

JEFFERSON COLLEGE

COURSE SYLLABUS

OTA125

BIOMECHANICAL BASIS OF PERFORMANCE

4 Credit Hours

Prepared by:

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By:

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OTA125 Biomechanical Basis of Performance

I. CATALOGUE DESCRIPTION

- A. Prerequisites: Reading proficiency, BIO212 Anatomy and Physiology II with a grade of “C” or better.
Co-requisites: OTA110 Physical Dysfunction in Occupational Therapy, OTA111 Physical Dysfunction Performance Skills.
- B. 4 semester credit hours
- C. Description - Biomechanical Basis of Performance focuses on the study of movement of the human body in the context of occupational performance. Emphasis is on the elements of the musculoskeletal system and body movements during functional activity. Coordination of body movement, pathokinesiology, and biomechanics with OT applications are examined in this course. Lab course provides hands - on experience in the study of human body movement. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES (With numbers in parentheses referring to ACOTE standards)

Expected Learning Outcomes	Assessment Measures
Analyze normal and abnormal movement patterns in the context of occupational performance. (B.2.11, B.4.4)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Discuss the joint classification system. (B.1.1)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Identify muscle types, locations, origins, insertions and actions of specific muscles. (B.1.1)	Hands on Activities Formative Assessment Written Project/Paper Summative Examination
Describe the relationship between biomechanical components, occupational performance and purposeful activity through logical thinking, critical analysis, problem solving and creativity. (B.2.2,B.2.7, B.2.11)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Demonstrate knowledge of the relationship between the musculoskeletal system and the biomechanics of movement. (B.1.1)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Evaluate specified biomechanical components both formally and through observation. (B.1.7, B.4.1, B.4.2, B.4.4)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Demonstrate the use of sound judgment in regard to safety of self and others and adhere to safety regulations throughout the OT	Class Discussion/Activity Formative Assessment

process as appropriate to setting and scope of practice. (B.2.8)	Written Project/Paper Summative Examination
Perform functional task analysis relative to the Occupational Therapy Practice Framework Domains. (B.2.7)	Hands on Activities Formative Assessment Written Project/Paper Summative Examination
Perform palpation to identify specific muscles, bony landmarks and axes of rotation of joints. (B.1.1)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Perform strength assessments, including Manual Muscle Test, Grip and Pinch testing. (B.4.2)	Hands on Activity Formative Assessment Written Project/Paper Summative Examination
Demonstrate use of a goniometer to complete a Range of Motion exam. (B.4.2)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Demonstrate the ability to assist in developing an occupation-based intervention plan that is culturally relevant, reflective of current occupational therapy practice and evidence-based. (B.5.1)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination

III. OUTLINE OF TOPICS

- A. Kinesiology: A Foundation in Occupational Therapy
 - 1. Foundations in Occupational Therapy
 - 2. Engagement in Human Occupation
 - 3. Occupational therapy practice Framework: Domain and Process
 - 4. Applications

- B. Human Body Functions and Structures Influencing Movement
 - 1. Body Functions
 - i. Neuromuscular and Movement Related Functions
 - ii. Cardiovascular and Respiratory System Functions
 - iii. Muscular Function
 - iv. Skeletal Functions
 - 2. Body Structures
 - i. Nervous System
 - 1. Innervations
 - 2. Brachial Plexus
 - ii. Muscle
 - 1. Origin, Insertion, Actions
 - iii. Skeleton
 - 1. Planes and Axes
 - 2. Movement Definitions
 - 3. Kinematics
 - 3. Applications

- C. Factors Influencing Movement

1. Contextual and Environmental Factors
 2. Related Factors
 - i. Simple Machines
 - ii. Active and Passive Insufficiency
 - iii. Kinematic Chains
 - iv. Open and Close-Pack Joint Positions
 3. Applications
- D. Introducing Movement Demands**
1. Human Movement for Function
 - i. Occupational Therapy Practice Framework
 - ii. Motor Behavior
 1. Motor Development
 2. Motor Learning
 - iii. Movement Characteristics
 - iv. Posture and Anticipatory Postural Movements
 2. Range of Motion and Manual Muscle Testing
 - i. Measuring Movement
 - ii. Introduction to Gross Range of Motion
 - iii. Types of End Feel
 - iv. Introduction to Gross Manual Muscle Testing
 - v. Contraindications and Precautions
 - vi. Manual Muscle Grades
 3. Applications
- E. Function and Movement of the Trunk and Neck**
1. Body Functions of the Trunk and Neck
 - i. Motions of the Trunk and Neck
 - ii. Observation for Function
 - iii. Vertebral Curves
 - iv. Trunk and Pelvic Girdle
 - v. Sitting Balance
 - vi. Problems with the Trunk and Neck
 2. Body Structures of the Trunk and Neck
 - i. Spine and Rib Cage
 - ii. The Cervical Vertebrae
 - iii. Thoracic Vertebrae
 - iv. Lumbar Vertebrae
 - v. Sacral Vertebrae
 - vi. Rib Cage
 - vii. Pelvic Girdle
 - viii. Ligaments
 - ix. Neck and Trunk Muscles
 3. Applications
- F. The Essential functions of the Lower Extremity**
1. Occupational Profile
 2. Body Functions of the Lower Extremity
 - i. Motions of the Lower Extremity
 - ii. Occupation-Based Mobility

- iii. Common Problems of the Lower Extremity
 - 3. Body Structures of the Lower Extremity
 - i. Structures of the Knee
 - ii. Structures of the Ankle
 - 4. Applications

- G. Function and Movement of the Shoulder and Scapula
 - 1. Occupational Profile
 - 2. Body Functions of the Shoulder Complex
 - i. Motions of the Shoulder Girdle and Glenohumeral Joint
 - ii. Scapulohumeral Rhythm
 - 3. Body Structures of the Shoulder Complex
 - 4. Applications

- H. Function and Movement of the Elbow Complex
 - 1. Occupational Profile
 - 2. Body Functions of the Elbow Complex
 - i. Motions of the Elbow Complex
 - ii. Common Problems of the Elbow Complex
 - 3. Body Structures of the Elbow Complex
 - i. Muscle Actions
 - ii. Muscle, Nerves, and Spinal Cord Levels
 - iii. Tendon and Ligaments
 - 4. Applications

- I. Function and Movement of the Hand
 - 1. Occupational Profile
 - 2. Body Functions of the Wrist and Hand
 - i. Motions of the Wrist and Hand
 - ii. Prehension
 - iii. Common Problems of the Wrist and Hand
 - iv. Joint Protection
 - 3. Body Structures of the Wrist and Hand
 - i. Muscle Actions of the Wrist
 - ii. Intrinsic and Extrinsic Muscles of the Hand
 - iii. Tendons and Ligaments of the Wrist and Hand
 - iv. Sensory Distribution in the Hand
 - 4. Applications

- J. The Lower Extremity: Balance and Posture

- K. Occupational Therapy Intervention
 - 1. Biomechanical Remediation Intervention Approach
 - 2. Principles of Exercise

IV. METHOD(S) OF INSTRUCTION

- A. Interactive lectures, videos, handouts and readings from the textbook

- B. Computer presentations, group activities and exercises
- C. Student presentations peer interactive activities, group projects, and discussions in classroom and online
- D. Use of internet resources

V. REQUIRED TEXTBOOKS

- A. Rybski, M. (Current Edition). *Kinesiology for occupational therapy*. Thorofare, NJ: Slack.
- B. Kendall, F., McCreary, E., Provance, P., Rodgers, & M. Romani, W., (Current Edition). *Muscles: Testing and function with posture and pain*. Baltimore, MD: Lippincott, Williams, & Wilkins.

VI. REQUIRED MATERIALS

- A. Course homepage available through Blackboard
- B. A computer with internet access (available through the Jefferson College Labs)
- C. Paper, notebooks, pens, pencils with erasers

VII. SUPPLEMENTAL REFERENCES

- A. Class Handouts
- B. Current Library Resources
 - 1. Books
 - a. Netter, F. (2011). *Atlas of human anatomy* (5th ed.). Philadelphia, PA: Saunders-Elsevier.
 - b. Hersch, G., Lamport, N., & Coffey, M. (2005). *Activity analysis: Application to occupation* (5th ed.). Thorofare, NJ: Slack.
 - c. Bracciano, A. (2008). *Physical agent modalities: Theory and application for the occupational therapist* (2nd ed.). Thorofare, NJ: Slack.
 - 2. Periodicals
 - 3. Videos
- C. Current internet resources
 - 1. On-line reference materials
 - 2. Textbook companion web-site

3. American Occupational Therapy Association (AOTA) web-site

VIII. METHOD OF EVALUATION (basis for determining course grade)

- A. Formative Assessment/Written Projects or Papers will equal 20% of total course grade. Consisting of 1-5 assignments focused on application of occupational therapy theory and principles
- B. Summative Examinations – 3-5 examinations worth up to 60%
- C. Attendance/Participation/Classroom Discussion/Activity – grade will equal 10% of total course grade
- D. Additional Credit – Additional activities, community service, or exemplary professional behaviors as assessed by a professional behaviors checklist will equal 10% of total course grade
- E. Grading Scale:
 - A = 90-100%
 - B = 80-89.9%
 - C = 70-79.9%
 - D = 60-69.9%
 - F = 0-59.9%

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library: phone 636-797-3000, ext. 3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the

Student Handbook. Any student who cheats or plagiarizes will be subject to dismissal from the Occupational Therapy Assistant program and will be referred to the college for disciplinary action. (See College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details. Student's grade will also be based on participation in class and attendance.

XII. OUTSIDE OF CLASS ACADEMICALLY-RELATED ACTIVITIES

The US Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically-related activities such as reading, studying, and completing assignments. Specifically, time spent on academically-related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.