UCC/UGC/ECCC
Proposal for Course Change
Fall 2016

☐ FAST TRACK  (Select if this will be a fast track item. Refer to Fast Track Policy for eligibility)

If the changes included in this proposal are significant, attach copies of original and proposed syllabi in approved university format.

1. Course subject and number: PT 657  2. Units: 2
   See upper and lower division undergraduate course definitions.

3. College:
   Health and Human Services

4. Academic Unit:
   Physical Therapy and Athletic Training

5. Current Student Learning Outcomes of the course.

At the completion of this course, the student will be able to:

1. Describe the levels of lower extremity amputation as well as the etiological factors leading to amputation.
2. State the effect of lower extremity amputation on energy consumption during walking.
3. Describe the pre-operative and post-operative surgical management for the lower extremity amputee.
4. Perform a compression wrap for both a above-knee and above-knee amputee.
5. Describe the components, types of suspension, alignment characteristics, and functional training procedures for the above knee amputee.
6. Describe the components, types of suspension, alignment characteristics, and functional training procedures for the above knee amputee.
7. Describe the etiology, prosthetic design, fitting considerations, and functional training procedures for the hip disarticulation amputee.
8. State the special factors that must be considered when treating juvenile amputees.
9. Describe the purpose, components, and factors for proper fitting of foot wear used alone or in conjunction with lower extremity orthoses.
10. List the different types of foot, ankle-foot, knee-ankle foot, hip, and hip-knee-ankle-foot orthoses commonly prescribed in clinical practice.

Show the proposed changes in this column (if applicable). Bold the proposed changes in this column to differentiate from what is not changing, and Bold with strikethrough what is being deleted. (Resources & Examples for Developing Course Learning Outcomes)

1. Describe the levels of lower extremity amputation as well as the etiological factors leading to amputation.
2. State the effect of lower extremity amputation on energy consumption during walking.
3. Describe the pre-operative and post-operative surgical management for the lower extremity amputee.
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Effective Fall 2015
| 11. Describe the general functions, components, and list the different types of spinal orthoses commonly prescribed in clinical practice. |
| 12. State the effects and effectiveness of spinal orthoses in relation to immobilization, motion control, support, and deformity prevention as well as correction. |
| 13. Describe the materials, construction procedures, and standard modifications required to fabricate hand and wrist splints. |
| 14. State the etiology of mechanically induced plantar ulcerations in diabetic neuropathic amputees. |
| 15. Describe the special evaluation procedures and management protocols required to treat a diabetic neuropathic amputee. |

| 1. Discuss the theory, design, function, and application of prosthetic and orthotic appliances for both the lower and upper extremities. Assessed by: Quiz 1-3, Case write-up 1-3, Midterm. |
| 2. Identify the physical therapist's role in the management of patients who utilize lower extremity prostheses, lower extremity orthoses, and spinal orthoses. Assessed by: Quiz 1-3, Case write-up 1-3, Midterm. |
| 3. Describe the evidence-based approach to wound management and the current standards of wound care and critically evaluate the innovations in wound care technologies. Assessed by: Quiz 4, Case write-up 4, Midterm. |
| 4. Discuss the nature of chronic pain in terms of its etiology, pathophysiology, clinical presentation, and pain management principles related to the physical therapy evaluation and treatment. Assessed by: Mid-term exam |
| 5. Discuss the use of dry needling for pain management, including safety administration issues and integration into physical and manual therapy treatment. Assessed by: Quiz 5, Case write-up 5, final exam. |
| 6. Discuss the assessment and biofeedback protocols for treatment of musculoskeletal and neuromuscular disorders from a neuromuscular reeducation perspective, primarily using surface-recorded EMG. Assessed by: Quiz 5, Case write-up 5, final exam. |
| 7. Identify and distinguish between 2D and 3D motion analysis as a diagnostic and treatment tool for musculoskeletal and neuromuscular disorders. Assessed by: Quiz 5, Case write-up 5, final exam. |
| 8. Identify the role (benefits and limitations) that musculoskeletal ultrasound can play in enhancing functional gains and quality of life in a traditional rehabilitation population. Assessed by: Quiz 5, Case write-up 5, final exam. |
| 9. Describe telerehabilitation and associated technologies such as image-based telerehabilitation; sensor based telerehabilitation; and virtual environments and |
virtual reality tele-rehabilitation. Assessed by: Quiz 6, Case write-up 6, final exam.

10. Identify the appropriate patient population and dosage/training principles for robotic-assisted therapies and wearable assistive devices in both upper and lower extremities. Assessed by: Quiz 6, Case write-up 6, final exam.

11. Discuss the brain-machine interface (BMI), including the principles behind different BMI approaches. Assessed by: Quiz 6, Case write-up 6, final exam.

12. Discuss the types, impact, effectiveness, design and implementation of routinely utilized computerized health care analytics/decision making support systems. Assessed by: Quiz 6, Case write-up 6, final exam.

13. Identify and discuss the variety of healthcare mobile apps currently in the marketplace, their use, if any, in healthcare, and their potential effectiveness. Assessed by: Quiz 6, Case write-up 6, final exam.

14. Describe the breadth of physical therapist specialty practice and advocate for the development of emerging specializations in terms of how they will benefit the healthcare system and the patients served. Assessed by: Group Presentations and final exam

15. Identify the role of clinical residencies, fellowships, board certification, certificate programs, and continuing education in professional career development. Assessed by: Group Presentations and final exam

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>PT657</td>
<td>PROSTHETICS AND ORTHOTICS (2)</td>
<td>Description: Principles of design, fabrication, and fitting of orthotic and prosthetic devices. Letter grade only. Units: 2 Prerequisite: Admission to the Physical Therapy program.</td>
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<tr>
<td></td>
<td>INNOVATIONS AND SPECIALIZATIONS IN PHYSICAL THERAPY PRACTICE (3)</td>
<td>Description: Principles of design, fabrication, and fitting of orthotic and prosthetic devices. Letter grade only. Examines the contemporary developments, innovative technologies, and areas of specialization in physical therapist practice. Innovations in medical devices including orthotics/prosthetics, information technology, and advanced modalities that will transform healthcare delivery will be addressed. Addresses established and emerging specializations to explore the breadth and depth of future physical therapy practice.</td>
</tr>
</tbody>
</table>
therapist practice in the dynamic healthcare environment.
Letter grade only.
Units: 2-3
Prerequisite: Admission to the Physical Therapy program.

* if there has been a previously approved UCC/UGC/ECCC change since the last catalog year, please copy the approved text from the proposal form into this field.

7. Justification for course change.

NOTE: Although the course title, number of credit hours and objectives differ, students who took the original version of PT 657 will be permitted to retake PT 657 with the proposed objectives and outcomes. The original 15 objectives from this course have been synthesized into the first 2 proposed objectives as the current content will be condensed and new content added that is more reflective of current clinical practice.

The U.S. health-care system is rapidly becoming ever more technology/data-driven and there is an increasing need to incorporate latest advances in physical therapy curriculum in order to equip students to make better decisions to support the transformation of healthcare to the personalized, evidence-supported model of the future. At the same time the breadth of physical therapy practice is rapidly expanding through avenues of specialization in practice to meet specific needs such as reproductive health, end of life care, and emergency room musculoskeletal care. The intention of this course change is to create a course that will more effectively prepare students for engagement with contemporary healthcare technologies and future participation in the growing areas of specialization in physical therapist practice. The original sole focus on prosthetics and orthotics as a specialty no longer represents the breadth of current physical therapist practice; therefore, we are condensing the current content while adding content that is more representative of current clinical practice. Hence this is why the original 15 objectives from this course have been synthesized into the first 2 proposed objectives. The proposed objectives are representative of the changing scope of physical therapist practice in regards to the use of technology and the additional credit hour will allow effective exploration of physical therapy specialty practice. The goal of this course is to enhance the student’s perception, knowledge, and skills in contemporary and emerging health care delivery innovations and specializations in order to be best prepared for practice in this dynamic and ever-changing healthcare environment.

**IN THE FOLLOWING SECTION, COMPLETE ONLY WHAT IS CHANGING**

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
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<tr>
<td>Current combined lecture &amp; lab components:</td>
<td>Proposed combined lecture &amp; lab components:</td>
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<td>Lab:</td>
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<td>letter grade</td>
<td>pass/fail</td>
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<td>Current repeat for additional units:</td>
<td>Proposed repeat for additional units:</td>
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<td>No</td>
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<td>Current Instruction Mode:</td>
<td>Proposed Instruction Mode:</td>
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<tr>
<td>In person</td>
<td>Online</td>
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8. Is this course in any plan (major, minor, or certificate) or sub plan (emphasis)?  
   Yes ☑  No ☐  
   If yes, list and include evidence of notification to and/or response from each impacted academic unit as necessary.

**Physical Therapy - Entry Level, Doctor of Physical Therapy (PTELDPT)**

9. Is there a related plan or sub plan change proposal being submitted?  
   Yes ☑  No ☐  
   If no, explain.

**Answer 10-13 for UCC/ECCC only:**

10. Is this course an approved Liberal Studies or Diversity course?  
    Yes ☑  No ☐  
    If yes, select all that apply.  
    Liberal Studies ☐  Diversity ☐  Both ☑

11. Do you want to remove the Liberal Studies or Diversity designation?  
    Yes ☐  No ☑  
    If yes, select all that apply.  
    Liberal Studies ☐  Diversity ☇  Both ☐

12. Is this course listed in the [Course Equivalency Guide]?  
    Yes ☑  No ☐

**FLAGSTAFF MOUNTAIN CAMPUS**

Scott Galland  
Reviewed by Curriculum Process Associate  
Date

**Approvals:**

Department Chair/Unit Head (if appropriate)  
Date

Chair of college curriculum committee  
Date

Dean of college  
Date

**For Committee use only:**

UCC/UGC Approval  
Date

**EXTENDED CAMPUSES**

Effective Fall 2015
CURRENT SYLLABUS

NORTHERN ARIZONA UNIVERSITY
Program in Physical Therapy

PT657-PROSTHETICS AND ORTHOTICS 2 semester hours
Spring Semester 2015

COURSE DESCRIPTION:
This course is designed to introduce the entry-level physical therapy student to the theory, design, function, and application of prosthetic and orthotic appliances for both the lower and upper extremity. In addition, the physical therapist's role in the management of patients who utilize lower extremity prostheses, lower extremity orthoses, and spinal orthoses will be discussed. Information regarding the fabrication and fitting of hand and wrist splints will also be presented.

INSTRUCTOR:
Mark Cornwall, PT, PhD, CPed (Instructor of Record)
Health Professions 104, (928) 523-1606
Jennifer Guerena, PT
Reese Evans, CPO
Alicia Allie, PT, DPT
David Mueller, DPT, CPO

Effective Fall 2015
CLOCK HOURS:
Friday 9:00am – 1:00pm.
Please note that there is one Friday in which class will be held from 8:00am to 5:00pm. In addition, there will be one class period that will be held on a Thursday rather than Friday. See tentative schedule.

COURSE PREREQUISITES:
- PT620 – Musculoskeletal Therapeutics I
- PT519 – Normal Human Gait
- PT619 – Abnormal Human Gait

COURSE OBJECTIVES:
At the completion of this course, the student will be able to:
1. Describe the levels of lower extremity amputation as well as the etiological factors leading to amputation.
2. State the effect of lower extremity amputation on energy consumption during walking.
3. Describe the pre-operative and post-operative surgical management for the lower extremity amputee.
4. Perform a compression wrap for both a above-knee and above-knee amputee.
5. Describe the components, types of suspension, alignment characteristics, and functional training procedures for the above knee amputee.
6. Describe the components, types of suspension, alignment characteristics, and functional training procedures for the above knee amputee.
7. Describe the etiology, prosthetic design, fitting considerations, and functional training procedures for the hip disarticulation amputee.
8. State the special factors that must be considered when treating juvenile amputees.
9. Describe the purpose, components, and factors for proper fitting of foot wear used alone or in conjunction with lower extremity orthoses.
10. List the different types of foot, ankle-foot, knee-ankle foot, hip, and hip-knee-ankle-foot orthoses commonly prescribed in clinical practice.
11. Describe the general functions, components, and list the different types of spinal orthoses commonly prescribed in clinical practice.
12. State the effects and effectiveness of spinal orthoses in relation to immobilization, motion control, support, and deformity prevention as well as correction.
13. Describe the materials, construction procedures, and standard modifications required to fabricate hand and wrist splints.
14. State the etiology of mechanically induced plantar ulcerations in diabetic neuropathic amputees.
15. Describe the special evaluation procedures and management protocols required to treat a diabetic neuropathic amputee.

COURSE OUTLINE:
1. LOWER EXTREMITY PROSTHETICS
   A. History of Prosthetics
   B. Amputation Levels
   C. Etiology of Lower Extremity Amputations
   D. Effect of Amputation on Energy Consumption During Walking
   E. Pre-Operative Management
      1. Evaluation
      2. Goals
      3. Treatment
   F. Post-Operative Management
1. Exercise Program
2. Positioning
3. Compression Wrapping

G. Below-knee Prostheses
   1. Components
   2. Suspension
   3. Alignment
   4. Functional Training

H. Above-knee Prostheses
   1. Components
   2. Suspension
   3. Alignment
   4. Functional Training

II. LOWER EXTREMITY ORTHOTICS
   A. General Concepts
   B. Function of Lower Extremity Orthoses
   C. Footwear
   D. Foot Orthoses (FO)
   E. Ankle-Foot Orthoses (AFO)
   F. Knee Orthoses (KO)
   G. Knee-Ankle-Foot Orthoses (KAFO)
   H. Hip Orthoses (HO)
   I. Hip-Knee-Ankle-Foot Orthoses (HKAFO)

III. SPINAL ORTHOSES
   A. General Functions
   B. Components
   D. Commonly Prescribed Spinal Orthoses
      1. CSP
      2. LSO
      3. TLSO
   E. Effects and Effectiveness of Spinal Orthoses

IV. HAND SPLINTING
   A. Splinting Materials
   B. Fabrication Methods
   C. Splint Classifications

TEACHING METHODS AND LEARNING EXPERIENCES:
The format of the course will be a combination of patient case discussion, lecture and patient demonstration. For the orthotic section of the course, patient case scenarios will be used to illustrate and apply the information from the readings. It will therefore be essential for students to come to class prepared, having completed all of the assigned readings and activities.

EVALUATION METHODS:
Student learning will be assessed through their performance on seven (7) quizzes, nine (6) patient case write-ups and two (2) examinations. All quizzes and examinations will be taken through BbLearn and must be completed by the designated due date. The format for the quizzes and exams will be a combination of true/false and multiple-choice. The seven quizzes may be taken up to two times before its due date. If the quiz is taken twice, the two scores will be averaged. The following is the approximate breakdown of points for the quizzes and examinations. Class participation will be considered when determining those grade that lie on the border.

<table>
<thead>
<tr>
<th>Quizzes</th>
<th>21%</th>
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<tbody>
<tr>
<td>A = 90% - 100%</td>
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Effective Fall 2015
### Mid-Term Exam 30%
- B = 80% - 89%

### Patient Write-Ups 12%
- C = 70% - 79%

### Final Exam 37%
- F = < 70%

100%

### REQUIRED TEXT AND READINGS:
- Abnormal Lower Extremity Gait. [http://jan.ucc.nau.edu/~cornwall/P&O/Amputee_Gait.html](http://jan.ucc.nau.edu/~cornwall/P&O/Amputee_Gait.html)

All course handouts and copies of the non-textbook required readings are available on the BbLearn web site for this course (https://BbLearn.nau.edu/).

### ADDITIONAL OR RECOMMENDED TEXTS AND READINGS: (I have these in my office)
- Seymour R: *Prosthetics and Orthotics: Lower Limb and Spinal*. Lippincott, Williams & Wilkins, Philadelphia, 2002
- Amputation Surgery. [www.ampsurg.org](http://www.ampsurg.org)

### COURSE POLICIES:
- Regular attendance and participation is expected for all classes. All lecture and demonstration sessions will start promptly and students are responsible for all lecture and demonstration material.
- AS A COURTESY TO FELLOW STUDENTS AND THE COURSE INSTRUCTORS, if you are delayed in getting to class on time, please enter and find a seat as quickly and quietly as possible.
- PLEASE NOTE: On days in which a guest speaker is scheduled, **if students are more than 10 minutes late**, they are requested **not to enter the classroom until there is a break**.
- Examinations and quizzes must be completed on the day specified or prior to the due date. No make-up examinations will be given unless prior arrangements have been made with the instructor of record.
- Plagiarism or any other form of cheating will result in a grade of Failure (F). Class activities, in which students may work together to complete assignments, will be specifically announced.
- The instructors for the course are committed to treating you in a professional manner as well as making this course a meaningful experience for you. **If you need any help or further explanation of the presented material, please contact the course instructor as soon as possible!**

Effective Fall 2015
Northern Arizona University  
Classroom Management Statement

Membership in the academic community places a special obligation on all members to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies that responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive.

It is the responsibility of each student to behave in a manner that does not interrupt or disrupt the delivery of education by faculty members or receipt of education by students, within or outside the classroom. The determination of whether such interruption or disruption has occurred has to be made by the faculty member at the time the behavior occurs. It becomes the responsibility of the individual faculty member to maintain and enforce the standards of behavior acceptable to preserving an atmosphere for teaching and learning in accordance with University regulations and the course syllabus.

At a minimum, students will be warned if their behavior is evaluated by the faculty member as disruptive. Serious disruptions, as determined by the faculty member, may result in immediate removal of the student from the instructional environment. Significant and/or continued violations may result in an administrative withdrawal from the class. Additional responses by the faculty member to disruptive behavior may include a range of actions from discussing the disruptive behavior with the student to referral to the appropriate academic unit and/or the Office of Student Life for administrative review, with a view to implement corrective action up to and including suspension or expulsion.

Professional Behavior Statement  
Program in Physical Therapy

Entrance into the program of study in physical therapy at Northern Arizona University signifies a commitment to a doctoring profession, which entails a consistent demonstration of specific knowledge, skills and attitudes. Professional behaviors are a defining element of a doctoring profession. Thus, integration of professional behaviors is a key aspect of the professional socialization process, which begins in the educational program. The following professional behavior (adopted from objectives 1-6, and 8 of the APTA Clinical Performance Instrument) are expected of all doctoral physical therapy learners:

- Practice in a safe manner that minimizes risk to the patient, self, and others;
- Present themselves in a professional manner;
- Demonstrate professional behavior during interactions with others;
- Adhere to ethical and legal practice standards;
- Communicate in ways that are congruent with situational needs; and
- Adapt delivery of physical therapy care to reflect respect for and sensitivity to individual differences.

Effective Fall 2015
## TENTATIVE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
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<tbody>
<tr>
<td>Mar 13</td>
<td>Introduction to Lower Extremity Orthoses</td>
<td>Ch 2: pp 18-25; Ch 13: pp 221-232; 241-246</td>
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<tr>
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<td>Footwear</td>
<td>Footwear Video Tutorial</td>
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<td>Quiz #1 Due by 9:00am</td>
<td>Ogrin article</td>
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<td>Diabetic Case Assignment Due</td>
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<td>Mar 27</td>
<td>Foot Orthoses</td>
<td>Ch 13: pp 232-241</td>
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<td>Chapter 13</td>
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<td>Quiz #2 Due by 9:00am</td>
<td>Cornwall, 2004a, Cornwall, 2004b, McPoil, 1994</td>
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<td>Foot Pain Case Assignment Due</td>
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<td>Apr 3</td>
<td>Ankle, Knee and Hip Orthoses</td>
<td>Ch 14, 15 and 16</td>
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<td>Quiz #3 Due by 9:00am</td>
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<td>Ankle Instability Case Assignment Due</td>
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<td>CVA Case Assignment Due</td>
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<td>TBI Case Assignment Due</td>
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<td>9 (Thurs) Spinal Orthotics (David Mueller, DPT, CPO)</td>
<td>Ch 17</td>
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<td>Thursday from 1:00pm to 4:00pm</td>
<td>Mueller, 1987</td>
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<td>Quiz #4 Due by 1:00pm</td>
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<td></td>
<td>10 Hand Splinting (Alicia Allie, PT DPT)</td>
<td>Ch 18</td>
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<td>Quiz #5 Due by 9:00am</td>
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<td>17 MIDTERM EXAMINATION Due by Midnight (Orthotics Only)</td>
<td>Ch 6 and 7</td>
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<td>LE Prosthetics (9:00am - 12:00noon)</td>
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<td>LE Amputee Management (1:00pm - 5:00pm)</td>
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<td>Jennifer Guerena, PT and Reese Evans, CPO</td>
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<td>Quiz #6 Due by 9:00am</td>
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<td>23 (Thurs) LE Amputee Gait and Review</td>
<td>Ch 4 and 5</td>
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<td>Thursday from 1:00pm to 3:00pm</td>
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<td>Abnormal LE Gait Website</td>
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**FINAL EXAMINATION** (Prosthetics Only) **DUE BY MIDNIGHT, MAY 4, 2015**
PROPOSED SYLLABUS

PT657 Innovations and Specializations in Physical Therapy Practice
Spring 2017

COURSE PREREQUISITES:
Admission to the DPT program.

INSTRUCTOR:
Course coordinator: Tarang Jain, PT, DPT, PhD  CHHS Rm. 108, 928-523-9971; tarang.jain@nau.edu
Office hours by appointment.

Guest speakers to be arranged per topic area.

CLOCK HOURS:
This course will be scheduled for 3 clock hours per week.

COURSE DESCRIPTION:
This course examines the contemporary developments, innovative technologies, and areas of specialization in physical therapist practice. Innovations in medical devices including orthotics/prosthetics, information technology, and advanced modalities that will transform healthcare delivery will be addressed. Established and emerging specializations will be addressed to explore the breadth and depth of future physical therapist practice in the dynamic healthcare environment.

COURSE PURPOSE:
The purpose of this course is to equip the future physical therapist with the knowledge and skills necessary to evaluate contemporary and emerging healthcare trends, technologies that promise to transform the delivery of healthcare, and specializations in physical therapist practice in order to make effective evidence based decisions in patient care. The course will emphasize on the innovations that include utilization of medical devices (prosthetics, orthotics, brain/machine interface, virtual reality/robotics, EMG biofeedback, etc.), information-seeking computerized technologies (computerized health care analytics/decision making support systems, telemedicine, “apps” from mobile devices, 2D and 3D movement-analysis techniques, etc.), advanced modalities (wound care, pain management and education, dry needling, ultrasound imaging, etc.). Specialization areas discussed will consider patients with focused clinical conditions or within unique practice environments (orthopedic, sports, neurology, women’s health, oncology, end-of-life care, vestibular rehabilitation, Emergency Department physical therapist practice, etc.). The culminating experience will provide the student an opportunity to explore and learn about promising technologies that may significantly affect the scope of practice, offering a whole new world of tech-savvy treatment options.
COURSE STUDENT LEARNING OUTCOMES AND ASSESSMENT METHOD

At the completion of this course, this student will be able to:

1. Discuss the theory, design, function, and application of prosthetic and orthotic appliances for both the lower and upper extremities. Assessed by: Quiz 1-3, Case write-up 1-3, Midterm.
2. Identify the physical therapist's role in the management of patients who utilize lower extremity prostheses, lower extremity orthoses, and spinal orthoses. Assessed by: Quiz 1-3, Case write-up 1-3, Midterm.
3. Describe the evidence-based approach to wound management and the current standards of wound care and critically evaluate the innovations in wound care technologies. Assessed by: Quiz 4, Case write-up 4, Midterm.
4. Discuss the nature of chronic pain in terms of its etiology, pathophysiology, clinical presentation, and pain management principles related to the physical therapy evaluation and treatment. Assessed by: Mid-term exam
5. Discuss the use of dry needling for pain management, including safety administration issues and integration into physical and manual therapy treatment. Assessed by: Quiz 5, Case write-up 5, final exam.
6. Discuss the assessment and biofeedback protocols for treatment of musculoskeletal and neuromuscular disorders from a neuromuscular reeducation perspective, primarily using surface-recorded EMG. Assessed by: Quiz 5, Case write-up 5, final exam.
7. Identify and distinguish between 2D and 3D motion analysis as a diagnostic and treatment tool for musculoskeletal and neuromuscular disorders. Assessed by: Quiz 5, Case write-up 5, final exam.
8. Identify the role (benefits and limitations) that musculoskeletal ultrasound can play in enhancing functional gains and quality of life in a traditional rehabilitation population. Assessed by: Quiz 5, Case write-up 5, final exam.
9. Describe telerehabilitation and associated technologies such as image-based telerehabilitation; sensor based telerehabilitation; and virtual environments and virtual reality tele-rehabilitation. Assessed by: Quiz 6, Case write-up 6, final exam.
10. Identify the appropriate patient population and dosage/training principles for robotic-assisted therapies and wearable assistive devices in both upper and lower extremities. Assessed by: Quiz 6, Case write-up 6, final exam.
11. Discuss the brain-machine interface (BMI), including the principles behind different BMI approaches. Assessed by: Quiz 6, Case write-up 6, final exam.
12. Discuss the types, impact, effectiveness, design and implementation of routinely utilized computerized health care analytics/decision making support systems. Assessed by: Quiz 6, Case write-up 6, final exam.
13. Identify and discuss the variety of healthcare mobile apps currently in the marketplace, their use, if any, in healthcare, and their potential effectiveness. Assessed by: Quiz 6, Case write-up 6, final exam.
14. Describe the breadth of physical therapist specialty practice and advocate for the development of emerging specializations in terms of how they will benefit the healthcare system and the patients served. Assessed by: Group Presentations and final exam
15. Identify the role of clinical residencies, fellowships, board certification, certificate programs, and continuing education in professional career development. Assessed by: Group Presentations and final exam
READINGS AND MATERIALS

- Abnormal lower extremity gait. (Http://jan.ucc.nau.edu/~cornwall/p&o/amputee_gait.html)

ADDITIONAL OR RECOMMENDED TEXTS AND READINGS:

Additional readings will be posted in bb learn throughout the semester to enhance learning

- Seymour R: Prosthetics and orthotics: lower limb and spinal. Lippincott, Williams & Wilkins, Philadelphia, 2002
- American board of physical therapy specialties (http://www.abpts.org/home.aspx)

CLASS OUTLINE OR TENTATIVE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignment/assessment</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction to lower extremity orthoses</td>
<td>Quiz#1, patient case write-up #1 due</td>
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<tr>
<td>Week 2</td>
<td>Footwear and foot orthoses</td>
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<tr>
<td>Week 3</td>
<td>Spinal orthotics</td>
<td>Quiz#2, patient case write-up #2 due</td>
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<tr>
<td>Week 4</td>
<td>Introduction to upper extremity orthoses</td>
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Effective Fall 2015
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<thead>
<tr>
<th>Week 5</th>
<th>Lower extremity prosthetics and amputation</th>
<th>Quiz#3, patient case write-up #3 due</th>
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<tbody>
<tr>
<td>Week 6</td>
<td>Lower extremity amputee management</td>
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<tr>
<td>Week 7</td>
<td>Advances in wound care technologies</td>
<td>Quiz#4, patient case write-up #4 due</td>
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<tr>
<td>Week 8</td>
<td>Chronic pain management principles and the application of dry needling for pain management.</td>
<td>Mid-term exam</td>
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<tr>
<td>Week 9</td>
<td>Introduction, ultrasound imaging, and 2d/3d movement analysis, emg biofeedback, and other sensor-based technologies.</td>
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<tr>
<td>Week 9</td>
<td>Introduction to brain machine interface, robotics, and virtual reality interfaces.</td>
<td>Quiz#5, patient case write-up #5 due</td>
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<td>Week 10</td>
<td>Introduction to telerehabilitation and computerized health care analytics</td>
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<tr>
<td>Week 11</td>
<td>Healthcare related ‘apps’ for mobile devices</td>
<td>Quiz#6, patient case write-up #6 due</td>
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<tr>
<td>Week 12</td>
<td>Specialization in orthopedics, neurology, oncology, women’s health</td>
<td>Group presentations#1</td>
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<tr>
<td>Week 13</td>
<td>Specialization in pediatrics, geriatrics, sports, dance</td>
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<tr>
<td>Week 14</td>
<td>Physical therapy practice in the emergency department and end-of-life care</td>
<td>Group presentations#2</td>
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<td>Week 15</td>
<td>No class/review week</td>
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<tr>
<td>Week 16</td>
<td>Finals week</td>
<td>Final exam</td>
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**EVALUATION METHODS:**

Student success in this course will be assessed through participation in group projects, 6 quizzes, 6 patient case write-ups, and two examinations covering the main concepts and application. All quizzes and examinations will be taken through bblearn.

| QUIZZES (6) | 15 % |
| PATIENT CASE WRITE-UPS (6) | 20 % |
MID-TERM EXAM 20 %
GROUP PRESENTATION 15 %
FINAL EXAM 30 %

100%

GRADING SCALE: 90 – 100% A  80 – 89.9% B  70 – 79.9% C  < 70%  F

**COURSE POLICIES:**

1. Class attendance will not be taken, but regular attendance is expected. Missing class should be minimized and instructor alerted via email: [https://policy.nau.edu/policy/policy.aspx?num=100335](https://policy.nau.edu/policy/policy.aspx?num=100335).
2. All sessions will start promptly. Timeliness is considered professional behavior. Since late entries are disruptive, they should be limited to emergencies.
3. Students are expected to “keep up” with course material. If you need help outside of class, please make an appointment with instructor.
4. Examinations must be taken on the day specified unless prior arrangements have been made with the instructor. No make-up examinations will be given.
5. Cheating, in any form, will result in a failing grade.
6. No remediation or extra credit will be allowed in this course.
7. Professional dress will be required for all guest lecturers.
8. Late lab and case study assignments will receive a 0.

**NORTHERN ARIZONA UNIVERSITY**
**POLICY STATEMENTS FOR COURSE SYLLABI**

**SAFE ENVIRONMENT POLICY**
NAU’s Safe Working and Learning Environment Policy prohibits sexual harassment and assault, and discrimination and harassment on the basis of sex, race, color, age, national origin, religion, sexual orientation, gender, gender identity, disability, or veteran status by anyone at this university. Retaliation of any kind as a result of making a complaint under the policy or participating in an investigation is also prohibited. The Director of the Equity and Access Office (EAO) serves as the university’s compliance officer for affirmative action, civil rights, and Title IX, and is the ADA/504 Coordinator. EAO also assists with religious accommodations. You may obtain a copy of this policy from the college dean’s office or from NAU’s Equity and Access Office website [nau.edu/diversity/](http://nau.edu/diversity/). If you have questions or concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (928-523-5181), or NAU’s Equity and Access Office (928) 523-3312 (voice), (928) 523-9977 (fax), (928) 523-1006 (TTD) or [equityandaccess@nau.edu](mailto:equityandaccess@nau.edu).

**STUDENTS WITH DISABILITIES**
If you have a documented disability, you can arrange for accommodations by contacting Disability Resources (DR) at 523-8773 (voice) or 523-6906 (TTY), [dr@nau.edu](mailto:dr@nau.edu) (e-mail) or 928-523-8747 (fax). Students needing academic accommodations are required to register with DR and provide required disability related documentation. Although you may request an accommodation at any time, in order for DR to best meet your individual needs, you are urged to register and submit necessary documentation ([www.nau.edu/dr](http://www.nau.edu/dr)) 8 weeks prior to the time you wish to receive accommodations. DR is strongly committed to the needs of student with disabilities and the

*Effective Fall 2015*
promotion of Universal Design. Concerns or questions related to the accessibility of programs and facilities at NAU may be brought to the attention of DR or the Office of Affirmative Action and Equal Opportunity (523-3312).

ACADEMIC CONTACT HOUR POLICY
Based on the Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-224), for every unit of credit, a student should expect, on average, to do a minimum of three hours of work per week, including but not limited to class time, preparation, homework, studying.

ACADEMIC INTEGRITY
Integrity is expected of every member of the NAU community in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded in honesty with respect to all intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all University relationships and interactions connected to the educational process, including the use of University resources. An NAU student’s submission of work is an implicit declaration that the work is the student’s own. All outside assistance should be acknowledged, and the student’s academic contribution truthfully reported at all times. In addition, NAU students have a right to expect academic integrity from each of their peers.

Individual students and faculty members are responsible for identifying potential violations of the university’s academic integrity policy. Instances of potential violations are adjudicated using the process found in the university Academic Integrity Policy.

RESEARCH INTEGRITY
The Responsible Conduct of Research policy is intended to ensure that NAU personnel including NAU students engaged in research are adequately trained in the basic principles of ethics in research. Additionally, this policy assists NAU in meeting the RCR training and compliance requirements of the National Science Foundation (NSF)-The America COMPETES Act (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science); 42 U.S.C 18620-1, Section 7009, and the National Institutes of Health (NIH) policy on the instruction of the RCR (NOT-OD-10-019; “Update on the Requirement for Instruction in the Responsible Conduct of Research”). For more information on the policy and the training activities required for personnel and students conducting research, at NAU, visit: http://nau.edu/Research/Compliance/Research-Integrity/

SENSITIVE COURSE MATERIALS
University education aims to expand student understanding and awareness. Thus, it necessarily involves engagement with a wide range of information, ideas, and creative representations. In the course of college studies, students can expect to encounter—and critically appraise—materials that may differ from and perhaps challenge familiar understandings, ideas, and beliefs. Students are encouraged to discuss these matters with faculty.

CLASSROOM DISRUPTION POLICY
Membership in the academic community places a special obligation on all participants to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies the responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive. Instructors have the authority and the responsibility to manage their classes in accordance with University regulations. Instructors have the right and obligation to confront disruptive behavior thereby promoting and enforcing standards of behavior necessary for maintaining an atmosphere conducive to teaching and learning.

Effective Fall 2015
Instructors are responsible for establishing, communicating, and enforcing reasonable expectations and rules of classroom behavior. These expectations are to be communicated to students in the syllabus and in class discussions and activities at the outset of the course. Each student is responsible for behaving in a manner that supports a positive learning environment and that does not interrupt nor disrupt the delivery of education by instructors or receipt of education by students, within or outside a class. The complete classroom disruption policy is in Appendices of NAU’s Student Handbook.

August 25, 2015