SYLLABUS & SCHEME OF EXAMINATION

BACHELOR OF PHYSIOTHERAPY

भौतिक चिकित्सा स्नातक पाठ्यक्रम

(Session 2016-17 & Onwards)
Ordinance for various Degree courses (3 years and above) in paramedical subjects

Objective of the courses -
1. The training of the candidate registering for various degree 3 years and above courses are aimed to develop skill in all diagnostics/ therapeutics tests and their interpretation on the modern hospital laboratory. The degrees in various courses are of three years or above.
2. Eligibility for admission
   (A) B. P. T. and B. O. T. course
   The candidate must have passed 10+2 and should obtain 50% marks in aggregate of Physics, Chemistry and Biology (P. C. B.).
   (B) All Paramedical degree courses (other than B. P. T. & B. O. T.)
   The candidate must have passed 10+2 with at least 45% marks in aggregate of Physics, Chemistry and Biology (P.C.B.).
   (C) B. M. L. T.
3. The candidate must have passed 10+2 with at least 45% marks in aggregate of Physics, Chemistry and Biology (P.C.B.) or 10+2 vocational (M. L. T.) course with at least 45% marks will also be eligible.
4. In case of S. C. / S. T. / O. B. C. candidate 5% marks relaxation will be given for the admission in above said course.
5. Weightage will be given as per University rules.
6. Number of seats will be 50 in each course.
7. The minimum age for admission shall be 17 years on 31 December of academic year of admission.
8. Selection of candidate will be on the basis of the entrance examination or in the absence of entrance examination purely on merit on the basis of marks obtained in qualifying examination.
9. For degree examination, candidates who have attended 75% in all theory classes and 85% in practical can only appear in university examination.
10. Revaluation & re totaling both shall be allowed as per university rules.
11. In order to pass the examination it is mandatory to obtain 50% marks in theory and practical examination separately. The viva and the sessional marks are to be added to the theory marks.
12. Other rules regarding conduct of examination will be as per Ordinance no. 06.
13. Permission will be given to start the courses after the permission from M P Paramedical Council (Department of Medical Education, Government of M. P.).
14. Syllabus and scheme of the examination shall be decided by the board of studies and Academic council of the university from time to time as per guidelines from M P Paramedical Council.
15. The medium of examination shall be English.
16. The examination pattern.
(A) B. P. T. & B. O. T. (4 years and six months internship)
   (1) The pattern for B. P. T. & B. O. T. shall be like M. B. B. S. There will be two exams in each year. Main exam to be held in April/May and supplementary / second exam to be held in July/August.
   (2) Students of B. P. T. & B. O. T. who have failed in first year will not be allowed to attend the classes of second year until and unless he/she has passed in all subjects of first year. But in case of second and third year, student is allowed to attend higher classes, but he/she is eligible to appear in higher class exam only when he/she has passed all the subjects of the previous year.
(B) Other Degree Courses –
   There will be two examinations in each year for remaining degree courses the main & supplementary as per University rule. The main examination will be held in April / May & Supplementary examination will be held in July / August & the candidate failing in the main & subsequently in supplementary examination shall not be allowed to go in the higher classes unless clearing all the previous examination.

17. There will be two examiners including one external and internal for both theory and practical examinations.
18. The examiner who evaluates the theory copies preferably should be appointed as external for practical examination for said course.
19. The colleges must conduct sessional exams twice in an academic year (once in a six months period) and send the same marks to the university one week before the commencement of university theory examination.
20. In order to be an examiner, a faculty member should have minimum three years of teaching experience and not below the rank of the Asst. professor and /demonstrator/tutor.
21. The examination papers (Theory) will be evaluated centrally at the university.
22. Various Degree course three years and above -
   1. Physiotherapy.
   2. Occupational therapy.
   4. X-Ray Radiographer.
   5. Human Nutrition.
   6. Pathology.
   7. Medical Lab technology.

N.B.- ALL OTHER RULES –REGULATIONS , ORDINANCES NOT INCLUDED IN HERE WILL BE APPLICABLE AS PER MADHYAPARDESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)
SCHEME OF EXAMINATION: BACHELOR OF PHYSIOTHERAPY (B.P.Th.)
2016-17 Batch Onwards
First Year B.P.Th. Examination

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Subject</th>
<th>Internal Assessment</th>
<th>University Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
<td>Theory</td>
</tr>
<tr>
<td>1</td>
<td>Human Anatomy</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Human Physiology</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Fundamental of Physics, Biomechanics &amp; Biomechanical Modalities</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Fundamental of Medical Electronics &amp; principles of Bioelectrical Modalities</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Psychology &amp; Sociology</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
</tbody>
</table>

**Total Max. Marks** 900

N.B.- Viva marks will be added in theory marks along with internal assessment theory; candidate have to get min. 50% marks in theory and viva collectively for passing the examination.

Second Year B.P.Th. Examination

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Subject</th>
<th>Internal Assessment</th>
<th>University Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
<td>Theory</td>
</tr>
<tr>
<td>1</td>
<td>Pathology &amp; Microbiology</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Biochemistry &amp; Pharmacology</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>Medicine including Pediatrics &amp; Geriatrics</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>General Surgery, Obstetrics &amp; Gynecology</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>Exercise therapy including yoga</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>Electrotherapy</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

**Total Max. Marks** 800

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<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
<td>Theory</td>
</tr>
<tr>
<td>1</td>
<td>Neurology including Psychiatry &amp; Neurosurgery</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Orthopaedics</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>Applied Biomechanics &amp; Kinesiology</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>Physiotherapeutic in Neurology &amp; Neurosurgery</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Physiotherapeutic in Orthopaedic Conditions</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>Physical Evaluation, Diagnosis &amp; Prescription</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

**Total Max. Marks**: 900

N.B.- Viva marks will be added in theory marks along with internal assessment theory; candidate have to get min. 50% marks in theory and viva collectively for passing the examination.

### Fourth Year B.P.Th. Examination

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<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
<td>Theory</td>
</tr>
<tr>
<td>1</td>
<td>Community PT, Rehabilitation &amp; Disability prevention</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Research methodology &amp; Biostatics</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>Cardiothoracic diseases and surgeries</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>Physiotherapeutic in General &amp; Cardiothoracic Conditions</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Sports Physiotherapy</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>PT Ethics, management &amp; Administration ** NUES</td>
<td>--</td>
<td>100</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>Project Work** NUES</td>
<td>---</td>
<td>100</td>
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**Total Max. Marks**: 900

N.B.- Viva marks will be added in theory marks along with internal assessment theory; candidate have to get min. 50% marks in theory and viva collectively for passing the examination.

**NUES=** Non-university Examination Subject
Section-II
B.P.Th. FIRST YEAR
STAFF PATTERN FOR FIRST YEAR B.P.Th.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Staff Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>1 M.S. Anatomy, Lecturer/ Asst. Prof.</td>
</tr>
<tr>
<td>Physiology</td>
<td>1 M.D. Physiology, Lecturer/ Asst. Prof.</td>
</tr>
<tr>
<td>Fundamentals of Physics, Biomechanics &amp;</td>
<td>1 Asst. Professor of Physiotherapy</td>
</tr>
<tr>
<td>Exercise Therapy</td>
<td></td>
</tr>
<tr>
<td>Medical Electronics and electro-therapeutic</td>
<td></td>
</tr>
<tr>
<td>modalities</td>
<td></td>
</tr>
<tr>
<td>Sociology</td>
<td>1 M.A. Sociology/Medical Social-Worker</td>
</tr>
<tr>
<td>Psychology</td>
<td>1 M.A. Psychologist. (Psychology)</td>
</tr>
</tbody>
</table>

FIRST YEAR B.P.Th. EXAMINATION SCHEME

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<td>Biomechanical Modalities</td>
<td></td>
<td></td>
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Total Max. Marks 900

N.B.- Viva marks will be added in theory marks along with internal assessment theory; candidate have to get min. 50% marks in theory and viva collectively for passing the examination.

Passing Marks:- A candidate must obtain 50% in aggregate with a minimum of 50% in theory including viva and minimum 50% in practical.
SCHEME OF EXAMINATION FOR FIRST YEAR B.P.Th.

There shall be five subjects for the first year B.P.T. Examination.

The subjects Qualification of the examination and the pattern of examination will be as follows.

1. HUMAN ANATOMY

<table>
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<td>Practical</td>
<td>Theory</td>
</tr>
<tr>
<td>Human Anatomy</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in anatomy after M.S. (Anatomy) with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to University theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

<table>
<thead>
<tr>
<th>No. &amp; Type of Question</th>
<th>Marks for each question</th>
<th>Total Max. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Very Short Answer Questions (Answer to be given in 50-60 words)</td>
<td>02</td>
<td>20</td>
</tr>
<tr>
<td>5 Short Answer Questions (Answer to be given in 250-300 words)</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>2 Essay Type Questions (Answer to be given in 450-500 words)</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

2. HUMAN PHYSIOLOGY

<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
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<td></td>
<td>Theory</td>
<td>Practical</td>
<td>Theory</td>
</tr>
<tr>
<td>Human Physiology</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in physiology after M.D. (Physiology) with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

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<td>50</td>
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<td>2 Essay Type Questions (Answer to be given in 450-500 words)</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

100
3. FUNDAMENTALS OF PHYSICS, BIOMECHANICS & BIOMECHANICAL MODALITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Theory</th>
<th>Practical</th>
<th>University Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Physics, Biomechanics &amp; Biomechanical Modalities</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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<tr>
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<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

4. FUNDAMENTALS OF MEDICAL ELECTRONICS & PRINCIPLES OF BIOELECTRICAL MODALITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Theory</th>
<th>Practical</th>
<th>University Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Medical Electronics &amp; Principles of Bioelectrical Modalities</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.
The pattern of University theory examination will be as under for 100 Max. Marks.

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<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100</strong></td>
</tr>
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</table>

5. PSYCHOLOGY & SOCIOLOGY

<table>
<thead>
<tr>
<th>Subject</th>
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<th>University Examination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Theory</td>
</tr>
<tr>
<td>Psychology &amp; Sociology</td>
<td>20</td>
<td>--</td>
<td>80</td>
</tr>
</tbody>
</table>

The University examination shall be of 80 marks with Section – A : Psychology and Section – B : Sociology the university theory examination marks for Psychology shall be 40 and for sociology 40 marks respectively. There shall be two paper setters and two evaluators, one from Psychology and one from Sociology. Section- A, which will be set by Psychology examiner (40 marks) and Section-B, by Sociology (40 marks) examiner. Recognized teachers in psychology and sociology with five years of experience shall be on the panel of examiners 50% shall be the minimum passing marks. Internal assessment will be of 10 marks in each subject. Total internal assessment will be 20 Marks.

The pattern of University theory examination will be as under for 80 Max. Marks.

There will be two section i.e. Section-A: Psychology and Section-B: Sociology of 40 Max. Marks each section and distribution of marks for questions will be as under

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>05 Very Short Answer Questions (Answer to be given in 50-60 words)</td>
<td>02</td>
<td>10</td>
</tr>
<tr>
<td>02 Short Answer Questions (Answer to be given in 250-300 words)</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>01 Essay Type Questions (Answer to be given in 450-500 words)</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
BACHELOR OF PHYSIOTHERAPY (B.P.Th.) FIRST YEAR

HUMAN ANATOMY

Total No. of Teaching Hours: - 200
Theory -140 Hrs. Practical / Laboratory- 60 hrs

Course Objectives:
1. Understanding of gross anatomy of various body parts.
2. Application of knowledge of anatomy to learn evaluation and application of physical therapy.
3. Major emphasis of learning is towards Musculo-skeletal, cardio-respiratory and nervous system.

SCHEME OF EXAMINATION

<table>
<thead>
<tr>
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There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in anatomy after M.S. (Anatomy) with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to University theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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<td>2 Essay Type Questions (Answer to be given in 450-500 words)</td>
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<td>30</td>
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Course Contents:

A . General Anatomy:

1) Introduction to Anatomy, terms and terminology
2) Regions of Body, cavities and Systems outline.
3) Surface anatomy – musculo-skeletal and cardiopulmonary
4) Cell Structure and function of cell organelles (Brief outline only).
5) Connective tissue & its modification, tendons, membranes, Special connective tissue.
6) Bone structure, blood supply, growth, ossification, and classification.
7) Muscle classification, structure and functional aspect.
8) Nerve – structure, classification, microscopy with examples.
9) Neurons, classification with examples. Simple reflex arc.
10) Parts of a typical spinal curve/Dermatome
12) Circulatory system – major arteries and veins of the body, structure of blood vessels
13) Lymphoid system – circulation + function, lymphoid organs- and their structure & functions.

B. Upper extremity:
1) Bony architecture
2) Joints – structure, range of movement
3) Muscles – origin, insertion, actions, nerve supply
4) Major nerves – course, branches and implications of nerve injuries
5) Development of limb bones, muscles and anomalies
6) Radiographic identification of bone and joints

C. Lower Extremity:
1) Bony architecture
2) Joints – structure, range of movement
3) Muscles – origin, insertion, actions, nerve supply
4) Major nerves – course, branches and implications of nerve injuries
5) Development of limb bones, muscles and anomalies
6) Radiographic identification of bone and joints

D. Spine:
1) Back muscles - Superficial layer, Deep muscles of back, their origin, insertion, action and nerve supply.
2) Vertebral column – Structure & Development, Structure & Joints of vertebra
3) Radiographic identification of bone and joints
E. Thorax:
   1) Thoracic cage
   2) Pleural cavities & pleura
   3) Lungs and respiratory tree
   4) Heart and great vessels
   5) Diaphragm

F. Head and neck:
   1) Cranium
   2) Facial Muscles
   3) Structure of eyeball in brief and extra ocular muscles, visual pathway
   4) Ear and auditory pathway
   5) Triangles of Neck, boundaries and contents
   6) Tongue – parts, extrinsic and intrinsic muscles, motor and sensory nerves, gustatory pathway
   7) Pharynx
   8) Larynx

G. CNS:
   1) Central nervous system – disposition, parts and functions
   2) Cerebrum
   3) Cerebellum
   4) Midbrain & brain stem
   5) Blood supply of brain & its applied anatomy
   6) Spinal cord- anatomy, blood supply, nerve pathways
   7) Pyramidal, extra pyramidal system
   8) Thalamus, hypothalamus
   9) Ventricles of brain, CSF circulation
   10) Development of nervous system & defects (Brief Description)
   11) Cranial nerves – special emphasis on V, VII, X, XI, XII (course, distribution and palsies)
   12) Sympathetic nervous system, its parts and components (Brief Description)
13) Parasympathetic nervous system (Brief Description).

H. Endocrine system – Pituitary, Thyroid, parathyroid (Brief Description)

I. Embryology in brief of neuromuscular tissue

J. Abdomen (Brief descriptions only):
   a. Boundaries, Muscles of abdominal wall
   b. Division of Abdominal cavity
      i. Pouch of Douglus
      ii. Morrisons pouch

K. Pelvis
   1) Pelvic floor, innervations
   2) Bony Pelvis

L. Digestive system (Liver & pancreas, Alimentary canal)

M. Urinary system – Kidney, Ureter, bladder, urethra

N. Genital system – Male and Female

Kinesiology
   1. Basic Concepts
   2. Muscular system
   3. Joints
   4. MachineryMusculoskeletal system
   5. Principles of Motion
   6. Principles of force and work
   7. Basics of the development of motor skill
   8. Principles of stability
   9. Postural principles

PRACTICAL

Learning of surface landmarks with special emphasis on bones, joints, muscles, and nerves.

The learning of anatomy is by demonstration only through dissected parts, slides, models, charts, etc.
Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain)

Demonstration of skeleton articulated and disarticulated.

During the training more emphasis will be given on the study of bones, muscles, joints, nerve supply of the limbs.

**PRACTICAL EXAMINATION**

Students will be assessed by viva based examination upon learning in theory, demonstration of bones, and joints, muscles, nerves and major viscera.

**Books Recommended for Readings:**

1. Chaurasia, B D Human Anatomy: Regional and CBS, New Delhi Latest 3V
2. Chaurasia, B D Human Osteology CBS, New Delhi Latest
5. Singh, Inderbir Text Book of Human Histology Jaypee, New Delhi Latest
7. Garg, Krishna Text Book Histology CBS, New Delhi Latest
8. Singh, Inderbir Multiple Choice Questions in Anatomy Jaypee, New Delhi Latest
11. Williams, Peter L Gray’s Anatomy: Anatomical Basis of Churchill Livingston, New York, Latest
13. Snell, Richard S Clinical Anatomy for Medical Students Little- Brown, Boston-Latest
BACHELOR OF PHYSIOTHERAPY (B.P.Th.) FIRST YEAR

HUMAN PHYSIOLOGY

Total No. of Teaching Hrs.- 200
Theory -140 Hrs., Practical / Laboratory- 60 Hrs.

Course objectives:
1. To understand the Physiological functions of human body
2. To understand the application of physiological functions & physiology of exercise in relation to physical therapy
3. Major area of learning is cardio-respiratory, Musculo-skeletal and nervous system.

Note: Group discussions, seminars and tutorial will be on the topics covered in didactic lectures.

SCHEME OF EXAMINATION

<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
<tr>
<td></td>
<td>Theory</td>
<td>Practical</td>
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<tr>
<td>Human Physiology</td>
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</tbody>
</table>

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in physiology after M.D. (Physiology) with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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</table>

Course Contents:

1. GENERAL PHYSIOLOGY
   1) Structure of cell membrane
   2) Transport across cell membrane
   3) Functional morphology of the cell
   4) Intercellular communication
   5) Homeostasis
2. CARDIOVASCULAR SYSTEM

1) General introduction of cardiovascular systems.
2) Structure and properties of Cardiac muscle.
3) Dynamics of blood & lymph flow
4) Anatomical, biophysical consideration of arterial, arteriolar & capillary venous level, Lymphatic circulation
5) Cardiac cycle and Heart sounds, Mechanical events of Cardiac cycle, Cardiac output, its regulation.
6) Origin and spread of cardiac excitation
7) Basic idea of Electrocardiogram and Interpretation of normal Electrocardiogram.
8) Cardiac output and cardiac failure.
9) Venous return,
10) Heart rate and its regulation.
11) Structure and organization of vascular tree.
12) Arterial blood pressure and pathophysiology of Hypertension.
13) Characteristic of Coronary circulation and pathophysiology of Coronary artery disease
14) Capillary circulation and physiological basis of Edema.
15) Local & systemic regulatory mechanisms of CVS, humeral & neural
16) Patho-physiology of Shock.
17) Cerebral, coronary, splanchnic, skin, Placental & Fetal circulation

3. RESPIRATORY SYSTEM

1) Functional anatomy of Respiratory System, Physiological anatomy of lungs, mechanics of respiration
2) Mechanics of breathing: Mechanism of inspiration and Expiration, intra-pleural and intra-alveolar pressures, Compliance, Surfactant, Air-way resistance and work of breathing
3) Pulmonary circulation, Respiratory membrane and Gas exchange in lungs
4) Composition of gases and Partial pressures.
5) Oxygen and Carbon-dioxide transport.
6) Other function of respiratory system
7) Lung Volumes, Capacities and Lung function tests.
8) Neural and Chemical control of breathing.
9) Regulation of respiratory activity, non-chemical influences on respiratory activity
10) Physio-clinical aspects of Dyspnoea, Apnoea, Asphyxia, Hypoxia, Cyanosis, Breath holding, high and Low atmospheric pressures.
4. CARDIO RESPIRATORY ADJUSTMENTS IN HEALTH & DISEASE
   1) Exercise, high altitude, deep sea diving
   2) Hypoxia, hypercapnia, hypocapnia, oxygen treatment
   3) Asthma, emphysema, artificial respiration

5. BLOOD
   1) W.B.C., R.B.C., Platelets formation & functions
   2) Plasma, Blood Groups
   3) Haemostasis, Immunity

6. RENAL SYSTEM
   1) Functions of Kidney, Formation of Urine, Glomerular filtration rate, clearance, Tubular function
   2) Water excretion, concentration of urine-regulation of Na, Cl, K excretion
   3) Physiology of urinary bladder, Micturition- Neurogenic bladder.

7. DIGESTIVE SYSTEM.
   1) Digestion & absorption of nutrients
   2) Gastrointestinal secretions & their regulation
   3) Functions of (a) Saliva, (b) Gastric juice, (c) Pancreatic juice (d) Succus entericus, (e) Bile.
   4) Movements of G.I.T.
   5) Functions of Liver & Exocrine Pancreas

8. NERVE - MUSCLE AND SYNAPTIC & JUNCTION TRANSMISSION
   1) Nerve – General Concept
   2) Nerve cell – structure
   3) Genesis of resting membrane potential & Action potential
   4) Their ionic basis, All or None phenomenon
   5) Ionic basis of nerve conduction
   6) Classification & types of nerve fibre
   7) Mixed nerves & compound action potential
   8) Concept of nerve injury & Wallerian degeneration
   9) Muscle properties and functions
   10) Electric & Mechanical responses & their basis
   11) Concept of isometric & isotonic muscle contraction
   12) Electrical events in postsynaptic neurons
13) Inhibition & facilitation at synapses
14) Chemical transmission of synaptic activity
15) Principal neurotransmitter system
16) Neuromuscular junction, structure & events occurring during excitation

9. NERVOUS SYSTEM (descriptive)

1) Organization of Nervous system.
2) Neuron and Neuralgia
3) Synapse: Properties and Synaptic transmission.
4) Reflex arc, its components, properties, type and neurological impairments.
5) General sensations and their properties.
6) Ascending tracts of the Spinal cord and effects of their lesions.
7) Pain and physiological Analgesia.
8) Motor neurons, Descending tracts and their applied aspects.
9) Regulation of Muscle Tone by Spinal and Supra-spinal mechanism.
10) Function of Brain -stem, Cerebellum, Basal Ganglia andMotor cortex.
11) Control of Voluntary movement
12) Regulation of posture and equilibrium, vestibular apparatus.
13) Broad functions of Thalamus, Hypothalamus, Major lobes of Cerebral cortex and Ascending Reticular
14) Activation System
15) Limbic System
16) Learning, memory, speech and conditional reflexes.
   a. Reflexes, monosynaptic, polysynaptic, withdrawal reflex
   b. Properties of reflexes
   c. Sense organ, receptors, electrical & chemical events in receptors
   d. Ionic basis of excitation
   e. Sensory pathways for touch, temperature, pain, proprioception, others
   f. Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions & clinical aspects
   g. Autonomic nervous system & Hypothalamus
      i. Functioning of Autonomic Nervous System with special reference to micturition, defecation and labour
      ii. Higher neural regulation of ANS.

10. HIGHER FUNCTIONS OF NERVOUS SYSTEM

  a. Learning & memory, neocortex,
  b. Limbic functions, sexual behaviour, fear & range, motivation

11. SPECIAL SENSES

  1. Functional anatomy of the Eye
  2. Optics of Vision
  3. Retinal Function
4. Visual Pathways
5. Mechanism of Hearing.

12. ENDOCRINE
   1. Role of Hypothalamus as an endocrine gland.
   2. Functions and hypo & hyper secretion of hormones of
      a. Pituitary
      b. Thyroid
      c. Parathyroid
      d. Adrenal
      e. Endocrine part of pancreas.

13. REPRODUCTIVE SYSTEM
   a) Male & female reproductive system
   b) Spermatogenesis, Functions of Testosterone.
   c) Ovarian and Menstrual Cycle and their hormonal control.
   d) Hormones of Ovary and their functions.
   e) Physiological basis of Fertilization, Implantation, Pregnancy, Parturition and Lactation.
   f) Contraception.

14. EXERCISE PHYSIOLOGY
   1. Effects of acute & chronic exercises
   3. Effects of Exercises on muscle strength, power, endurance, B.M.R., R.Q.- hormonal & metabolic effectsrespiratory & cardiac conditioning.
   4. Aging.
   5. Training, fatigue & recovery.
   6. Fitness- related to age, gender, & body type.

15. SKIN AND BODY TEMPERATURE REGULATION
   1. Functional anatomy of the Skin and its function
   2. Different mechanisms involved in body temperature regulation.
   3. Physiological basis of Pyrexia and Hypothermia
PRACTICAL

1. Examination of pulse, B.P., respiratory rate, & measure study the effect of posture & exercise. Recording of arterial blood pressure – effects of change in posture & exercise on A.B.P.

2. Stethography
   - Effect of deglutition.
   - Effect of voluntary hyperventilation
   - Effect of exercise.

Spirometry to measure various lung capacities & volumes, Respiratory rate, tidal volume, VC, timed VC, IRV, IC, ERV, EC on Spirometry (demonstration only)
   - Spirometry : Lung volumes and capacities.
   - Mosso’s finger ergography and bicycle ergography
   - Perimetry
   - Clinical examination of
     1. Respiratory system.
     2. Cardiovascular system.
     3. Central Nervous system.
     4. Special senses.
     3. Estimate of Haemoglobin, T.R.B.C., T.W.B.C. count (demonstration only) ,Study of Graphs
     4. Blood indices, Blood grouping, Bleeding & Clotting time (demonstration only]
     5. Skeletal muscles
       - Simple muscle twitch
       - Effect of increasing strength on SMT.
       - Effect of increasing load on SMT.
       - Effect of pre load & after load (Starling’s law).
       - Effect of temperature.
       - Effect of two successive stimuli.
       - Effect of fatigue.
       - Effect of multiple stimuli & tetanus.

6. Cardiac muscles
   - Simple myo-cardiogram.
Effect of temperature on the myo-cardiogram.
Effect of drugs.
All or none law.
Staircase phenomenon.

7. Physiology Fitness

- Breath holding
- Mercury column test
- Cardiac efficiency test – Harvard step test – Master step test

PRACTICAL EXAMINATION

Students will be assessed by viva based upon learning in theory.
Demonstration of measurements of pulse, BP

Suggested Readings:

1. Chatterji, C. C., Human Physiology Medical Allied,
2. Keele, Cyril A, Samson Wright’s Applied Physiology, Oxford University Press
3. Bijlani, R L, Understanding Medical Physiology, Oxford University Press
4. Guyton, A.C. and Hall, J. E., Textbook of Medical Physiology, W.B. Saunders, Singapore
Course Objectives:
This course will enable the student to understand the basic principles of Physics, Biomechanics & exercise therapy, basic principles and application of soft tissue manipulation

SCHEME OF EXAMINATION

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<tr>
<td>Fundamental of Physics, Biomechanics &amp; Biomechanical Modalities</td>
<td>20</td>
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There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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Course Contents:
All topics are for a brief description only
1. Mechanics - Definition of mechanics and Biomechanics
2. Force - Definition, diagrammatic representation, classification of forces, concurrent, coplanar and co-linear forces, composition and resolution of forces, angle of pulls of muscle
3. Momentum - principles, and practical application
4. Friction
5. Gravity - Definition, line of gravity, Centre of gravity
6. Equilibrium - Supporting base, types, and equilibrium in static and dynamic state
7. Levers - Definition, function, classification and application of levers in physiotherapy & order of levers with example of lever in human body
8. Pulleys - system of pulleys, types and application
9. Elasticity - Definition, stress, strain, Hooke’s Law
10. Springs - properties of springs, springs in series and parallel, elastic materials in use
11. Aims and scope of various biomechanical modalities – shoulder wheel, shoulder ladder, shoulder pulleys, pronator-supinator instrument, static cycle, rowing machine, ankle exerciser, balancing board, springs, weights
12. Normal Posture - definition & description, static and dynamic, alignments of various joints, centre of gravity, planes & muscular moments, and Analysis of posture
13. Movements - Anatomical definition and description, Movements and exercise as therapeutic modality and their effects, Physiological reaction of exercise
14. Traction - Rationale, Technique, indications & contra-indications
15. Normal Gait - definition & description, alignments, centre of gravity during gait cycle, planes & muscle acting mechanisms, pattern, characteristics Normal gait cycle, time & distance parameters, & determinants of Gait
16. Starting positions - Description and muscle work, Importance of fundamental and derived types, Effects and uses of individual positions
17. Soft tissue manipulation - History, definition, types and their rationale, general effects, local effects of individual manipulation (physiological effects) and uses, contra-indications and techniques of application

PRACTICAL
Demonstration of Biomechanical principles
Study of structure, function and application of various Biomechanical modalities – shoulder wheel, shoulder ladder, shoulder pulleys, pronator-supinator instrument, static cycle, rowing machine, ankle exerciser, balancing board, springs, weights, etc.
Study of structure, function and application of suspensions, Demonstration and practice of
- Soft tissue manipulative techniques
- Normal gait and posture
- Starting and derived positions
- Spinal mechanical traction
PRACTICAL EXAMINATION

Students will be assessed by viva based upon learning in theory, demonstrations of various biomechanical modalities, suspensions, and manipulative techniques learned.

Suggested Readings:
1. Hollis, M. and Cook; P.F., Practical Exercise Therapy CBS, New Delhi, Latest Edition
2. Gardiner, Dena; Principles of Exercise Therapy CBS, New Delhi, Latest Edition
3. Lippert, Lynn; Clinical Kinesiology for Physical Therapy, Jaypee New Delhi, Latest Edition
BACHELOR OF PHYSIOTHERAPY (BPh) FIRST YEAR

FUNDAMENTALS OF MEDICAL ELECTRONICS & PRINCIPLES OF BIOELECTRICAL MODALITIES

Total No. of teaching Hrs.- 160

Theory- 100 Hrs.  Practical- 60 Hrs.

SHHEME OF EXAMINATION

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<tr>
<td>Fundamental of Medical Electronics &amp; Principles of Bioelectrical Modalities</td>
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There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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Course Objectives:
This course will enable the student to understand the basic electricity, electronics, equipments and their application in Electrotherapy.

Course Contents:
N.B.- All sections carry equal weightage. All topics are for a brief description only.
Section – A: FUNDAMENTALS OF MEDICAL ELECTRONICS & MAGNETISM

1. DC Currents - Modern concept of electricity: fundamental electric charges (proton and electron), bound and free electrons, free electrons and current, static electric charge, charging of an object, potential and capacitance, potential difference and EMF

2. A. C. currents: Sinusoidal wave from, frequency, wavelength, Amplitude and phase of a sine wave, Average & RMS value of a sine wave

3. Quantity of electricity, magnitude of current, conductors and insulators, resistance of conductor and Ohm’s law, resistances in series and parallel

4. Capacitors: Electric field around a capacitor, charging and discharging of capacitor, types of capacitor with application of each in Physiotherapy department

5. Rheostat: Series and shunt Rheostat with application of each in the Physiotherapy department

6. Effects of electric Current: Thermal effect, chemical effect (ionization) and magnetic effect. Electric shock, Earth shock, causes and its prevention

7. Magnetism: Magnetic - non-magnetic substances and their properties, properties of magnet, molecular theory, poles of magnet and its properties, magnetic lines of force and their properties, Electromagnetism, magnetic effects of electric current, Electromagnetic induction, Lenz’s law, Inductor and Inductance, types of inductor, reactance and impedance.

Section – B: Electronic Devices

1. Thermionic Valves: Thermionic emission, Diode and Triode valves and their characteristics, Construction and application of Cathode Ray Oscilloscope


Basing of Diode and their characteristics, Light Emitting Diodes, integrated circuits, Advantage of semiconductor devices over thermionic valve


4. A.C. AND D.C. meters: Functions and applications of Ammeter and volt meters, Ohmmeters,

5. Introduction to Therapeutic Energies – Thermal, Mechanical, Electrical, Electromagnetic and magnetic - Definition, description, Electromagnetic spectrum, physiological effects, pathological effects and dangers

Section – C: Bioelectrical Modalities

6. Medical Instrumentation For Physical Therapy: Brief description of generation, circuit diagrams and testing

7. Low frequency currents, Direct currents

8. Medium frequency currents

9. Short wave Diathermy-continuous and pulsed
10. Microwave Diathermy
11. Ultrasound

Note: Emphasis is given only to generation circuit diagram and testing of the various electrotherapy apparatus.

PRACTICAL
Demonstration of Bioelectrical principles
Demonstration of electrotherapy instruments, principles of their functioning, usage, and safety implications for human beings

PRACTICAL EXAMINATION
Students will be assessed by viva based upon learning in theory and demonstration of various components of the equipments.

Suggested Readings:
1. Froster, A. and Palastanga, N.; Clayton’s Electrotherapy: Theory and Practice AITBS, Delhi
2. Jhon, Low and Ann, Reed; Electrotherapy Explained: Principles Butterworth Heine, Oxford
3. Nelson, R.M. and Currier, D.P.; Clinical Electrotherapy Appleton and Lange
5. Michlovitz, S L; Thermal Agents in Rehabilitation, F A Davis, Philadelphia
The University examination shall be of 80 marks with Section – A : Psychology and Section – B : Sociology the university theory examination marks for Psychology shall be 40 and for sociology 40 marks respectively. There shall be two paper setters and two evaluators, one from Psychology and one from Sociology. Section- A, which will be set by Psychology examiner (40 marks) and Section-B, by Sociology (40 marks) examiner. Recognized teachers in psychology and sociology with five years of experience shall be on the panel of examiners , 50% shall be the minimum passing marks. Internal assessment will be of 10 marks in each subject. Total internal assessment will be 20 Marks.

The pattern of University theory examination will be as under for 80 Max. Marks. There will be two section i.e. Section-A: Psychology and Section-B: Sociology of 40 Max. Marks each section and distribution of marks for questions will be as under

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**Course objectives:**
This course will enable the student to understand specific psychological factors and effects in physical illness and this will help them to have a holistic approach in their dealings with patients during admission, treatment, rehabilitation and discharge.

Note: This course is to be taught by two teachers (Psychologist & Sociologist / Medical Sociologist). Each part carries equal weightage. External Question Paper for each part shall be set by two relevant subject paper setters. The examinees shall use different answer books for the two different parts. And, relevant subject teachers shall evaluate these.
PSYCHOLOGY (PART – A)

Course Contents :-
1. What is psychology? Fields of application of psychology, influence of heredity and environment on the individual
2. Learning – theories & principles learning
3. Memory, Forgetting, theories of memory and forgetting, thinking & methods to improve memory
4. Thinking – process, problem solving, decision making and creative thinking
5. Motivation - theories and types of Motivation
6. Emotions - theories of Emotions and stress
7. Attitudes – theories, attitudes and behaviour, factors in attitude change
8. Intelligence - theories of intelligence
9. Personality, theories of personality, factors influencing personality
10. Development and growth of behavior in infancy and childhood, adolescence, adulthood and old age
11. Behavior - normal and abnormal
12. Counseling - Definition, Aims and principles
13. Psychotherapy – brief introduction to paradigms in psychopathology and therapy
14. Psychological need of children and geriatric patients
15. Communication – effective and faulty
16. Emotional and behavioral disorders of childhood and adolescence- (in brief)
   a) Disorders of under and over controlled behavior
   b) Eating disorders
17. Mental deficiency
   a) Mental retardation,
   b) Learning disabilities
   c) Autistic behavior
18. Anxiety Disorders -
   a) Phobias, panic disorder,
   b) Generalized Anxiety disorder,
   c) Obsessive Compulsive Disorder,
   d) Post –traumatic Stress Disorder
19. Somatoform and Dissociate Disorders -
   a) Conversion Disorder,
   b) Somatization Disorder,
   c) Dissociate Amnesia & Dissociate Fugue

20. Personality Disorder

21. Patho-physiological Disorders – stress and health

22. Severe psychological disorders – Mood disorders, psychosis

**Suggested Readings:**

1. Morgon, Clifford T; Introduction to Psychology Tata McG. Hill, Delhi
2. Farnald, L.D. Introduction to Psychology AITBS, Delhi
3. Korchin, Sheldon J.; Modern Clinical Psychology: Principals, CBS, New Delhi
4. McDavid, J.W. and Harari, H.; Social psychology: Individuals, Groups, Societies CBS, New Delhi
6. Mehta, Manju; Behavioral Sciences in Medical Practice, Jaypee, New Delhi
SOCIOLOGY (PART – B)

Course Contents:-
A-Introduction
   1. Meaning-Definition and scope of Sociology
   3. Methods of Sociology-case study, Social Survey, Questionnaire, interview and opinion poll methods.
   4. Importance of its study with special reference to health care professionals.
B-Social Factors in Health and Disease:
   1. The meaning of Social Factors.
   2. The role of Social factors and illness.
C-Socialization:
   1. Meaning and nature of Socialization.
   2. Primary, Secondary, and Anticipatory Socialization.
   3. Agencies of Socialization.
D. Social Groups:
   1. Concepts of social groups.
   2. Influence of formal and informal groups on health and sickness.
   3. The roll of primary groups and secondary groups in the hospital and rehabilitation settings.
E- Family:
   1. The family - Meaning and definition, Functions
   2. Changing family Patterns
   3. Influence of family on the individual health, family, and nutrition.
   4. The effects of sickness on family and psychosomatic disease and their importance to Physiotherapy
F-Community:
   1. Rural community – Meaning and features – Health hazards of rural population
   2. Urban community – Meaning and features – Health hazards of urban population
G-Culture and Health:
   1. Concept of culture
   2. Cultures and Behaviour
   3. Cultural meaning of sickness
4. Culture and health disorders

H-Social change:

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

I-Social problems of disabled: Consequences of the following social problems in relation to sickness and Disability, remedies to prevent these problems

2. Poverty and unemployment.
5. Prostitution.
6. Alcoholism.
7. Problems of women in employment.


K-Social worker: Meaning of social work; the role of a medical social worker.

Suggested Readings:
1. Bhusan, Vidya and Sachdeva, D.R.; Introduction to Sociology Kitab Mahal, New Delhi
2. Turner, J. H.; Structure of Sociological Theory, Jaipur Publication
3. Anand Kumar Indian Society and Culture Vivek, New Delhi
# B.P.Th. SECOND YEAR

**STAFF PATTERN FOR SECOND YEAR B.P.Th.**

<table>
<thead>
<tr>
<th>Subjects</th>
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<tbody>
<tr>
<td>Pathology</td>
<td>1 M.D. Pathology, Lecturer/ Asst. Prof.</td>
</tr>
<tr>
<td>Microbiology</td>
<td>1 M.D. Microbiology, Lecturer/ Asst. Prof.</td>
</tr>
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<td>Biochemistry</td>
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<tr>
<td>Pharmacology</td>
<td>1 M.D. Pharmacology, Lecturer/ Asst. Prof.</td>
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<tr>
<td>General Medicine, including Pediatrics &amp; Geriatrics</td>
<td>1 M.D. Medicine, Lecturer/ Asst. Prof.</td>
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<tr>
<td>General Surgery</td>
<td>1 M.S. Surgery, Lecturer/ Asst. Prof.</td>
</tr>
<tr>
<td>Obstetrics &amp; Gynecology</td>
<td>1 M.S. Obstetrics &amp; Gynecology, Lecturer/ Asst. Prof.</td>
</tr>
<tr>
<td>Exercise therapy</td>
<td>1 Asst. Professor of Physiotherapy</td>
</tr>
<tr>
<td>Yoga</td>
<td>1 Asst. Professor of Physiotherapy/Yoga therapy</td>
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## Second Year B.P.Th. Scheme of Examination

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**Total Max. Marks** | **800**

N.B.- Viva marks will be added in theory marks along with internal assessment theory; candidate have to get min. 50% marks in theory and viva collectively for passing the examination.
SCHEME OF EXAMINATION FOR SECOND YEAR B.P.Th.

There shall be Six subjects for the Second year B.P.Th. Examination.
The subjects Qualification of the examination and the pattern of examination will be as follows.

1. PATHOLOGY & MICROBIOLOGY

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The University examination shall be of 80 marks with Section – A : Pathology and Section – B : Microbiology the university theory examination marks for Pathology shall be 40 and for Microbiology 40 marks respectively. There shall be two paper setters and two evaluators, one from Pathology and one from Microbiology. Section- A, which will be set by Pathology examiner (40 marks) and Section-B, by Microbiology (40 marks) examiner. Recognized teachers in pathology and microbiology with five years of experience shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 10 marks in each subject. Total internal assessment will be 20 Marks.

The pattern of University theory examination will be as under for 80 Max. Marks.

There will be two section i.e. Section-A: Pathology and Section-B: Microbiology of 40 Max. Marks each section and distribution of marks for questions will be as under

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2. BIOCHEMISTRY & PHARMACOLOGY

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3. MEDICINE INCLUDING PEDIATRICS & GERIATRICS

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There shall be one paper setter external or internal for theory examination. Recognized teachers in Medicine after M.D. (Medicine) with five years of teaching experience shall be on the panel of examiner. 50% shall be the minimum passing marks. Internal assessment will be of 20 marks. The pattern of University theory examination will be as under for 80 Max. Marks.

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4. GENERAL SURGERY, OBSTETRICS & GYNECOLOGY

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The University examination shall be of 80 marks with Section – A: General Surgery and Section – B: Obstetrics & Gynecology, the university theory examination marks for General Surgery shall be 40 and for Obstetrics & Gynecology 40 marks respectively. There shall be two
paper setters and two evaluators, one from General Surgery and one from Obstetrics & Gynecology. Section A, which will be set by General Surgery examiner (40 marks) and Section-B, by Obstetrics & Gynecology (40 marks) examiner. Recognized teachers in General Surgery and Obstetrics & Gynecology with five years of experience shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 10 marks in each subject. Total internal assessment will be 20 Marks.

The pattern of University theory examination will be as under for 80 Max. Marks.

There will be two section i.e. Section-A: General Surgery and Section-B: Obstetrics & Gynecology of 40 Max. Marks each section and distribution of marks for questions will be as under

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5. EXERCISE THERAPY INCLUDING YOGA

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There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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6. ELECTROTHERAPY

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BACHELOR OF PHYSIOTHERAPY (BPTh): SECOND YEAR

PATHOLOGY & MICROBIOLOGY

Total No. of Hrs. : 100

Course objectives:

- Rationale for understanding of the subject for Physiotherapy students
- Brief concept of pathological basis of disease and infectious disease prevention

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SECTION A: PATHOLOGY

Theory: 52 Hrs. Practical Demonstration : 8 Hrs.

Course Contents:-
1. Aims and objectives of study of pathology
2. Concept of Diseases, Classification of Lesions.
2. Brief outline of cell injury, degeneration, necrosis and gangrene.

3. Brief concepts of inflammation and Repair, Degeneration, Necrosis and Gangrenes. Inflammation: Definition, vascular and cellular phenomenon, differences between transudate and exudate, granuloma.

4. Deficiency Diseases vitamin A, vitamin B, vitamin C, vitamin D.


7. Neoplasia: Brief overview of Tumors, Definition, Classification, Etiology and spread of tumors, Benign versus Malignant tumors

8. In brief about:

   A. Respiratory system diseases- Etio-pathogenesis, gross pathology of conditions - aging, Pneumonia, Bronchitis, Bronchiectasis, COPD, Asthma, Emphysema, Pulmonary Tuberculosis, Lung cancers, Restrictive Lung disease and Occupational Lung diseases


   C. Alimentary system – Peptic ulcer, Carcinoma of stomach

      Ulcerative lesions of Intestine.

      a. Liver – Hepatitis, Cirrhosis and Hepatoma.

      b. Pancreas – Pancreatitis, Carcinoma of Pancreas, Diabetes.

9. Details about:

   a. CNS and PNS: Etio-pathogenesis, gross pathology of conditions - Aging, Meningitis, Encephalitis, Parkinson’s, Amyotrophic lateral sclerosis, Ataxias, Multiple Sclerosis, stroke, Neuropathies (Carcoat Marie Tooth’s disease, Compression and entrapments, diabetic, G.B syndrome), Poliomyelitis and post-polio syndrome, Myasthenia Gravis, brief outline of C.N.S. Tumours and peripheral nerve lesions.

   b. Musculoskeletal system (Bones and Joints): Etio-pathogenesis, gross pathology of conditions - osteomalacia, Osteoporosis, Osteomyelitis, Osteoarthritis, rheumatoid arthritis, Gout, spondyloarthropathy, Osteonecrosis, bone tumors, Myofascial pain syndrome. Biological responses to trauma, bone and soft tissue immobilization

   c. Muscle – Poliomyelitis, Myopathies, Volkman’s ischemic contracture.

   d. Skin – Scleroderma, Psoriasis, Autoimmune disorders.

10. In brief about

   (a) Urinary system – Nephrotic syndrome, Nephritis, Glomerulonephritis.

   (b) Prostate – Prostatitis, BPH, Carcinoma of Prostate.
(c) Endocrine – Thyroid, Thyroiditis, Thyroid Tumours.
(d) Salivary gland – Salivary gland tumours.

Note: No Questions should be asked from practical demonstration in theory paper.

Practical (8hrs.)

1. Normal total and differential WBC count, Hemoglobin, RBC.
2. Demonstration of slides:
   • Anemia
   • Leukemia
   • Acute inflammation – Appendix
   • Chronic inflammation – Non – specific.
   • Tuberculosis of lymph Node – specific inflammation.
   • Leprosy – Skin and Leprabacilli.
   • Squamous cell carcinoma – skin.
   • Osteogenic sarcoma – Bone tumor.
   • Osteoclastoma – Bone tumor.
   • Ewings – Bone tumour.
   • Multiple Myeloma – Bone tumor.
SECTION B : MICROBIOLOGY
Total no. of teaching Hrs.= 40

Course Contents

I. General Microbiology
   1. Introduction and historical background.
   2. Classification of Microorganisms.
   4. Sterilization and disinfection.
   5. Immunity – Antigens and Antibodies, General overview of antigen antibody reaction and practical applications.

II. Systemic Microbiology
   8. Gram positive bacilli – Tubercule bacilli, Lepra bacilli, Clostridium tetani, Clostridium perfrigens.
   9. Gram negative bacilli – Salmonella, Coloforms, pseudomonas, proteus etc.
   10. Anaerobic non – sporing cocci and bacilli.
   12. Spirochetes- Syphilis (congenital and acquired).
   13. Malaria
   14. Mycology – Actinomycosis, Maduramycosis, Mucosal Candidiasis
   15. Applied microbiology as relevant to diseases of bones, joints, Muscles, Skin, Infection and Burns.

III. Demonstration
   17. Demonstration of morphology and culture of organisms.
   18. Demonstration of simple Gram’s and Ziehl-Neelsen staining.
   19. Sterilization and Disinfection techniques.
   20. Demonstration of serological tests for syphilis, Hepatitis.

Suggested Readings:
1 Chakraborty, P. Textbook of Microbiology NCB, Calcutta 1999
3 Chatterjee, K. D. Parasitology: Protozoology and helminthology Chatterjee, Calcutta 1965
4 Cotran, Ramzi S Pathologic Basis of Disease W. B. Saunders, Singapore 1999
5 Vinay Kumar Basic Pathology Harcourt 1997
7 Talib, V. H. Essential Parasitology Mehta, New Delhi 2001
BACHELOR OF PHYSIOTHERAPY (BPh) SECOND YEAR

BIOCHEMISTRY & PHARMACOLOGY

Total No. of Hrs.-100

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SECTION : A- BIOCHEMISTRY

Theory:- No. of Teaching Hrs. 60

Course Objective

To understand biochemical basis of life sciences

After 60 hours lecture and demonstration in Biochemistry this course shall provide the student with basic Biochemistry knowledge with special emphasis on clinical understanding of biochemistry processes. Students shall be able to relate these processes with underlying mechanism of physiotherapeutics.
Note: A brief description of metabolic pathways mentioned herein is indicated. Details and structures are to be avoided.

Course Contents:-

I. Basic Biophysics:
- Concept of Acid base, buffer, Henderson- Hasselbach equation, brief knowledge of biophysical process such as Osmosis. Viscosity, Surface tension, Dialysis with special emphasis on their biomedical implication. A brief study of Radio-isotopes and their clinical applications.

II. General Biochemistry with Biomedical functions
1. Nutrition: Basic principles of nutrition; Carbohydrates, Proteins and Lipid caloric requirement and balance diet.
2. Carbohydrates: Definition, classification with examples and general functions.
   Metabolism - Glycolysis, T.C.A Glycogen metabolism, Blood Sugar regulation, Diabetes and diabetic keto-acidosis
5. Study of hemoglobin and immunoglobulins with functions.
7. Nucleic Acids: Brief overview of the structure of RNA and DNA including Nucleosides and Nucleotides. Study of few biologically important nucleotides.
8. Tissue chemistry: Chemistry of connective tissue, bone and teeth. Composition function and chemical mediators of nerve structure of muscle tissue. General Biochemistry of muscle contraction and relaxation.

III. Bioenergetics
Study of Plasma Membrane, Review of laws of thermodynamics as applicable to biological systems. Concept of free energy charge. High-energy compounds and Respiratory chain.

IV. General Metabolism
(Note: A brief outline of metabolic pathway herein is indicated. Details and Structure are to be avoided).
8. Lipids Metabolism: Beta-oxidation of Fatty acids, Fatty acid synthesis, cholesterol synthesis, Ketosis and Fatty liver.

9. Protein Metabolism: General reaction of Amino acids, Formation and fate of Ammonia, Urea cycle.


V. Water and Electrolyte Balance

General outline of fluid compartments of the body with their water and electrolyte content and balance, Dehydration.

Book References

1. Textbook of Biochemistry by West and Todd.
2. Textbook of Medical Biochemistry by Chatterjee and Shinde
4. Textbook of Biochemistry by A.C. Deb
5. Ahuja, Lakshmi CBS Quick Review in Biochemistry CBS, New Delhi
6. Chatterji, M N Text Book of Medical Biochemistry Jaypee, Bangalore
7. Deb, A.C. Fundamentals of Biochemistry CBA,Calcutta
8. Lehninger, A.L. Principles of Biochemistry CBS,Delhi
SECTION : B – PHARMACOLOGY

Total No. of Teaching Hrs. = 40 Hrs.

Course Objective
The objective of the course in Pharmacology is that after 40 hours of lectures and
demonstration, the students shall be able to understand and correlate the biochemical process
involved with drugs in human body and their clinical importance especially in
physiotherapeutic, in addition, the students shall be able to fulfill with 75% accuracy (as
measured by written, oral, practical and internal evaluation) the following objectives of the
courses.

a) To understand pharmaco-kinetics, pharmaco-dynamics.
b) Usage of common drugs with (indications, contraindications, side effects).
c) To understand the drug actions that may affect the physical therapy treatment.
d) Course is not prescription oriented.

Course Contents:-

I. General Pharmacology (Brief description only)

1. Definition of drug, Pharmacokinetics and Pharmacodynamics.
2. Broad categories of adverse drug reactions.
3. Alcohols
5. Sedatives.
7. Drugs acting on muscles- Muscle relaxants, Muscle stimulants.
8. Anti-parkinsonism agents
9. Drugs modifying B.P.
11. Anticoagulants.
12. Thyroxin and Anti thyroid drugs.
15. Calcium, Phosphorus, Calcitonin and Parathormone.
16. Narrow spectrum antibiotics.
17. Broad-spectrum antibiotics.
18. Anti-cancer drugs.


20. Vitamins.


22. Locally acting drugs: Anodies, Local anesthetic drugs, Counter-irritants Rubefacient, Soothing agent, Anti-microbial.

Books Suggested :-

1. Pharmacology by Satoskar
2. Clinical Pharmacology by Lawrence.
4. Tripathi, K.D. Essential of Medical Pharmacology New Delhi
BACHELOR OF PHYSIOTHERAPY (BPTh) SECOND YEAR

MEDICINE INCLUDING PAEDIATRICS & GERIATRICS

Total No. of Hrs.- 130

Theory: - 100 Hrs.                                      Practical :30 Hrs.

SCHEME OF EXAMINATION

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<td>Theory</td>
<td>Practical</td>
<td>Theory</td>
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<tr>
<td>Medicine including Pediatrics &amp; Geriatrics</td>
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There shall be one paper setter external or internal for theory examination. Recognized teachers in Medicine after M.D. (Medicine) with five years of teaching experience shall be on the panel of examiner, 50% shall be the minimum passing marks. Internal assessment will be of 20 marks. The pattern of University theory examination will be as under for 80 Max. Marks.

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<td>2 Essay Type Questions (Answer to be given in 450-500 words)</td>
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Description

This course follows the basic course on Anatomy, Physiology, Psychology, Sociology, Pathology and Microbiology and provides knowledge about relevant aspects of General Medicine with emphasis on physiotherapeutic.

Course Objective

The objective of this course is that students at the end of course shall have a broad understanding about common medical diseases, which they would be handing as a physiotherapist. They should have a brief idea about Etiology, pathology, Type and Degree of Disability the patient will have as a result of the disease, so that he/she as a physiotherapist with physician should help the patient to achieve cure and/or ameliorate his/her illness and sufferings.

To understand a Paediatrics patient and its special needs in relation to physical therapy

Course Contents:-

A. Infections

Outline briefly the Etiology, symptoms and brief management of the following disease.
Bacterial – Tetanus, Typhoid.
Viral – Herpes simplex, Herpes Zoster, Measles, Hepatitis –B. and HIV.
Protozal – Filariasis, Malaria, Amoebiasis.

**B. Diseases of blood.**

- Define and describe clinical aspects of Nutritional Anaemias.
  - Brief description of Bleeding Disorder with emphasis to Haemophilia.
  - Lymphadenopathy and splenomegaly.
  - Leukaemia – acute and chronic.

**C. Diseases of Liver**
- Jaundice
- Viral Hepatitis.
- Cirrhosis of Liver

**D. GIT Diseases (Brief description)**
1. Peptic Ulcer
2. Diarrhea and Dysentery.

**E. Renal Diseases**
1. Brief description of acute and Chronic renal Failure.
   - Urinary Tract Infection.
   - Acute Nephritis, Nephrotic Synodrome.

**F. Nutritional and Metabolic Disease.**
1. Balanced normal diet.
2. Protein Calorie Malnutrition
3. Avitaminosis of both water and fat-soluble vitamins.
5. Obesity – Etiology and management.
6. Hyper and Hypo-thyroidism.
7. Calcium Homeostasis.

**G. Diseases of Bones, Joints and Connective tissue**
1. Brief introduction to understanding of Auto immune diseases.
2. Rheumatic fever and Rheumatoid arthritis – Aetio pathogenesis, Clinical features, complications, diagnosis and briefly outline the management.
   Osteoarthritis – Aetiopathogenesis, clinical feature, diagnosis, complication and management.

**H. Genetics and Diseases**

**I. Miscellaneous**
1. Allergy
2. Drug reactions.

**J. Dermatology**
2. Psoriasis
4. Venereal diseases – Syphilis, HIV etc., brief description and prevention (lecture demonstration only).

**K. Radiology**
   (Both in normal and Pathological conditions).
   - Radiology of Bone and joints.
   - Radiology of chest including Heart.

**L. Geriatrics**
Physiology of ageing, manifestations of diseases in old people and general principles of management. Common Geriatric Disorders and their management, Implications of aging in physical therapy. lung disease, Pleurisy & Pulmonary embolism

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**PAEDIATRICS**

**Total No. of Hrs.- 20**

1. Normal Growth and development of child – motor, mental, language and social from birth to 12 years including physical, social, adaptive development.
2. Pathological presentations of growth and development disorders
3. Common infectious diseases in children: Brief description of following infectious diseases along with outline of management: Tetanus, diphtheria, Mycobacterial, measles, chicken pox, gastroenteritis, HIV, and Malaria
4. Immunization programmes – WHO schedule, different vaccinations, rationale; special consideration to various disease eradication programmes like Pulse-Polio
5. Child and nutrition - Nutritional requirements, malnutrition syndrome, Vitamins (A, B, C, D & K) and Minerals (iron, calcium phosphorus, iodine) deficiencies in children and management in brief

6. Clinical presentation, management & prevention of the following: - Cerebral palsy, Poliomyelitis, Muscular dystrophy

7. Childhood rheumatism-types, clinical presentation, & management in brief

8. Acute CNS infections: clinical presentation, complications and management of bacterial and tubercular infections in brief

9. Clinical presentation, management & prevention of the following respiratory conditions: URI, LRI, bronchiolitis, asthma, TB (in brief)

10. Clinical presentation, management & prevention of the following cardiac conditions: Rheumatic heart disease, SABE, Congenital heart disease - ASD, VSD, PDA (in brief)

**Practical:**

Students shall be posted for one month in general Medicine ward. They shall do clinical checking and ward work to acquaint themselves to General Medicine and pediatrics.

**Book References:**

1. Davidson Principles and Practice of Medicine (Churchill Livingstone)
2. Chamberlin, E.N.and Ogilvie, C. Symptoms and signs in Clinical Medicine Jhon Wright
4. Ghai, O. P. Essential Pediatrics Interprint, New Delhi
5. Haslett, C. Davidson’s Principal and Practice of Medicine Churchill Livingstone, London
6. Golwalla, Aspi F. Medicine For Student NBD, Mumbai
BACHELOR OF PHYSIOTHERAPY (BPT) SECOND YEAR

GENERAL SURGERY, OBSTETRICS & GYNECOLOGY

Total No. of teaching Hrs.- 150+40

SCHEME OF EXAMINATION

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<tr>
<td>General Surgery, Obstetrics &amp; Gynecology</td>
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The University examination shall be of 80 marks with Section – A : General Surgery and Section – B : Obstetrics & Gynecology, the university theory examination marks for General Surgery shall be 40 and for Obstetrics & Gynecology 40 marks respectively. There shall be two paper setters and two evaluators, one from General Surgery and one from Obstetrics & Gynecology. Section- A, which will be set by General Surgery examiner (40 marks) and Section-B, by Obstetrics & Gynecology (40 marks) examiner. Recognized teachers in General Surgery and Obstetrics & Gynecology with five years of experience shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 10 marks in each subject. Total internal assessment will be 20 Marks.

The pattern of University theory examination will be as under for 80 Max. Marks.

There will be two section i.e. Section-A: General Surgery and Section-B: Obstetrics & Gynecology of 40 Max. Marks each section and distribution of marks for questions will be as under

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<tr>
<td>01Essay Type Questions (Answer to be given in 450-500 words)</td>
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Course Description

This course follows the basic course on Anatomy, Physiology, Psychology, Sociology, Pathology and Microbiology and provides knowledge about relevant aspects of general surgery, Plastic surgery, Pediatrics, E.N.T. Ophthalmology, Obstetrics and Gynecology and Radiology with emphasis on physiotherapeutic.
Course Objectives
The objective of this course is that students at the end of course shall have a broad understanding about common surgical diseases, which they would be handing as a physiotherapist. They should have a brief idea about etiology, pathology and type and degree of disability the patient will have as a result of the disease, so that he/she as a Physiotherapist with surgeon should help the patient to achieve cure and/or ameliorate his/her illness and sufferings.

SECTION:A- GENERAL SURGERY
(INCLUDING NEUROSURGERY, E.N.T AND OPHTHALMOLOGY)

Theory : 110 Hrs. Practical : 40 Hrs.

General Surgery Theory:- No. of Hrs. 50

Course Contents:-
1. Introduction: Description of events frequently accompanying general Anesthesia, Blood transfusion and physiological response of the body.
2. Wounds, scars, ulcers, boils, carbuncles etc.
3. Principles of pre- and post –operative physical examination, investigations, postoperative complications and their management.
4. Abdominal surgery: Incisions, complications and management of following:
5. Burns: Causes, Classification, Medical management and precautions in the acute stage, complications of burns and their management.
6. Plastic Surgery:
   b. Cineplasty.
   c. Principles of cosmetic surgery.
   d. Skin grafting.
   e. Surgery of Hand with emphasis on management of traumatic & leprosy hand.
   f. Burns and plastic surgery management.
7. Neurosurgery THEORY-Total Hrs.- 40
   A) Neurophysiology: Reviews in brief the neurophysiologic basis of tone and Disorders of tone and Posture, Bladder control, Muscle conduction, Movement and Pain.
   B) Clinical Features and Management: Briefly outline the clinical features and management of the following neurological disorders.
      1. Congenital and Childhood disorders
a) Hydrocephalus.
b) Spinal Bifida.

2. Trauma - Broad localization, first aid and management of sequelae of Head injury and Spinal Cord injury.

3. Diseases of the Spinal Cord:
   a) Craniovertebral junction anomalies.
   b) Syringomyelia.
   c) Cervical and lumbar disc disease
   d) Tumours.
   e) Spinal arachnoiditis.

4. Peripheral Nerve Disorders:
   a) Peripheral nerve injuries: Localization and Management
   b) Entrapment Neuropathies.

5. Intracranial tumours: Broad Classification, Signs and Symptoms.


**Practical**

Clinical assessment of neurological function to be taught through bedside or demonstration in clinics, of the following:

- Basic history taking to determine whether the brain, spinal cord or peripheral nerve is involved.
- Assessment of higher mental function such as Orientation, Memory, Attention, Speech and Language.

1. Assessment of Cranial nerves.
2. Assessment of Motor system.
3. Assessment of Sensory function, Touch, Pain and Position.
4. Assessment of Tone- Spasticity, Rigidity and Hypotonia.
5. Assessment of Cerebral function.

Students shall be posted for 10 hrs. in Neurosurgery units. They shall do clinical checking and ward work to acquaint themselves to neurological and surgical conditions.
8. **Ophthalmology:** Etiology, symptomatology and treatment of visual defects emphasis on Errors of Refraction, Squint, Conjunctivitis, Trachoma, Corneal ulcers, Iritis, Cataract, Retinitis, Detachment of retina and Glaucoma (lecture demonstration only-10 Hrs.)

9. **E.N.T.**:- Etiology, sysptomatology and treatment of sinusitis, Rhinitis, Acute and Chronic Otitis, Otosclerosis, Mastoidectomy and loss of hearing. (lecture demonstration only-10 Hrs.)

**Book References**

2. Surgery by Baily & Love –
5. Gupta, R. L. Text Book of Surgery Jaypee, New Delhi
SECTION:B- OBSTETRICS AND GYNECOLOGY

Total teaching Hrs.- 40 Hrs.

Course objectives:
To understand common gynaecological conditions and procedures (in brief)
To understand implications of gynaecological conditions and procedures on physical therapy

Course Contents:
1. Brief Anatomy and physiology of female reproductive system.
2. Basic principles of clinical examination, investigation, diagnosis, prognosis of female reproductive system disorders.
4. Physiological changes during pregnancy.
5. Antenatal care and diagnosis of pregnancy including high-risk pregnancy.
6. Labour, stage of labour, normal and abnormal labour, Delivery and management of neonate.
8. Pelvic pain and its management: Musculo-skeletal problems in an obstetric patient, management
10. Prenatal and post-natal care
11. Prolapse Uterus, causes of incontinence of urine, type and management.
12. Pelvic inflammatory diseases
13. Abortion and birth control.
14. Surgical consideration in obstetrics and gynecology.

Practical
Students shall be posted for one month in General Surgery, plastic and burns, obstetrics and Gynecology & Radiology units. They will do clinical checking and ward work to acquaint themselves to General Surgical and Obs. & Gyn. conditions.

Suggested Readings:-
1. Gynaecology and Obstetrics in the Health care of a Woman by Seymoul L. Romney, Mary Jane Gray, J. A. Merrill.
2. Shaw’s Textbook of Gynecology.
5. Howkins, John Shaw’s Textbook of Gynecology Orient-Longman, Bangalore
BACHELOR OF PHYSIOTHERAPY (BPT): SECOND YEAR

EXERCISE THERAPY INCLUDING YOGA

Total No. of teaching Hrs. - 200

Theory :- 120hrs. Practical:- 80hrs.

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<td>Theory</td>
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<tr>
<td>Exercise therapy including yoga</td>
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There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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Course Description

In these courses, the student shall learn principles, techniques and effects of exercise as a therapeutic modality in the restoration of physical function.

Courses Objective

To understand the principles of exercise therapy and its application as a treatment modality. The objectives of this course is that after 200 hours of lectures, demonstrations, practical and clinical, the students shall be able to list the indications and contraindications of various types of exercise and demonstrate the different techniques and describe their effects. In addition, the students shall be able to fulfill with 75% accuracy (as measured by written, oral and practical internal evaluation) the following objective of the course.
Course Contents:-

1. Introduction to Exercise Therapy.
2. Exercise and physiology of body.
4. Classification of movements in details:
   - **Active voluntary movements**: Free, assisted and resisted
     - Indication, contraindications, advantages and techniques of various types of active exercises
     - Clinical methods of strengthening of various muscle groups.
   - **Involuntary movements**
   - **Passive movements**: Definition, types- Relaxed, forced and stretching type.
     - Indications, contraindications, advantages and Techniques of various passive movements.
5. Voluntary Movements :- Free exercises, assisted exercises, Resisted exercise.
   A. Free exercises – Classification technique effects of free exercise on various systems
   B. Resisted exercises – technique and types of resistance, SET system (heavy resisted exercise, Oxford method, Delorme method, McQueen’s method)
6. Relaxed passive movement- Definition, Classification of relaxed passive movements, Technique, effects and uses of relaxed passive movements.
7. Muscle strength – Anatomy and Physiology of muscle tissue, Causes of muscle weakness/paralysis, Prevention of muscle weakness/paralysis. Type of muscle work and contractions, Torque of muscle work, Muscle assessment M.R.C. grading, Principles of muscle strengthening/re-education, early re-education of a paralyzed muscle etc., Strengthening technique, Endurance training, Therapeutic Gymnasium.
10. Manipulation therapy: Introduction, Principles of therapy, Indications and Contraindication (no clinical application of these techniques).


15. Re-education of muscles:

- Concept, technique, spatial and temporal summation.
- Various reduction techniques and facilitating methods.
- Progressive strengthening of various muscle groups in Grade-I-Grade IV.
- Muscle strengthening technique – PNF - Principles of PNF, indications, contra indications, techniques, limb patterns


17. Suspension Therapy: Principles of suspension, Type of suspension, Therapeutic effects and uses of suspension therapy, their application either to mobilize a joint or to increase muscle power.


19. Hydrotherapy : Indication, contraindication, benefits, dangers and precautions

- Hydrotherapy regimes of exercises, Hydrotherapy exercise for all age groups
- Types of pools and baths

20. Soft tissue manipulations Techniques of application, Kneading and picking up, rolling (back) Clapping, Tapping, Friction.


22. Exercises of the shoulder and hip and evaluation.

23. Exercise of hand, food and evaluation.

24. Exercise of the knee and elbow and evaluation.

25. Spinal exercises including neck exercises.

27. Walking aids and crutch walking:
- Description of crutch - components, classification
- Good crutch, measurements, Crutch use- Preparation, Training, counseling.
- Crutch gaits- types, & significance. Crutch complications- Palsy, dependency etc.

28. Types of paraplegic gaits.


31. Yogasanas and Pranayama:
   - Physiology and therapeutic principles of yoga, Yogasanas and their scientific studies
   - Concept of total yoga discipline, Yogasana for physical culture, relaxation and medication.
   - Psycho-physiological aspects yoga procedures, Psychological aspects of yoga, Psycho-social aspects of yoga, Yogasanas for physical fitness, relaxation, flexibility and meditation.
   - Yoga a holistic approach

**EXERCISE THERAPY INCLUDING YOGA : PRACTICAL**

**PRACTICAL**

Demonstration and learning of active & passive movements of Limbs and spine

Demonstration and practice of Manual Muscle testing, Goniometry

Demonstration and practice of muscle stretching techniques

Demonstration and practice of muscle strengthening techniques

Demonstration and practice of muscle reeducation techniques

Demonstration and practice of coordination exercises (Frankel’s)

Demonstration and practice of relaxation techniques

Demonstration and practice of all types of soft tissue manipulation, mobilization of peripheral joints, various types of manipulations demonstrated and practiced to Upper limbs, Lower Limbs, Neck and Face appropriately

Demonstration of normal and pathological gaits and crutch walking.

Demonstration and practice of suspension techniques
Demonstration and Practice of Functional Re-education Technique.

Demonstration and Practice of various Yogasana & Pranayama.

PRACTICAL EXAMINATION

Students will be assessed by viva & practical demonstrations based upon learning in theory & practical classes.

Suggested Books for Readings:

2. Gardiner, Dena M. Principles of Exercise Therapy CBS, New Delhi
3. Lippert, Lynn Clinical Kinesiology for Physical Therapy Jaypee, New Delhi
5. Jones and Barker, Human Movement Explained Butter worth- Heine
6. Thomson, Ann Tidy's Physiotherapy Varghese, Mumbai
8. Norkin Measurement of Joint Motion
10. Holey, E. and Cook, E. Therapeutic Massage Harcourt, Singapore
11. Bates, Andrea and Hanson, Norm Aquatic Exercise Therapy W.B.Saunders, Philadelphia
14. Perry, Jan F Kinesiology Workbook F A Davis, Philadelphia
17. Therapeutic Exercise by Basmajian.
18. Aliimco all Volumes.
20. Basic Athletic training by Cramer.
22. The yogi philosophy of physical well being by Yogi Tamacharaka.
BACHELOR OF PHYSIOTHERAPY (BPTh): SECOND YEAR

ELECTROTHERAPY

Total No. of teaching Hrs. - 200

Theory: - 120hrs. 
Practical: - 80hrs.

SCHEME OF EXAMINATION

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<tr>
<td>Electrotherapy</td>
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There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations. Recognized teachers in Physiotherapy after M.P.T. (Physiotherapy) or B.P.T. with five years of teaching experience shall be on the panel of examiner. The viva marks shall be added to university theory examination marks and 50% shall be the passing marks for both theory and practical university examination respectively.

The pattern of University theory examination will be as under for 100 Max. Marks.

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**Course Description**

In this course the student shall learn the principles, techniques and effects of electrotherapy as a therapeutic modality in the restoration of physical function.

**Course Objective**

The objective of this course is that after 200 hours of lectures, demonstration, practical and clinics, the students shall be able to list the indications and contraindications of various types of electrotherapy, modalities and demonstrate the different techniques and describe their effect. In addition, the students shall be able to fulfill with 75% accuracy (as measured by written, oral and practical internal evaluation) the following objective of the course-

a) To list indications and contraindications of various Modalities.

b) To understand different techniques of applications, their justification and effects.

c) Demonstration of individual techniques of applications of various modalities.
Course Contents:-

A. LOW FREQUENCY CURRENTS:

I. Nerve Muscle Physiology - Resting potential, Action potential, propagation of action potential, in myelinated and un myelinated nerve fiber, Motor unit, and Synapse and Synaptic transmission of Impulse. Effect of negative and positive electrodes on nerve and accommodation of the nerve.

II. Faradic Current - Definition, Characteristic of original Faradic current, modified faradic plane faradic current interrupted faradic current and surged faradic current, parameters, indication, effect on denervated muscles, innervated muscles, technique of application, group muscles stimulation, individual muscle stimulation, faradic bath, faradic under pressure, pelvic floor muscle reeducation, therapeutic effect of faradic current, contraindication and dangers.

III. Galvanic Current – Classification of Galvanic current
   - Plain galvanic current
   -Interrupted galvanic current

   Plain Galvanic Current :- Parameters of plain Galvanic current, principle of Iontophorosis technique of Iontophorosis (Bath method, bath and pad method, pad method) Common drugs used in Iontophorosis with its polarity, therapeutic effect, contraindication and dangers of plain galvanic current

   Interrupted Galvanic current (Interrupted direct current I.D.C.)
   - Definition of IDC, parameters, wave form, duration and amplitude of the pulse effect of strength and duration on muscles and nerves technique of stimulation of individual muscles and group muscles, therapeutic effect, contraindication and dangers and precaution of IDC.

III. Electro-Diagnosis -
   - S.D. Curve
   - Chronaxae and Rheobase
   - Nerve Conduction
   - EMG
   - Nerve Conduction Velocity Measurement (outline only).

IV. TENS:- Definition, parameters and wave form, pain gate theory of pain modulation, techniques of application, therapeutic effect and contraindication.

B. MEDIUM FREQUENCY CURRENTS:
Definitions, effects, indications, techniques of application, contraindications

Interferential therapy:
• Physiological, therapeutic effects & dangers, Indications & contra indications
• Technique and method of applications, Dosimetry.

C. HIGH FREQUENCY CURRENT

I. Short Wave Diathermy: - Introduction, Principle of application (Capacitor field methods and conductive field methods) preparation of patient, Therapeutic effects, contraindication and dangers of SWD.

Methods of application-capacitor and induction electrode, precautions and Potential harmful effects of treatment, Dosimetry.

II. Pulsed S.W.D.: - Definition, Characteristic, Principles of Treatment, Therapeutic effects, Indications, Technique of application, Contraindications and dangers.

III. Microwave Diathermy: - Definition, characteristic of wave, properties of microwave, technique of application, Therapeutic effects, contraindication, and dangers, precautions and potential harmful effects, Dosimetry.

D. ACTINOTHERAPY:

I. Infra-Red: - Introduction, Classification, penetration depth, Techniques of application, Dangers and Contraindications.

II. Ultraviolet Radiation: - Introduction, classification of ultraviolet rays, penetration depth, effect of ultraviolet, Physiological and therapeutic effects- photosensitization, test dose calculation, technique of application, (contact methods non contact methods ) Physiological and Therapeutic effect, Indications and contraindications, Potential harmful effects and dangers, Methods of application, Sensitizes, Filters, Dosage, wavelength, penetration, tolerance, Treatment / Application condition wise.

Comparison between UVR & IR Therapy.

III. LASER: -(Infrared and red light laser, helium/neon laser and semi conductor laser)

Definition, principle of application, (contact methods non contact methods) technique of application, Therapeutic effect and potential harmful effects, dose calculation, indications, contraindications and dangers.

E. ULTRASONIC THERAPY: - Introduction and Characteristics of the wave parameters, coupling media, Therapeutic effects, Indications, Contraindication and Dangers, Testing of Apparatus, and Techniques of application and dose.
F. THERMAL THERAPY MODALITIES:

- Therapeutic effects and uses, Techniques and applications
- Indications, contraindications, precautions and Potential harmful effects of various heat modalities:


   II. Hydro collator packs (Heating pad, and Moist heat): - Introduction, methods of application, indication, contra indication.

   III. Whirlpool and moist heat Heating pads

   IV. Hot air chambers, fluidotherapy.

   V. Cryotherapy :- Introduction, Physical Principles, Physiological and Therapeutic effects, Techniques of Application, Indications, precautions and Potential harmful effects of treatment, Contraindications and dangers, Dosimetry.

E. ULTRASONIC THERAPY:

- Physiological and therapeutic effects & potential harmful effects.
- Indications, contraindications, methods of application and precautions, Dosimetry

F. Bio Feedback :


G. Advanced electrotherapy:

- Computerization of electrotherapy modalities
- Programming of parameter of treatment.
- Appropriate Selection and combination of parameters in therapy.
- Combined therapy-Microwave with traction, Ultrasonic therapy with stimulation,IFT or TENS-Principles, uses, indications etc.
ELECTROTHERAPY PRACTICAL

Practical:- No. of Hrs. (80)

- Testing of above apparatus
- Techniques of application of above treatment modalities (Demonstration & Practice)
- Demonstration of Electrical Modalities functioning & Usage
- Demonstration and practice of various motor point stimulations.
- Demonstration and practice of therapeutic application of different low frequency currents.
- Demonstration and practice of Electro diagnosis (demonstration and Practice of following electro diagnostic Measures) F.G. Test, SD curves plotting, Chronaxae and Rheobase, Reaction of degeneration.
- Demonstration and practice of therapeutic application of the following modalities:
  - Short-wave diathermy, Ultrasound, Infra red, Wax bath, Hydro collator, Electric muscle stimulator, Interferential currents, TENS, Ultraviolet, Microwave, Lasers, and Electrical Traction.

Note: All the demonstrations are done on normal persons.

PRACTICAL EXAMINATION

Students will be assessed by viva & practical demonstrations based upon learning in Theory and Practical.

Suggested Readings Books:

5. Michlovitz, S L Thermal Agents in Rehabilitation F A Davis, Philadelphia
6. B.K.Nanda, Electrotherapy, Jaypee Publication, New Delhi