MPED – IV Semester
PART – A
THEORY COURSES

MPCC – 401:
Course Title: KINESIOLOGY & SPORTS BIOMECHANICS

Credit			Teaching Hours		
Lecture/Tutorials	**Practical/Internship**	**Total**	**Lecture/Tutorials**	**Practical/Internship**	**Total**
3	1	4	48	32	80

COURSE OBJECTIVES:

1. To develop the basic understanding of biomechanics and kinesiology and its application in human body movements in performing sports activities.
2. To explain the concept of mechanical laws involved in human motion.
3. To develop a comprehensive understanding of movement analysis
4. To develop the ability to perform mechanical analysis of various fundamental movements and sports skills

STUDENT LEARNING OUTCOMES:

1. Explain the basic mechanical concepts and will be able to interpret its relation to human body movements
2. Organize and specify the overall goal of the course.
3. Apply and analyze the factors of mechanical laws involved in human movement.
4. Explain the principles of movement analysis
5. Analyze the mechanical principles of motor skills and sports related skills along with their proper techniques and corrective measures.

UNIT I: Introduction

- Kinesiology and Sports Biomechanics
  - Meaning and Definition
  - Role of Important in Physical Education
- Axis and planes,
- Dynamics, Kinematics, Kinetics, Statics Centre of Gravity-
- Line of Gravity
- Vectors and Scalars
- Meaning of work, power, energy, kinetic energy and potential energy,

UNIT II – Major Muscles – their Location & Action

- Origin, Insertion and action
  - Pectoralis major and minor,
  - Deltoid, Biceps, Triceps (Anterior and Posterior),
  - Trapezius, Serratus, Sartorius, Rectus femoris, Abdominis, Quadriceps,
  - Hamstring, Gastrocnemius

UNIT III – Kinematic and Kinetics of Human movement

- Meaning and definition of Motion,
- Types of motion, Linear motion, angular motion, circular motion, uniform motion,
- principals related to the law of inertia,
- law of acceleration, and law of counter force,
- Meaning and definition of force,
- Sources of force-force components,
- force applied at an angle-pressure-friction-buoyancy,
- Spin-centripetal force Centrifugal force.
- Leverage-classes of lever, practical application, Projectiles,
- Equation of projectiles stability factors influencing equilibrium.

UNIT IV: Air & Fluid Mechanics

- Flotation
- Fluid Resistance: Air & Water
- Drag & lift
- Spin

LIST OF PRACTICUM

- Analysis of movement:
- Types of analysis, Kinesiological, Biomechanical, Cinematographic,
- Methods of analysis – Qualitative, Quantitative, Predictive

TEACHING LEARNING STRATEGIES: The class will be taught by using lectures and demonstration, seminars, classroom discussion, videos, charts and presentations method.

ACTIVITIES: Lecture//Laboratory Work/ Field Work/ Outreach Activities/ Project Work/ Vocational Training/Viva/ Seminars/ Term Papers/Assignments/ Presentations/ Self-Study etc.

ASSESSMENT RUBRIC: Classroom Test, Project Work, Assignments, Presentations, Practical Work

TEXT & REFERENCES:

- McGinnis, P. (2013). Biomechanics of sport and exercise. Champaign, IL: Human Kinetics. ISBN 9780736079662
- Blazevich, A. (2007). Sports biomechanics. London: A. & C. Black. ISBN 9780713678710
- Bartlett, R. (2007). Introduction to sports biomechanics. London: Routledge, Taylor & Francis Group. ISBN 9780415339933
- Hall, S. (2014) Basic biomechanics. Mcgraw Hill Higher Educat. ISBN 9780073522760
- Knudson, D. (2007). Fundamentals of biomechanics. New York, NY: Springer. ISBN 978-0-387-49311-4
- Deshpande S.H. (2002), Manav Kriya Vigyan – Kinesiology (Hindi Edition) Amravati: Hanuman Vyayam Prasarak Mandal.
- Hoffman S.J. Introduction to Kinesiology (Human Kinesiology Publication in 2005).
- Steven Roy,& Richard Irvin (1983). Sports Medicine, New Jersey: Prentice Hall.
- Thomas. (2001). Manual of structural Kinesiology, New York: Me Graw Hill.
- Uppal A.K. Lawrence Mamta MP Kinesiology (Friends Publication India (2004)
- Uppal, A.K. (2004), Kinesiology in Physical Education and Exercise Science, Delhi Friends Publication
- Williams M (1982) Biomechanics of Human Motion, Philadelphia, Saunders Co.