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)

<table>
<thead>
<tr>
<th>Expected Learning Outcomes</th>
<th>Assessment Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyze normal and abnormal movement patterns in the context of occupational performance. (B.2.11, B.4.4)</td>
<td>Class Discussion/Activity  Formative Assessment  Written Project/Paper  Summative Examination</td>
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<tr>
<td>Discuss the joint classification system. (B.1.1)</td>
<td>Class Discussion/Activity  Formative Assessment  Written Project/Paper  Summative Examination</td>
</tr>
<tr>
<td>Identify muscle types, locations, origins, insertions and actions of specific muscles. (B.1.1)</td>
<td>Hands on Activities  Formative Assessment  Written Project/Paper  Summative Examination</td>
</tr>
<tr>
<td>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)</td>
<td>Class Discussion/Activity  Formative Assessment  Written Project/Paper  Summative Examination</td>
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<tr>
<td>Demonstrate knowledge of the relationship between the musculoskeletal system and the biomechanics of movement. (B.1.1)</td>
<td>Class Discussion/Activity  Formative Assessment  Written Project/Paper  Summative Examination</td>
</tr>
<tr>
<td>Evaluate specified biomechanical components both formally and through observation. (B.1.7, B.4.1, B.4.2, B.4.4)</td>
<td>Class Discussion/Activity  Formative Assessment  Written Project/Paper  Summative Examination</td>
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<tr>
<td>Demonstrate the use of sound judgment in regard to safety of self and others and adhere to safety regulations throughout the OT</td>
<td>Class Discussion/Activity  Formative Assessment</td>
</tr>
<tr>
<td>Process as appropriate to setting and scope of practice. (B.2.8)</td>
<td>Written Project/Paper Summative Examination</td>
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<tr>
<td>Perform functional task analysis relative to the Occupational Therapy Practice Framework Domains. (B.2.7)</td>
<td>Hands on Activities Formative Assessment Written Project/Paper Summative Examination</td>
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<tr>
<td>Perform palpation to identify specific muscles, bony landmarks and axes of rotation of joints. (B.1.1)</td>
<td>Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination</td>
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<tr>
<td>Perform strength assessments, including Manual Muscle Test, Grip and Pinch testing. (B.4.2)</td>
<td>Hands on Activity Formative Assessment Written Project/Paper Summative Examination</td>
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<tr>
<td>Demonstrate use of a goniometer to complete a Range of Motion exam. (B.4.2)</td>
<td>Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination</td>
</tr>
<tr>
<td>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)</td>
<td>Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination</td>
</tr>
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### 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


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
   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.