

## Ph.D. Course Work

### Scheme of Ph.D. Course Work

<i>Paper</i>	<i>Title of the paper</i>	<i>Teaching Hrs</i>	<i>Max. Marks Allowed</i>			<i>Minimum passing marks in aggregate</i>
			<i>External Assessment</i>	<i>Internal Assessment</i>	<i>Total</i>	
<b>Common for all Disciplines</b>						
RCW-I	Research Methodology (RCW - I)	50	70	30	100	50
RCW-II	Computer Application (RCW - II)	50	70	30	100	50
<b>Elective (One) Specific Course for each Discipline</b>						
RCWM-III - Management	Management	50	70	30	100	50
RCWE-III- Education	Education	50	70	30	100	50
RCWL-III- Law	Law	50	70	30	100	50
RCWCS-III- CSE	Computer Science and Engineering	50	70	30	100	50
RCWME-III- ME	Mechanical Engineering	50	70	30	100	50
<b>Pre-Ph.D. Course Work for Ph.D. in Physiotherapy</b>						
RCWP-I	Research Methodology	50	70	30	100	50
RCWP-II	Biostatistics and Computer Application in Research	50	70	30	100	50
RCWP-III	Research Skill Acquisition in Physiotherapy	50	70	30	100	50
RCWP-IV	Research Tools In Physiotherapy	50	70	30	100	50

## **Syllabus for One Semester Ph. D. Course Work**

### **RESEARCH METHODOLOGY (RCW – I)**

(Common for all disciplines)

Time: 3 Hrs.

Max. Marks 100

Note: (i) Eight questions will be set out of which the student shall be required to attempt to five questions. (ii) All questions carry equal marks.

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#### **Research**

- Objective, Types of research, process and steps in it. Research proposal and concept.
- Research Design- meaning, need, concept and different research designs. Literature survey and review, research design process and error in research.
- Research Modeling- Types of Models, Model building and stages, Data consideration and testing (Sampling, Collection and Analysis), Heuristic and Simulation.

#### **Design of Experiments**

- Objectives, strategies, Factorial experimental design, Designing engineering experiments, basic principles- replication, randomization, blocking, guidelines for design of experiment.
- Analysis of variance- ANOVA- Basic principle, One way and Two way technique.
- Analysis of Co-variance- ANOCOVA technique.

#### **Report writing and Interpretation**

- Pre- writing considerations. Meaning and technique of interpretation.
- Different steps in report writing, Formats of report writing, Thesis writing, Formats of publication in Research journals.

**References:**

1. Montgomery, Douglas C.(2007)5/e, Design and Analysis of Experiments.(Willey, India)
2. Kothari, C. R. (2004). 2/e, Research Methodology- Methods and Technique.(New Age International, New Delhi)
3. Montgomery, Douglas C. and Runger, George C. (2007), 3/e. applied statistics and probability for Engineers. (Willey, India)

## **Syllabus for One Semester Ph. D. Course Work**

### **Computer Application (RCW – II)** (Common for all disciplines)

Time: 3 Hrs.

Max. Marks 100

Note: (i) Eight questions will be set out of which the student shall be required to attempt to five questions. (ii) All questions carry equal marks.

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#### **Spreadsheet Tool**

- Introduction to spreadsheet application, features and function
- Using formulas and functions, Data storing
- Features for statistical data analysis, Generating charts/ graph and other features.
- Tools used may be Microsoft Excel, Open office or similar tool.

#### **Presentation Tool**

- Introduction to presentation tool, features and function.
- Creating presentation, Customizing presentation, showing presentation.
- Tools used may be Microsoft power Point, Open office or similar tool.

#### **Writing Tool**

- M.S.Word
- PDF format
- LaTeX

#### **Web Search**

- Introduction to Internet, Use of internet and WWW, Using search engine like Google, Yahoo etc.
- Using advanced search techniques.

**References:**

1. The complete reference Office Xp- Stephan L. Nelson, Gujulia Kelly (TMH)
2. A document preparation system, User's guide and reference manual- Leslie Lamprot. (Addison-Wesley Pub.Co.)

## Syllabus for One Semester Ph. D. Course Work

### Management (RCWM – III)

Time: 3 Hrs.

Max. Marks 100

Note: (i) Eight questions will be set out of which the student shall be required to attempt to five questions. (ii) All questions carry equal marks.

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#### **Managerial Economics**

Demand Analysis: Demand forecasting, Law of Demand. Determinants of Demand, Measurement of Elasticity of Demand; Production Function with One Variable Input and with Two variable input; Cost Concepts, Short Run and Long Run Cost Function. Cost Output Relationship.

Forms of Market Perfect Competition: Monopoly, Monopolistic Competition. Price Determination in Different Market

Macro Economics – concept, need and significance; National Income concepts and its measurement, Inflation and Unemployment

#### **Organisation Behaviour**

Concept and significance of organisational behaviour, , organisational design, types of organisational structure and structural components, understanding and managing Individual behaviour – Personality, Perception, Attitudes, Learning Theories and reinforcement, Motivation theories

Understanding and managing Group Behaviour – Process, interpersonal and group dynamics, communication – verbal, non-verbal, Leadership – types, , Managing conflicts, Change Management and organisation development

#### **Human Resource Management**

Concepts and perspectives in HRM; HR Planning – objectives, process and techniques; Job Analysis- job description and specification; Recruitment and selection process; Induction, Training and Development – types and process;

Performance appraisal methods and evaluation; Job evaluation and wage & salary administration, Industrial Relations and Trade Unions; Industrial Disputes – dispute settlement bodies and process, grievance handling; Labour Welfare & Social Security measures

#### **Financial Management**

Financial Management – nature, scope, objective and importance. Assumptions, importance and limitations of Cost volume profit analysis; Capital Budgeting decisions- Traditional methods and Discounted Cash Flow methods.

Factors affecting Capital Structure and calculation Cost of Capital; Determinants of Dividend Policy; Long term and short term sources of finance, Preparation of cash flow statements and its advantages. Meaning, objectives and limitations of Ratio Analysis. Calculation of various Ratios.

#### **Marketing Management**

Consumer and Industrial markets, Market Segmentation – Targeting and positioning; Product decisions, Product Mix, Product life cycle, Branding and Packaging, Pricing methods and strategies;

Promotion decisions, promotion mix - advertising, personal selling; Channel Management, Vertical marketing system; Evaluation and control of marketing effort; New issues in Marketing – online marketing, customer relationship management

### **Production and Operations Management**

Role and scope of production management, Facility location, layout planning and analysis; production planning and control – production process analysis, Production scheduling; Work measurement, Time and motion study, Statistical quality control, TQM

Role and scope of operations research; Linear Programming; Sensitivity analysis; Transportation Model; Inventory control, Queing Theory, PERT/CPM, Probability distributions – Binomial, Poisson, Normal and Exponential, Correlation and regression analysis

### **Business Environment & Strategic Management**

Nature and Concept, Components (Economic and Non-Economic), Types of Market Economy, Monetary Policy : Concept & Instruments, Fiscal Policy : Concept, Government Budget and its Components; Privatization and Liberalization, Fundamentals and Facets of Globalization, GATT, WTO;

Components of Strategic Management, BCG Model, Porter's generic strategies, strategies in industry evolution, fragmentation, maturity and decline, Global entry strategies, Joint Ventures and Strategies Alliances

### **Business Ethics & Corporate Governance**

Entrepreneurship – concept, types, issues in innovation and creativity; Ethical issues in management, Ethical organization and its corporate code, Importance and need for business ethics; concept and importance of corporate governance, Corporate Governance & Ethics, Corporate Social Responsibility – concept, scope of Social Responsibility, Stakeholders (Internal and External)

## **Syllabus for One Semester Ph. D. Course Work**

### **Education (RCWE – III)**

Time: 3 Hrs.

Max. Marks 100

Note: (i) Eight questions will be set out of which the student shall be required to attempt to five questions. (ii) All questions carry equal marks.

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#### Objectives of the Course:

- To understand Education as a discipline.
- To understand methods to study human behavior in a scientific way.
- To understand concept of mental health and adjustment.
- To understand the group behavior, leadership and decision making.
- To realize importance of teacher education.
- To know about various statutory bodies related with teacher education.

#### **UNIT-1**

- Education as a discipline, meaning and nature.
- Aims of Education in the context of secular and human society.
- Education for sustainable development: education for socially disadvantaged sections of society.
- Constitutional provisions of education with special reference to SC, ST, Women and rural population.

#### **Unit-2**

- Teacher Education at Centre, State and district level.
- Statutory bodies related with teacher education in India: NAAC, NCTE, UGC, RCI & NCERT.
- Quality of Teacher education. Issues and challenges.

#### **Unit-3**

- Education Psychology. Methods of Educational Psychology: Clinical, Experimental, differential and psychoanalytical.
- Mental Health and adjustment: Meaning and factors affecting mental health of an individual. Role of education in developing good mental health of students and teachers.
- Behavioral Problems: Stress, Anxiety, frustration and aggression. Prevention and control.

#### **Unit-4**

- Dynamics of Social Development: Group dynamics. Mimesis, suggestion, sympathy and imitation.
- Meaning and nature of Education Planning and administration.
- Leadership: Meaning, theories and styles.  
Decision making: Concept and process.

#### **References:-**

- Barron Robert a & Bysue Donn (2002)  
Social Psychology. New Delhi: Pearson Education
- Cronbach (1954) Educational Psychology Harcourt Jovanovich, Inc.
- Kuppuswamy B (1972) Advanced Educational Psychology. Sterling Publication
- Srivastowa G.N.P (1986) Recent Trends in Educational Psychology. Acua
- Hurlock, E.B (2006) Developmental Psychology: A life span approach Tata Mc. Graw Hill, Publishing Co, New York.
- Obert. S Feldman (2009) Understanding Psychology Tata Mc Graw Hill.
- Mathur S.S. (1969) Educational Administration, New Delhi: Delhi Publisher
- Chauhan S.S. (1990) Advanced Educational Psychology, Vichar Publication, Tata Mc Graw Hill

- Mangal S.K. (2004) Advanced Educational Psychology Prentice Hall of India, New Delhi.

## Syllabus for One Semester Ph. D. Course Work

### Law (RCWL - III)

Time: 3 Hrs.

Max. Marks 100

Note: (i) Eight questions will be set, out of which the students shall be required to attempt five questions. (ii) All questions shall carry equal marks.

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#### **Constitutional Law India**

Essential features of Indian Constitution

Preamble

Fundamental Rights and Duties

Fundamental principles of State policy

Judiciary

Executive

Union State Legislative Relations

Emergency Provisions

Amendment of Constitution

Writ Jurisdiction

#### **Legal Theory**

Nature and Sources of Law

Positivism, Natural Law Theory, Sociological Jurisprudence

Rights and Duties

Concepts of Possession and Ownership

Law and Morality

#### **Public International Law**

Nature of International Law and its relationship with Municipal Law

Sources of International Law

Recognition of States and Governments

United Nations and its organs

Human Rights: Nature and scopes, Evolution and growth

#### **Administrative Law**

Nature, Scope and Importance of Administrative Law

Principles of Natural Justice

Administrative Discretion and its control

Delegated Legislation

Lokpal and Lokayukta

### **Law of Torts**

Foundation of Tortious Liability

General Defences to an action of Torts

Vicarious Liability

Strict and Absolute Liability: Emerging trends in India

### **Law of Crimes - General Principles**

Nature and Definition of Offence

Private defences

Common Intention and Common Object

Offences against Human body

Offences against Property

Offences against women

### **Law of Contracts-General Principles**

Essentials of a valid contract

Offer, acceptance and consideration

Capacity to Contract-Minor's contract

Elements vitiating contract-mistake, fraud, misrepresentation, public policy, coercion, undue influence, frustration of contract

Remedies for breach of contract-Damages.

## **Syllabus for One Semester Ph. D. Course Work**

### **Computer Science Engineering (RCWCS – III)**

Time: 3 Hrs.

Max. Marks 100

Note: (i) Eight questions will be set out of which the student shall be required to attempt to five questions. (ii) All questions carry equal marks.

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#### Unit-1

Computer Networks: Network fundamentals: Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Wireless Networks, Inter Networks. Reference Models: The OSI model, TCP/IP model. Transmission media-twisted pair, coaxial cables, fibre-optic cables, wireless transmission-radio, microwave, infrared, multiplexing, switching, narrowband ISDN, broadband ISDN, ATM, High speed LANS. Internetworking: Switch/Hub, Bridge, Router, Gateways, Firewalls. Routing: Virtual circuits and datagrams. Routing algorithms. Congestion control. Network Security: Cryptography-public key, secret key. Domain Name System (DNS) -Electronic Mail and Worldwide Web(WWW)

#### Unit-2

Operating Systems (with Case Study of Unix): Main functions of operating systems. Multi Programming, multiprocessing, and multitasking. Memory Management: Virtual memory, paging, fragmentation. Concurrent Processing: Mutual exclusion. Critical regions, lock and unlock. Scheduling: CPU scheduling, I/O scheduling, Resource scheduling. Deadlock and scheduling algorithms. Banker's algorithm for deadlock handling. UNIX: The Unix System: File system, process management, bourne shell, shell variables, command line programming. Filters and Commands: Pr, head, tail, cut, paste, sort, uniq, tr, join, etc. grep, egrep, fgrep, etc. sed, awk, etc. System Calls (like): Creat, open, close, read, write, isseek, link, unlink, stat, fstat, umask, chmod, exec, fork, wait, system.

#### Unit-3

Software Engineering: System Development Life Cycle (SDLC): Steps, Water fall model, Prototypes, Spiral model. Software Metrics: Software Project Management. Software Design: System design, detailed design, function oriented design, object oriented design, user interface design. Design level metrics. Coding and Testing: Testing level metrics. Software quality and reliability. Clean room approach, software reengineering.

#### Unit-4

Computer Arithmetic: Propositional (Boolean) Logic, Predicate Logic, Well-formed formulae (WFF), Satisfiability and Tautology. Logic Families: TTL, ECL and C-MOS gates. Boolean algebra and Minimization of Boolean functions. Flip-flops-types, race condition and comparison.

Design of combinational and sequential circuits. Representation of Integers: Octal, Hex, Decimal, and Binary. 2's complement and 1's complement arithmetic.

Unit-5

Relational Database Design and SQL: E-R diagrams and their transformation to relational design, normalization-1NF, 2NF, 3NF, BCNF and 4NF. Limitations of 4NF and BCNF. SQL: Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) commands.

**Syllabus for One Semester Ph. D. Course**  
**Work Advanced Subject Paper MECH-I**  
**Code: RCWME**

**Time: 3 Hrs.**

**Max. Marks :100**

**Note: (i) Eight questions will be set out of which the student shall be required to attempt to five questions (ii) All questions carry equal marks**

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**Metal Machining** - Modelling and control of Chip Formation, Machining of hard materials and metal matrix reinforced composites, Characterization and surface integrity in hard machining, Modern concepts of machining

**Metal Forming:**

Yield criteria, Slip line field theory, Temperature Field in Material.- Plastic and viscoplastic behaviour of material, Surfaces of Discontinuity, Numerical Models of Plasticity.

**Advanced Machining Processes:**

Hybrid electro-chemical processes, Hybrid thermal processes, Solid, liquid and powder based material addition processes (Analytical Study)

**Reverse Engineering :**

Reverse engineering – Methodologies and Techniques, Hardware and software, Rapid prototyping –Relationship with reverse engineering

**Group Technology:** Role of group technology in CAD/CAM integration, Methods for developing part families, Classification and coding, Examples of coding systems, Facility design using group technology, Benefits of G.T.

**Computer Aided Process Planning:** Role of Process Planning, Approaches to process planning- Manual, Variant, Generative approach; Examples of Process planning systems - CAPP, DCLASS, CMPP; Criteria for selecting a CAPP system, Benefits of CAPP.

**Computer Integrated Manufacturing Systems:** Types of manufacturing systems, Machine tools and related equipment, Material handling systems, Computer control systems, CIMS Benefits.

**Quality Engineering in Manufacturing:** Introduction – quality and improvement-objectives-quality assurance-quality systems-Economics – Statistical Tolerances – Quality loss function, Process variability- Charts for attributes, variables, moving average control charts

**Reference Books:**

1. Quality control –by Montgomery
2. Managing for total quality – by N. Logothetis
3. Quality planning and Analysis by Juran and Gryna
4. Computer Integrated Design and Manufacturing by David D. Bedworth, Mark R. Henderson, Philip M. Wolfe.
5. CAD / CAM by Groover & Zimmers (PHI)
6. Avitzur B., “Metal Forming - Process and analysis” Tata Mc-Graw Hill
7. Milton C Shaw, “Metal Cutting Principles” 2nd Edition, Oxford series in Advanced Manufacturing.

## Syllabus for One Semester Ph. D. Course Work

### Physiotherapy (RCWP – I)

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	<b>Paper 1</b>	<b><i>Research Methodology</i></b>	Time Allowed-
<b>Theory</b>			
3 Hrs			
External Assessment-50			
Internal Assessment-50			
Total Marks-100			
Pass Marks-50			
<b>Instruction for the paper setter</b>			
There shall be 10 questions covering the entire syllabus uniformly out of which the candidates shall have to answer any 5. All questions shall carry equal marks.			
<b>Instruction for the Candidate</b>			
Attempt any 5 out of 10 questions .Pass percentage is 50% and time allotted is 3 hours.			

#### **SECTION A Concept of research**

Research – Scientific method, Introduction, scope, characteristics, types, Aims and objectives Scope and limitations Structure of research project

Formulation of Research Problem: Problem identification, formulation and statement of the problem Location and criteria of selecting a Research problem Limitations and Delimitations.

Definition, objectives , advantage , disadvantage and steps of various Research designs in health sciences : epidemiological research- observational studies ( descriptive studies , cross sectional studies ,longitudinal studies ,case study , case control studies , cohort study - retrospective - prospective ) experimental research - brief introduction to clinical testing (phase 1,2,3,4 ) Meaning and Nature of Experimental Research

Sample--- Introduction, types of sampling, advantage and disadvantage of various types of sampling

#### **.SECTION B Conduct of research**

Literature review: need, importance , steps of performing a good literature review identification of types of literature , search strategy, data base , pubmed , cinhal, pedro primary search - types, Secondary search - data search engine

Data collection : types of data - primary , secondary , Tools of data collection: brief description, method of construction, validity, reliability advantage and disadvantage of following

- Schedule, Questionnaire, Interview, content analysis Observation, case study ,use of instruments , case study , others

5. Data collection in experimental research: out come measures, intervention, experimental protocol, steps of establishing a research laboratory - instrumentation and documentation, standard operating protocol

### **Section C Ethics and administration**

Ethical issues in research , general principles governing research with human and animal subjects - essentiality , informed consent , confidentiality , compensation, competence , accountability , transparency , responsibility , risk minimization , special groups as research subjects .

Features of Helsinki declaration, ICMR code for biomedical research

Mechanism for ethical regulation of research - ethical review committee - constitution, function

Legal aspects of research: brief introduction to intellectual property rights, - patent, copyright, design, trademarks, Plagiarism

### **Section D : Element of scientific writing**

Art of scientific writing - difference between ordinary writing and scientific writing language uses , steps for better writing , organization of material

Citation and referencing: citation system - note system - Parenthetical referencing, introduction to different citation styles - Harvard style, Vancouver style, judging the quality of publication by citation index, H index, impact factor

Structure of various scientific communication for publication : abstract , original article, review paper, short technical communication, thesis, book, standard operating protocol

Structure of reports and proposals - research proposal for grants, technical report, progress report, inspection report, feasibility report

Presentation of research - poster presentation, platform presentation

### **Suggested reading:**

1 Research methodology - methods and techniques CR kothari, new age international publishers

2. Clinical research made easy - Bhandari M Sancheti P, jaypee brothers

3 Medical ethics - Francis jaypee brothers

4 Park text book of social and preventive medicine

5 Essentials of research methodology and dissertation writing -yelikar jaypee.brothers

**Paper 2 Bio statistics and computer application  
(RCWP-II)**

**Theory**

Time Allowed-3 Hrs

External Assessment-50

Internal Assessment-50

Total Marks-100

Pass Marks-50

**Instruction for the paper setter**

There shall be 10 questions covering the entire syllabus uniformly out of which the candidates shall have to answer any 5. All questions shall carry equal marks.

**Instruction for the Candidate**

Attempt any 5 out of 10 questions .Pass percentage is 50% and time allotted is 3 hours.

(**Note:** Emphasis should be given on the Application and uses, and interpretation of results of the various statistical procedures mention in the syllabus. The details of formula derivations and calculations are not required and should be avoided)

**Section A**

Biostatistics –Introduction, origin & development, scope, and functions , central tendencies Mean Median, Mode Measures of dispersion, range, Standard deviation, Standard error, skew ness, kurtosis, Organization and presentation of data- Classification, tabulation-classification, tabulation, graphical and diagrammatic presentations.

**Section B**

**Types of Correlation , regression analysis** linear - non linear ,frequency distributon : normal , binomialand poisson, parametric test Z-test, t-test, F test , analysis of variance( ANOVA) and analysis of covariance ( ANCOVA) , non parametric test - chi- square test sign test , wilcoxon signed rank test , Mann witney Utest, kruskal-walis test

**Section C**

Brief review of soft ware packages commonly used for data management and analysis . descriptive statistics using Excel

**Section D computer application in research**

Data analysis with SPSS: various types of data and data input into data editor, linear regression and correlation , analysis of variance using SPSS

### Suggested reading

1. Bailey, NTJ. Statistical methods in biology , the English university press, London
2. Carver RH data analysis with SPSS, Cengage learning, India
3. Colton. Statistics in medicine, little brown company , Boston
4. Fisher RA statistical methods for research work, oliver and boyd, Edinburgh
5. Gupta SP , statistical methods . Sultan chand and sons, new Delhi
6. Golden CH methods in statistical analysis. Asia publishing house house, new delhi
7. Mahajan . Methods in biostatistics. Jaypee Brothers Medical Publishers ( P) New Delhi
8. Singh I elementary statics for medical workers, Jaypee Brothers Medical Publishers (P) New Delhi
9. Bio statistics a manual of statistical methods for use in health, nutrition and anthropometry ed Rao KV Jaypee Brothers Medical Publishers (P) New Delhi
10. Research for physiotherapist's project design and analysis - Hicks CM, Churchill Livingstone
11. Research methodology kothari CR

**Paper 3 : Research Skill Acquisition in physiotherapy  
(RCWP-III)**

**Practical**

External Assessment-50

Internal Assessment-50

Total Marks-100

Pass Marks-50

**Instruction to the candidate**

**Student shall maintain a project diary that should contain all the practical works done by him / her during the course. The project diary and the skills acquired shall be evaluated at the end of semester in the practical examination.**

1. Preparing the format for research study in Physiotherapy
2. Conducting a pilot study on a topic of research in Physiotherapy
3. Practicing operational skills of equipments used for data collection in Physiotherapy establishing reliability and validity
4. Performing and practicing the assessment tests used for data collection in Physiotherapy
5. Performing and practicing the assessment tools used for data collection in Physiotherapy
6. Case study and presentations emphasizing on differential diagnosis and clinical reasoning skills
7. review of papers on selected topics

**Books Recommended:**

1. Research for physiotherapists project, design and analysis - Hicks CM, Churchill Livingstone
2. Research methodology - kothari CR
3. Essentials of research methodology and dissertation writing -Yelikar Jaypee.brothers
4. Clinical neurophysiology -U K misra and J Kalita, Elsevier
5. Electro therapy Explained: Principles & Practice - Low& Reed, Butterworth Heinemann
6. Muscle testing and functions - Kendall - Williams & Wilkins

7. Daniels and Worthingham's - Muscle testing - Hislop & Montgomery - W.B. Saunders
8. Textbook of Orthopaedics and Rheumatology for Physiotherapists, Patricia A Downie
9. Orthopedic Physical Assessment - David Magee
10. Principles of geriatric physiotherapy -Multani and Verma, Jaypee Brothers publication
11. Cash Textbook of Neurology for Physiotherapists
12. Physical Rehabilitation - Susan
13. Physiotherapy in Pediatrics - Roberta Sheppard
14. Neurological Rehabilitation - Carr and Shepard
15. Neurological Rehabilitation - Darcy Umphred
16. Physiotherapy in Cardio Respiratory Disease - Jenifor Pryou and Ammani Prasad
17. Physical Rehabilitation - Assessment and Treatment. Susan Sullivan
18. Cardio Pulmonary Rehabilitation - Scott Irwin
19. Essentials of Cardio Pulmonary Physical Therapy - Ellen Hilleglass; Steven Sadowsky : W. B. Saunders company
20. Physical Rehabilitation Assessment and Treatment, Susan Sullivan, Jaypee Brother Publications
21. Cash Textbook of Cardio Respiratory Disease for Physiotherapistis, Elsevier : Jaypee Brothers Publications

**Paper 4 Research tools in Physiotherapy  
(RCWP-IV)**

**Theory**

Time Allowed-3 Hrs

External Assessment-50

Internal Assessment-50

Total Marks-100

Pass Marks-50

**Instruction for the paper setter**

There shall be 10 questions, covering the entire syllabus uniformly, out of which the candidates shall have to answer any 5 . All questions shall carry equal marks.

**Instruction for the Candidate**

Attempt any 5 out of 10 questions .Pass percentage is 50% and time allotted is 3 hours.

**SECTION A: RESEARCH TERMINOLOGIES WITH SPECIAL REFERENCE TO  
PHYSIOTHERAPY**

Epidemiology, Absolute rate of incidence, Relative rate of incidence, Prevalence, Inclusion criteria, Exclusion criteria, Study variables, Questionnaire, Self-report, Interview

**SECTION B: EQUIPMENT USED FOR DATA COLLECTION IN  
PHYSIOTHERAPY**

Spirometer, Dynamometer, Nerve conduction Velocity, Electromyography, Complete electrotherapy unit, Sensory evaluation kit, Audio-visual reaction time, Biofeedback, Bone densitometer, Podiascan, Jumping power board, Skinfold caliper, Sliding caliper

**SECTIONC: ASSESSMENT TOOLS USED FOR RESEARCH IN  
PHYSIOTHERAPY**

ADL & IADL, Functional outcome scales, Balance scales, Gait assessment scales, Disability scales, Cognitive assessment scales, Radiographic classification, Nutritional assessment scales, Spasticity assessment scales, Geriatric assessment tools, Disease specific assessment scales

**SECTION D: ASSESSMENT TESTS USED FOR DATA COLLECTION IN  
PHYSIOTHERAPY**

Manual muscle testing, Aerobic and anaerobic capacity, Sit and reach, Sports specific Skills test, Tests used for cardiopulmonary, musculoskeletal and neurological impairments.

### **Books Recommended:**

- Research for physiotherapists project, design and analysis - Hicks CM, Churchill Livingstone
- Research methodology - Kothari CR
- Essentials of research methodology and dissertation writing - Yelikar Jaypee Brothers
- Clinical neurophysiology - U K Misra and J Kalita, Elsevier
- Electrotherapy Explained: Principles & Practice - Low & Reed, Butterworth Heinemann
- Muscle testing and functions - Kendall - Williams & Wilkins
- Daniels and Worthingham's - Muscle testing - Hislop & Montgomery - W.B. Saunders
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- Physical Rehabilitation - Susan
- Physiotherapy in Pediatrics - Roberta Sheppard
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- Cardio Pulmonary Rehabilitation - Scott Irwin
- Essentials of Cardio Pulmonary Physical Therapy - Ellen Hilleglass; Steven Sadowsky : W. B. Saunders company
- Physical Rehabilitation Assessment and Treatment, Susan Sullivan, Jaypee Brother Publications
- Cash Textbook of Cardio Respiratory Disease for Physiotherapists, Elsevier : Jaypee Brothers Publications