A3) 3. Constructs problem list according to the ICF domains (C3, P4, A3) 4. Demonstrate the clinical reasoning and decision making process for the management of the patient based on the evaluation (C3, P5, A3) 5. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 6. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during evaluation (A4)	156
Unit 2		
Neuro-physiotherapy techniques and approaches	1. Demonstrate Physiotherapy techniques and approaches for neurological disorders (C4, P5, A3) 2. Demonstrate the clinical reasoning and decision making process for choosing appropriate physiotherapeutic approach/ technique for the management of patients with neurological disorders (C3, P5, A3)	78
Unit 3		
Physiotherapy management of adults with neurological conditions	1. Demonstrate the clinical reasoning and decision making process for choosing appropriate physiotherapeutic approach/ technique for the management of patients with neurological disorders with emphasis on tonal abnormalities, oromotor dysfunctions and gait abnormalities (C3, P5, A3) 2. Plan and prescribe appropriate orthotic device (C3, P5, A3) 3. Perform early mobilization safely and reduce secondary complications of immobilization (C3, P5, A3) 4. Performs chest physiotherapy and maintains respiratory hygiene (C3, P5, A3) 5. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3)	156

Content	Competencies	Number of Hours
	6. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during assessment and intervention (A4)	
Unit 4		
Physiotherapy management of neonatal and Paediatric neurological conditions	1. Demonstrate the relevant assessment methods based on the clinical presentations of paediatric neurological disorders (C3, P5, A3) 2. Construct a structured exercise program for children with paediatric and neurological disorders (C3, P5, A3) 3. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 4. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during evaluation (A4)	78
Total		468

Learning Strategies, Contact Hours and Student Learning Time (SLT)					
Learning Strategies	Contact Hours	Student Learning Time (SLT)			
Self-directed learning (SDL)	36	72			
Case Based Learning (CBL)	28	56			
Clinic	360	-			
Practical	28	56			
Assessment	16	32			
Total	468	216			
Assessment Methods					
Formative		Summative			
Case presentations		End Semester Exam			
Clinical performance					
Mapping of Assessment with COs					
Nature of Assessment	CO1	CO2	CO3	CO4	CO5
Presentations	X	X	X	X	X
End Semester Exam	X	X	X	X	X
Feedback Process	Mid-Semester Feedback				
	End-Semester Feedback				
Main Reference	1. Adams RD, Victor M, 97:603-5. 2. Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Springer Science & Business Media; 2007 Dec 22. 3. Ayres AJ, Robbins J. Sensory integration and the child: Understanding hidden sensory challenges. Western				

- Psychological Services; 2005.
4. Basmajian JV. Biofeedback: Principles and practice for clinicians. Williams & Wilkins; 1979.
 5. Bobath B. Adult hemiplegia: evaluation and treatment. Elsevier Health Sciences; 1990.
 6. Butler DS, Jones MA. Mobilisation of the nervous system. Elsevier Health Sciences; 1991.
 7. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005.
 8. Carr JH, Shepherd RB. A motor relearning programme for stroke. Aspen Pub; 1987.
 9. Connolly BH, Montgomery P. Therapeutic exercise in developmental disabilities. Slack Incorporated; 2005.
 10. Davies PM, Davies PM. Starting again. Springer-Verlag; 1994 May.
 11. Davies PM. Right in the middle: selective trunk activity in the treatment of adult hemiplegia. Springer Science & Business Media; 1990 May 11.
 12. Davies PM. Steps to follow: the comprehensive treatment of patients with hemiplegia. Springer Science & Business Media; 2000 May 8.
 13. Fredericks CM. Pathophysiology of the motor systems: principles and clinical presentations. Fredericks CM, Saladin LK, editors. Philadelphia, PA: FA Davis; 1996 Jan.
 14. Gjelsvik BE, Syre L. The Bobath concept in adult neurology. Thieme; 2016 Mar 16.
 15. Herdman SJ, Clendaniel R. Vestibular rehabilitation. FA Davis; 2014 Jul 24.
 16. Johnstone M, Barton E. Restoration of normal movement after Stroke. WB Saunders Company; 1995.
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 19. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug.
 20. Misra UK; et al. Principles of Neurophysiology. Elsevier Health Sciences; 2010
 21. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.
 22. Patten J. Neurological differential diagnosis. Springer Science & Business Media; 1996.
 23. Preston DC, Shapiro BE. Electromyography and Neuromuscular Disorders E-Book: Clinical-Electrophysiologic Correlations (Expert Consult-Online). Elsevier Health Sciences; 2012 Nov 1.
 24. Tecklin JS, editor. Paediatric physical therapy. Lippincott

	<p>Williams & Wilkins; 2008.</p> <p>25. Umphred DA, Lazaro RT, Roller M, Burton G, editors. Neurological Rehabilitation-E-Book. Elsevier Health Sciences; 2013 Aug 7.</p> <p>26. Wade DT. Measurement in neurological rehabilitation.</p> <p>27. Wyan Parry CB, Salter M. M. Knott and DE Voss, Proprioceptive Neuromuscular Facilitation.</p> <p>28. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials</p> <p>NOTE: This is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well</p>
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Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Evidence Based Physiotherapy Practice in Neurosciences						
Course Code		PTH7505						
Academic Year		Second						
Semester		III						
Number of Credits		02						
Course Prerequisite		Students should have basic knowledge in evidence based physiotherapy practice.						
Course Synopsis		The course will focus on the development of skill to search for evidence, appraise the available literature and apply the relevant evidence into clinical practice for the physiotherapy assessment and management of Obstetrics and gynecologic disorders. Through this course, students will learn to summarise recent trends and developments in Obstetrics and Gynecology (including assessment and treatment) by reviewing the scientific literature of the last 5-10 years while emphasizing on landmark studies, high levels of evidence, on-going controversies, on-going studies, and the way forward.						
Course Outcomes (COs)								
At the end of the course student shall be able to:								
CO1	Appraise the process of evidence based practice and implementation to clinical practice (C5)							
CO2	Appraise the process of evidence-based practice in obstetric and gynecological diseases across life span (C5)							
CO3	Appraise the process of evidence-based practice lifestyle diseases (C5)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1						X	X	
CO2	X					X		
CO3	X					X		

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Evidence based practice	1. Define evidence-based practice (EBP) (C1) 2. Explain the process of evidence-based practice (C4)	2

Content	Competencies	Number of Hours
	3. Adopt a search strategy and appraise the available literature (C5)	
Unit 2		
Evidence based Physiotherapy assessment in neurological diseases	1. Identify, appraise and summarize evidence through systematic searches of databases for the assessment of neurological diseases (C5) 2. Recommend strategies for implementation of evidence based practice assessment strategies (C5)	12
Unit 3		
Evidence based Physiotherapy management in neurological diseases	1. Identify, appraise and summarize evidence through systematic searches of databases for the assessment and management of neurological diseases (C5) 2. Recommend strategies for implementation of evidence based practice management strategies (C5)	12
Total		26

Learning Strategies, Contact Hours and Student Learning Time (SLT)			
Learning Strategies	Contact Hours	Student Learning Time (SLT)	
Lecture	2	4	
Seminar	24	48	
Total	26	52	
Assessment Methods			
Formative		Summative	
Presentation		Sessional Exam (theory)	
Mapping of Assessment with COs			
Nature of Assessment	CO1	CO2	CO3
Sessional Examination	x	x	x
Assignments/Presentations	x	x	x
Feedback Process	Mid-Semester Feedback		
Main Reference	1. Guide to Evidence Based Physical Therapy Practice by Dianne V Jewell; Jones and Bartlett Publishers (2008) 2. http://www.apta.org/EvidenceResearch/EBPTtools/ 3. https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html 4. https://www.bmj.com/about-bmj/resources/readers/publications/how-read-paper 5. Young JM, Solomon MJ. How to critically appraise an article. Nat Clin Pract Gastroenterol Hepatol. 2009;6(2):82-91 6. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials		

Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Research Progress in Neurosciences - II						
Course Code		PTH7570						
Academic Year		Second						
Semester		III						
Number of Credits		03						
Course Prerequisite		Students should have basic knowledge in the application of research methods for the project.						
Course Synopsis		This course is developed to introduce the student to the art of scientific writing. Students will be facilitated to complete a required certification in scientific writing during this time and will be prepared to implement the knowledge from this course into writing their research project. This course will ensure that students continue to adhere to guidelines and good clinical practice recommendations related to enrolment, data collection and storage. The course will enhance the skill of the student to keep abreast with recent developments in the area of study through periodic literature updates.						
Course Outcomes (COs)								
At the end of the course student shall be able to:								
CO1	Explain and components of scientific writing (C2, P2)							
CO2	Demonstrate data collection procedures and document maintenance (P4, A4)							
CO3	Perform literature search and update (P4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x	x						
CO2			x		x			
CO3		x				x		

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Basics of scientific writing	1. Explain the components of scientific writing in dissertation and manuscript (C2, P2)	08
Unit 2		
Data collection	1. Perform data collection according to the	39

Content	Competencies	Number of Hours
	procedure approved by the approval committees (P5, A3)	
Unit 3		
Document maintenance	1. Obtain, organize and store the documents relevant to the study e.g. Informed Consent document, Ethical approvals, data collection forms (P4, A4)	06
Unit 4		
Literature update	1. Perform literature search and update the review (P4)	25
Total		78

Learning Strategies, Contact Hours and Student Learning Time (SLT)			
Learning Strategies	Contact Hours	Student Learning Time (SLT)	
Small Group Discussion (SGD)	10	20	
Self-directed learning (SDL)	48	-	
Practical	20	-	
Total	78	20	
Assessment Methods			
Formative		Summative	
Research progress and conduct			
Mapping of Assessment with COs			
Nature of Assessment	CO1	CO2	CO3
Assignments/Presentations		x	
Clinical/Practical Log Book/ Record Book	x		x
Feedback Process	Mid-Semester Feedback		
	End-Semester Feedback		
Main Reference	1. Research for Physiotherapists: Project Design and Analysis – Caroline Hicks. 2. Foundations of Clinical Research by Leslie Gross Portney 3. Tests, Measurements and Research in Behavioural Sciences by A K Singh 4. Physical Therapy Research: Principles and Applications by Elizabeth Domholdt 5. Rehabilitation Research - E-Book: Principles and Applications by Russell Carter, Jay Lubinsky, et al. 6. Essentials of Research Methodology for all Physiotherapy and Allied Health Sciences Students by Ramalingam Thangamani A NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well		

SEMESTER - IV

Option1: Elective in Neurological Physiotherapy

COURSE CODE : COURSE TITLE

**PTH7512 : Physiotherapy in Neurological
Conditions**

**PTH7514 : Clinical practice in Neurological
Physiotherapy**

PTH7580 : Research project in Neurosciences

Manipal College of Health Professions								
Name of the Department	Physiotherapy							
Name of the Program	Master of Physiotherapy (Neurosciences)							
Course Title	Physiotherapy in Neurological Conditions							
Course Code	PTH7512							
Academic Year	Second							
Semester	IV							
Number of Credits	03							
Course Prerequisite	Students should have advance knowledge in physiotherapy assessment and management of patients with neurological disorders							
Course Synopsis	This module is designed to enable students to assess and plan an evidence based physiotherapy management of neurological conditions.							
Course Outcomes (COs):								
At the end of the course student shall be able to:								
CO1	Assess and plan an evidence based physiotherapy management of neurological conditions involving brain and spinal cord (C5)							
CO2	Assess and plan an evidence based physiotherapy management for diseases of muscles, neuro-muscular junction, cranial and spinal nerves (C5)							
CO3	Assess and plan an evidence based physiotherapy management for vestibular disorders (C5)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x					x		
CO2	x					x		
CO3	x					x		

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Cerebrovascular Accident	1. Explain the causes, types, pathophysiology and clinical features of the cerebrovascular accident (C2) 2. Outline the investigations and medical management of stroke (C2) 3. Compare and contrast the features of stroke syndromes (C4) 4. Discuss the prevention and management of post-stroke complications (C2) 5. Explain the assessment and physiotherapy management during acute, subacute and chronic stages of stroke recovery (C4)	6

Content	Competencies	Number of Hours
	6. Appraise the evidence for physiotherapy management for people with stroke (C5)	
Unit 2		
Infectious diseases of Nervous System	<ol style="list-style-type: none"> 1. Explain the causes, clinical features and medical management of the infectious diseases of nervous system (C2) 2. Assess and plan an evidence based physiotherapy for people with infections of nervous system (C5) 	3
Unit 3		
Demyelinating Diseases of Nervous System	<ol style="list-style-type: none"> 1. Explain the causes, types, pathophysiology and clinical features of the demyelinating diseases of the nervous system (C2) 2. Outline the investigations and medical management of the demyelinating diseases of the nervous system (C2) 3. Explain the assessment and physiotherapy management for demyelinating disease of nervous system (C4) 4. Assess and plan an evidence based exercise prescription for people with demyelinating disease of nervous system (C5) 	3
Unit 4		
Degenerative Diseases of Nervous System	<ol style="list-style-type: none"> 1. Explain the causes, types, pathophysiology and clinical features of the degenerative diseases of nervous System including Dementia & Alzheimer's Disease (C2) 2. Outline the investigations and medical management of the degenerative diseases of nervous System (C2) 3. Explain the assessment and physiotherapy management for degenerative diseases of nervous System (C4) 	3
Unit 5		
Diseases of Spinal Cord	<ol style="list-style-type: none"> 1. Explain the causes, types, pathophysiology and clinical features of the diseases of the spinal cord (C2) 2. Outline the investigations and medical management of the diseases of the spinal cord (C2) 3. Explain the assessment and physiotherapy management for the diseases of the spinal cord (C4) 4. Assess and plan an evidence based physiotherapy for people with diseases of spinal cord (C5) 	4

Content	Competencies	Number of Hours
Unit 6		
Extrapyramidal disorders	<ol style="list-style-type: none"> 1. Explain the causes, types, pathophysiology and clinical features of the extrapyramidal disorders (C2) 2. Outline the investigations and medical management of extrapyramidal disorders (C2) 3. Explain the assessment and physiotherapy management for extrapyramidal disorders (C4) 4. Assess and plan an evidence based physiotherapy for people with extrapyramidal disorders (C5) 	4
Unit 7		
Cerebellar disorders	<ol style="list-style-type: none"> 1. Classify the cerebellar disorders and explain the etiology, pathophysiology and clinical features of cerebellar disorders (C2) 2. Outline the medical management of people with cerebellar disorders (C2) 3. Explain the physiotherapy evaluation and management for people with cerebellar disorders (C4) 4. Assess and plan an evidence based Physiotherapy management of people with cerebellar disorders (C5) 	4
Unit 8		
Diseases of cranial and spinal nerves	<ol style="list-style-type: none"> 1. Explain the causes, types, pathophysiology and clinical features of the diseases of cranial and spinal nerves including Radiculopathy (C2) 2. Outline the investigations and medical management of the diseases of cranial and spinal nerves (C2) 3. Explain the assessment and physiotherapy management for diseases of cranial and spinal nerves (C4) 4. Assess and plan an evidence based physiotherapy for people with diseases of cranial and spinal nerves (C5) 	3
Unit 9		
Diseases of Muscles & Neuromuscular Junction (NMJ)	<ol style="list-style-type: none"> 1. Classification of diseases of muscles and NMJ (C2) 2. Explain the causes, types, pathophysiology and clinical features of the diseases of muscles and NMJ (C2) 3. Outline the investigations and medical management of the diseases of muscles and NMJ (C2) 4. Explain the assessment and physiotherapy 	3

Content	Competencies	Number of Hours
	management for people with diseases of muscles and NMJ (C4) 5. Assess and plan an evidence based physiotherapy for people with the diseases of muscles and NMJ (C5)	
Unit 10		
Space Occupying Lesions of Central Nervous System excluding tumors	1. Classify space occupying lesions of central nervous system (C2) 2. Explain the etiology, clinical features of space occupying lesions of central nervous system such as non-traumatic SDH, tuberculomas, AVM, aneurysms, Cystic Lesions (C2) 3. Outline the investigations and medical management of space occupying lesions of central nervous system (C2) 4. Explain the assessment and physiotherapy management for deficits following space occupying lesions of central nervous system (C4)	3
Unit 11		
Vestibular Disorders and Management	1. Explain the role of vestibular system on postural control and identify the postural abnormalities in vestibular disorders (C4) 2. Distinguish between the vestibular functions tests and interpret the findings (C4) 3. Explain the features of bilateral vestibular dysfunctions (C2) 4. Outline the medical management of vestibular disorders (C2) 5. Explain the assessment and physiotherapy management for people with central and peripheral vestibular dysfunction (C4) 6. Assess and plan an evidence based exercise prescription for people with central and peripheral vestibular dysfunction (C5)	3
Total		39

Learning Strategies, Contact Hours and Student Learning Time (SLT)		
Learning Strategies	Contact Hours	Student Learning Time (SLT)
Lecture	13	26
Seminar	8	16
Small group discussion (SGD)	12	24
Problem Based Learning (PBL)	2	4
Case Based Learning (CBL)	4	8
Total	39	78

Assessment Methods			
Formative		Summative	
Presentations (Seminars)		Mid Semester/Sessional Exam (Theory)	
		End Semester Exam (Theory)	
Mapping of Assessment with COs			
Nature of Assessment	CO1	CO2	CO3
Mid Semester / Sessional Examination 1	x		x
Presentations	x	x	x
End Semester Exam	x	x	x
Feedback Process	Mid-Semester Feedback		
	End-Semester Feedback		
Main Reference	<ol style="list-style-type: none"> Adams RD, Victor M, Ropper AH. Principles of Neurology. 6th. Edition. Singapore, McGraw-Hill Book Co. 1997:603-5. Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Springer Science & Business Media; 2007 Dec 22. Basmajian JV. Biofeedback: Principles and practice for clinicians. Williams & Wilkins; 1979. Bobath B. Adult hemiplegia: evaluation and treatment. Elsevier Health Sciences; 1990. Bromley I. Tetraplegia and paraplegia: a guide for physiotherapists. Elsevier Health Sciences; 2006. Butler DS, Jones MA. Mobilisation of the nervous system. Elsevier Health Sciences; 1991. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005. Carr JH, Shepherd RB. A motor relearning programme for stroke. Aspen Pub; 1987. Davies PM, Davies PM. Starting again. Springer-Verlag; 1994 May. Davies PM. Right in the middle: selective trunk activity in the treatment of adult hemiplegia. Springer Science & Business Media; 1990 May 11. Davies PM. Steps to follow: the comprehensive treatment of patients with hemiplegia. Springer Science & Business Media; 2000 May 8. Fredericks CM. Pathophysiology of the motor systems: principles and clinical presentations. Fredericks CM, Saladin LK, editors. Philadelphia, PA: FA Davis; 1996 Jan. Gjelsvik BE, Syre L. The Bobath concept in adult neurology. Thieme; 2016 Mar 16. Herdman SJ, Clendaniel R. Vestibular rehabilitation. FA Davis; 2014 Jul 24. Johnstone M, Barton E. Restoration of normal movement after Stroke. WB Saunders Company; 1995. Lindsay KW, Bone I, Callander R. Neurology and 		

	<p>neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug.</p> <p>17. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.</p> <p>18. Patten J. Neurological differential diagnosis. Springer Science & Business Media; 1996.</p> <p>19. Umphred DA, Lazaro RT, Roller M, Burton G, editors. Neurological Rehabilitation-E-Book. Elsevier Health Sciences; 2013 Aug 7.</p> <p>20. Wade DT. Measurement in neurological rehabilitation.</p> <p>21. Wyan Parry CB, Salter M. M. Knott and DE Voss, Proprioceptive Neuromuscular Facilitation.</p> <p>22. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials</p> <p>NOTE: This is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well</p>
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Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Clinical Practice in Neurological Physiotherapy						
Course Code		PTH7514						
Academic Year		Second						
Semester		IV						
Number of Credits		12						
Course Prerequisite		Students should have advance knowledge in physiotherapy assessment and management of patients with neurological disorders						
Course Synopsis		This module will enable students to apply fundamental and advanced knowledge in physiotherapy assessment and management of patients with neurological disorders. They will be able to demonstrate comprehensive assessment techniques, interpret findings, formulate treatment plan and implement it with an inter-professional team. They will be able to demonstrate sound decision making and adapt physiotherapy treatment based on patient progression.						
Course Outcomes (COs):								
At the end of the course student shall be able to:								
CO1	Perform a detailed evaluation of patients with neurological conditions and measure patient outcomes of patients with neurological conditions (C3, P5, A3)							
CO2	Demonstrate patient centered approach and work with an inter-professional team and deliver evidence based physiotherapy for patients with neurological conditions (C5, P5, A3)							
CO3	Discuss health related information and display verbal and written communication with patients/ clients, caregivers, peers and health care professionals and ability to work as a team (C3, P5, A3)							
CO4	Practice ethical principles during assessment and treatment (A4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		x						
CO2		x				x		x
CO3			x		x			
CO4				x	x			

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Evaluation in neurological conditions	<ol style="list-style-type: none"> 1. Explain and perform detailed physiotherapy evaluation on a patient with neurological dysfunction (C4, P4, A3) 2. Choose and Perform measurements using reliable and valid measurement tools. (C3, P5, A3) 3. Constructs problem list according to the ICF domains (C3, P4, A3) 4. Demonstrate the clinical reasoning and decision making process for the management of the patient based on the evaluation (C3, P5, A3) 5. Identify appropriate interprofessional members and communicate with the team with a patient centers approach 6. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 7. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during assessment and intervention (A4) 	234
Unit 2		
Physiotherapy management of Patients with neurological conditions	<ol style="list-style-type: none"> 1. Demonstrate the clinical reasoning and decision making process for choosing appropriate physiotherapeutic approach/ technique for the management of patients with neurological disorders (C3, P5, A3) 2. Plan and prescribe appropriate orthotic device (C3, P5, A3) 3. Perform early mobilization safely and reduce secondary complications of immobilization (C3, P5, A3) 4. Performs chest physiotherapy and maintains respiratory hygiene (C3, P5, A3) 5. Organises treatment schedule and implements evidence based physiotherapy (C4, P5, A3) 6. Identifies changes in patient outcomes to adapt and reorganise treatment strategy (C4,P6, A4) 7. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 	234

Content	Competencies	Number of Hours
	8. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during assessment and intervention (A4)	
Total		468

Learning Strategies, Contact Hours and Student Learning Time (SLT)

Learning Strategies	Contact Hours	Student Learning Time (SLT)
Self-directed learning (SDL)	36	72
Case Based Learning (CBL)	28	56
Clinic	360	-
Practical	28	56
Assessment	16	32
Total	468	216

Assessment Methods

Formative	Summative
Case presentations	End Semester Exam (Practical)
Clinical performance	

Mapping of Assessment with COs

Nature of Assessment	CO1	CO2	CO3	CO4
Case Presentations	x	x	x	x
Clinical performance	x	x	x	x
End Semester Exam	x	x	x	x

Feedback Process	Mid-Semester Feedback
	End-Semester Feedback

Main Reference	Text Books/Reference Books
	1. Adams RD, Victor M, Ropper AH. Principles of Neurology. 6th. Edition. Singapore, McGraw-Hill Book Co. 1997:603-5. 2. Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Springer Science & Business Media; 2007 Dec 22. 3. Basmajian JV. Biofeedback: Principles and practice for clinicians. Williams & Wilkins; 1979. 4. Bobath B. Adult hemiplegia: evaluation and treatment. Elsevier Health Sciences; 1990. 5. Bromley I. Tetraplegia and paraplegia: a guide for physiotherapists. Elsevier Health Sciences; 2006. 6. Butler DS, Jones MA. Mobilisation of the nervous system. Elsevier Health Sciences; 1991. 7. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005. 8. Carr JH, Shepherd RB. A motor relearning programme

- for stroke. Aspen Pub; 1987.
9. Davies PM, Davies PM. Starting again. Springer-Verlag; 1994 May.
 10. Davies PM. Right in the middle: selective trunk activity in the treatment of adult hemiplegia. Springer Science & Business Media; 1990 May 11.
 11. Davies PM. Steps to follow: the comprehensive treatment of patients with hemiplegia. Springer Science & Business Media; 2000 May 8.
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 13. Gjelsvik BE, Syre L. The Bobath concept in adult neurology. Thieme; 2016 Mar 16.
 14. Herdman SJ, Clendaniel R. Vestibular rehabilitation. FA Davis; 2014 Jul 24.
 15. Johnstone M, Barton E. Restoration of normal movement after Stroke. WB Saunders Company; 1995.
 16. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug.
 17. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.
 18. Patten J. Neurological differential diagnosis. Springer Science & Business Media; 1996.
 19. Umphred DA, Lazaro RT, Roller M, Burton G, editors. Neurological Rehabilitation-E-Book. Elsevier Health Sciences; 2013 Aug 7.
 20. Wade DT. Measurement in neurological rehabilitation.
 21. Wyan Parry CB, Salter M. M. Knott and DE Voss, Proprioceptive Neuromuscular Facilitation.
 22. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials

NOTE: This is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well

Manipal College of Health Professions	
Name of the Department	Physiotherapy
Name of the Program	Master of Physiotherapy (Neurosciences)
Course Title	Research Project in Neurosciences
Course Code	PTH7580
Academic Year	Second
Semester	IV
Number of Credits	05
Course Prerequisite	Students should have advance knowledge in the application of research methodology.
Course Synopsis	This course is designed to facilitate the student to apply knowledge in Biostatistics to the data collected through data entry, data analysis and interpretation. The course will develop skills in the use of essential statistical software for the management and analysis of data. The course will also facilitate the application of knowledge of scientific writing into the final submission of the research project. The course will promote the student's ability to justify the study and its findings through both written and spoken methods. It will also sensitize the student to the process of developing a manuscript to a journal. The course will also expose the student to the guidelines on completion of a research project as per prevailing regulatory and institutional norms.

Course Outcomes (COs)

At the end of the course student shall be able to:

CO1	Perform data analysis and interpret results (C4, P4)
CO2	Prepare and submit dissertation document and manuscript (P4)
CO3	Present and defend dissertation (P4,A3)

Mapping of Course Outcomes (COs) to Program Outcomes (POs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	X	X						
CO2						X	X	
CO3		X	X					

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Data compilation	1. Perform data entry and prepare for analysis in statistical software (P4)	26

Content	Competencies	Number of Hours
Unit 2		
Statistical analysis	1. Perform appropriate statistical tests and interprets the results is the student expected to do the analysis (C5,P4)	13
Unit 3		
Dissertation and Manuscript writing	1. Prepare the dissertation document according to institutional guidelines (P4) 2. Prepares manuscript for submission to an indexed journal (P4)	52
Unit 4		
Dissertation presentation	1. Present and defend the dissertation to the relevant scientific committee(s) (P4, A3)	13
Unit 5		
Closure report	1. Complete requirements regarding closure of research project (P4)	26
Total		130

Learning Strategies, Contact Hours and Student Learning Time (SLT)			
Learning Strategies	Contact Hours	Student Learning Time (SLT)	
Small Group Discussion (SGD)	16	32	
Self-directed learning (SDL)	80	-	
Practical	10	-	
Assessment	24	48	
Total	130	80	
Assessment Methods			
Formative		Summative	
Research progress and conduct		Presentation and Viva	
Mapping of Assessment with COs			
Nature of Assessment	CO1	CO2	CO3
Quiz / Viva			x
Assignments/Presentations		x	
Clinical/Practical Log Book/ Record Book	x		
End Semester Exam- Viva			x
Feedback Process	Mid-Semester Feedback		
	End-Semester Feedback		
Main Reference	1. Research for Physiotherapists: Project Design and Analysis –Caroline Hicks. 2. Foundations of Clinical Research by Leslie Gross Portney 3. Tests, Measurements and Research in Behavioural Sciences by A K Singh		

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|--|---|
| | <ol style="list-style-type: none">4. Physical Therapy Research: Principles and Applications by Elizabeth Domholdt5. Rehabilitation Research - E-Book: Principles and Applications by Russell Carter, Jay Lubinsky, et al.6. Essentials of Research Methodology for all Physiotherapy and Allied Health Sciences Students by Ramalingam Thangamani A |
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NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well

SEMESTER - IV

Option 2: Elective in Neurosurgical Physiotherapy

COURSE CODE	COURSE TITLE
PTH7522	Physiotherapy in Neurosurgical Conditions
PTH7524	Clinical Practice in Neurosurgical Physiotherapy
PTH7580	Research Project in Neurosciences

Manipal College of Health Professions	
Name of the Department	Physiotherapy
Name of the Program	Master of Physiotherapy (Neurosciences)
Course Title	Physiotherapy in Neurosurgical Conditions
Course Code	PTH7522
Academic Year	Second
Semester	IV
Number of Credits	03
Course Prerequisite	Students should have advance knowledge in physiotherapy assessment and management of patients with neurosurgical disorders
Course Synopsis	This module is designed to enable students to assess and plan an evidence based physiotherapy management of neurosurgical conditions.

Course Outcomes (COs):

At the end of the course student shall be able to:

CO1	Assess and plan an evidence based physiotherapy assessment and management for patients with traumatic brain injury and spinal cord injury (C4)
CO2	Develop comprehensive physiotherapy assessment and plan an evidence based rehabilitation for people with compressive myelopathies, surgically managed stroke, tumors, spinal dysraphism, peripheral nerve injuries, as well as disorders of CSF circulation and cranio-vertebral junction anomalies (C4)
CO3	Develop a structured respiratory care and mobilization protocol for patients following neurosurgical procedures (C3)
CO4	Plan physiotherapy management following functional neurosurgical procedures and stem cell therapy (C3)

Mapping of Course Outcomes (COs) to Program Outcomes (POs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x					x		
CO2	x					x		
CO3	x							
CO4	x							

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Common Neurosurgical procedures	1. Outline the common investigations, and neurosurgical procedures of brain and spinal cord (C2) 2. Explain the principles of post-surgical	2

Content	Competencies	Number of Hours
	physiotherapy management, education and prevention of post-operative complications (C2)	
Unit 2		
Traumatic Brain injury	<ol style="list-style-type: none"> 1. Explain the mechanism, types of injuries, pathophysiology, and clinical features of traumatic brain injury (C2) 2. Outline the principles of medical and surgical management of traumatic brain injury (C2) 3. Choose and interpret the assessment of consciousness dysfunctions (C4) 4. Explain the physiotherapy management of a patient with disorder of consciousness due to TBI (C4) 5. Summaries the early mobilization protocol following TBI (C3) 6. Plan strategies for preventing and managing the secondary complications post head injury (C3) 7. Construct a comprehensive assessment and evidence-based physiotherapy management as per the level of impairment (C4) 8. Plan a community integration program for patients with TBI (C3) 	6
Unit 3		
Traumatic Spinal cord Injury	<ol style="list-style-type: none"> 1. Explain the causes, mechanism, types, pathophysiology and clinical features of spinal cord injury (C2) 2. Outline the investigations and discuss the medical and surgical management of patients with spinal cord injury (C2) 3. Explain the assessment and physiotherapy management of patients with spinal cord injury (C4) 4. Assess and plan an evidence based physiotherapy for patients with spinal cord injury (C5) 5. Plan strategies for reintegrating the spinal cord injury patient into community (C3) 	6
Unit 4		
Compressive myelopathies	<ol style="list-style-type: none"> 1. Explain the causes, types and clinical features of compressive myelopathies (C2) 2. Outline the investigations and discuss the surgical management for compressive myelopathies (C2) 3. Explain the assessment and physiotherapy management post-surgery following compressive myelopathy (C4) 	3

Content	Competencies	Number of Hours
Unit 5		
Brain tumors	<ol style="list-style-type: none"> 1. Classify the types and explain the clinical features of the brain tumors (C2) 2. Outline the management of brain tumors through medicines, radiation, chemotherapy and surgery (C2) 3. Explain the assessment and physiotherapy management after surgical resection of the brain tumors and discuss the considerations during radiation and chemotherapy(C4) 	3
Unit 6		
Rehabilitation of Surgically managed Stroke	<ol style="list-style-type: none"> 1. Explain the causes, types, pathophysiology and clinical features of the cerebrovascular accident (C2) 2. Outline the investigations and medical management of stroke (C2) 3. Compare and contrast the features of stroke syndromes (C4) 4. Outline the neurosurgical and endovascular procedures post-stroke (C2) 5. Summarize the post-surgical complications in patients with stroke (C2) 6. Explain the assessment and physiotherapy management post-surgery following stroke (C4) 	4
Unit 7		
Spinal dysraphism	<ol style="list-style-type: none"> 1. Explain the types, clinical features and complications of spinal dysraphism (C2) 2. Outline the neurosurgical procedures and the post-operative care (C2) 3. Explain the assessment and physiotherapy management post-surgery following Spinal dysraphism (C4) 	2
Unit 8		
Disorders of CSF circulation	<ol style="list-style-type: none"> 1. Outline surgical management of hydrocephalous (C2) 2. Summarize the secondary complications following surgical procedures for CSF disorders (C2) 3. Plan the assessment and physiotherapy management for deficits following CSF disorders (C3) 	2
Unit 9		
Cranio-vertebral Junction	<ol style="list-style-type: none"> 1. Explain the types and clinical features of the disorders of Cranio-vertebral junction anomalies with emphasis to Arnold Chiari Malformation (C2) 	2

Content	Competencies	Number of Hours
Anomalies	<ol style="list-style-type: none"> Outline the neurosurgical management of CVJ anomalies (C2) Explain the assessment and physiotherapy management following surgical management of CVJ anomalies (C4) 	
Unit 10		
Peripheral Nerve Injuries	<ol style="list-style-type: none"> Classify the peripheral nerves injuries and explain the causes and clinical features of the same (C2) Outline the conservative and surgical management following peripheral nerve injuries (C2) Explain the assessment and physiotherapy management following peripheral nerve injuries (C4) 	2
Unit 11		
Respiratory care and mobilization of Neurosurgical patients	<ol style="list-style-type: none"> Explain the pathophysiology and features of respiratory dysfunction following neurosurgical procedures of brain and spinal cord (C2) Construct respiratory hygiene protocol for a patient undergoing intensive neurosurgical care (C3) Assess and plan an evidence based early mobilization strategies for patients following neurosurgical procedures (C4) 	2
Unit 12		
Rehabilitation concepts following Functional neurosurgical procedures and stem cell therapy	<ol style="list-style-type: none"> Outline the common functional neurosurgery procedures (C2) Explain the rehabilitation following functional neurosurgical procedures and stem cell therapy (C2) Outline the indications, procedure, uses and complications of stem cell therapy for neurological conditions(C3) Explain the assessment and physiotherapy management following stem cell therapy for brain and spinal cord (C4) 	2
Unit 13		
Vestibular Disorders and Management	<ol style="list-style-type: none"> Explain the role of vestibular system on postural control and identify the postural abnormalities in vestibular disorders (C4) Distinguish between the vestibular functions tests and interpret the findings (C4) Explain the features of bilateral vestibular dysfunctions (C2) Outline the medical and surgical management of vestibular disorders (C2) 	3

Content	Competencies	Number of Hours
	5. Explain the assessment and physiotherapy management for people with central and peripheral vestibular dysfunction (C3, C4) 6. Assess and plan an evidence based exercise prescription for people with central and peripheral vestibular dysfunction (C5)	
Total		39

Learning Strategies, Contact Hours and Student Learning Time (SLT)		
Learning Strategies	Contact Hours	Student Learning Time (SLT)
Lecture	13	26
Seminar	8	16
Small group discussion (SGD)	12	24
Problem Based Learning (PBL)	2	4
Case Based Learning (CBL)	4	8
Total	39	78

Assessment Methods
Formative
Summative

Presentations

Mid Semester/Sessional Exam (Theory)

End Semester Exam (Theory)

Mapping of Assessment with COs

Nature of Assessment	CO1	CO2	CO3	CO4
Mid Semester / Sessional Examination 1	x	x		
Presentations	x	x	x	x
End Semester Exam	x	x	x	x

Feedback Process

Mid-Semester Feedback

End-Semester Feedback

Main Reference
Text Books/Reference Books

- Adams RD, Victor M, Ropper AH. Principles of Neurology. 6th. Edition. Singapore, McGraw-Hill Book Co. 1997:603-5.
- Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Springer Science & Business Media; 2007 Dec 22.
- Basmajian JV. Biofeedback: Principles and practice for clinicians. Williams & Wilkins; 1979.
- Bobath B. Adult hemiplegia: evaluation and treatment. Elsevier Health Sciences; 1990.
- Bromley I. Tetraplegia and paraplegia: a guide for physiotherapists. Elsevier Health Sciences; 2006.
- Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005.

7. Carr JH, Shepherd RB. A motor relearning programme for stroke. Aspen Pub; 1987.
8. Connolly BH, Montgomery P. Therapeutic exercise in developmental disabilities. Slack Incorporated; 2005.
9. Davies PM, Davies PM. Starting again. Springer-Verlag; 1994 May.
10. Davies PM. Right in the middle: selective trunk activity in the treatment of adult hemiplegia. Springer Science & Business Media; 1990 May 11.
11. Davies PM. Steps to follow: the comprehensive treatment of patients with hemiplegia. Springer Science & Business Media; 2000 May 8.
12. Gjelsvik BE, Syre L. The Bobath concept in adult neurology. Thieme; 2016 Mar 16.
13. Herdman SJ, Clendaniel R. Vestibular rehabilitation. FA Davis; 2014 Jul 24.
14. Johnstone M, Barton E. Restoration of normal movement after Stroke. WB Saunders Company; 1995.
15. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug.
16. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.
17. Umphred DA, Lazaro RT, Roller M, Burton G, editors. Neurological Rehabilitation-E-Book. Elsevier Health Sciences; 2013 Aug 7.
18. Wade DT. Measurement in neurological rehabilitation.
19. Wyan Parry CB, Salter M. M. Knott and DE Voss, Proprioceptive Neuromuscular Facilitation.
20. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials

NOTE: This is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well

Manipal College of Health Professions								
Name of the Department		Physiotherapy						
Name of the Program		Master of Physiotherapy (Neurosciences)						
Course Title		Clinical Practice in Neurosurgical Physiotherapy						
Course Code		PTH7524						
Academic Year		Second						
Semester		IV						
Number of Credits		12						
Course Prerequisite		Students should have advance knowledge in physiotherapy assessment and management of patients with neurosurgical disorders.						
Course Synopsis		This module will enable students to apply fundamental and advanced knowledge in physiotherapy assessment and management of patients with neurological disorders. They will be able to demonstrate comprehensive assessment techniques, interpret findings, formulate treatment plan and implement it with an inter-professional team. They will be able to demonstrate sound decision making and adapt physiotherapy treatment based on patient progression.						
Course Outcomes (COs):								
At the end of the course student shall be able to:								
CO1	Perform a detailed evaluation of patients with neurological conditions and measure patient outcomes of patients with neurosurgical conditions (C3, P5, A3)							
CO2	Demonstrate patient centered approach and work with an inter-professional team and deliver evidence based physiotherapy for patients with neurosurgical conditions (C5, P5, A3)							
CO3	Discuss health related information and display verbal and written communication with patients/ clients, caregivers, peers and health care professionals and ability to work as a team (C3, P5, A3)							
CO4	Practice ethical principles during assessment and treatment (A4)							
Mapping of Course Outcomes (COs) to Program Outcomes (POs)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		X						
CO2		X				X		X
CO3			X		X			
CO4				X	X			

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Evaluation in neurosurgical conditions	1. Explain and perform detailed physiotherapy evaluation on a patient with neurological conditions (C4, P4, A3) 1. 2.Choose and Perform measurements using reliable and valid measurement tools. (C3, P5, A3) 2. Constructs problem list according to the ICF domains (C3, P4, A3) 3. Demonstrate the clinical reasoning and decision making process for the management of the patient based on the evaluation (C3, P5, A3) 4. Identify appropriate interprofessional members and communicate with the team with a patient centers approach 5. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 6. 7. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during assessment and intervention (A4)	234
Unit 2		
Physiotherapy management of Patients with neurosurgical conditions	1. Demonstrate the clinical reasoning and decision making process for choosing appropriate physiotherapeutic approach/ technique for the management of patients with neurosurgical conditions (C3, P5, A3) 2. Plan and prescribe appropriate orthotic device (C3, P5, A3) 3. Perform early mobilization safely and reduce secondary complications of immobilization (C3, P5, A3) 4. Performs chest physiotherapy and maintains respiratory hygiene (C3, P5, A3) 5. Organises treatment schedule and implements evidence based physiotherapy (C4, P5, A3) 6. Identifies changes in patient outcomes to adapt and reorganise treatment strategy (C4, P6, A4) 7. Discuss health related information with clients, caregivers, peers and health care professionals and displays ability to work as a team (C3, P5, A3) 8. Display ethical and professional behaviour (Autonomy, Beneficence and Justice) during assessment and intervention (A4)	234
Total		468

Learning Strategies, Contact Hours and Student Learning Time (SLT)				
Learning Strategies	Contact Hours	Student Learning Time (SLT)		
Self-directed learning (SDL)	36	72		
Case Based Learning (CBL)	28	56		
Clinic	360	-		
Practical	28	56		
Assessment	16	32		
Total	468	216		
Assessment Methods				
Formative		Summative		
Case presentations		End Semester Exam (Practical)		
Clinical performance				
Mapping of Assessment with COs				
Nature of Assessment	CO1	CO2	CO3	CO4
Case Presentations	x	x	x	x
Clinical performance	x	x	x	x
End Semester Exam	x	x	x	x
Feedback Process	Mid-Semester Feedback			
	End-Semester Feedback			
Main Reference	Text Books/Reference Books 1. Adams RD, Victor M, Ropper AH. Principles of Neurology. 6th. Edition. Singapore, McGraw-Hill Book Co. 1997:603-5. 2. Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Springer Science & Business Media; 2007 Dec 22. 3. Basmajian JV. Biofeedback: Principles and practice for clinicians. Williams & Wilkins; 1979. 4. Bobath B. Adult hemiplegia: evaluation and treatment. Elsevier Health Sciences; 1990. 5. Bromley I. Tetraplegia and paraplegia: a guide for physiotherapists. Elsevier Health Sciences; 2006. 6. Campbell WW, DeJong RN. DeJong's the neurologic examination. Lippincott Williams & Wilkins; 2005. 7. Carr JH, Shepherd RB. A motor relearning programme for stroke. Aspen Pub; 1987. 8. Connolly BH, Montgomery P. Therapeutic exercise in developmental disabilities. Slack Incorporated; 2005. 9. Davies PM, Davies PM. Starting again. Springer-Verlag; 1994 May. 10. Davies PM. Right in the middle: selective trunk activity in the treatment of adult hemiplegia. Springer Science & Business Media; 1990 May 11. 11. Davies PM. Steps to follow: the comprehensive			

- treatment of patients with hemiplegia. Springer Science & Business Media; 2000 May 8.
12. Gjelsvik BE, Syre L. The Bobath concept in adult neurology. Thieme; 2016 Mar 16.
 13. Herdman SJ, Clendaniel R. Vestibular rehabilitation. FA Davis; 2014 Jul 24.
 14. Johnstone M, Barton E. Restoration of normal movement after Stroke. WB Saunders Company; 1995.
 15. Lindsay KW, Bone I, Callander R. Neurology and neurosurgery illustrated. New York: Churchill Livingstone; 1997 Aug.
 16. O'Sullivan SB, Schmitz TJ, Fulk G. Physical rehabilitation. FA Davis; 2013 Jul 23.
 17. Umphred DA, Lazaro RT, Roller M, Burton G, editors. Neurological Rehabilitation-E-Book. Elsevier Health Sciences; 2013 Aug 7.
 18. Wade DT. Measurement in neurological rehabilitation.
 19. Wyan Parry CB, Salter M. M. Knott and DE Voss, Proprioceptive Neuromuscular Facilitation.
 20. Related scientific publications including position statements, guidelines, landmark trials, systematic reviews and meta-analysis and recent trials

NOTE: This is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well

Manipal College of Health Professions	
Name of the Department	Physiotherapy
Name of the Program	Master of Physiotherapy (Neurosciences)
Course Title	Research Project in Neurosciences
Course Code	PTH7580
Academic Year	Second
Semester	IV
Number of Credits	05
Course Prerequisite	Students should have advance knowledge in the application of research methodology.
Course Synopsis	This course is designed to facilitate the student to apply knowledge in Biostatistics to the data collected through data entry, data analysis and interpretation. The course will develop skills in the use of essential statistical software for the management and analysis of data. The course will also facilitate the application of knowledge of scientific writing into the final submission of the research project. The course will promote the student's ability to justify the study and its findings through both written and spoken methods. It will also sensitize the student to the process of developing a manuscript to a journal. The course will also expose the student to the guidelines on completion of a research project as per prevailing regulatory and institutional norms.

Course Outcomes (COs)

At the end of the course student shall be able to:

CO1	Perform data analysis and interpret results (C4, P4)
CO2	Prepare and submit dissertation document and manuscript (P4)
CO3	Present and defend dissertation (P4,A3)

Mapping of Course Outcomes (COs) to Program Outcomes (POs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x	x						
CO2						x	x	
CO3		x	x					

Course Content and Outcomes

Content	Competencies	Number of Hours
Unit 1		
Data compilation	1. Perform data entry and prepare for analysis in statistical software (P4)	26

Content	Competencies	Number of Hours
Unit 2		
Statistical analysis	1. Perform appropriate statistical tests and interprets the results (C5,P4) is the student expected to do the analysis	13
Unit 3		
Dissertation and Manuscript writing	1. Prepare the dissertation document according to institutional guidelines (P4) 2. Prepares manuscript for submission to an indexed journal (P4)	52
Unit 4		
Dissertation presentation	1. Present and defend the dissertation to the relevant scientific committee(s) (P4, A3)	13
Unit 5		
Closure report	1. Complete requirements regarding closure of research project (P4)	26
Total		130

Learning Strategies, Contact Hours and Student Learning Time (SLT)			
Learning Strategies	Contact Hours	Student Learning Time (SLT)	
Small Group Discussion (SGD)	16	32	
Self-directed learning (SDL)	80	-	
Practical	10	-	
Assessment	24	48	
Total	130	80	
Assessment Methods			
Formative		Summative	
Research progress and conduct		Presentation and Viva	
Mapping of Assessment with COs			
Nature of Assessment	CO1	CO2	CO3
Quiz / Viva			x
Assignments/Presentations		x	
Clinical/Practical Log Book/ Record Book	x		
End Semester Exam- Viva			x
Feedback Process	Mid-Semester Feedback		
	End-Semester Feedback		
Main Reference	1. Research for Physiotherapists: Project Design and Analysis –Caroline Hicks. 2. Foundations of Clinical Research by Leslie Gross Portney 3. Tests, Measurements and Research in Behavioural Sciences by A K Singh		

	<ol style="list-style-type: none">4. Physical Therapy Research: Principles and Applications by Elizabeth Domholdt5. Rehabilitation Research - E-Book: Principles and Applications by Russell Carter, Jay Lubinsky, et al.6. Essentials of Research Methodology for all Physiotherapy and Allied Health Sciences Students by Ramalingam Thangamani A <p>NOTE: this is not an exhaustive list of references and there will be other textbooks and articles which should be referenced as well</p>
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7. Program Outcomes (POs) and Course Outcomes (COs) Mapping

Sem.	Course Code	Course Title	Credits	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
I	ABS6101	Advanced Biostatistics & Research Methodology	4	CO1 CO2 CO3 CO4 CO5					CO2	CO4	
I	PTH6001	Principles of Physiotherapy Practice	3	CO1 CO2 CO3 CO4 CO5					CO4 CO5		CO1
I	PTH6003	Clinical Practice in Physiotherapy	12		CO1 CO2 CO3 CO4		CO1 CO2 CO4		CO3		
I	PTH6570	Research Proposal in Neurosciences Physiotherapy	2	CO1	CO1 CO2			CO2			
II	EPG6201	Ethics and Pedagogy	2	CO1 CO2 CO3 CO4 CO5	CO4		CO1 CO2 CO3 CO5				
II	PTH6502	Foundations of Physiotherapy in Neurosciences	3	CO1 CO2 CO3 CO4 CO5							
II	PTH6504	Physiotherapy Clinical Practice in Neurosciences-I	12	CO1 CO2	CO1 CO2	CO3	CO4	CO3 CO4			
II	PTH6580	Research Progress in Neurosciences-I	2		CO2	CO2	CO1		CO1		
III	PTH7501	Physiotherapy in General Neurosciences	3	CO1 CO2 CO3 CO4 CO5					CO1		
III	PTH7503	Physiotherapy Clinical Practice in Neurosciences –II	12		CO1 CO2 CO3 CO4	CO5	CO5	CO3 CO4	CO1 CO2		
III	PTH7505	Evidence based Physiotherapy Practice in Neurosciences	2	CO2 CO3					CO1 CO2 CO3	CO1	

Sem.	Course Code	Course Title	Credits	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
III	PTH7570	Research Progress in Neurosciences -II	3	CO1	CO1 CO3	CO2		CO2	CO3		
IV	PTH7512	Physiotherapy in Neurological Conditions	3	CO1 CO2 CO3					CO1 CO2 CO3		
IV	PTH7514	Clinical Practice in Neurological Physiotherapy	12		CO1 CO2	CO3	CO4	CO3 CO4	CO2		CO2
IV	PTH7580	Research project in Neurosciences	5	CO1	CO1 CO3	CO3			CO2	CO2	
IV	PTH7522	Physiotherapy in Neurosurgical Conditions	3	CO1 CO2 CO3 CO4					CO1 CO2		
IV	PTH7524	Clinical Practice in Neurosurgical Physiotherapy	12		CO1 CO2	CO3	CO4	CO3 CO4	CO2		CO2
IV	PTH7580	Research Project in Neurosciences	5	CO1	CO1 CO3	CO3			CO2	CO2	

8. MCHP PG PROGRAM REGULATION

1. Program Structure

- 1.1. The program offers a semester based credit system (with few programs offering specialization too).
- 1.2. An academic year consists of two semesters – Odd semester (July - December) and Even semester (January – June)
- 1.3 Each semester shall extend over a minimum period of 13 weeks of academic delivery excluding examination days, semester breaks, declared holidays and non-academic events.
- 1.4 Medium of instruction shall be in English

2 Credit Distribution

- 2.1 Each semester has minimum 13 weeks of contact sessions. One credit = 13 hours. The credit distribution hours for Lecture, Tutorial, Practical, Clinics and Project are as follows:

Lecture (L)	:	1 Hour /week = 1 credit
Tutorial (T)	:	1 Hour /week = 1 credit
Practical/Project (P/PR)	:	2 Hours/week = 1 credit
Clinics (CL)	:	3 Hours/week = 1 credit

- 2.2 A semester has courses structured as theory, practical, and clinics. Each course is of minimum 2 credits. The maximum credits for theory course is 4; theory and practical combined is 5.

3 Attendance

- 3.1 Minimum attendance requirements for each course is:

- i. Theory : 85 %
- ii. Clinics / Practical : 90 %

- 3.1 As per the directives of MAHE, there will be no consideration for leave on medical grounds. The student will have to adjust the same in the minimum prescribed attendance.

- 3.2 Students requiring **leave** during the academic session should apply for the same through a formal application to the Head of Department through their respective Class In-charge/ Coordinator. The leave will be considered as absent and reflected in their attendance requirements.

- 3.3 No leverage will be given by the department for any attendance shortage.
- 3.4 Students, Parents/ guardians can access the attendance status online periodically. Separate intimation regarding attendance status would not be sent to parents/students.
- 3.5 Students having attendance shortage in any course (theory & practical) will not be permitted to appear for the End-semester exam (ESE) of the respective course.

4 Examination

- 4.1 Exams are in two forms – Sessional examination (conducted as a part of internal assessment) and End semester examination.
- 4.2 The final evaluation for each course shall be based on Internal Assessment Components (**IAC**) and the End-semester examinations (**ESE**) based on the weightage (as indicated in clause 5.1) given for respective courses.
- 4.3 IAC shall be done on the basis of a continuous evaluation after assessing the performance of the student in mid semester exam, class participation, assignments, seminars or any other component as applicable to a course.
- 4.4 All the ESE for the odd semesters (**regular ESE**) will be conducted in November-December. All the ESE for the even semesters (**regular ESE**) will be conducted in May-June.
- 4.5 For those whose failed to clear any course during regular ESE, a **supplementary/make up exam** is conducted 2 weeks immediately after the ESE result declaration to enable him / her to earn those lost credits. A nominal fee as per MAHE rules will be applicable during this examination.
- 4.6 For core courses, the duration of ESE for a 2 credit course would be 2 hours (50 marks) and for a course with 3 or more credits, 3 hours (100 marks). For program elective course, the exam duration is 3 hours (100 marks).

5. Weightage for Internal Assessment Component (IAC) and End Semester Exam (ESE)

5.1 Any one or a combination of marks distribution criteria applicable to a course.

IAC Weightage (%)	ESE Weightage (%)
30	70
50	50
100	Nil
Nil	100

6. Minimum Requirements for Pass

6.1. Pass in a course will be reflected as grades. No candidate shall be declared to have passed in any course unless he/she obtains not less than **“E” grade**

6.2. For all courses (core / non-core), candidate should obtain a minimum of 50% (ESE) to be declared as pass.

6.3 When a student appears for **supplementary examination**, the maximum grade awarded is “C” grade or below irrespective of their performance.

6.4. For students who fail to secure a minimum of ‘E’ grade for a course, an **improvement examination** is conducted to improve their IAC marks. The student can appear for these examination along with the subsequent batches’ mid semester / sessional exams. The marks obtained in other components of IAC can be carried forward without reassessment. A nominal fee is charged as per MAHE for per course of improvement in IAC.

7. Calculation of GPA and CGPA

7.1. Evaluation and Grading (**Relative Grading**) of students shall be based on GPA (Grade Point Average) & CGPA (Cumulative Grade Point Average).

7.2. The overall performance of a student in each semester is indicated by the Grade Point Average (GPA). The overall performance of the student for the entire program is indicated by the Cumulative Grade Point Average (CGPA).

7.3. A ten (10) point grading system (**credit value**) is used for awarding a letter grade in each course.

Letter Grade	A+	A	B	C	D	E	F/I/DT
Grade points	10	9	8	7	6	5	0

DT – Detained/Attendance shortage, I – Incomplete

7.4 Calculation of GPA & CGPA: An example is provided

Course code	Course	Credits (a)	Grade obtained by the student	Credit value (b)	Grade Points (a x b)
AHS 101	Course - 1	4	B	8	32
AHS 103	Course - 2	4	B	8	32
AHS 105	Course - 3	3	A+	10	30
AHS 107	Course - 4	4	C	7	28
AHS 109	Course - 5	5	A	9	45
Total		20	-	-	167

1st Semester GPA = Total grade points / total credits

$$167/20 = 8.35$$

Suppose in **2nd semester GPA** = 7 with respective course credit 25

$$\text{Then, 1st Year CGPA} = \frac{(8.35 \times 20) + (7 \times 25)}{20 + 25} = 7.6$$

8. Progression Criteria to higher semesters

- 8.1 There is no separate criteria / credits required in order to be promoted to the next academic year.
- 8.2 However, in order to be eligible to appear for fourth semester (Theory / practical / project submission), the student should have cleared all his previous semesters (i.e. first, second and third).
- 8.4 The student must complete all the course work requirements by a **maximum of double the program duration**. For e.g. 2 years' program, all the academic course work needs to be completed within 4 years. Failure to do so will result in exit from the program.

9. Semester Break

- 9.1 Students will have a short semester break following their odd and even end-semester examinations.

10. Project / Dissertation

- 10.1 Project / Dissertation will carry credits and marks (as applicable to each program)

- 10.2 Final copy of dissertation (**e-copy**) to be submitted by end of March for plagiarism check and submission to University. A **single hardcopy (student copy)** of the dissertation to be prepared and presented before the external examiner during the viva-voce.
- 10.3 **Manuscript** format of the thesis also to be submitted to the respective guides / dept.
- 11. Award of Degree**
- 11.1 Degree is awarded only on **successful completion of entire coursework.**

Head of the Department

Dean

Deputy Registrar - Academics

Registrar