



**MGM SCHOOL OF PHYSIOTHERAPY**  
(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)  
(Deemed University u/s 3 of UGC Act 1956)  
Grade "A" Accredited by NAAC  
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**CHOICE BASED CREDIT SYSTEM**

**CURRICULUM FOR**

**BACHELOR OF PHYSIOTHERAPY (BPT)**

**DEGREE PROGRAM**

**(2019)**

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## **Vision and Mission of MGM School of Physiotherapy**

### **Vision**

MGM Institute of Health Sciences aims to be a top ranking centre of Excellence in Health Science Education, Health Care and Research.

### **Mission**

- Students graduating from the Institute will have the required skills to deliver the quality health care to all the sections of the society with compassion and benevolence, without prejudice or discrimination at an affordable cost.
- As a Research Centre, it shall focus on finding better, safer and affordable ways of diagnosing, treating and preventing diseases. In doing so, it will maintain highest ethical standard.

## Description of Degree

**Name of the Degree Offered: Bachelor in Physiotherapy (BPT)**

**Duration of Program:** 4 ½ years (4 years Academics + 6 months compulsory rotator Internship).

**Program pattern:**

First Semester	August
Second Semester	February
Third Semester	August
Fourth Semester	February
Fifth Semester	August
Sixth Semester	February
Seventh Semester	August
Eight Semester	February

**Eligibility Criteria:**

- He/she has passed the Higher Secondary (10+2) with Science (PCB) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, and Biology.
- Minimum percentage of marks: 50% aggregate.

**Medium of Instruction:**

English will be the medium of instruction for all the subjects of study and for examinations.

## I. Preamble

Physiotherapy or Physical Therapy (PT) is a **Movement Science** with an established theoretical and scientific base and widespread clinical applications in the **Prevention, Restoration & Rehabilitation, Maintenance and Promotion of optimal physical function**. Physiotherapists **diagnose and manage movement dysfunction** and enhance physical and functional abilities. This physical dysfunction may be the sequelae of involvement of any of the systems like Musculoskeletal, Neurological, Cardiovascular, Respiratory or other body systems.

These practitioners contribute to society and the profession through practice, teaching, administration, and the discovery and application of new knowledge about physiotherapy experiences of sufficient excellence and breadth by research to allow the acquisition and application of essential knowledge, skills, and behaviors as applied to the practice of physiotherapy. Physiotherapist (PT) are autonomous, effective and compassionate professionals, who practice collaboratively in a variety of healthcare set ups such as neonatal to geriatric, from critical care to community fitness to sports training. Emerging graduate and post graduate students are required to demonstrate a substantial knowledge base, possess skills related to Physiotherapy practices, possess high emotional quotient to address family health and meet community responsibilities, demonstrate gender sensitivity and socio-culturally relevant competence. They should be aware of legal issues governing professional practice and follow evidence based clinical practices.

The Chairman, University Grants Commission (UGC) via letter D.O.No.F.1- 1/2015 (CM) dated 8<sup>th</sup> January, 2015, communicated the decision of the Ministry of Human Resources Development to implement Choice Based Credit System (CBCS) from the academic session 2015-2016 in all Indian Universities to enhance academic standards and quality in higher education through innovation and improvements in curriculum, teaching- learning process, examination and evaluation systems.

Diversity in the system of higher education, and multiple approaches followed by universities towards curriculum, examination, evaluation and grading system has led to the lack of uniformity. While the Universities must have the flexibility and freedom in designing the examination and evaluation methods that best fits the curriculum, syllabi and teaching– learning methods, there is a need to devise a sensible system for awarding the grades based on the performance of students. Presently the performance of the students is reported using the conventional system of marks secured in the examinations or grades or both. The conversion from marks to letter grades and the letter grades used vary widely across the Universities in the country. This creates difficulty for the academia and the employers to understand and infer the relative performance of the students graduating from

different universities and colleges in the country. Hence the UGC has recommended the implementation of CBCS in Universities.

The grading system is considered to be better than the conventional marks system and hence it has been followed in the top institutions in India and abroad. Introduction of a uniform grading system will facilitate student mobility across institutions within and across countries and also enable potential employers to assess the performance of students. To bring in the desired uniformity, in grading system and method for computing the cumulative grade point average (CGPA) based on the performance of students in the examinations, the UGC has formulated the guidelines and communicated it to all Universities for adoption.

UGC, subsequently, in its notification No.F.1-1/2015 (Sec.) dated 10/4/15 has provided a set of model curricula and syllabi for CBCS program under the Faculties of Arts, Humanities and Sciences providing the academic flexibility for Universities to make changes/ innovation upto 20% in the syllabi of these program. It has also specified that all UG program should be for a minimum of three years duration. UG Program with 120-140 credits in the 180 annual teaching days system being designated as regular B.A/B.Sc./B.Com., B.B.A etc., Those UG programs with 140-160 credits or more with fully supported higher number of annual teaching days can be designated as B.A (Hons)/ B.Sc.(Hons) /B.B.A(Hons)/B.Com(Hons) etc.,

Further , the University Grants Commission encourages higher education institutes to integrate learning outcome based framework into the curriculum for undergraduate education which is considered critical for enabling effective participation of young people in knowledge production , participation in knowledge economy, improving national competitiveness in a globalised world and equipping young people with skills relevant to global and national standards. Outcome oriented curriculum enhances employability of graduates and enables translation of academic research into innovations for practical use in society and economy.

Learning outcomes-based approach specifies what graduates completing BPT program are expected to know, understand and able to do after completing the program. The BPT degree is awarded based on demonstration of achievement of outcomes in terms of knowledge, skills, attitudes and values and academic standards expected of the graduate. The expected learning outcomes help define the graduate attributes, qualification descriptors, program learning outcomes , course learning outcomes, curriculum planning, design, delivery and review of the academic program.

MGM Institute of Health Sciences, accredited A grade, has taken a proactive step in adopting the CBCS system for Physiotherapy programs implemented by its constituent unit, MGM School of Physiotherapy.

The duration of Bachelor in Physiotherapy (BPT) program is four and half years offering 184 credits with well defined learning outcomes. The BPT CBCS Curriculum has been designed

with reference to existing curriculum of state Universities within the country, generic guidelines of University Grant Commission, global guidelines for curriculum, input from experts in the field of Physiotherapy and feedback from stakeholders namely students, teachers, alumni, employers and professionals to remain in consonance with the spirit of choice based credit system and learning objective based curriculum.

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## **II. Introduction :**

Physiotherapy is a branch of modern medical science which includes examination, assessment, interpretation, physical diagnosis, planning and execution of treatment and advice to any person for the purpose of preventing, correcting, alleviating and limiting dysfunction, acute and chronic bodily malfunction including life saving measures via chest physiotherapy in the intensive care unit, curing physical disorders or disability, promoting physical fitness, facilitating healing and pain relief and treatment of physical and psychological disorders through modulating psychological and physical response using physical agents, activities and devices including exercise, mobilization, manipulations, therapeutic ultrasound, electrical and thermal agents and electrotherapy for diagnosis, treatment and prevention.

(Definition as per the Maharashtra State Council for Occupational therapy & Physiotherapy, 2004)

'**Physiotherapist**' is a qualified professional who has acquired all the above mentioned knowledge and skills for entry into practice after being awarded a bachelor degree in the subject of " Physiotherapy" from a recognized institute affiliated to the University conducting a fulltime course not less than four years and six months of internship.

## **III. Objectives of the Bachelor's in Physiotherapy (BPT) program**

This program is formulated to enable student to gain adequate knowledge, skills and clinical hands on experience leading to an ability to establish independent professional practice. The overall content of the curriculum focuses on learning experiences and clinical education experiences for each student that encompasses the following.

1. Ethical, evidence-based, efficient Physiotherapy treatment of adult as well as pediatric patients/clients with an array of conditions (eg musculoskeletal, neuromuscular, cardiovascular/pulmonary, integumentary etc) across the lifespan and the continuum of care, to all people irrespective of gender, caste, nation, states and territories, region, minority groups or other groups.
2. Ability to prevent movement dysfunction or maintain/restore optimal function and quality of life in individuals with movement disorders.
3. Ability to operate as independent practitioners, as well as members of health service provider teams, act as first contact practitioners, from whom patients/clients may seek direct services without referral from another health care professional.
4. Ability to promote the health and wellbeing of individuals and the general public/society, emphasizing the importance of physical activity and exercise.

5. Prevent impairments, activity limitations, participatory restrictions and disabilities in individuals at risk of altered movement behaviors due to health factors, socio-economic stressors, environmental factors and lifestyle factors.
6. Provide interventions/treatment to restore integrity of body systems essential for movement, maximize function and recuperation, minimize incapacity, and enhance the quality of life, independent living and workability in individuals and groups of individuals with altered movement behaviors resulting from impairments, activity limitations, participatory restrictions and disabilities.
7. Ability to modify environmental, home and work access and barriers to ensure full participation in one's normal and expected societal roles.
8. Become an essential part of the health and community/welfare services delivery systems, practice independently of other health care/service providers and also within interdisciplinary rehabilitation/habilitation programs, independent professional practice in self employed set up or employment at the multiple settings such as hospitals, nursing homes, institutions catering services to specific conditions (like paraplegic /geriatric homes), primary as well as rural & urban health care set up, community health , domiciliary practice like residential areas, education & research centers, fitness /wellness centers like health clubs, occupational health centers g]- Schools including special schools, geriatric care units, and others.
9. Ability to carry out research projects

#### **IV. Physiotherapy Graduate Attributes**

The following graduate attributes are considered as “essential requirements” to strengthen abilities of a Physiotherapist for widening knowledge, skills and abilities through meaningful learning experiences, and critical thinking. These attributes are necessary for completing the professional education enabling each graduate to subsequently enter clinical practice. The purpose of this curriculum is to delineate the cognitive, affective and psychomotor skills deemed essential for completion of this program and to perform as a competent physiotherapist who will be able to evaluate, plan & execute physiotherapy treatment independently. Some of the characteristic attributes that a graduate should demonstrate are as follows:

1. **Disciplinary knowledge:** The student must demonstrate comprehensive knowledge and understanding of curricular content that form the program. The student must demonstrate cognitive learning skills, ability to receive, interpret, remember, reproduce and use information in the cognitive, psychomotor, and affective domains of learning to solve problems, evaluate work, and generate new ways of processing or categorizing similar information listed in course objectives.
2. **Psychomotor Skills:** Physiotherapy students must demonstrate psychomotor skills of locomotor ability to access lecture halls, practical laboratory and clinics.

- a. They must possess ability to move with reasonable swiftness in emergency situations to protect the patient (e.g. from falling).
  - b. They should be competent to perform physical tasks such as positioning patients to effectively perform evaluation, manipulate assessment tools used for evaluation of joint mobility, muscle strength, testing musculoskeletal, neurological and cardiorespiratory systems.
  - c. Students should be competent to perform risk assessment, safely and effectively guide, facilitate, inhibit, and resist movement and motor patterns through physical facilitation and inhibition techniques (including ability to give timely urgent verbal feedback), perform transfers, positioning, exercise, mobilization techniques and use assistive devices and perform cardiopulmonary resuscitation.
  - d. Students must possess fine motor skills to legibly record thoughts for written assignments (including diagrams) and tests, document evaluations, patient care notes, referrals, etc. in standard medical charts in hospital/clinical settings in a timely manner and consistent with the acceptable norms of clinical settings and safely use electrotherapy modalities and fine mobilisation techniques.
  - e. Students must possess visual acuity to read patient's treatment chart, observe demonstrations, visual training, receive visual information from patients, treatment environment and clues of treatment tolerance. Auditory acuity to distinguish between normal and abnormal sounds, engage in conversation with patients and retrieve meaningful information relevant to patient care.
3. **Communication skills** : The student must be able to express thoughts and ideas effectively in writing and verbally, communicate with others using appropriate media, share views, demonstrate ability to listen carefully, write analytically, present complex information in a clear, and concise manner. Student must be able to effectively communicate information and safety concerns with other students, teachers, patients, peers, staff and personnel by asking questions, giving information, explaining conditions and procedures, or teaching home programs. They should be able to receive and send verbal communication in life threatening situations in a timely manner within the acceptable norms of clinical settings. Physiotherapy education presents exceptional challenges in the volume and breadth of required reading and the necessity to impart information to others. Students must be able to communicate quickly, effectively and efficiently in oral and written English with all members of the health care team.
  4. **Critical thinking** : Student should be able to apply analytical thought to a body of knowledge , analyze based on empirical evidence, draw relevant assumptions or implications , formulate arguments, critically evaluate policies and theoretical framework and formulate a scientific approach to knowledge development. They should be able to identify structural and functional impairments, identify contextual factors influencing function, critically appraise treatment options and implement care

- that is socio-culturally relevant to each patient.
5. **Problem Solving:** Students must demonstrate capacity to extrapolate theoretical knowledge and apply competencies gained to solve non- familiar problems and real life situations.
  6. **Analytical reasoning:** To a certain extent, students should be able to evaluate reliability and relevance of evidence, synthesize data, draw valid conclusions and support them with evidence.
  7. **Research – Related Skills:** Students should be able to define research problem, formulate hypothesis, manage resources, analyze and interpret data, explore cause – effect relationships, plan and execute a report, present results of the experiment and demonstrate a sense of scientific enquiry, reflective thinking, self directed learning and creativity.
  8. **Co-operation /Team Work:** Students should demonstrate the ability to work effectively and respectfully with a multi disciplinary team, facilitate co-operative and co-ordinated effort for the common cause in various clinical settings.
  9. **Socio-cultural and multicultural competency:** Knowledge of socio-cultural values, attitudes and beliefs relevant to a particular society, nation and global perspectives must be present to effectively engage and identify with diverse groups.
  10. **Awareness of moral, ethical and legal issues:** Students must demonstrate moral /ethical values in conduct, awareness of ethical issues related to patient care, work practices, refraining from malpractice, unethical behaviour, falsification, plagiarism, misinterpretation of data, non adherence to intellectual property rights, adhering to truthful, unbiased actions in all aspects of work without discrimination based on age, race, gender, sexual preference, disease, mental status, lifestyle, opinions or personal values.
  11. **Leadership qualities:** Students must demonstrate ability for task allocation, organization of task elements, setting direction, formulating an inspiring vision, team building, to achieve a vision, engaging, knowledge and respect individual values and opinions in order to foster harmonious working relationships with colleagues, peers, and patients.
  12. **Ongoing Learning:** Students must demonstrate ability to acquire knowledge and skills through ongoing learning, participation in continuous education programs, engaging in self-paced, self- directed learning aimed at personal development, meeting social and cultural objectives, skill development, adapting to changing environment and workplace requirements and challenges.

## **V. Qualification Descriptors for Bachelor of Physiotherapy (BPT) program**

Students who complete the four and half years Bachelor of Physiotherapy program will be awarded a bachelor's degree. Expected outcomes that a student must demonstrate include:

1. Systematic, extensive and coherent knowledge and skill in Physiotherapy and its applications including critical understanding of established theories, principles and concepts, knowledge of advanced and emerging issues in Physiotherapy, skills in musculoskeletal, neurological, cardio-respiratory Physiotherapy, recent advances and research in Physiotherapy evaluation and treatment procedures.
2. Comprehensive information about electrotherapy modalities, exercise equipment, advanced learning material, skills and techniques.
3. Skill in collecting quantitative and qualitative data, analysis and interpretation of data using appropriate methodology and communicating results to scientific community and beneficiaries for formulating appropriate evidence based health care solutions.
4. Address self-learning needs related to current and emerging areas of study, use research and professional material, apply knowledge to new concepts and unfamiliar areas and seek solutions in real life situations.
5. Demonstrate profession related transferable skills relevant to patient care and employment opportunities.

## **VI. Program Outcomes for Bachelor of Physiotherapy Program**

Students who complete four and half year's undergraduate program in Physiotherapy would earn a Bachelor of Physiotherapy (BPT) degree. The learning outcomes that a student should be able to demonstrate on completion of a degree level program include academic, personal, behavioral, entrepreneurial and social competencies. It is expected that a student completing a particular course must have a level of understanding of the subject and its sub-areas in consonance with the learning outcomes mentioned at the end of that course. Program learning outcomes include Physiotherapy specific skills, generic skills, transferable global skills and competencies that prepare the student for employment, higher education, and research thereby developing students as contributing members for overall benefit to the society.

The program learning outcomes relating to BPT degree program are summarized below:

PO 1	To demonstrate behavioral skills and humanitarian approach while communicating with patients, relatives, society at large and co-professionals
PO 2	To develop healthy Physiotherapist – Patient relationship
PO 3	To demonstrate and relate moral, ethical values and legal aspects concerned with Physiotherapy management
PO 4	To demonstrate academic skills and knowledge related to understanding the structural and functional of human body and applied anatomy, physiology in physiotherapy practice.
PO 5	To apply and outline pathology of medical conditions in context with Physiotherapy, interpret & use medical communication.
PO 6	To apply knowledge of biomechanics of human movement in musculoskeletal, neurological and cardio-respiratory conditions in planning, recommending, and executing Physiotherapy management.
PO 7	To outline and implement Physiotherapy management by co-relating assessment and examination skills of clinical subjects like Orthopedics, General Surgery, Medicine, Neurology, Pediatrics, Dermatology & Gynecology & Obstetrics, Community Medicine and Sociology
PO 8	To demonstrate skill in maneuvers of passive movements, massage, stretching, strengthening, and various manual therapy techniques. Students will integrate Physiotherapy evaluation skills including electro diagnosis on patients to arrive at a Functional/ Physical Diagnosis in musculoskeletal, neurological, cardiovascular and pulmonary conditions.
PO 9	To describe and analyze concepts of energy conservation, global warming and pollution and justify optimal use of available resources.
PO 10	To demonstrate ability of critical thinking, scientific enquiry, experiential learning, personal finance, entrepreneurship and managerial skills related to task in day-to-day work for personal & societal growth.
PO 11	To demonstrate and apply basic computer applications for data management, data storage, generating data bases and for research purposes.

## VII. Program Specific Outcomes for Bachelor of Physiotherapy Program

Physiotherapist as a Professional  
**Reflect, learn and teach others**

PSO 1	Acquire, assess, apply and integrate new knowledge, learn to adapt to changing circumstances and ensure that patients receive the highest level of professional care.
PSO 2	Establish the foundations for lifelong learning and continuing professional development, including a professional development portfolio containing reflections, achievements and learning needs.
PSO 3	Continually and systematically reflect on practice and, whenever necessary, integrate that reflection into action, using improvement techniques and audit.
PSO 4	Manage time and prioritize tasks, and work autonomously when necessary and appropriate.
PSO 5	Recognize own personal and professional limits and seek help from colleagues and supervisors when necessary.
PSO 6	Function effectively as a mentor and teacher including contributing to the appraisal, assessment and review of colleagues, providing effective feedback, and taking advantage of opportunities to develop these skills.

### Learn and work effectively within a multi-professional team

PSO 7	Analyze the roles and expertise of health and social care professionals in the context of working and functioning as a multi-professional team to the delivery of safe and high-quality care.
PSO 8	Demonstrate ability to work with colleagues in ways that best serve the interests of patients, passing on information and handing over care, demonstrating flexibility, adaptability and a problem-solving approach.
PSO 9	Demonstrate ability to build team capacity and positive working relationships and undertake various team roles including leadership and the ability to accept leadership by others.

### Physiotherapist as a Scholar and a Scientist

Physiotherapy graduate will be able to apply biomedical scientific principles, method and knowledge relating to: anatomy, physiology, biochemistry, cell biology, pathology, and psychology to Physiotherapy clinical practice.

#### The graduate will be able to:

PSO 10	Explain normal human structure and functions, examine the correlation between structural and functional impairment.
PSO 11	Explain the scientific basis for common musculoskeletal, neurological, cardio-respiratory, women's health related, geriatric and sports related disorders, compare and contrast Physiotherapy treatment techniques applicable in relevant case scenarios.
PSO 12	Justify selection of appropriate clinical examination and investigation for common clinical conditions and critically analyze clinical findings
PSO 13	Plan appropriate rehabilitation goals for common disorders and design management protocols.
PSO 14	Examine the role of environmental and occupational hazards in ill-health and discuss ways to mitigate their effects.

### Apply scientific method and approaches to Physiotherapy research

PSO 15	Plan, and conduct research experiments to evaluate current practices and design innovative physiotherapy interventions, based on evidence, to provide highest level of healthcare.
PSO 16	Critically appraise the results of relevant qualitative and quantitative studies as reported in scientific literature.
PSO 17	Outline the ethical issues involved in clinical research.

### Physiotherapist as a Practitioner

#### The graduate will be able to

PSO 18	Record a patient's medical history, including family and social history; communicate with relatives or other caretakers where ever appropriate.
PSO 19	List patients' questions, their understanding of condition and treatment options, their views, concerns, values, preferences and extent to which patients want to be involved in decision-making regarding their care and treatment.
PSO 20	Assess structural, functional impairments, compare performance and capacity through clinical examination and risk evaluation, prioritize goals, recommend Physiotherapy treatment and carry out independent consultation with a patient.
PSO 21	Examine ethical and legal issues in patient care, obtain informed consent, demonstrating community responsibility, good communication skills and socio-cultural competency
PSO 22	Respond to patients concerns and preferences, and respect the rights of patients to reach decisions with their doctor about their treatment and care and to refuse or limit treatment.

### **Communicate effectively with patients and colleagues in a health context**

PSO 23	Communicate clearly, sensitively and effectively with patients, caregivers, and colleagues from the medical and other professions, by listening, sharing and responding.
PSO 24	Communicate clearly, sensitively and effectively with individuals and groups regardless of their age, social, cultural or ethnic backgrounds or their disabilities including when English is not the patient's first language.
PSO 25	Communicate by spoken, written and electronic methods (including medical records), and be aware of other methods of communication used by patients.
PSO 26	Communicate appropriately in difficult circumstances, such as when breaking bad news, and when discussing sensitive issues, such as alcohol consumption, smoking or obesity, with difficult or violent patients, people with mental illness and with vulnerable population

### **Provide immediate care in medical emergencies**

PSO 27	Assess and recognize the severity of a clinical presentation and a need for immediate emergency care.
PSO 28	Apply basic first aid and cardio-pulmonary resuscitation or direct other team members to carry out resuscitation.

### **Use information effectively in a health context**

PSO 29	Write accurate, legible and complete clinical records, use computers and other information systems for data storage, retrieval , prepare health promotion material for patients, research and education.
PSO 30	Demonstrate confidentiality, use data protection legislation and codes of practice in all dealings with information.

**VIII. Course learning outcomes:** are defined within the course content that makes up the program. The courses are structured such that learning is vertically and horizontally integrated into the curriculum. The CBCS curriculum offers a certain degree of flexibility in taking courses. Course learning is aligned to the program learning outcomes and graduate attributes. The BPT program is inclusive of 9 semesters inclusive of 40 core courses and 28 weeks of compulsory rotator internship, (122 Credits), 4 ability enhancement compulsory courses (AECC-12 credits), 6 ability enhancement elective courses (AEEC-6 credits) and 12 discipline specific skill electives (SEC-12 credits) and 2 generic electives (GEC-2 credits). Supervised clinical training (CLT) is included in each semester (30 credits). Evaluation of the courses vary as appropriate to the subject area, inclusive of formative and summative assessment, ongoing comprehensive assessment in the form of closed and open book tests, objectively structured practical examination (OSPE), objectively structured clinical examination (OSCE), problem based assignments, practical assignments, observation of practical skills, project reports, case reports, viva, seminars, essays, and others.

## **XI. CBCS Definition and Benefits:**

Choice Based Credit System is a flexible system of learning. The distinguishing features of CBCS are the following:

- It permits students to learn at their own pace.
- The electives are selected from a wide range of elective courses offered by the other University Departments.
- Undergo additional courses and acquire more than the required number of credits.
- Adopt an inter-disciplinary and intra-disciplinary approach in learning.
- Make best use of the available expertise of the faculty across the departments or disciplines
- Has an inbuilt evaluation system to assess the analytical and creativity skills of students in addition to the conventional domain knowledge assessment pattern.

### **9.1 Definitions of Key Words:**

- i. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- ii. The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).
- iii. **Course:** Usually referred to, as “papers” is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/ laboratory work/ outreach activities/ project work/ viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.

- iv. **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.
- v. **Credit:** A unit by which the course work is interpreted. It functions the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
- vi. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the sum total of the credit points obtained by the student in various courses in all semesters and the sum of the total credits of all courses in all the semesters.
- vii. **Grade Point:** It is a numerical marking allotted to each letter grade on a 10-point scale.
- viii. **Letter Grade:** It is an appreciated point of the student's performance in a selected course. Grades are denoted by letters O, A+, A, B, C and RA x.
- ix. **Programme:** An educational programme leading to award of a Degree certificate.
- x. **Semester Grade Point Average (SGPA):** It is index of performance of all performance of work in a semester. Its total credit points obtained by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
- xi. **Semester:** Each semester will extend for 6 months and will consist of minimum of 130 teaching/learning days, exclusive of examinations and holidays. The odd semesters will be scheduled from July to December and even semesters from January to June.
- xii. **Transcript or Grade Card or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

## **X. Semester System and Choice Based Credit System**

The semester system accelerates the teaching-learning process and enables vertical and horizontal mobility of students in learning. The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system enables students to take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.

**10.1. Semesters:****An academic year consists of two semesters:**

Semesters	UG
Odd Semesters 1 <sup>st</sup> , 3 <sup>rd</sup> , 5 <sup>th</sup> , 7 <sup>th</sup>	August -January
Even Semesters 2 <sup>nd</sup> , 4 <sup>th</sup> , 6 <sup>th</sup> , 8 <sup>th</sup>	February-July

**10.2 Credits:**

Credit defines the coefficient of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Credits will be assigned in each course on the basis of number of lectures/ practical/tutorial/ laboratory work and other forms of learning required, to complete the course contents in a 15-20 week schedule:

- a. **1 credit** = 1 hour of lecture per week
- b. **3 credits** = 3 hours of instruction per week
  - ✓ Credits will be assigned on the basis of the lectures (L) / Clinical Training (CT) / laboratory work (P) / Research Project (RP) and other forms of learning in a 15-20 week schedule L - One credit for one hour lecture per week
- c. **P** - One credit for every two hours of laboratory or practical
- d. **CT** - One credit for every three hours of Clinical training/Clinical rotation/posting
- e. **RP** - One credit for every two hours of Research Project per week – Maximum Credit 20- 25

	Lecture - L	Tutorial - T	Practical - P	Clinical Training/ Rotation– CT/CR	Research Project– RP*
1 Credit	1 Hour	2 Hours	2 Hours	3 Hours	2 Hours
RP*	Maximum Credit 20 – 25 / Semester				

- a. **Types of Courses:** Courses in the programme are of three kinds:

- **Core Course**
- **Elective Course**
- **Ability Enhancement Course**

1. **Core Course:** A course, which should compulsorily be studied by a candidate as a basic requirement to complete the program, is termed as a Core course. There are Core Theory (CT) and Core Practical (CP) Courses in every semester.

**2. Elective Course:** A course which can be chosen from a very specific or advanced subject of study or which provides an extended scope or which enables exposure to some other domain or expertise, is called an Elective Course. Elective courses may be of two types

**2a. Discipline Specific Skill Elective (SEC) Course:** Elective courses offered by the main subject of study are referred to as Discipline Specific Elective. The Institute may also offer discipline related Elective courses of interdisciplinary nature. An elective may be “Discipline Specific Electives (DSE)” gazing on those courses which add intellectual efficiency to the students.

**2b. Generic Elective (GEC) Course:** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective.

**Dissertation / Project:** An Elective/Core course designed to acquire special / advanced knowledge, such as supplement study / support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher / faculty member is called dissertation / project.

**3. Ability Enhancement Courses (AEC):** The Ability Enhancement (AE) Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC).

“AECC” courses are the courses based upon the content that leads to Knowledge enhancement (i) Environmental Science and (ii) English/MIL Communication. These are mandatory for all disciplines.

**Skill Enhancement Courses (SEC):** SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, Indian and foreign languages etc. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

**2.4 Assigning Credit Hours per Course:** While there is flexibility for the departments in allocation of credits to various courses offered, the general formula would be:

- All core courses will be restricted to a maximum of 4 credits
- All electives will be restricted to a maximum of 3 credits
- All ability enhancement courses will be restricted to a maximum of 2 credits
- Projects will be restricted to a maximum of 3 credits

Any course requiring more than 4 credit hours for covering the syllabus content will be divided into two courses i.e., 6 Credits Course 1 - 3 credits + Course 2 – 3 credits or 6 Credits Course 1 Theory - 4 credits + Course 2 Lab – 2 credits.

**2.5 Assigning total Credits for a Program:** The UGC, in its notification No.F.1-1/2015 (Sec.) dated 10/4/15 has provided a set of Model curricula and syllabi for CBCS programs. In conformation with this notification, the BPT program credits for 4 1/2 years duration will be 184 credits in total, inclusive of clinical rotation/clinical training and research project.

MGMSOP MGMHS

## XI. Credit Value Per Course & Structure Of Syllabus:

To ensure uniformity in assigning the credits to a course, a structured and unitized syllabus shall be observed. For UG & PG Programs each course will be provided a structured syllabus in the following format:

- a) Title of the Course
- b) Learning Objectives
- c) Units for

Category	Credits	BPT Syllabus units
Core Theory (CT)	3 – 4	6
Core Practical (CP)	2 – 4	10- 15 experiments/ cases/ spotters
Ability enhancement (AE)	2	4
Skills enhancement (SE)- theory or practicals	2	4
General Elective	2	2
Clinical Training (CLT)	3-15	Structured monitoring and assessment
Research Projects (RP)	18-25	Structured monitoring and assessment
Internship (IN)	Min.15	Structured monitoring and assessment

- d) Syllabus Content
- e) Learning Outcomes
- f) References
  - a. Text Books – 2
  - b. Reference Books – 2
  - c. Web Resources – 2 Web Portals

Minimum credit allocation will be as per requirements of each course curriculum.

**Structure of CBCS BPT Curriculum**

<b>Semester I</b>		<b>Semester II</b>		<b>Semester III</b>	
<b>Course Code</b>	<b>Core Course</b>	<b>Course Code</b>	<b>Core Course</b>	<b>Course Code</b>	<b>Core Course</b>
BPT001	Human Anatomy-1 CT	BPT005	Human Anatomy II -CT	BPT010	Kinesiology CT
BPT002	Human Anatomy-1 CP	BPT006	Human Anatomy II- CP	BPT011	Clinical Kinesiology CP
BPT003	Human Physiology-1 CT & CP	BPT007	Human Physiology –II CT, CP	BPT012	Electrotherapy CT & CP
BPT004	Kinesiotherapy-I CT &CP	BPT008	Kinesiotherapy- II- CT & CP	BPT013	Pharmacology CT
		BPT009	Thermal Agents CT & CP	BPT014	Psychology CT
<b>Semester IV</b>		<b>Semester V</b>		<b>Semester VI</b>	
<b>Course Code</b>	<b>Core Course</b>	<b>Course Code</b>	<b>Core Course</b>	<b>Course Code</b>	<b>Core Course</b>
BPT015	Physiotherapy Skills CT & CP	BPT020	Medical and surgical aspects of musculoskeletal conditions CT	BPT024	Medical and surgical aspects of neurological disorders CT
BPT016	Electro-Diagnosis CT & CP	BPT021	Medical and surgical aspects of cardiovascular, pulmonary and general medical conditions CT	BPT025	Physiotherapy for Women and Child Care CT & CP
BPT017	Pathology & Microbiology CT	BPT022	Diagnosis of movement dysfunction & ICF CT & CP	BPT026	Public Health and preventive Physiotherapy CT & CP
BPT018	Sociology CT	BPT023	Public Health	BPT027	Physiotherapy in Geriatric care CT & CP
BPT019	Research Methodology CT			BPT028	Introduction to Evidence Based Physiotherapy CT & CP

Semester VII		Semester VIII		Semester IX	
Course Code	Core Course	Course Code	Core Course	Course Code	Core Course
BPT029	Musculoskeletal Physiotherapy 1 CT,CP	BPT032	Musculoskeletal Physiotherapy II CT,CP	BPT036	Musculoskeletal Physiotherapy CLT
BPT030	Cardiovascular and pulmonary PT 1 CT,CP	BPT033	Cardiovascular and pulmonary PT II CT,CP	BPT037	Cardiovascular and pulmonary PT CLT
BPT031	Neuro Physiotherapy 1 CT,CP	BPT034	Neuro Physiotherapy II CT,CP	BPT038	Neuro Physiotherapy CLT
		BPT035	Research Project	BPT039	Public Health Promotion CLT
				BPT040	Research Project RP

## XII. Selection of Generic Elective and Skills Enhancement Courses:

The students should apply in the prescribed format and should reach the CBCS coordinator before the start of the semester. All candidates must register for the courses of the said semester.

List of Ability Enhancement Compulsory Courses AECC (Credits=3)			
SrNo	Elective Code	Title	Semester
1	AECC001	Biophysics and medical electronics	1
2	AECC002	Environmental Science	1&2
3	AECC003	English and Communication Skills	1
4	AECC004	Biochemistry	2

List of Ability Enhancement Elective Courses (Credits=2)			
SrNo	Elective Code	Title	Semester
1	AEEC001	Ergonomics and health promotion	3
2	AEEC002	Personality development & Learning styles	3
3	AEEC003	Biostatistics and SPSS	4
4	AEEC004	Medical ethics, Human rights and professional values	4
5	AEEC005	Diagnostic Radiology	5
6	AEEC006	Pulmonary Function Test	5

List of Generic Elective Courses (Credits=2)			
SrNo	Elective Code	Title	Semester
1	GEC001	2D motion capture	5
2	GEC002	Device Innovation and IPR	5

List of Skill Based Discipline Specific Elective Courses (Credits=2)			
SrNo	Elective Code	Title	Semester
1	SEC001	Indian Human Movement Science I–Yoga	3
2	SEC002	Indian Human Movement Science II–Yoga	4
3	SEC003	Clinical Biomechanics	6
4	SEC004	Vestibular rehabilitation	6
5	SEC005	Hand rehabilitation	7
6	SEC006	Foot rehabilitation	7
7	SEC007	Aquatic Therapy	7
8	SEC008	Sports Physiotherapy	7
9	SEC009	Neurodevelopmental techniques	8
10	SEC010	PT in ICU	8
11	SEC011	Splinting & Bracing	8
12	SEC012	Integumentary Physiotherapy	8

Elective courses from Swayam/ NPTEL platform [[www. https://swayam.gov.in](https://swayam.gov.in) & <http://nptel.ac.in>] may be included in the above pool as and when needed.

### XIII. Framework of BPT Curriculum

#### Semester I

BPT CBCS syllabus 2019																			
Semester I (20 weeks teaching/ 36 hours/week)																			
Course Code	Course Title	Course Description	Credits per week				Hours/week			Hours per semester				Marks				Total	
			T	P	CLT	Total Credits	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam Theory	IA Practical	Semester Exam Practical		
BPT001	Human Anatomy I	Core Theory	3	0		3	3				60			60	20*	80			100
BPT002	Human Anatomy I Practical	Core practical		2		2		4				80		80			20*	80	100
BPT003	Human Physiology I	Core Theory and practical	3	1		4	3	2		60	40		100	20*	80	20*	80	200	
BPT004	Kinesiotherapy I	Core Theory and Practical	2	2		4	2	4		40	80		120	20*	80	20*	80	200	
AECC001	Biophysics and medical electronics	Ability Enhancement compulsory course	2	1		3	2	2		40	40		80	40 #					
AECC002	Environmental Sciences	Ability Enhancement compulsory course	1			1	1			20			20	\$					
AECC003	English and Communication Skills	Ability Enhancement Compulsory Course	3			3	3			60			60	40 #					
	Introduction to basic skills in patient care	Clinical Training			3	3			10			200	200						
		Total	14	6	3	23	14	12	10	280	240	200	720					600	
* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam																			
# College Exam																			
\$ will be evaluated in Semester II																			

## Semester II

BPT CBCS syllabus 2019																		
Semester II ( 20 weeks teaching/36 hrs/week )																		
Course Code	Course Title	Course Description	Credits per week				Hours /week			Hours per semester				Marks				
			T	P	CLT	Total Credit	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam theory	IA Practical	Semester Exam Practical	Total
BPT005	Human Anatomy II	Core Theory	3			3	3			60			60	20*	80			100
BPT 006	Human Anatomy II Practical	Core Practical		2		2		4		80			80			20*	80	100
BPT007	Human Physiology II	Core Theory and practical	3	1		4	3	2		60	40		100	20*	80	20*	80	200
BPT008	Kinesiotherapy-II	Core Theory and practical	2	2		4	2	4		40	80		120	20*	80	20*	80	200
BPT009	Thermal Agents	Core Theory and practical	2	1		3	2	2		40	40		80	40 #		40 #		
AECC004	Biochemistry	Ability Enhancement compulsory course	3	0		3	3			60			60	40 #				
AECC002	Environmental Sciences	Ability Enhancement compulsory course	1	1		2	1	2		20	40		60	40 #				
	Introduction to basic skills in patient care	Clinical training			2	2		8				160	160					
		<b>Total</b>	<b>14</b>	<b>7</b>	<b>2</b>	<b>23</b>	<b>14</b>	<b>14</b>	<b>8</b>	<b>280</b>	<b>280</b>	<b>160</b>	<b>720</b>					<b>600</b>
* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam																		
# College Exam																		

## Semester III

BPT CBCS syllabus 2019																		
Semester III ( 20 weeks teaching/36 hours /week )																		
Course Code	Course Title	Course Description	Credits per week				Hours /week			Hours per semester				Marks				
			T	P	CLT	Total Credit	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam Theory	IA Practical	Semester Exam Practical	Total
BPT010	Kinesiology	Core Theory	3			3	3			60			60	20*	80			100
BPT011	Clinical Kinesiology	Core Practical		2		2		4			80		80			20*	80	100
BPT012	Electrotherapy	Core Theory and Practical	2	1		3	2	2		40	40		80	20*	80	20*	80	200
BPT013	Pharmacology	Core Theory	3			3	3			60			60	10*	40			50
BPT014	Psychology	Core Theory	3			3	3			60			60	40#				
SEC001	Indian Human Movement Science I - Yoga therapy	Skill Elective Course	1	1		2	1	2		20	40		60	40#				
AEEC001/ AEEC002	Ergonomics and health promotion/ Personality development and learning styles	Ability Enhancement Elective Course Theory	2			2	2			40			40	40#				
	Basic skills in patient care	Clinical Training			4	4		14				280	280					
		Total	14	4	4	22	14	8	14	320	160	240	720					450

\* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam  
# College Exam

## Semester IV

**BPT CBCS syllabus 2019**  
**Semester IV ( 20 weeks teaching/36 hrs/wk )**

Course Code	Course Title	Course Description	Credits per week				Hours /week			Hours per semester			Marks						
			T	P	CLT	Total Credits	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam	IA Practical	Semester Exam	Total	
BPT015	Physiotherapy Skills	Core Theory and Practical	2	2		4	2	4		40	80		120	20 *	80	20 *	80	200	
BPT016	Electro - Diagnostics	Core Theory and Practical	2	2		4	2	4		40	80		120	20 *	80	20 *	80	200	
BPT017	Pathology & Microbiology	Core Theory	4			4	4			80			80	40 #					
BPT018	Sociology	Core Theory	2			2	2			40			40	40 #					
BPT019	Research Methodology	Core Theory	2			2	2			40			40	40 #					
SEC002	Indian Human Movement Science II	SEC Theory and Practical	1	1		2	1	2		20	40		60	40 #					
AEEC003/004	Biostatistics and SPSS	Ability Enhancement Elective Course Theory and Practical	1	1		2	1	2		20	40		60	40 #					
	Medical Ethics, Human rights & professional values																		
	Basic skills in patient care	Clinical Training			3	3		10				200	200						
	<b>Total</b>		14	6	3	23	14	12	10	280	240	200	720					<b>Total</b>	<b>400</b>

\*Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam  
#College Exam

## Semester V

BPT CBCS syllabus 2019																			
Semester V ( 20 weeks teaching/ 36 hours/wk )																			
Course Code	Course Title	Course Description	Credits per week			Hours /week			Hours per semester				Marks				Total		
			T	P	CLT	Total Credits	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam Theory	IA Practical		Semester Exam Practical	
BPT020	Medical and surgical aspects of Musculoskeletal conditions	Core Theory	4			4	4				80			80	20*	80			100
BPT021	Medical and surgical aspects of cardiovascular, pulmonary disorders and general medical conditions	Core Theory	4			4	4				80			80	20*	80			100
BPT022	Diagnosis of movement dysfunction and ICF	Core theory and Practical	1	1		2	1	2		20	40		60	20*	80	20	80	200	
BPT023	Public Health	Core Theory	3			3	3			60			60	10*	40			50	
GEC001/ GEC002	2D motion capture / Device Innovation and IPR	Generic Elective Theory and Practical	1	1		2	1	2		20	40		60	40 #					
AEEC005/ AEEC006	Diagnostic Radiology/ Pulmonary Function Test	Ability Enhancement Elective Course Theory and Practical	1	1		2	1	2		20	40		60	40 #					
	Basic skills in patient care	Clinical Training			5	5			16			320	320						
		<b>Total</b>	<b>14</b>	<b>3</b>	<b>5</b>	<b>22</b>	<b>14</b>	<b>6</b>	<b>16</b>	<b>280</b>	<b>120</b>	<b>320</b>	<b>720</b>				<b>Total</b>	<b>450</b>	
* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam																			
# College Exam																			

## Semester VI

BPT CBCS syllabus 2019																			
Semester VI (20 weeks teaching /36 hours/week)																			
Course Code	Course Title	Course Description	Credits per week				Hours /week			Hours per semester				Marks					
			T	P	CLT	Total Credits	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam Theory	IA Practical	Semester Exam Practical	Total	
BPT024	Medical and surgical aspects of Neurological disorders	Core Theory	4			4	4				80			80	20*	80			100
BPT025	Physiotherapy for women and child care	Core Theory and Practical	2	2		4	2	4			40	80		120	20*	80	20*	80	200
BPT026	Public Health and preventive Physiotherapy	Core Theory and Practical	2	1		3	2	2			40	40		80	10*	40	10*	40	100
BPT027	Physiotherapy in Geriatric care	Core Theory and Practical	1	1		2	1	2			20	40		60	40 #				
BPT028	Introduction to Evidence Based Physiotherapy	Core Theory and Practical	1	1		2	1	2			20	40		60	40 #				
SEC003/ SEC004	Clinical Biomechanics / Vestibular Rehabilitation	Skill Based Elective Course Theory and Practical	1	1		2	1	2			20	40		60	40 #				
	Basic skills in patient care	Clinical Training				4	4				13			260	260				
	Total		11	6	4	21	11	12	13	220	240	260	720						400
* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam																			
# College Exam																			

## Semester VII

BPT CBCS syllabus 2019																		
Semester VII ( 20 weeks teaching/36 hours/week )																		
Course Code	Course Title	Course Description	Credits per week				Hours /week			Hours per semester				Marks				Total
			T	P	CLT	Total Credits	T	P	CLT	T	P	CLT	Total hours	IA Theory	Semester Exam Theory	IA Practical	Semester Exam Practical	
BPT029	Musculoskeletal PT I	Core	3	1		4	3	2		60	40		100	20*	80	20*	80	200
BPT030	Cardiovascular and Pulmonary PT I	Core	3	1		4	3	2		60	40		100	20*	80	20*	80	200
BPT031	Neurophysiotherapy I	Core	3	1		4	3	2		60	40		100	20*	80	20*	80	200
SEC005/ SEC006	Hand rehabilitation/Foot Rehabilitation	Skill based elective	1	1		2	1	2		20	40		60	40 #				
SEC007/ SEC008	Aquatic Therapy/ Sports Physiotherapy	Skill based elective	1	1		2	1	2		20	40		60	40 #				
	Basic skills in patient care	Clinical Training			5	5			15			300	300					
		Total	11	5	5	21	11	10	15	220	200	300	720					600
* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam																		
# College Exam																		

## Semester VIII

BPT CBCS syllabus 2019																		
Semester VIII ( 20 weeks teaching / 36 hours /week )																		
Course Code	Course Title	Course Description	Credits per week				Hours /week			Hours per semester				Marks	Semester Exam	IA	Semester Exam	Total
			T	P/RP	CLT	Total Credits	T	P/RP	CLT	T	P/RP	CLT	Total hours	IA Theory	Theory	Practical	Practical	
BPT032	Musculoskeletal PT II	Core Theory and Practical	3	1		4	3	2		60	40		100	20*	80	20*	80	200
BPT033	Cardiovascular and Pulmonary PT II	Core Theory and Practical	3	1		4	3	2		60	40		100	20*	80	20*	80	200
BPT034	Neurophysiotherapy II	Core Theory and Practical	3	1		4	3	2		60	40		100	20*	80	20*	80	200
BPT035	Research Project	Research		1		1		2			40		40					
SEC09/ SEC010	Neurodevelopmental techniques /PT in ICU	Skill Based Elective Course Theory and Practical	1	1		2	1	2		20	40		60	40 #				
SEC011/ SEC012	Splinting and Bracing /Integumentary Physiotherapy	Skill based elective course	1	1		2	1	2		20	40		60	40 #				
	Basic skills in patient care	Clinical Training			4	4			13			260	260					
		<b>Total</b>	<b>11</b>	<b>6</b>	<b>4</b>	<b>21</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>220</b>	<b>240</b>	<b>260</b>	<b>720</b>					<b>600</b>
* Internal Assessment Exam will be conducted for 40 marks and be calculated out of 10/20 for inclusion in Semester Exam																		
# College Exam																		

### Internship - Semester IX

<b>BPT CBCS 2019 - Internship - 26 weeks /40 hours per week supervised clinical practise</b>			
<b>Course Description</b>	<b>Clinical Postings</b>	<b>Credits</b>	<b>Hours</b>
<b>Core Clinical Training</b>	<b>Musculoskeletal PT</b>	<b>3</b>	<b>260</b>
<b>Core Clinical Training</b>	<b>Cardiovascular and Pulmonary PT</b>	<b>3</b>	<b>260</b>
<b>Core Clinical Training</b>	<b>Neurophysiotherapy</b>	<b>3</b>	<b>260</b>
<b>Core Clinical Training</b>	<b>Public Health Promotion</b>	<b>1</b>	<b>80</b>
<b>Research</b>	<b>Research Project</b>	<b>2</b>	<b>180</b>
	<b>Total</b>	<b>12</b>	<b>1040</b>

## **XIV. Rules and Regulation for Examination of Bachelor of Physiotherapy Program under MGM School of Physiotherapy offering CBCS Pattern**

- 1. Title of the courses offered : Bachelor of Physiotherapy**
- 2. Duration of the course:** Four and half years, including one year of Internship for UG course.
- 3. Medium of instruction:** The medium of instruction and examination shall be in English
- 4. Letter Grades And Grade Points:**

MGMSOP has adopted the UGC recommended system of awarding grades and CGPA under Choice Based Credit Semester System for all the UG/PG courses.

4.1 MGMSOP would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.

4.2 The UGC recommended 10-point grading system with the following letter grades will be followed:

**Table 1: Grades and Grade Points:**

<b>Letter Grade</b>	<b>Grade Point</b>
O (Outstanding)	10
A+ ( Excellent)	9
A (Very Good)	8
B (Good)	7
C (Above Average)	6
F (Fail)/ RA (Reappear)	0
Ab ( Absent)	0
Not Completed (NC)	0
RC (<50% in attendance or in Internal Assessment)	

4.3 A student obtaining Grade F/RA will be considered failed and will require reappearing in the examination.

4.4 Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 50% attendance or less than 50% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

## 5. CBCS Grading System - Marks Equivalence Table

### 5.1 Table 2: Grades and Grade Points

Letter Grade	Grade Point	% of Marks
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60 -69
B (Good)	7	55 -59
C (Above Average) – <b>Passing criteria for BPT</b>	6	50- 54
F (Fail) )/ RA (Reappear)	0	Less than 50
Ab (Absent)	0	-
NC- not completed	0	-
RC- Repeat the Course	0	0

### 5.2 Table 3: Cumulative Grades and Grade Points

Letter Grade	Grade Point	CGPA
O (Outstanding)	10	9.01 - 10.00
A+ ( Excellent)	9	8.01 – 9.00
A (Very Good)	8	7.01 – 8.00
B (Good)	7	6.00 - 7.00
C (Above Average)	6	5.01 - 6.00

**6. Assessment of a Course:** Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CBCS to conduct internal assessments (IA), followed by one end-semester university examination (ES) for each course.

6.1 For all category of courses offered (Theory, Practical, Discipline Specific Elective [DE] ; Generic Elective [GE] and Ability Enhancement Courses [AE]; Skills Enhancement Courses [SE] Theory or P (Practical) & RP( Research Project), assessment will comprise of Internal Assessment (IA) in the form of continuous comprehensive evaluation and mid-semester exam, end-semester (ES) examination or college exam as applicable.

6.2 Courses in programs wherein Theory and Practical/Clinical are assessed jointly (UG or PG), the minimum passing head has to be 50% Grade each for theory and practical's separately. RA grade in any one of the components will amount to reappearing in both components. i.e. theory and practical.

6.3 Evaluation for a course with clinical rotation or clinical training or internship will be done on a continuous basis.

**7. Eligibility to appear for the end-semester examinations for a course includes:**

7.1 Candidates having  $\geq 75\%$  attendance and obtaining the minimum 40% in internal assessment in each course to qualify for appearing in the end-semester university examinations.

7.2 The students desirous of appearing for university examination shall submit the application form duly filled along with the prescribed examination fee.

7.3 Incomplete application forms or application forms submitted without prescribed fee or application form submitted after due date will be rejected and student shall not be allowed to appear for examination.

**8. Passing Heads**

8.1 Courses where theory and practical are involved, the minimum passing head shall be 50% in total including the internal assessment.

8.2 Elective subjects – the minimum prescribed marks for a pass in elective subject should be 50%. The marks obtained in elective subjects should be communicated to the university before the commencement of the university examination.

**9 Detention:** A student not meeting any of the above criteria maybe detained (NC) in that particular course for the semester. In the subsequent semester, such a candidate requires improvement in all, including attendance and/or IA minimum to become eligible for the next end-semester examination.

**10** The maximum duration for completing the program will be 8 years (minimum duration of program x 2) i.e. (4x2) = 8 years for UG program & (2x2) = 4 years for PG program, failing which his/her registration will be cancelled. Full fees of entire program of 4 or 2 years as the case may be liable to be paid by the students.

### **11 Carry over benefit:**

- 11.1 A student will be allowed to keep term for Semester II irrespective of number of heads of failure in Semester I.
- 11.2 A student will be allowed to keep term for Semester III if she/he passes each Semester I and II OR fails in not more than 2 courses each in semester I and II.
- 11.3 Student will be allowed to keep term for Semester IV irrespective of number of heads of failure in Semester III. However, student must mandatorily have passed each course of Semester I and II in order to appear for Semester IV exam.
- 11.4 Student will be allowed to keep term for Semester V, if she/he passes Semester I,II, III and IV OR has passed in all courses of Semester I and II and fails in not more than two courses each of Semester III and IV.
- 11.5 Student will be allowed to keep term for Semester VI, irrespective of number of heads of failure in Semester V. However, student must mandatorily have passed each course of Semester I, II, III and IV in order to appear for Semester VI exam.
- 11.6 Student will be allowed to keep term for Semester VII, if she/he passes Semester I,II, III, IV, V and VI OR has passed in all courses of Semester I, II,III and IV and fails in not more than two courses each of Semester V and VI.
- 11.7 A student will not be allowed to appear for the Semester VIII examination unless she/he has cleared all previous examinations.
- 11.8 Student will be allowed to commence internship if he/she passes Semester VIII examination.

### **12 Grace Marks for UG Courses:**

- 12.1 A student shall be eligible for grace marks, provided he/she appeared in all the papers prescribed for the examination.
- 12.2 Maximum up to 5 grace marks may be allowed for passing, spread over between subjects.
- 12.3 No grace marks will be awarded in internal evaluation.

### 13 University End-Semester Examination

- 13.1 There will be one final university examination at the end of every semester.
- 13.2 A student must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each subject to be eligible for appearing the University examination.
- 13.3 The Principal / Director shall send to the university a certificate of completion of required attendance and other requirements of the applicant as prescribed by the university, two weeks before the date of commencement of the written examination.
- 13.4 A student shall be eligible to sit for the examination only, if she / he secure a minimum of 40% in internal assessment (individually in theory and practical as applicable). Internal examinations will be conducted at college/ department level.
- 13.5 Notwithstanding any circumstances, a deficiency of attendance at lectures or practical maximum to the extent of 10% - may be condoned by the Principal / Director.
- 13.6 If a student fails either in theory or in practical, he/ she have to re-appear for both.
- 13.7 There shall be no provision of re-evaluation of answer sheets. Student may apply to the university following due procedure for recounting of theory marks in the presence of the subject experts.
- 13.8 Internal assessment shall be submitted by the Head of the Department to the University through Director of MGMSOP at least two weeks before commencement of University theory examination.

**14. Supplementary examination:** The supplementary examination will be held in the next semester. Eligibility to appear for supplementary examination will be as per rule number 11.1-11.8.

### 15. Re-Verification

There shall be provision of re-totaling of the answer sheets; candidate shall be permitted to apply for recounting/re-totaling of theory papers within 8 days from the date of declaration of results.

**16. Scheme of University Exam Theory UG/PG Program:** General structure / patterns for setting up question papers for Theory / Practical courses, for UG/PG program of MGMSOP are given in the following tables. Changes may be incorporated as per requirements of specific courses.

**16.1 : Theory Question Paper Pattern For Core Subjects in University Examinations  
Under CBCS - 80 Marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section 1</b>				
Short answer questions	8	5	8x5	40
<b>Section 2</b>				
Medium long answer question	4	10	4 x 10	40
				<b>Total= 80</b>

**16.2 : Theory Question Paper Pattern For Core Subjects in University  
Examinations  
Under CBCS - 40 Marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section 1</b>				
Short answer questions	4	5	4 x 5	20
<b>Section 2</b>				
Medium long answer question	2	10	2 x 10	20
				<b>Total= 40</b>

**General Instructions (Theory):**

- A. Time duration of each Theory Paper will be of Three (3) Hrs or 1 1/2 hrs as the case may be.
- B. Total Marks of each Theory Paper will be 80 Marks / 40 Marks.
- C. There will be TWO Sections in Question Paper. Section 1 will be short answer questions and Section 2 will be medium long answer questions. There will be internal option.
- D. Both the Sections are compulsory.

E. Both the sections are to be written in the separate answer sheet

**16.3 Practical Question Paper Pattern For University Examinations Under CBCS - 80 Marks**

( May vary as per course requirement)

Exercise	Description	Marks
Q No 1	Long Practical exercise/Case	30
Q No 2	Short Practical exercise/Case	20
Q No 3	Spots (4 x 5 marks )	20
QNo 4	Journal	10
		<b>Total = 80</b>

**16.4 Practical Question Paper Pattern For University Examinations Under CBCS - 40 Marks**

( May vary as per course requirement)

Exercise	Description	Marks
Q No 1	Long Practical exercise - 1	1 x15=15
Q No 2	Short station exercise	3x5M=15
Q No 3	VIVA	5 M
QNo 4	Journal	5 M
		<b>Total = 40 M</b>

**General Instructions (Practical):**

- A. All the students have to remain present at the examination centre 15 minutes before the scheduled time for examination.
- B. Students have to carry with them certified journal, I-card or examination receipt, and other necessary requirements for examination.
- C. Candidate should not leave the practical hall without the permission of examiner.
- D. Use of calculator is allowed but the use of mobile phones is strictly prohibited.
- E. The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.

**16.5 Internal examination pattern (Mid-Semester Theory) : 40 marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Short answers	4	5	4 x 5	20
Long answers	2	10	2 x 10	20
<b>Total</b>				<b>Total= 40</b>

**16.6 Internal Examination Pattern (Mid-Semester Practical):****40 marks****( May vary as per course requirement)**

Long Practical exercise/case	20 marks
Short station /OSPE/OSCE	10 marks
Viva	5 marks
Log book	5 marks
Theory and practical	Total = 40 M

**G.16.7 Internal examination pattern (Mid-Semester Theory) : 20marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Long essays	1	10	1x10	10 marks
Short answers	2	5	2x5	10 marks
<b>Total= 20 marks</b>				

Marks should be submitted by respective departments at least 15 days prior to onset of university examination to the university.

**16.6 Internal Examination Pattern (Mid-Semester Practical): 20 Marks**  
( May vary as per course requirement)

Short Exercise /Case/OSPE/OSCE	10 marks
Viva	5 marks
Log book	5 marks
Theory and practical	Total = 20 M

**Note – Internal assessment marks will be summative of continuous comprehensive evaluation and mid semester exam and will be converted to as per determined weightage for submission to the University.**

**16.7 College Examination Pattern**

Question Type	No. of questions	Marks/question	Question x marks	Total marks
Short answers	8	5	8 x 5	40

**16.8 Assessment of Seminar (50 Marks)**

Description	Marks
Submission of seminar report	25
Subject knowledge	5
Concept and Methodology	5
Presentation	5
VIVA	10 M
	Total = 50 M

**16.9 Clinical Evaluation**

Clinical Placement Area	Duration in Weeks	Assignment/Case Documentations
Musculoskeletal PT	6	3
Neurophysiotherapy	6	3
Cardiovascular & Pulmonary PT	6	3

- Presentation of required number of cases to the respective clinical supervisors and documentation in the Log book for each posting is mandatory, failing which the particular posting will be repeated.
- Attendance is mandatory at all clinical postings with a permission of only one official leave per month. Interns remaining absent for more than the permitted leaves and without prior intimation to the clinical supervisors, candidate will have to compensate the days absent after completion of the rotatory internship placement schedule.
- Appropriate dress code to be followed at all the clinical posting areas.

### 16.10 Ongoing Comprehensive Evaluation:

On completion of each unit of a course evaluation in the form of multiple choice questions, essays, case reports etc may be undertaken. Marks of all evaluation will be added along with the following summative evaluation and mid – semester marks to obtain the internal assessment score.

#### Summative Evaluation

Sr No	Criteria	5	4	3	2	1
1	Punctuality and dress code					
2	Attitude towards patients & colleagues					
3	Urge for Learning/ Initiative					
4	Accountability/Responsibility					
5	Administrative ability (Records/Maintenance of equipments)					
Total Score/ 25						

Remarks:-

Signature of Clinical Supervisor

Date:-

**16.11 Case Evaluation**

Sr No	Criteria	5	4	3	2	1
1	Attitude –Towards patient ,self introduction Relevant history taken					
2	Physical Assessment Skills Choice of tests Testing of all functional impairments ICF					
3	Cognitive- problem solving clinical decision & reasoning					
4	Planning treatment- short term goals					
5	Long term goals - reevaluation					
6	Explanation of home program to patient and relatives					
7	Skills of Treatment maneuvers					
8	Skills of equipment handling					
9	Documentation of case					
10	Timely submission of assignment					
	Total Score					

Remarks:-

Signature of Clinical Supervisor

Date:-

**16.12 Research Project Report:-**

BPT student should submit a suitable research project topic forwarded by the guide to MGM School of Physiotherapy by September in Semester VII. Following approval of ethics & scientific committee, work should be carried out in subsequent semesters and internship. Completed project report should be submitted at least a month before end of internship.

**17. Research Project report Evaluation Guidelines for BPT program:**

The research project report allows the student to develop and display in-depth understanding of a theme in International Studies, as well as an in-depth understanding of the appropriate research tools, approaches and theories applicable to that theme. The dissertation should be based on a well-defined and clear research question of scholarly significance, and that the dissertation develops a theoretically and methodologically informed and evidence-based answer to that question.

Criteria for evaluating a research project report: The following guidelines and criteria should be applied when assessing a dissertation.

**Guidelines to Prepare Internship Research Proposal & Project****1. Selection of Research Problem:**

Select your interest area of research, based on felt need, issues, social concern.

- a. State the problem in brief, concise, clear.
- b. State the purpose of selected study & topic.
- c. State the objectives of proposal/project.
- d. Prepare conceptual framework based on operational definition.
- e. Write scope of research proposal/project.

**2. Organizing Review of Literature**

- a. Study related and relevant literature which helps to decide conceptual framework and research design to be selected for the study
- b. Add specific books, bulletins, periodicals, reports, published dissertations, encyclopaedia and text books
- c. Organize literature as per operational definition
- d. Prepare summary table for review of literature

**3. Research Methodology: To determine logical structure & methodology for research project.**

- a. Decide and state approach of study i.e. experimental or non-experimental
- b. Define/find out variables to observe effects on decided items & procedure
- c. Prepare simple tool or questionnaire or observational checklist to collect data.
- d. Determined sample and sampling method
- e. Mode of selection ii) Criteria iii) Size of sample iv) Plan when, where and how data will be collected.
- f. Test validity of constructed tool
- g. Check reliability by implementing tool before pilot study(10% of sample size)
- h. Conduct pilot study by using constructed tool for 10% selected sample size

**4. Data collection: To implement prepared tool**

- a. Decide location
- b. Time
- c. Write additional information in separate exercise book to support inferences and interpretation

**5. Data analysis and processing presentation**

- a. Use appropriate method of statistical analysis i.e. frequency and percentage
- b. Use clear frequency tables, appropriate tables, graphs and figures.
- c. Interpretation of data:
- d. In relation to objectives
- e. Hypothesis
- f. Variable of study or project
- g. Writing concise report

**6. Writing Research Report**

- a. **Aims:**
  - i. To organize materials to write project report
  - ii. To make comprehensive full factual information
  - iii. To make appropriate language and style of writing
  - iv. To make authoritative documentation by checking footnotes, references & bibliography
  - v. To use computers & appropriate software

- b. Points to remember**
- i. Develop thinking to write research report
  - ii. Divide narration of nursing research report
  - iii. Use present tense and active voice
  - iv. Minimize use of technical language
  - v. Use simple, straightforward, clear & concise language
  - vi. Use visual aids in form of table, graphs & figures
  - vii. Treat data confidentially
  - viii. Review & rewrite if necessary

### Evaluation Criteria for Project Report

Sr. No	Criteria	Rating					Remark
		1	2	3	4	5	
<b>I</b>	<b>Statement of the problem</b>						
	1. Significance of the problem selected						
	2. Framing of title and objectives						
<b>II</b>	<b>Literature Review</b>						
	1. Inclusion of related studies on the topic and its relevance						
	2. Operational definition						
<b>III</b>	<b>Research Design</b>						
	1. Use of appropriate research design						
	2. Usefulness of the research design to draw the inferences among study variables/ conclusion						
<b>IV</b>	<b>Sampling Design</b>						
	1. Identification & description of the target population						
	2. Specification of the inclusion & exclusion criteria						
	3. Adequate sample size, justifying the study design to draw conclusions						
<b>V</b>	<b>Data Collection Procedure</b>						
	1. Preparation of appropriate tool						
	2. Pilot study including validity & reliability of tool						

	3. Use of appropriate procedure/ method for data collection						
<b>VI</b>	<b>Analysis of Data &amp; Interpretation</b>						
	1. Clear & logical organization of the finding						
	2. Clear presentation of tables(title, table & column heading)						
	3. Selection of appropriate statistical tests						
<b>VII</b>	<b>Ethical Aspects</b>						
	1. Use of appropriate consent process						
	2. Use of appropriate steps to maintain ethical aspects & principles						
<b>VIII</b>	<b>Interpretation of the finding</b>						
	& appropriate discussion of the results						
<b>IX</b>	<b>Conclusion</b>						
	Summary & recommendations						
<b>X</b>	<b>Presentation/ Report Writing</b>						
	Organization of the project work including language & style of presentation						

Signature of the Evaluator

## 18. Eligibility for award of degree

18.1 A candidate shall have passed in all the subjects of all semester's I-VIII, completed internship and submitted research project report to be eligible for award of BPT degree.

The performance of a candidate in a course will be indicated as a letter grade, whereas grade point will indicate the position of the candidate in that batch of candidates. A student is considered to have completed a course successfully and earned the prescribed credits if he/she secures a letter grade other than F/RA. A letter grade RA in any course implies he/she has to Re-appear for the examination to complete the course.

18.2 The RA grade once awarded in the grade card of the student is not deleted even when he/she completes the course successfully later. The grade acquired later by the student will be indicated in the grade sheet of the subsequent semester in which the candidate has appeared for clearance in supplementary exams

18.3 If a student secures RA grade in the Project Work/Dissertation, he/she shall improve it and resubmit it, if it involves only rewriting / incorporating the revisions suggested by the evaluators. If the assessment indicates lack of student performance or data collection then the student maybe permitted to re-register by paying the prescribed re-registration fee and complete the same in the subsequent semesters.

A candidate shall be declared to have passed the examination if he/she obtains the following minimum qualifying grade / marks:-

- (a) For Core courses CT (Core Theory), CL (Core Lab), DE (Discipline centric Electives), clinical rotation and internship student shall obtain Grade B (50 % of marks) in the University End Semester Examination (ES) and in aggregate in each course which includes both Internal Assessment and End Semester Examination.
- (b) For Generic Electives (GE), Ability Enhancement (AE) and Skill Enhancement (SE) courses student shall obtain Grade D (40 % of marks) in the College Examination.

## 19. Guidelines for Clinical Internship or Research internship:

19.1 Internship may be commenced only on completion of all course work. The internship may be observed only at the clinical postings and areas of extension activities of MGM School of Physiotherapy, Navi Mumbai. No external postings

will be considered during internship. Students are expected to act in a responsible and professional manner at all times during their postings.

19.2 Eligibility for appearing for Internship: On completion of all course work, a candidate is permitted by the Director/Principal to join internship during the beginning of the semester i.e., Odd/ Even.

19.3 Responsibilities during internship: During the internship period candidates should show at least 90% attendance. They must engage in practice/ skill based learning of professional conduct. Their learning outcomes must be maintained and presented in the form of logbooks/ case studies/ research project report. The appropriate formats for the postings/ clinical rotations/ research assignments will be as prescribed as required.

19.4 Evaluation of internees and award of credits: All internees will be assessed based on their satisfactory attendance, performance in the postings/ research labs and the presentation of the logbook. The credits and hours of internship will be as defined in the BPT program

## **XV. Computation of SGPA and CGPA**

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone & earned by a student, i.e.,

$$SGPA (S_i) = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

where  $C_i$  is the number of credits of the  $i$ th course and  $G_i$  is the grade point scored by the student in the  $i$ th course.

- ii. The CGPA is also calculated in the same manner taking into account all the courses undergone & earned by a student over all the semesters of a programme, i.e.

$$CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

where  $S_i$  is the SGPA of the  $i$ th semester and  $C_i$  is the total number of credits in that semester.

- iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

## Illustration of Computation of SGPA and CGPA

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139
<b>Illustration for SGPA</b>				
Thus, SGPA = $139/20 = 6.95$				

Semester 1	Semester 2	Semester 3	Semester 4
Credit : 20 SGPA : 6.9	Credit : 22 SGPA : 6.8	Credit : 25 SGPA : 6.6	Credit : 26 SGPA : 6.0
Semester 5	Semester 6		
Credit : 26 SGPA : 6.3	Credit : 25 SGPA : 8.0		
<b>Illustration for CGPA</b>			

Thus,

$$20 \times 6.9 + 22 \times 6.8 + 25 \times 6.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0$$

$$\text{CGPA} = \frac{\quad}{\quad} = 6.75/\text{B+}$$

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- ii. Transcript : Based on the above recommendations on Letter grades, grade points and SGPA and CGPA, the transcript for each semester and a consolidated transcript indicating the performance in all semesters may be issued.

### Sample Transcript

MGM School of Physiotherapy Constituent unit of MGM Institute of Health Sciences Sector 1&2, Kamothe, Navi Mumbai				
Choice Based Credit System Grade Card				
<b>Name of Candidate</b>			<b>Date of Birth:</b>	
<b>Program</b>	Bachelor of Physiotherapy (BPT)		<b>PRN Number :</b>	
<b>Semester</b>	Semester I		<b>Month &amp; Year :</b>	
<b>Institute</b>	MGM School of Physiotherapy, Navi Mumbai			
<b>BPT001</b>	<b>Core Theory</b>	<b>Human Anatomy I Theory</b>	<b>Letter Grade</b>	<b>Result</b>
<b>BPT002</b>	<b>Core Practical</b>	<b>Human Anatomy I Practical</b>		
<b>BPT003</b>	<b>Core Theory</b>	<b>Human Physiology I Theory &amp; Practical</b>		
<b>BPT004</b>	<b>Core Practical</b>	<b>Kinesiotherapy I Theory &amp; Practical</b>		
<b>AECC001</b>	<b>Ability Enhancement Compulsory Course</b>	<b>Biophysics and medical electronics</b>		
<b>AEEC003</b>	<b>Ability Enhancement Compulsory Course</b>	<b>English and Communication Skills</b>		
<b>Credits registered</b>				
<b>Credits earned</b>				
<b>Grade point averaged</b>				
<b>Date:</b>	<b>Signature</b>			

## **XVII. Course Registration**

17.1. After admission to a Program, a student identity number is generated .This PRN number may be used in the process of registration for a course.

17.2 The registration process is a registration for the courses in a semester. The registration card is generated after a student completes the choice of electives. Every student shall register for the stipulated number of Courses/Credits semester wise even if electives are not prescribed in their regulations for the said semester. Every student must register for Elective/Ability Enhancement Courses semester-wise for the courses he/she intends to undergo in that semester within two weeks of commencement of the semester.

The list of students registered for each elective will be communicated to the HoDs/ Course Chairpersons. Students will be requested to authenticate the chosen electives by appending their signature in acceptance with approval by the HoDs/ Course Chairpersons. A soft copy of the registered students will be submitted to the elective course offering departments for their official use.

## **XVIII. Re - Entry after Break of Study:**

The University regulations for readmission are applicable for a candidate seeking re-entry to a program.

- a) Students admitted the program and absenting for more than 3 months must seek readmission into the appropriate semester as per university norms.
- b) The student shall follow the syllabus in vogue (currently approved / is being followed) for the program.
- c) All re-admissions of students are subject to the approval of the Vice-Chancellor.

## **XI. Ranking**

The first two ranks of the programme will be decided on the basis of grades of CGPA in the courses (core and DE courses only). In case of a tie, marks % [of core and DE courses only] will be taken into account.

## XII. Classification of Successful Candidates

Overall Performance in a Program and Ranking of a candidate is in accordance with the University regulations.

Consolidated Grade Card - BPT Program			
Letter Grade	% Marks Range	Grade point	CGPA RANGE
O	80 & Above	10	9.01 – 10
A+	75-80	9	8.01 - 9.00
A	60-74	8	7.01 - 8.00
B+	55-59	7	6.01- 7.00
B	50-54	6	5.01- 6.00
F/RA (Reappear)	Less than 50	0	4.51 – 5.00
Ab (Absent)		0	
Not Completed (NC)		0	
Repeat the course (RC = <50% in attendance or Internal Assessment)		0	

### A successful candidate will be :

- i. Who secures not less than O grade with a CGPA of 9.01 – 10.00 shall be declared to have secured 'OUTSTANDING' provided he/she passes the whole examination in the FIRST ATTEMPT;
- ii. Who secures not less than A+ grade with a CGPA of 8.01 – 9.00 shall be declared to have secured 'EXCELLENT' provided he/she passes the whole examination in the FIRST ATTEMPT;
- iii. Who secures not less than A grade with a CGPA of 7.01 – 8.00 and completes the course within the stipulated course period shall be declared to have passed the examinations with 'Very Good'
- iv. All other candidates (with grade B and above) shall be declared to have passed the examinations.

**Bachelor of Physiotherapy (BPT) Semester-I (0-6 months)**

<b>Course Code</b>	<b>Course Title</b>	<b>Course Description</b>	<b>Theory Hours</b>	<b>Practical Hours</b>	<b>Clinical Hours</b>	<b>Credits</b>
<b>BPT001</b>	<b>Human Anatomy I</b>	<b>Core Theory</b>	<b>60</b>	<b>-</b>	<b>-</b>	<b>3</b>
<b>BPT002</b>	<b>Human Anatomy I</b>	<b>Core Practical</b>	<b>-</b>	<b>80</b>	<b>-</b>	<b>2</b>
<b>BPT003</b>	<b>Human Physiology I</b>	<b>Core Theory &amp; Practical</b>	<b>60</b>	<b>40</b>	<b>-</b>	<b>4</b>
<b>BPT004</b>	<b>Kinesiotherapy I</b>	<b>Core Theory and practical</b>	<b>40</b>	<b>80</b>	<b>-</b>	<b>4</b>
<b>AECC001</b>	<b>Biophysics and medical electronics</b>	<b>Ability Enhancement Compulsory Course</b>	<b>40</b>	<b>40</b>	<b>-</b>	<b>3</b>
<b>AECC002</b>	<b>Environmental Sciences</b>	<b>Ability Enhancement Compulsory Course</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>1</b>
<b>AECC003</b>	<b>English and Communication Skills</b>	<b>Ability Enhancement Compulsory Course</b>	<b>60</b>	<b>-</b>	<b>-</b>	<b>3</b>
		<b>Introduction to basic skills in patient care</b>	<b>-</b>	<b>-</b>	<b>200</b>	<b>3</b>

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy (BPT)</b>
<b>Name of the Course</b>	<b>Human Anatomy- I Theory</b>
<b>Course Code</b>	<b>BPT-001</b>
<b>Course Description</b>	<b>Core Theory</b>
<b>Credit per Semester</b>	<b>3 credits</b>
<b>Hours per Semester</b>	<b>60 hours</b>

<b>Course Learning Outcomes:</b> The student will be able to	
CO 1	describe anatomical aspects of muscles, bones, joints, their attachments of thorax and upper quadrant & to understand and discuss analysis of movements with respect to bones, joints and soft tissues related to musculoskeletal system of thorax, & upper extremity.
CO 2	describe structures of the cardio vascular & respiratory system, mechanism of respiration and the course of blood vessels, structure of rib cage & its contents with special emphasis to lungs, tracheo-bronchial tree, respiratory muscles & heart
CO 3	describe source & course of major arterial, venous & lymphatic system, related to upper quadrant, thorax and heart.
CO 4	describe various structures of the genitor-urinary system, abdomen, pelvic organs and sense organs and apply knowledge to living anatomy

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>General anatomy</b> a. Introduction ,Skin, fascia, vessels, Bone, joint, muscles & nerves Imaging techniques	<b>09</b>
2	<b>General Histology</b> a. Epithelium b. Connective tissue c. Muscle d. Bone and cartilage e. Nerve and vessels	<b>05</b>
3	<b>Embryology</b>	<b>05</b>
4	<b>Musculoskeletal anatomy (dissection / pro-section mandatory)</b> a. Superior extremity with shoulder girdle.	<b>15</b>
5	<b>Cardiovascular system (Including Lymphatics) and Respiratory system</b>	<b>12</b>

	<ul style="list-style-type: none"> <li>a. Thoracic wall , Mediastinum</li> <li>b. Heart and major blood vessels</li> <li>c. Lungs</li> <li>d. Respiratory muscles, Diaphragm, Intercostals, Accessory muscles</li> <li>e. Lymphatics</li> <li>f. Applied Anatomy</li> </ul>	
6	<b>Systemic Anatomy</b> <ul style="list-style-type: none"> <li>a. Urinary system</li> <li>b. Reproductive system, (special emphasis to Female organs &amp; Pelvic floor muscles supporting system for uterus)</li> <li>c. Abdominal muscles</li> <li>d. Organs of gastro-intestinal system</li> <li>e. Sensory organs – Ear , Eye</li> </ul>	<b>14</b>
<b>Total</b>		<b>60</b>

### EXAMINATION SCHEME

**Theory question paper pattern for University Semester Examination under CBCS - 80 marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section1</b>				
Short Answer Questions(from units 1,2,4,5,6)	5 out of 6	3	3x 5	40
Brief answer questions (from units 1,2,4,5,6)	3 out of 4	5	5 x 3	
Long Answer Question (from units 4,5)	1 out of 2	10	1 x 10	
<b>Section 2</b>				
Short Answer Questions(from units 1,2,4,5,6)	5out of 6	3	3x 5	40
Brief answer questions (from units 1,2,4,5,6)	3 out of 4	5	5 x 3	
Long Answer Question (from units 4,5)	1 out of 2	10	1 x 10	
<b>Total= 80</b>				

**Internal examination pattern (Theory): 40marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
Short Answer Questions(from units 1,2,4,5,6)	5 out of 6	3	3 x 5	40
Brief answer questions (from units 1,2,4,5,6)	3 out of 4	5	5 x 3	
Long Answer Question (from units 4,5)	1 out of 2	10	1 x 10	
				<b>Total= 40</b>

**RECOMMENDED TEXT BOOKS**

1. Snell RS. Clinical anatomy: an illustrated review with questions and explanations. Lippincott Williams & Wilkins; 2004.
2. Chaurasia BD. Human anatomy Volume- I, II & III, CBS Publisher; 2004. Singh Vishram Textbook of Anatomy Head, Neck, and Brain; Volume III; 2014
3. Singh I. Textbook of human neuroanatomy. Jaypee Brothers Publishers; 2006.
4. Kadasne'S T.B.Of Anatomy Vol.1 Upper And Lower Extremities 2009
5. Singh V. Textbook of clinical neuroanatomy. Elsevier Health Sciences; 2014.
6. Dutta AK. Essentials of human anatomy, head and neck.

**RECOMMENDED REFERENCE BOOKS**

1. Johnson TB, Whillis J. Gray's Anatomy: Descriptive and Applied. Longman; 1958.
2. Eroschenko VP, Di Fiore MS. DiFiore's atlas of histology with functional correlations. Lippincott Williams & Wilkins; 2013.
3. DiFiore's Atlas of Histology with Functional Correlations
4. Wells K. Kinesiology, ed. 3, Philadelphia, 1960.
5. Snell RS. Neuroanatomy: a review with questions and explanations. Little, Brown; 1992 Jan.
6. Singh V. Textbook of clinical neuroanatomy. Elsevier Health Sciences; 2014 Aug 14.
7. Romanes GJ. Cunningham's manual of practical anatomy.

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy (BPT)</b>
<b>Name of the Course</b>	<b>Human Anatomy- I Practical</b>
<b>Course Code</b>	<b>BPT-002</b>
<b>Course Description</b>	<b>Core Practical</b>
<b>Credit per Semester</b>	<b>2 credits</b>
<b>Hours per Semester</b>	<b>80 hours</b>

**Course Learning Outcomes:** The student will be able to

CO 1	identify anatomical aspects of muscles, bones, joints, their attachments of thorax and upper quadrant & to understand and discuss analysis of movements with respect to bones, joints and soft tissues related to musculoskeletal system of thorax, & upper extremity.
CO 2	identify structures of the cardio vascular & respiratory system, mechanism of respiration and the course of blood vessels, structure of rib cage & its contents with special emphasis to lungs, tracheo-bronchial tree, respiratory muscles & heart
CO 3	Identify source & course of major arterial, venous & lymphatic system, related to upper quadrant, thorax and heart.
CO 4	identify various structures of the genitor-urinary system, abdomen and pelvic organs and apply knowledge to living anatomy
CO 5	demonstrate the movements of various joints , name and identify the origin/insertion, nerve /blood supply, root value & function of various skeletal muscles (upper extremity, abdominal wall & pelvic floor) with special emphasis to extremities, find various surface land-marks.

<b>Unit</b>	<b>Topics</b>	<b>No of Hrs</b>
1	<b>General anatomy</b>	<b>5</b>
2	<b>General Histology</b>	<b>5</b>
3.	<b>Musculoskeletal anatomy (dissection / pro-section mandatory)</b> Superior extremity – with Radiological , Living Anatomy and Osteology	<b>30</b>
4	<b>Respiratory System</b> - Respiratory system, Thoracic cage and respiratory muscles, diaphragm, Lung & Pleura , Trachea & Bronchopulmonary segments , Mediastinum - with Radiological , Living Anatomy and thorax osteology	<b>15</b>
5	<b>Circulatory System</b> - Types of blood vessels, Heart & Pericardium, Coronary Circulation, Overview of mediastinum , Blood vessels of Thorax with radiological and living anatomy	<b>10</b>
6	<b>Systemic Anatomy</b> – with Radiological & Living Anatomy and abdomen and pelvis osteology	<b>15</b>
<b>Total Hours</b>		<b>80</b>

**Practical question paper pattern for University Semester Examinations under CBCS -  
80 marks**

Exercise	Description	Marks	Total = 80
Q No 1	Spots (Total – 15)		40
	Spots (4 from Upper limb + 2 General Anatomy )	3 M x 6 = 18	
	Spots (from cardio-respiratory system)	3 M x 4 = 12	
	Spots (from Systemic Anatomy)	2 M x 5 = 10	
Q No 2	Viva ( Soft parts (10) + hard parts (10))		20
Q No 3	Radiology (Upper limb + cardio-respiratory system)		05
Q No 4	Living Anatomy (Upper limb + cardio-respiratory system)		05
Q No 5	Journal		10

**Internal Examination Pattern (Practical): 40 Marks**

Spots	25 marks
Viva	10 marks
Journal	05 marks
Total	40 marks

**Internal Assessment marks will be weighted out of 20 marks, for theory and practical, respectively**

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy (BPT)</b>
<b>Name of the Course</b>	<b>Human Physiology I Theory</b>
<b>Course Code</b>	<b>BPT-003</b>
<b>Course Description</b>	<b>Core Theory and Practical</b>
<b>Credit per Semester</b>	<b>4 credits</b>
<b>Hours per Semester</b>	<b>100 hours</b>

<b>Course Learning Outcomes:</b> The student will be able to	
CO 1	describe relative contribution of each organ system in maintenance of the Milieu Interior (Homeostasis)
CO 2	describe physiological functions of various systems, with special reference to Musculo-skeletal, Neuro-motor, Cardio-respiratory, Excretory, & relate alterations in function with aging
CO 3	Acquire the skill of basic clinical examination, with special emphasis to Cardiovascular & Respiratory system

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>General Physiology</b> a. Structure of cell membrane. b. Transport across cell Membrane c. Homeostasis	<b>04</b>
2	<b>Blood</b> a. Overview of Blood b. Blood Composition c. Plasma makeup-Red Blood Cells, White Blood Cells, Platelets d. Normal values of Blood e. Homeostasis (Coagulation or Clotting) f. ABO, Group System Surface Antigens, Inheritance -Incompatibility in Blood/Plasma Transfusions, Hemolytic Disease of the Newborn-Diseases of the Blood	<b>08</b>
3	<b>Muscle</b> a. Structure b. Properties-classification-excitation/contraction Muscle coupling-Motor unit- E.M.G. Factors affecting muscle contraction c. Neuro-muscular transmission work-Involuntary muscle properties-muscles of heart –Neurophysiology	<b>8</b>
4	<b>Nerve- Neuron AHC / Neuroglial cells</b> a. Structure	<b>6</b>

	<ul style="list-style-type: none"> <li>b. Classification &amp; Properties of nerve fibres</li> <li>c. Resting Membrane Potential Action potential</li> <li>d. Propagation of nerve impulse degeneration &amp; regeneration</li> <li>e. Reaction of degeneration (retrograde)</li> </ul>	
5	<b>Respiratory System</b> <ul style="list-style-type: none"> <li>a. Introduction, mechanics of respiration</li> <li>b. Pulmonary volumes and capacities,</li> <li>c. Anatomical and physiological dead space, surfactant</li> <li>d. Perfusion, ventilation-perfusion ratio</li> <li>e. Gas exchange and transport of gases</li> <li>f. Nervous and chemical control of respiration,</li> <li>g. Pulmonary function test,</li> <li>h. Physiological changes at altitude / acclimatization, hypoxia and abnormal respiration.</li> <li>i. Effect of exercise on respiratory system</li> </ul>	<b>14</b>
6	<b>Cardiovascular system</b> <ul style="list-style-type: none"> <li>a. Structure and properties of cardiac muscle,</li> <li>b. Cardiac cycle, Heart rate regulation,</li> <li>c. Factors affecting blood pressure,</li> <li>d. Cardiac output, Peripheral resistance</li> <li>e. Venous return, Regional circulation, coronary circulation</li> <li>f. Normal ECG</li> <li>g. Shock</li> <li>h. Effects of exercise</li> </ul>	<b>14</b>
7.	<b>Excretory system</b> <ul style="list-style-type: none"> <li>a. Kidneys , Renal blood flow and JJ apparatus, Glomerular filtration rate</li> <li>b. Body fluid and Electrolyte balance, Urine formation, Micturition,</li> <li>c. Neural control, Neurogenic bladder</li> </ul>	<b>06</b>
<b>Total</b>		<b>60</b>

**Theory question paper pattern for University Semester Examination under CBCS -  
80 marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section 1</b>				
Short Answer Questions(from units 1,2,4,5,6,7)	5 out of 6	3	3x 5	40
Brief answer questions (from units 1,2,4,5,6,7)	3 out of 4	5	5 x 3	
Long Answer Question (from units 3,4,5)	1 out of 2	10	1 x 10	
<b>Section 2</b>				
Short Answer Questions(from units 1,2,4,5,6,7)	5 out of 6	3	3x 5	40
Brief answer questions (from units 1,2,4,5,6,7)	3 out of 4	5	5 x 3	
Long Answer Question (from units 3,4,5)	1 out of 2	10	1 x 10	
				<b>Total= 80</b>

**Internal examination pattern (Theory): 40marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
Short Answer Questions(from units 1,2,4,5,6,7)	5 out of 6	3	3x 5	40
Brief answer questions (from units 1,2,4,5,6,7)	3 out of 4	5	5 x 3	
Long Answer Question (from units 3,4,5)	1 out of 2	10	1 x 10	
				<b>Total= 40</b>

**Practical**

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	Haematology – (demonstration only)	6
2	Graphs I. Skeletal muscle-properties-pre / after load-fatigue-Starling's law II. Cardiac muscle-properties-effect of Ach & Adrenaline III. Ergography	10
3	Blood Pressure – Effects of change in posture & exercise	4
4	Spirometry - Lung volumes ii. Timed vital capacity	2
5	Examination of Pulse	4
6	Clinical Examination - i. Respiratory system ii. Cardiovascular system ,ECG	12
7	Stethography i. Voluntary hyperventilation	1
8	Spots	1
<b>Total</b>		<b>40</b>

**EXAMINATION SCHEME**

**Practical question paper pattern for University Semester Examination under CBCS - 80 marks**

<b>Exercise</b>	<b>Description</b>	<b>Marks</b>
Q No 1	Cardio respiratory Practicals	30
Q No 2	Spots	2 x 10 = 20
Q No 3	Viva	20
QNo 4	Journal	10
		<b>Total = 80</b>

**Internal examination pattern (practical): 40 Marks**

<b>Exercise</b>		<b>Marks</b>
Q No 1	Clinical	20
Q No 2	Spots (open)	20
<b>Total</b>		<b>Total= 40</b>

**Internal Assessment marks will be weighted out of 20 marks, for theory and practical, respectively**

**RECOMMENDED TEXT BOOKS**

1. Text book on Medical Physiology – Guyton
2. Textbook of Physiology – A K Jain (for MBBS students)

**RECOMMENDED REFERENCE BOOKS**

1. Review of Medical Physiology – Ganong
2. Samson & Wright's Applied Physiology
3. Textbook of Medical Physiology – Bern and Levy

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Kinesiotherapy– I</b>
<b>Course Code</b>	<b>BPT004</b>
<b>Course Description</b>	<b>Core Theory and Practical</b>
<b>Credit per Semester</b>	<b>4 credits</b>
<b>Hours per Semester</b>	<b>120 hours</b>

<b>Course Learning Outcomes</b>	
<b>Cognitive</b>	
At the end of the course, the candidate will be able to:	
CO 1	define the various terms used in mechanics, biomechanics & kinesiology
CO 2	explain the basic principles of biophysics related to mechanics of movement / motion & apply these principles to simple equipment designs along with their efficacy in Therapeutic Gymnasium & various starting positions used in therapeutics.
CO 3	explain the concepts of physical, social and mental health, differentiate between physical activity and fitness, describe factors affecting physical fitness, and importance of regular monitoring of fitness for prevention of non communicable diseases
<b>Psychomotor</b>	
At the end of the course, the candidate will be able to:	
CO 4	demonstrate use of various equipments of the Therapeutic Gymnasium
CO 5	demonstrate movements in terms of anatomical planes and axes, demonstrate various starting & derived positions used in therapeutics.
CO 6	apply therapeutic skills of massage
CO 7	Demonstrate assessment of basic evaluation like sensations, reflexes & vital parameters
CO 8	Acquire the diagnostic skill of objective assessment of Range of Motion of the upper quadrant, head and neck by Goniometry

Unit.	Topics	No. of Hrs.
1	<b>Application of Biomechanics in Human Anatomy</b> a. Types of Muscles- A anatomical & Physiological b. Types of muscle work / Contraction c. Muscle Action: Roles as Agonist, Antagonist, Fixators, Synergist d. Active & Passive insufficiency e. Range of muscle work, Angle of pull – with importance to efficiency of muscle work and stability of joint	5
2	<b>Classification of Movements</b> a. Definition and classification b. Principles of movements c. Effects, uses and Techniques (active: assisted, free, assisted- resisted, resisted & passive)	5
3	<b>Starting Positions &amp; Derived Positions</b> a. Application of stability b. BOS, Gravity and muscle work in relation to various positions	5
4	<b>Therapeutic Gymnasium</b> a. Use of therapy accessories such as Pulleys Springs, Shoulder wheel, Walking aids, Finger ladder, Therapeutic balls, Weights, Resistance bands, tubes, & wands c. Applied mechanics of all above accessories	5
5	<b>Assessment of Vital Parameters</b> a. Blood Pressure b. Heart Rate/ Pulse rate c. Respiratory Rate d. Chest expansion e. Assessment of Reflex testing f. Limb Girth	5
6	<b>Goniometry- Diagnostic application for identification of movement dysfunction</b> Overview of surface anatomy b. Bony land marks of skeletal system --Reference points for identification of vertebral level, Carpal & Tarsal bone Land marks for identification of articular surface & peri- articular structures of joints c. Definition and Types of Goniometers d. Principles e. Techniques for individual joints with biomechanical principles Uses – upper quadrant	5
7	<b>Soft Tissue maneuvers</b>	7

	<p>a. Types of manoeuvres  b. Physiological principles of each  c. Therapeutic uses  d. Indications and contraindications</p> <p>Pre-session preparation – Type of media used for manipulation  Environment  Starting positions – used for model as well as therapist.  Skills on Upper limb , Face, Scalp and Neck.</p>	
8	<p><b>Concept of Health, Exercise and Fitness</b></p> <ul style="list-style-type: none"> <li>• Definition of health-Physical, social and mental health</li> <li>• Physical activity and Fitness, Factors affecting physical fitness</li> <li>• Energy sources for exercise , Physiological effects and benefits of exercise on body systems</li> <li>• Importance of testing fitness and regular monitoring</li> <li>• Role of physical activity in preventing non communicable diseases</li> </ul>	5
<b>Total</b>		<b>40</b>

MGMSOP MGMIHS

**BPT 005 – Kinesiotherapy- I (Practical)**

<b>Course Learning Outcomes</b>	
At the end of the course, the candidate will be able to:	
CO 1	name different types of muscles, palpate the muscles and able to recognize different types of muscle action
CO 2	demonstrate assisted, resisted and passive movements
CO 3	apply concept of base of support and gravity, starting positions & derived positions. Identify muscle work in various position
CO 4	demonstrate use of different equipments of therapeutic gymnasium
CO 5	assess BP, HR, chest expansion, limb girth, reflex testing
CO 6	use goniometry for assessment of upper limb range of motion, identify joint fulcrum ,position of movable and fixed arms, identify factors affecting joint motion
CO 7	perform different types of soft tissue maneuvers with understanding of indications and contraindications of each technique on upper limb, face, scalp and neck.

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>Classification of Movements</b> Active, active-assisted, free, assisted- resisted, resisted & passive	10
2	<b>Starting Positions &amp; Derived Positions</b> BOS, Gravity and muscle work in relation to various positions	10
3	<b>Therapeutic Gymnasium</b> Pulleys Springs, Shoulder wheel, Walking aids, Finger ladder, Therapeutic balls, Weights, Resistance bands, tubes, & wands.	10
4	<b>Assessment of Vital Parameters</b> Blood pressure, pulse rate, respiratory rate, chest expansion, reflex testing	10
5	<b>Goniometry – Upper quadrant</b>	15
6	<b>Soft Tissue maneuvers</b> Skills on upper limb , face, scalp and neck	15
7	<b>Fitness program</b>	10
<b>Total</b>		<b>80</b>

**EXAMINATION SCHEME****Theory question paper pattern for University Semester Examination under CBCS - 80 Marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
<b>Section 1</b>				
Short answer questions (from unit 1-7)	8 out of 10	5	8x5	40
<b>Section 2</b>				
Long answer question (from 1-7)	4 out of 5	10	4 x 10	40
				<b>Total= 80</b>

**Practical question paper pattern for University Semester Examination under CBCS - 80 marks**

Exercise	Description	Marks
Q No 1	Exercise- (from unit 5,6,7- upper quadrant goniometry/ soft tissue maneuvers, fitness)	30
Q No 2	2 OSPE stations (from unit 2,3- therapeutic gymnasium)	2 x 10=20
Q No 3	2 OSPE stations (from unit 4- assessment of vital parameters)	2 x 10=20
QNo 4	Journal	10
		<b>Total = 80</b>

**Internal examination pattern (theory): 40marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Short answers(unit 1-7)	4	5	4 x 5	20
Long answers (unit 1-7)	2	10	2 x 10	20
<b>Total</b>				<b>Total= 40</b>

**Internal examination pattern (practical): 40 marks**

<b>Exercise</b>		<b>Marks</b>
Q No 1	Exercise- upper quadrant goniometry/ soft tissue maneuvers	15
Q No 2	1 OSPE stations (from therapeutic gymnasium)	10
Q No 3	1 OSPE stations (assessment of vital parameters)	10
QNo 4	Journal	5
		<b>Total= 40</b>

**Internal Assessment marks will be weighted out of 20 marks, for theory and practical, respectively**

**RECOMMENDED TEXT BOOKS**

1. Gardiner MD. The principles of exercise therapy. G. Bell; 1957.
2. Licht SH, editor. Massage, manipulation, and traction. E. Licht; 1960.
3. Kisner C, Colby LA, Borstad J. Therapeutic exercise: Foundations and techniques. Fa Davis; 2017 Oct 18.
4. Hollis M. Massage for therapists: a guide to soft tissue therapy. Wiley-Blackwell; 2009 .
5. Hollis M, Cook PF, editors. Practical exercise therapy. Wiley-Blackwell; 1999.
6. Practical Exercise therapy Margaret Hollis, Phyllis Fletcher Cook  
Wiley
7. Norkin CC, White DJ. Measurement of joint motion. A guide to goniometry. 1995
8. Levangie PK, Norkin CC. Joint Structure and function: a comprehensive analysis. 3rd. Philadelphia: FA. Davis Company. 2000.
9. Houglum PA, Bertoti DB. Brunnstrom's clinical kinesiology. FA Davis; 2011.
10. World Health Organisation; Global Strategy on Diet, Physical Activity and Health
11. McArdle WD, Katch FI, Katch VL. Exercise physiology: nutrition, energy, and human performance. Lippincott Williams & Wilkins; 2010..
13. Kennedy-Armbruster C, Yoke M. Methods of group exercise instruction. Human
14. Kinetics; 2014 .

**RECOMMENDED REFERENCE BOOK**

1. ACSM's Guidelines for Exercise Testing and Prescription
- 2 Kisner C, Colby LA, Borstad J. Therapeutic exercise: Foundations and techniques. Fa Davis; 2017

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Biophysics and medical electronics</b>
<b>Course Code</b>	<b>AECC001</b>
<b>Course Description</b>	<b>Ability Enhancement Compulsory Course - Theory and Practical</b>
<b>Semester</b>	<b>Semester I</b>
<b>Credit per Semester</b>	<b>3 credits</b>
<b>Hours per Semester</b>	<b>80 hours</b>

<b>Course Learning Outcomes</b>	
At the end of the course, the candidate will be able to:	
CO 1	Explain various terms used in relation to biophysics, mechanics, biomechanics & kinesiology. Explain the physics principles & Laws of Electricity, & Electro magnetic spectrum
CO 2	Discuss effects of environmental & man made electromagnetic field at the cellular level & outline risk factors on prolonged exposure.
CO 3	Describe the Main electrical supply, Electric shock, examine precautions to be taken for prevention of electric shock
CO 4	Identify and describe in brief, certain common electrical components such as transistors, valves, capacitors, transformers etc & the simple instruments used to test / calibrate these components (such as potentiometer, oscilloscope , multimeter) of the circuit ; & identify such components.

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<p><b>Basic Physics:</b></p> <ul style="list-style-type: none"> <li>a. Structure of atom, Isotopes, States of matter;</li> <li>b. Compound formation-(covalent formation),</li> <li>c. Properties of Electric lines of forces</li> </ul> <p><b>Biophysics- Mechanics &amp; Application to human Body</b></p> <ul style="list-style-type: none"> <li>a. Definition and terminologies: Mechanics (Statics &amp; Dynamics), Biomechanics, Kinetics, Kinematics (Osteokinematics, Arthrokinematics, Open Chain &amp; Closed Chain kinematics)</li> <li>b. Axes / planes,</li> <li>c. Laws of inertia &amp; motion,</li> </ul>	20

	<ul style="list-style-type: none"> <li>d. Gravity, C.O.G, L.O.G and B.O.S.</li> <li>e. Equilibrium – Types and affecting factors</li> <li>f. Mechanics of Forces Work, Energy, Power, Friction, Momentum, Parallelogram of Forces</li> <li>g. Torque</li> <li>h. Pendulum</li> <li>i. Mechanical and Anatomical pulleys</li> <li>j. Levers</li> <li>k. Fluid mechanics related to Hydrotherapy (physics, statics &amp; dynamics)</li> </ul>	
2	<p><b>Theory of Electricity:</b></p> <ul style="list-style-type: none"> <li>a. Production of Electric Charge</li> <li>b. Characteristics of charged electrical body</li> </ul>	4
3	<p><b>Main supply:</b></p> <ul style="list-style-type: none"> <li>a. Types: A.C./ D.C.</li> <li>b. Distribution/ Grid system wiring of the house, colour coding of electrical supply to the apparatus</li> <li>c. Testing of mains</li> </ul>	4
4	<p><b>Magnetism:</b></p> <ul style="list-style-type: none"> <li>a. Nature and Types</li> <li>b. Molecular theory of Magnetism</li> <li>c. Property of Magnet</li> <li>d. Magnetic effect of electric current – Electro Magnets</li> <li>e. Meters for measuring A.C.</li> </ul>	4
5	<p><b>Electro Magnetic Spectrum</b></p> <ul style="list-style-type: none"> <li>a. Electro Magnetic Radiation, Laws Governing E.M.R: Laws of Reflection, Refraction, Absorption, Attenuation, Cosine Law, Inverse Square Law, Grothus Law</li> </ul>	4
6.	<p><b>Shock</b></p> <ul style="list-style-type: none"> <li>a. Definition</li> <li>b. Types ( Electric Shock &amp; Earth shock)</li> <li>c. Severity, Causes, Effects &amp; Precaution</li> <li>d. Types of Plugs &amp; Switches</li> <li>e. Fuse</li> </ul>	2
7.	<b>Earthing and its importance</b>	2
<b>Total</b>		<b>40</b>

**Practical**

Sr. No.	Topics	No. of Hrs.
1	List, describe, draw various electrical components like diodes & triodes, rheostat, capacitor, potentiometer, switches, plugs and pulse generator	10
2	Apply technique of testing of mains supply	10
3	Draw free body diagrams, force vectors during walking and further applications	20
<b>Total</b>		<b>40</b>

**EXAMINATION SCHEME**

**This course will not be assessed as Semester University Examination. Assessment will be conducted as Internal College Exam**

**Internal examination pattern (theory): 40marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Short answer questions	8	5	5 x 8	40
<b>Total</b>				<b>Total= 40</b>

**RECOMMENDED TEXT BOOKS**

1. Kitchen S, Bazin S, editors. Clayton's electrotherapy. Bailliere Tindall Limited; 1996.
2. Robertson V, Ward A, Low J, Reed A, MCSP D. Electrotherapy explained: principles and practice. Elsevier Health Sciences; 2006
3. Kahn J. Principles and practice of electrotherapy. Saunders; 2000.
4. Bellis E. Electrotherapy: evidence-based practice.
5. Gardiner MD. The principles of exercise therapy. G. Bell; 1957.
6. Norkin CC, White DJ. Measurement of joint motion: a guide to goniometry. FA Davis; 2016

**RECOMMENDED REFERENCE BOOK**

1. Nelson RM, Hayes KW, Currier DP, editors. Clinical electrotherapy. Prentice Hall; 1999.
2. Clinical Electrotherapy -- Nelson & Currier
3. Biomechanics – Cynthia Norkins

<b>Ability Enhancement Compulsory Course (AECC)</b>	
<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Environmental Sciences</b>
<b>Course Code</b>	<b>AECC002</b>
<b>Credit per Semester</b>	<b>1 credit</b>
<b>Hours per Semester</b>	<b>20 hours</b>

<b>Course Learning Outcomes</b>	
CO1	describe ecosystem and its structural and functional aspects, examine interconnectedness among all the biotic and abiotic components of environment and dynamic nature of ecological processes in maintaining equilibrium in nature.
CO2	List Earth's resources, their generation, extraction and impact of human activities on earth's environment, to examine effective management strategies, and critical insight on major sustainability issues.

<b>Units</b>	<b>Topics</b>	<b>No. of Hrs.</b>
<b>Unit 1: Introduction to environmental studies</b>		
1.	Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere.	<b>5</b>
2.	Scope and importance; Concept of sustainability and sustainable development.	
<b>Unit 2: Ecosystems</b>		
3.	Structure and function of ecosystem. Energy flow in an ecosystem: food chain, Food web, Ecological succession.	<b>5</b>
4.	Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	
<b>Unit 3: Natural Resources: Renewable and Non-renewable Resources</b>		
5.	Land Resources and land use change; Land degradation, soil erosion and desertification.	<b>10</b>
6.	Deforestation: Causes and impacts due to mining, dam building on environment,	

	forests, biodiversity and tribal populations.	
7.	Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).	
8.	Heating of earth and circulation of air; air mass formation and precipitation	
9.	Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies	
<b>Total</b>		<b>20</b>

**This course will not be assessed as Semester University Examination. Assessment will be conducted as Internal College Exam at the end of Semester II**

**Books:**

1. Plumwood V, Low N. Global Ethics and Environment..
2. Gleick PH. Water in crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p. 1993;9.
3. Principles of conservation biology Martha J Groom; Gary K Meffe; C Ronald Carroll Sunderland, Mass. : Sinauer Associates, ©2006.
4. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
5. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
6. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
7. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
8. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
9. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
10. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
11. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.

<b>Ability Enhancement Compulsory Course</b>	
<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>English and Communication Skills</b>
<b>Course Code</b>	<b>AECC003</b>
<b>Course Description</b>	<b>Ability Enhancement Compulsory Course – Theory</b>
<b>Semester</b>	<b>Semester I</b>
<b>Credits per semester</b>	<b>3 credit</b>
<b>Hours per semester</b>	<b>60 hours</b>

<b>Course Learning Outcomes: The student will be able to</b>	
CO 1	apply basics of grammar and writing skills
CO 1	apply and communicate ideas orally and in writing with a high level of proficiency
CO 2	use appropriate expressions in varied situations and topics of interest
CO 3	demonstrate independence in using basic language structure in oral and written
CO 4	apply correct usage of English grammar in writing and speaking
CO 5	speak in English both in terms of fluency and comprehensibility

<b>Sr. No.</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>Basics of Grammar –</b> Vocabulary, Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words	6
2	<b>Basics of Grammar – Part II –</b> Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms	6
3	<b>Writing Skills -</b> Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension	6
4	Writing and Reading, Summary writing, Creative writing, news paper reading	6
5	Practical Exercise, Formal speech, Phonetics, semantics and pronunciation	6
6	<b>Introduction to communication skills</b> Communication process, Elements of communication, Barriers of communication and how to overcome them, Nuances for communicating with patients and their attenders in hospitals	6

7	<b>Speaking</b> Importance of speaking efficiently, Voice culture, Preparation of speech. Secrets of good delivery, Audience psychology, handling , Presentation skills, Individual feedback for each student, Conference/Interview technique	6
8	<b>Listening</b> Importance of listening , Self assessment, Action plan execution, Barriers in listening, Good and persuasive listening	6
9	<b>Reading</b> What is efficient and fast reading, Awareness of existing reading habits, Tested techniques for improving speed, Improving concentration and comprehension through systematic study	6
10	<b>Non Verbal Communication</b> Basics of non-verbal communication, Rapport building skills using neuro- linguistic programming (NLP), Communication in Optometry practice	6
<b>Total</b>		<b>60</b>

**Text books:**

1. Lock G. Functional English grammar: An introduction for second language teachers. Cambridge University Press; 1996
2. Van Servellen G. Communication skills for the health care professional: Concepts, practice, and evidence. Jones & Bartlett Publishers; 2009 .

**Examination Scheme**

**This course will not be assessed as Semester University Examination. Assessment will be conducted as Internal College Exam**

**Theory question paper pattern for internal assessment under CBCS - 40 Marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section 1</b>				
Short answer questions	8 out of 10	5	8x5	40
				<b>Total= 40</b>

**Bachelor of Physiotherapy (BPT) Semester-II (7-12 months)**

Code	Course type	Title	Theory Hours	Practical Hours	Clinical Hours	Credits
BPT005	Core Theory	Human Anatomy II Theory	60	-	-	3
BPT006	Core Practical	Human Anatomy II Practical	-	80	-	2
BPT007	Core Theory and Practical	Human Physiology II	60	40	-	4
BPT008	Core Theory and practical	Kinesiotherapy II	40	80	-	4
BPT009	Core Theory and practical	Thermal Agents	40	40	-	3
AECC004	Ability Enhancement Compulsory Course	Biochemistry	60	-	-	3
AECC002	Ability Enhancement Elective Course	Environmental Sciences	20	40	-	2
	Introduction to basic skills in patient care Clinics		-	-	160	2

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy (BPT)</b>
<b>Name of the Course</b>	<b>Human Anatomy- II</b>
	<b>Theory</b>
<b>Course Code</b>	<b>BPT-005</b>
<b>Course Description</b>	<b>Core Theory</b>
<b>Credit per Semester</b>	<b>3 credits</b>
<b>Hours per Semester</b>	<b>60 hours</b>

<b>Course Learning Outcomes: The student will be able to</b>	
CO 1	describe anatomy of lower quadrant including spine, pelvis and lower extremities : list bones, joints, soft tissues, muscles related to musculoskeletal system of spine & lower extremities and to localize various surface land-marks, apply related radiological and living anatomy
CO 2	describe anatomy of structures of head, face and neck
CO 3	describe and outline various parts of nervous system: Source, course & components of various trans-sections of spinal tracts and C.N.S; Source, course & components of various trans-sections of brain, cranial nerves (Special emphasis to III, IV, V, VI & VII) & peripheral nerves.
CO 4	describe blood circulation of C.N.S. & spinal cord.
CO 5	describe the course of peripheral nerves.
CO 6	discuss anatomical basis of clinical conditions of nervous system.
CO 7	demonstrate movements of lower extremity joints – Identify & describe the origin/insertion, nerve /blood supply, root value & function of various skeletal muscles (including lower extremity and spine)

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>Musculoskeletal anatomy (dissection / pro-section mandatory)</b> a. Inferior extremity b. Overview of pelvic girdle & pelvic floor muscles. c. Spine	<b>18</b>
2	<b>Head, Face and Neck</b> a. Facial muscles and its blood and nerve supply. b. Triangles of neck, Glands, Tongue & Palate c. Larynx & Pharynx d. Muscles of Mastication & T.M. joint e. Extra ocular muscles with nerve supply f. Nose & Para nasal sinuses	<b>14</b>
3	<b>Neuro anatomy</b> a. General organization of C.N.S. (Brain & spinal cord) b. Central Nervous System c. Cranial nerves -Peripheral nervous system d. Autonomic Nervous System -Sensory system, e. Neuro-muscular junction f. Neuro-muscular integration	<b>28</b>
	<b>Total</b>	<b>60</b>

**EXAMINATION SCHEME****Theory question paper pattern for University Semester Examination under CBCS - 80 marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section1</b>				
Short Answer Questions(from units 1,2,3)	5 out of 6	3	3x 5	40
Brief answer questions (from units 1,2,3)	3 out of 4	5	5 x 3	
Long Answer Question (from units 1,3)	1 out of 2	10	1 x 10	
<b>Section 2</b>				
Short Answer Questions(from units 1,2,3)	5out of 6	3	3x 5	40
Brief answer questions (from units 1,2,3)	3 out of 4	5	5 x 3	
Long Answer Question (from units 1,3)	1 out of 2	10	1 x 10	
				<b>Total= 80</b>

**Internal examination pattern (Theory): 40marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section1</b>				
Short Answer Questions(from units 1,2,3)	5out of 6	3	3x 5	40
Brief answer questions (from units 1,2,3)	3 out of 4	5	5 x 3	
Long Answer Question (from units 1,3)	1 out of 2	10	1 x 10	
				<b>Total= 40</b>

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy (BPT)</b>
<b>Name of the Course</b>	<b>Human Anatomy- II</b>
	<b>Practical</b>
<b>Course Code</b>	<b>BPT-006</b>
<b>Course Description</b>	<b>Core Practical</b>
<b>Credit per Semester</b>	<b>2 credits</b>
<b>Hours per Semester</b>	<b>80 hours</b>

<b>Course Learning Outcomes: The student will be able to</b>	
CO 1	Identify and list bones, joints, soft tissues, muscles related to musculoskeletal system of spine & lower extremities and to localize various surface land-marks, apply related radiological and living anatomy
CO 2	Identify structures of head, face and neck
CO 3	Identify source, course & components of various trans-sections of spinal tracts and C.N.S; Source, course & components of various trans-sections of brain, cranial nerves (Special emphasis to III, IV, V, VI & VII) & peripheral nerves.
CO 4	demonstrate movements of lower extremity joints – Identify & describe the origin/insertion, nerve /blood supply, root value & function of various skeletal muscles (including lower extremity and spine) , course of peripheral nerves

<b>Unit</b>	<b>Topics</b>	<b>No of Hrs</b>
1	<b>Musculoskeletal anatomy (dissection / pro-section mandatory)</b> Lower Quadrant: Inferior extremity & Spine – with Radiological & Living Anatomy and Osteology	30
2	<b>Head, face and neck</b> – with Radiological & Living Anatomy, Osteology	20
3	<b>Neuro anatomy</b>	30
<b>Total Hours</b>		<b>80</b>

**Practical question paper pattern for University Semester Examination under CBCS - 80 marks**

Exercise	Description	Marks	Total = 80
Q No 1	Spots (Total – 15)		40
	Spots (from Lower limb + Spine )	3 M x 6 = 18	
	Spots (from Neuroanatomy)	3 M x 4 = 12	
	Spots (from Head, Face, neck)	2 M x 5 = 10	
Q No 2	Viva ( Soft parts (10) + hard parts (10))		20
Q No 3	Radiology (Lower limb + Head, Face, neck)		05
Q No 4	Living Anatomy (Lower limb + Head, Face, neck)		05
Q No 5	Journal		10

**Internal Examination Pattern (Practical): 40 Marks**

Spots	25 marks
Viva	10 marks
Journal	05 marks
Total	40 marks

**Internal Assessment marks will be weighted out of 20 marks, for theory and practical, respectively.**

**Learning material as in Anatomy I**

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy (BPT)</b>
<b>Name of the Course</b>	<b>Human Physiology II</b>
<b>Course Code</b>	<b>BPT-007</b>
<b>Course Description</b>	<b>Core Theory and Practical</b>
<b>Credit per Semester</b>	<b>4 credits</b>
<b>Hours per Semester</b>	<b>100 hours</b>

**Course Learning Outcomes: The student will be able to**

CO 1	describe of various systems, with special reference to Nervous system, & neuro-motor alterations in function with aging
CO 2	analyze physiological response & adaptation to environmental stresses-with special emphasis on physical activity, altitude, temperature
CO 3	demonstrate basic clinical examination, with special emphasis to special senses, sensations, reflex testing, Exercise tolerance / Ergography.
CO 4	describe physiological functions of reproductive system, gastro intestinal system

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<p><b>Nervous system</b></p> <ul style="list-style-type: none"> <li>a. Introduction of nervous system, classification – C.N.S, P.N.S. &amp; A.N.S.</li> <li>b. Synapse-structure, properties, &amp; transmission;</li> <li>c. Reflexes-classification &amp; properties;</li> <li>d. Receptor physiology: classification, properties.</li> <li>e. Physiology of Touch, Pain, Temperature &amp; Proprioception;</li> <li>f. Sensory and motor tracts: effect of transaction (complete and incomplete) at various levels</li> <li>g. Physiology of Muscle Tone (muscle spindle); Stretch reflex</li> <li>h. Connection &amp; function of Basal ganglia, Thalamus, Hypothalamus, Sensory and Motor cortex, Cerebellum, Limbic system, Vestibular Apparatus</li> <li>i. Autonomic nervous system: Structure and functions of the sympathetic and the parasympathetic nervous system.</li> <li>j. Learning, memory &amp; conditioned reflex</li> <li>k. Physiology of Voluntary movement</li> </ul>	25
2	<p><b>Endocrine</b></p> <ul style="list-style-type: none"> <li>a. Secretion-regulation &amp; function of Pituitary-thyroid-adrenal-parathyroid-pancreas (emphasis on insulin)</li> </ul>	7
3	<b>Temperature Regulation</b>	3

	a. Circulation of the skin- body fluid- electrolyte balance	
4	<b>Special Senses</b> a. Structure and function of the eye b. Applied physiology: errors of refraction, accommodation, c. Reflexes - dark and light adaptation, photosensitivity. d. Structure and function of the ear e. Applied physiology- types of deafness	5
5	<b>Reproductive system-</b> a. Function of estrogen, progesterone, testosterone, spermatogenesis, menstruation , menopause	5
6	<b>Gastrointestinal system</b> a. Motility-Secretion-Regulation-Digestion- Splanchnic circulation	5
7	<b>Exercise Physiology BMR</b>	6
8	<b>Physiology of Ageing</b>	4
<b>Total</b>		<b>60</b>

**EXAMINATION SCHEME**

**Theory question paper pattern for University Semester Examination under CBCS - 80 marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section1</b>				
Short Answer Questions(from units 2-6,8)	5 out of 6	3	3x 5	40
Brief answer questions (from units 2-6,8)	3 out of 4	5	5 x 3	
Long Answer Question (from units 1,7)	1 out of 2	10	1 x 10	
<b>Section 2</b>				
Short Answer Questions(from units 2-6,8)	5out of 6	3	3x 5	40
Brief answer questions (from units 2-6,8)	3 out of 4	5	5 x 3	
Long Answer Question (from units 1,7)	1 out of 2	10	1 x 10	
				<b>Total= 80</b>

**Internal examination pattern (Theory): 40marks**

Question type	No. of questions	Marks/ question	Question X marks	Total marks
<b>Section1</b>				
Short Answer Questions(from units 2-6,7)	5out of 6	3	3x 5	40
Brief answer questions (from units 2-6,7)	3 out of 4	5	5 x 3	
Long Answer Question (from units 1,7)	1 out of 2	10	1 x 10	
				<b>Total= 40</b>

**Practical**

Sr. No.	Topics	No. of Hrs.
1	<b>Clinical Examination</b> i. Nervous system - higher functions /Memory/ Time/ Orientation / Reflexes/ Motor & Sensory System	20
2	<b>Physical fitness</b> i. Breath holding ii. Mercury Column Test iii. Cardiac Efficiency Test – Harvard Step Test, Master Step Test	15
3	<b>Perimetry</b>	5
<b>Total</b>		<b>40</b>

**Practical question paper pattern for University Semester Examination under CBCS - 80 marks**

Exercise	Description	Marks
Q No 1	CNS Practicals	30
Q No 2	Spots	2x10=20
Q No 3	Viva	20
QNo 4	Journal	10
		<b>Total = 80</b>

**Internal Examination Pattern (Practical): 20 Marks**

Exercise		Marks
Q No 1	Clinicals	20 marks
Q No 2	Spots (4 x 5 marks)	20 marks
<b>Total</b>		<b>Total = 40 M</b>

**Internal Assessment marks will be weighted out of 20 marks, for theory and practical, respectively**

**Text Books same as for Human Physiology I**

MGMSOP MGMIHS

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Kinesiotherapy – II</b>
<b>Course Code</b>	<b>BPT008</b>
<b>Course Description</b>	<b>Core Theory and Practical</b>
<b>Credit per Semester</b>	<b>4 credits</b>
<b>Hours per Semester</b>	<b>120 hours</b>

<b>Course Learning Outcomes</b>	
At the end of the course, the candidate will be able to:	
CO 1	describe the physiological effects, therapeutic use, merits / demerits of soft tissue manipulations (massage), & demonstrate the skill of application of various manipulations & the limbs, face, back & abdomen
CO 2	describe types of Goniometry, methods of assessment of joint range of motion, measure range of motion of joints of lower extremity and spine by using Goniometry
CO 3	discuss physiological basis , principles, therapeutic use of relaxation & demonstrate various methods of relaxation
CO 4	demonstrate group & recreational activities, examining advantages and disadvantages of group exercises, general fitness exercises used in physical training, describe physiological responses and principles of aerobic exercises for general fitness & demonstrate fitness skills on self/healthy people.

Units	Topics	No. of Hrs.
1	<p><b>Goniometry- Diagnostic application for identification of movement dysfunction</b></p> <p>a. Overview of surface anatomy</p> <p>f. Bony land marks of skeletal system --Reference points for identification of vertebral level, Tarsal bone Land marks for identification of articular surface &amp; peri- articular structures of lower extremity joints</p> <p>g. Revision of Definition and Types of Goniometers</p> <p>h. Principles</p> <p>i. Techniques for individual joints with biomechanical principles – Lower quadrant</p> <p>j. Assessment of Spinal mobility</p>	12
2	<p><b>Soft Tissue maneuvers</b></p> <p>e. Types of manoeuvres</p> <p>f. Physiological principles of each</p> <p>g. Therapeutic uses</p> <p>h. Indications and contraindications</p> <p>Pre-session preparation – Type of media used for manipulation Environment</p> <p>Starting positions – used for model as well as therapist.</p> <p>Skills on Lower limb, Abdomen and back.</p>	8
3.	<p><b>Principles of General Fitness</b></p> <p>a. Physiology of aerobic and anaerobic exercise.</p> <p>b. Components of fitness (definition of terms only)</p> <p>c. Warm up</p> <p>d. Cool down exercises</p>	8
4.	<p><b>Group &amp; recreational activities</b></p> <p>a. Advantages and disadvantages</p> <p>b. Basic principles of General fitness exercises for healthy</p> <p>c. Need for fitness exercise for sedentary life</p>	7
5.	<p><b>Relaxation</b></p> <p>a. Principles,</p> <p>b. Techniques along with their effects &amp; uses</p> <p>General – Jacobson's, Shavasana &amp; Reciprocal ( Laura Mitchell )</p> <p>Local- Heat, Massage, Gentle/Rhythmic passive movements</p>	5
<b>Total</b>		<b>40</b>

**BPT 008 – Kinesiotherapy II (Practical)**

<b>Course Learning Outcomes</b>	
At the end of the course, the candidate will be able to:	
CO 1	demonstrate techniques for measurement of range of motion of individual joints with application of biomechanical principles – Lower quadrant and assessment of Spinal mobility, identify bony fulcrum, fixed arm and movable arm of goniometer for testing joint movement, identify structures affecting joint mobility
CO 2	demonstrate and apply different types of soft tissue maneuvers on lower limb, abdomen and back with understanding of indications and contraindications of each.
CO 3	design general fitness program inclusive of warm up, conditioning phase and cool down.
CO 4	demonstrate group & recreational activities focusing on special groups of people,
CO 5	Demonstrating relaxation techniques: General – Jacobson's, Shavasana & Reciprocal ( Laura Mitchell ) Local- Heat, Massage, Gentle/Rhythmic passive movements, with understand of principles, techniques, effects & uses

<b>Sr. No.</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>Goniometry – Lower quadrant and spinal mobility</b>	20
2	<b>Soft Tissue maneuvers</b> Skills on Lower limb, Abdomen, Back	20
3	<b>Principles of Physical fitness</b> Warm up and cool down, aerobic activities	10
4	<b>Group and recreational activities</b>	10
5	<b>Relaxation techniques</b>	20
<b>Total</b>		<b>80</b>

**EXAMINATION SCHEME****Theory question paper pattern for University Semester Examination under CBCS - 40 Marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
<b>Section 1</b>				
Short answer questions (from units 1-5)	8 out of 10	5	8x5	40
<b>Section 2</b>				
Long answer question (from units 1-5)	4 out of 5	10	4 x 10	40
				<b>Total= 80</b>

**Practical question paper pattern for University Semester Examination under CBCS - 80 marks**

Exercise	Description	Marks
Q No 1	2 OSPE stations (from unit 1-goniometry)	2x10=20
Q No 2	2 OSPE stations (from unit 2,3,4 fitness/soft tissue maneuver)	2x10=20
Q No 3	Exercise-Application of relaxation/soft tissue maneuver/fitness	30
QNo 4	Journal	10
		<b>Total = 80</b>

**Internal examination pattern (theory): 40marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Short answers (units 1-5)	4	5	4 x 5	20
Long answers (from units 1-5)	2	10	2 x 10	20
<b>Total</b>				<b>Total= 40</b>

**Internal examination pattern (practical): 40marks**

Exercise	Description	Marks
Q No 1	1 OSPE station – from unit 1- goniometry	1x10=10
Q No 2	1 OSPE station - from unit 2,3,4 fitness/soft tissue maneuver	1x10=10
Q No 3	Exercise- Application of relaxation/soft tissue maneuver/fitness	15
QNo 4	Journal	5
<b>Total</b>		<b>40 marks</b>

**RECOMMENDED TEXT BOOKS**

1. Gardiner MD. The principles of exercise therapy. G. Bell; 1957.
2. Licht SH, editor. Massage, manipulation, and traction. E. Licht; 1960.
3. Kisner C, Colby LA, Borstad J. Therapeutic exercise: Foundations and techniques. Fa Davis; 2017 Oct 18.
4. Hollis M. Massage for therapists: a guide to soft tissue therapy. Wiley-Blackwell; 2009 .
5. Hollis M, Cook PF, editors. Practical exercise therapy. Wiley-Blackwell; 1999.
6. Practical Exercise therapy Margaret Hollis, Phyllis Fletcher Cook  
Wiley
7. Norkin CC, White DJ. Measurement of joint motion. A guide to goniometry. 1995
8. Levangie PK, Norkin CC. Joint Structure and function: a comprehensive analysis. 3rd. Philadelphia: FA. Davis Company. 2000.
9. Houghlum PA, Bertoti DB. Brunnstrom's clinical kinesiology. FA Davis; 2011.
10. World Health Organisation; Global Strategy on Diet, Physical Activity and Health
11. McArdle WD, Katch FI, Katch VL. Exercise physiology: nutrition, energy, and human performance. Lippincott Williams & Wilkins; 2010..
13. Kennedy-Armbruster C, Yoke M. Methods of group exercise instruction. Human Kinetics; 2014 .

**Internal Assessment marks will be weighted out of 20 marks, for theory and practical, respectively**

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Thermal Agents</b>
<b>Course Code</b>	<b>BPT009</b>
<b>Credit per Semester</b>	<b>3 credits</b>
<b>Hours per Semester</b>	<b>80 hours</b>

<b>Course Learning Outcomes</b>	
At the end of the course the candidate will be able to –	
CO 1	Test the working of the various superficial thermal agents
CO 2	State and explain physical principles of Thermal Energy , Cryotherapy and equipment used to deliver cryotherapy- assess physiological effects, therapeutic effects/uses, compare and contrast merits/demerits, Indications/contraindications, demonstrate skills of application, discuss dosage
CO 3	Describe & identify various equipments used to deliver superficial heat therapy - radiant energy techniques like Infrared, Ultraviolet and LASER therapy (production, physiological, therapeutic effects, techniques of application, indications & contraindications, dangers, precautions and dosage) ; superficial thermal agents such as Paraffin wax bath, Hydrocollator packs, IRR, UVR, Laser, home remedies, their physiological & therapeutic effects, Merits / demerits & acquire the skill of application.
CO 4	Distinguish between Cryotherapy and Thermotherapy

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1.	<b>Physical Principles of Thermal Energy</b> a. Specific Heat b. Modes of Heat Transfer	8
2.	Physiological effects, Therapeutic effects/ Uses, Merits/demerits, Indications/contraindications, Skills of application of: a. Paraffin wax bath b. Hydro-collator hot packs c. Contrast bath d. Whirl pool e. Cryotherapy	10
3.	Choosing Between Cryotherapy and Thermotherapy	2

4.	<b>Infra-red Radiation (I.R.R)</b> a. Definition, Types and production b. Physiological & Therapeutic effects c. Technique & Methods of Application d. Dosage control e. Indications & contraindications f. Dangers & Precautions	7
5.	<b>Ultra-violet Radiation (U.V.R)</b> a. Definition, Types and production b. Physiological & Therapeutic effects c. Test Dose and Dosage calculation d. Technique & Methods of Application e. Indications & contraindications f. Dangers & Precautions	6
6.	<b>LASER</b> a. Definition, Types and Production. b. Physiological & Therapeutic effects c. Technique & Methods of Application d. Indications & Contraindications e. Dosage f. Dangers & Precautions	7
<b>Total</b>		<b>40</b>

### BPT 013 - Electrotherapy II (Practical)

Sr. No.	Topics	No. of Hrs.
1	The skill of application of thermal agents (on models) : a. Hot packs b. P.W.B. c. Whirlpool d. Contrast bath e. Cryotherapy	20
2	The techniques of testing I.R. ,U.V.R. ,LASER	20
<b>Total</b>		<b>40</b>

## Examination Scheme

**This course will not be assessed as Semester University Examination. Assessment will be conducted as Internal College Exam**

**Internal examination pattern (theory): 40marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Short answers (from units 1-6)	8	5	8 x 5	40

**Internal examination pattern (practical): 40marks**

Exercise	Description	Marks
Q No 1-4	4 OSPE stations from unit 1-6	10
		<b>Total = 40</b>

### **RECOMMENDED TEXT BOOKS**

1. Kitchen S, Bazin S, editors. Clayton's electrotherapy. Bailliere Tindall Limited; 1996.
2. Robertson V, Ward A, Low J, Reed A, MCSP D. Electrotherapy explained: principles and practice. Elsevier Health Sciences; 2006
3. Kahn J. Principles and practice of electrotherapy. Saunders; 2000.
4. Bellis E. Electrotherapy: evidence-based practice.
5. Gardiner MD. The principles of exercise therapy. G. Bell; 1957.
6. Norkin CC, White DJ. Measurement of joint motion: a guide to goniometry. FA Davis; 2016

### **RECOMMENDED REFERENCE BOOK**

1. Nelson RM, Hayes KW, Currier DP, editors. Clinical electrotherapy. Prentice Hall; 1999.

<b>Ability Enhancement Compulsory Course (AECC)</b>	
<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Environmental Sciences</b>
<b>Course Code</b>	<b>AECC002</b>
<b>Credit per Semester</b>	<b>2 credit</b>
<b>Hours per Semester</b>	<b>40 hours</b>
<b>Course continued from Semester I</b>	

<b>Course Learning Outcomes</b>	
CO1	Categorize different aspects of environmental contamination, which adversely affect human health, mechanisms of pollutants impacting human health, different types of pollutants, their sources and mitigation measures
CO2	Outline the legal structure of India and fundamentals of environmental legislation and policy making.
CO3	Identify environmental hazards, their causes, classifications, and impacts, management strategies and governmental action plan to mitigate and prepare for such hazards, global changes on human communities and initiatives taken at global and regional levels to combat them.
CO4	Describe the multidisciplinary nature, components of environment, concept of sustainable development and structure and function of ecosystem.
CO5	Plan strategies to conserve and protect the natural resources such as fuel, food, water, electricity at home and in the community and social environment
CO6	Assess the impact of significant global environmental issues such as acid rain, climate change, and resource depletion; historical developments in cultural, social and economic issues related to land, forest, and water management in a global context; interface between environment and society.

Units	Topics	No. of Hrs.
<b>Unit 4: Environmental Pollution</b>		
1	Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution	<b>5</b>
2	Solid waste management: Control measures of urban and industrial waste	
3	Nuclear hazards and human health risks	
<b>Unit 5: Environmental Policies &amp; Practices</b>		
1	Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.	<b>5</b>
2	Environment Laws : Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention(CWC).	
3	Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context	
<b>Unit 6: Human Communities and the Environment</b>		
1	Human population and growth: Impacts on environment, human health and welfares.	<b>10</b>
2	Carbon foot-print.	
3	Resettlement and rehabilitation of project affected persons; case studies.	
4	Disaster management: floods, earthquakes, cyclones and landslides.	
5	Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan.	
6	Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.	
7	Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).	
<b>Practical Aspects : Field Visits</b>		<b>40</b>
<b>Total</b>		<b>60</b>

**EXAMINATION SCHEME**

**This course will not be assessed as Semester University Examination. Assessment will be conducted as Internal College Exam**

**Theory question paper pattern for Internal Assessment under CBCS - 40 Marks**

Question type	No. of questions	Marks/question	Question X marks	Total marks
Short answers (from unit 1-6)	8	5	8 x 5	40
<b>Total</b>				<b>Total= 40</b>

**Books:**

1. Plumwood V, Low N. Global Ethics and Environment..
2. Gleick PH. Water in crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p. 1993;9.
3. Principles of conservation biology Martha J Groom; Gary K Meffe; C Ronald Carroll Sunderland, Mass. : Sinauer Associates, ©2006.
4. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
5. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
6. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
7. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
8. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
9. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
10. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
11. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.

<b>Name of the Programme</b>	<b>Bachelor of Physiotherapy</b>
<b>Name of the Course</b>	<b>Biochemistry</b>
<b>Course Code</b>	<b>AECC004</b>
<b>Course Description</b>	<b>Ability Enhancement Compulsory Course - Theory</b>
<b>Semester</b>	<b>Semester II</b>
<b>Credit per Semester</b>	<b>3 credits</b>
<b>Hours per Semester</b>	<b>60 hours</b>

<b>Course Outcomes</b>	
CO 1	describe carbohydrate, fat and protein metabolism , classification, digestion, absorption , regulation and clinical application
CO 2	define bio-enzymes, classify, factors affecting enzyme action and therapeutic uses
	describe vitamins, minerals , hormones - classify, discuss manifestations of nutritional deficiency
CO 3	discuss normal levels in body fluids required for functioning and their abnormal levels to understand the disease process
CO 4	discuss biochemical mechanisms of muscle contraction and biochemistry of connective tissue
CO 5	describe functions of nucleic acids

<b>Unit</b>	<b>Topics</b>	<b>No. of Hrs.</b>
1	<b>Cell</b> -Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton.	1
2	<b>Carbohydrates</b> a. Definition, general classification with examples, Glycosidic bond b. Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. c. Glycosaminoglycan (mucopolysaccharides) <b>Carbohydrate metabolism</b> a. Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation. b. Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle c. Hormonal regulation of glucose, Glycosuria, Diabetes mellitus.	6

3	<p><b>Proteins</b></p> <ul style="list-style-type: none"> <li>a. Amino acid chemistry: Definition, Classification, Peptide bonds</li> <li>b. Peptides: Definition, Biologically important peptides</li> <li>c. Protein chemistry: Definition, Classification, Functions of proteins, Protein metabolism</li> <li>a. Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle</li> <li>b. Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.</li> </ul>	6
4	<p><b>Lipid</b></p> <ul style="list-style-type: none"> <li>a. Definition, general classification</li> <li>b. Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol</li> <li>c. Essential fatty acids and their importance</li> <li>d. Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies</li> </ul> <p><b>Lipid Metabolism</b></p> <ul style="list-style-type: none"> <li>a. Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids,</li> <li>b. Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues</li> <li>c. Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test.</li> <li>d. Cholesterol metabolism: synthesis, degradation, cholesterol transport</li> <li>e. Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver</li> </ul>	6
5	<p><b>Digestion and Absorption</b></p> <p>General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.</p>	2
6	<p><b>Enzymes</b></p> <p>Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)</p>	4
7	<p><b>Vitamins</b></p> <ul style="list-style-type: none"> <li>a. Definition, classification according to solubility,</li> <li>b. Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.</li> </ul>	4

8	<b>Minerals</b> Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.	3
9	<b>Nutrition</b> a. Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food. b. Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person c. Balanced diet i. Recommended dietary allowances ii. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers iii. Role of lipids in diet iv. Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non- essential amino acids. Nitrogen balance v. Nutritional disorders.	3
10	<b>Hormones</b> Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.	1
11	<b>Muscle Contraction and Connective Tissue</b> Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction Connective Tissue- Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.	2
12	<b>Nucleic Acid</b> a. Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body. b. Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.	1
13	<b>Acid-Base balance –</b> Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance. Water and Electrolyte –Osmorality and role of aldosterone and ADH	1

14	<p><b>Clinical Biochemistry</b></p> <p>a. Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.</p> <p><b>Normal levels of blood and urine constituents( 1 Hour each= 13 hours)</b></p> <ol style="list-style-type: none"> <li>1. Introduction to clinical biochemistry laboratory, blood collection and anticoagulants.</li> <li>2. Demonstrate the estimation of blood glucose</li> <li>3. Demonstrate the estimation of blood urea</li> <li>4. Demonstrate the estimation of serum creatinine and creatinine clearance</li> <li>5. Demonstrate estimation of serum proteins, albumin and A:G ratio</li> <li>6. Demonstrate estimation of calcium and phosphorous</li> <li>7. Demonstrate the estimation of serum bilirubin</li> <li>8. Demonstrate the estimation of SGOT and SGPT</li> <li>9. Demonstrate the estimation of alkaline phosphatase</li> <li>10. Demonstrate the estimation of Uric acid</li> <li>11. Normal and abnormal constituents of urine</li> <li>12. Demonstrate the estimation of ABG analysis</li> <li>13. Water balance and imbalance and Interpretation of serum electrolytes</li> </ol> <p><b>Case studies based on Relevance of blood and urine levels of various constituents in various diseases.(1 hour each= 7 hours)</b></p> <ol style="list-style-type: none"> <li>1. Diabetes mellitus</li> <li>2. Dyslipidemia, Myocardial infarction</li> <li>3. Renal failure,- proteinuria,- nephrotic syndrome</li> <li>4. Jaundice,- liver diseases</li> <li>5. Gout</li> <li>6. Thyroid disorders</li> <li>7. Muscular and connective tissue disorders</li> </ol>	20
<b>Total</b>		<b>60</b>

**EXAMINATION SCHEME**

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**RECOMMENDED TEXT BOOKS**

1. Satyanarayana Biochemistry Aug 2013
2. Vasudevan DM, Sreekumari S, Vaidyanathan K. Textbook of biochemistry for medical students. JP Medical Ltd; 2013
3. Naik P. Essentials of Biochemistry (for Medical Students). JP Medical Ltd; 2011.

**RECOMMENDED REFERENCE BOOK**

1. Wood EJ. Harper's biochemistry 24th edition