

PHYSICAL THERAPY

Berrien Springs Campus

Physical Therapy Building

Department Administration & Admissions
(616) 471-AUPT or 800-827-AUPT
FAX: (616) 471-2867
pt-info@andrews.edu
http://www.andrews.edu/PHTH/

MSPT Program
(616) 471-AUPT or 800-827-AUPT
FAX: (616) 471-2866

Dayton Campus

Andrews University Physical Therapy
2912 Springboro West, Suite 301
Dayton, OH 45439-1674
(937) 298-AUPT or 888-827-AUPT
FAX: (937) 298-9500

Faculty

C. William Habenicht, *Chair*
Wayne L. Perry, MSPT Program Director
Daryl W. Stuart, MPT Program Director
Philip A. Anloague
John C. Banks
Kathy A. Berglund
John Carlos, Jr.
Heidi C. Clarke
Norene M. Clouten
Bonny D. Dent
Betsy Donahoe-Fillmore
Edward G. Greene
Kurt J. Jackson
Harold L. Merriman
A. Lynn Millar
Janet A. Mulcare
Elizabeth Oakley
David P. Village

Academic Programs	Credits
<u>Berrien Springs campus</u>	
BS: Anatomy and Physiology (interim degree for MSPT students)	
MSPT: Master of Science in Physical Therapy (5-years that includes BS credits)	174
AMPT: Advanced Master in Physical Therapy	26.5-32.5
ACPT: Advanced Certificate in Physical Therapy	23
<u>Dayton OH campus</u>	
MPT: Master of Physical Therapy	78.5

Physical therapy is a health profession dedicated to evaluating, treating, and preventing physical injury and disease. Physical therapists design and implement the necessary therapeutic interventions to promote fitness, health and improve the quality of life in patients. They also become active in consultation, education and research.

Physical therapists work closely with their client's family, physician, and other members of the medical team to help their client return to their

home environment and resume activities and relationships of normal daily living.

PROFESSIONAL ENTRY PROGRAMS

Master of Science in Physical Therapy (MSPT). This 3-year program begins after a student completes 2 years of college prerequisites. A previous college degree is not necessary. Students may earn 2 degrees: an interim Bachelor of Science (received after 2 years in the professional program) and an MSPT degree.

Master in Physical Therapy (MPT). The curriculum in this 2-year program uses problem-based learning and is designed for individuals who already have completed a baccalaureate degree.

ACCREDITATION AND BOARD CERTIFICATION

The MSPT and MPT programs are both accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE). Graduates may apply to take the state board examination in the state of their choice after receiving either MSPT or MPT degrees.

APPLICATION PROCESS

Information Packets. Packets which describe admission requirements for both professional entry programs are available throughout the year. The information is designed to aid the prospective student through the application and admissions process. Please call 1-800-827-2878, option 1, to request an information packet.

Application Packets. Packets containing all necessary forms and instructions for completing the application process are available by June of each year. Applicants holding a baccalaureate or advanced degree are welcome to apply to both the MSPT/Dayton and the MSPT/Berrien Springs programs simultaneously and will receive equal consideration for admission.

Applicants who meet eligibility requirements are invited to participate in a personal interview with admissions personnel.

Notices of acceptance and denial are sent by certified mail. Classes begin on the Berrien Springs campus in July, and on the Dayton campus in August.

ADMISSION REQUIREMENTS

1. Minimum 3.00 cumulative GPA in both natural science prerequisite and general education prerequisite courses.
2. Personal interview of eligible applicants.
3. Documentation of 80 hours (including 20 hours in an inpatient setting) of clinical observation under a licensed physical therapist.

International applicants must also provide:

1. A minimum score of 80 on the *MELAB* or 550 on the *TOEFL* test (if English is not their first language).
2. English translation of relevant course descriptions from college bulletin(s) where course work was completed.
3. Documentation of successful completion of 30 credits (or equivalent) of course work taken in the U.S. or Canada in the English language.
4. If a baccalaureate or advanced degree has been earned, documentation that the applicant graduated from an institution registered in the *International Handbook of Universities*.

MSPT PROGRAM

Berrien Springs, MI

UNDERGRADUATE PREREQUISITES

Natural Sciences—19

Microbiology—3

One term with lab as required by health-related programs.

AU Students: BIOL260

Anatomy & Physiology—6

One full sequence of anatomy and physiology with labs as required by health related programs. A full sequence of general biology with labs or general zoology with labs may be substituted for anatomy and physiology.

AU Students: BIOL111 & BIOL112

Physics & Chemistry—Choose one option—6/4

Option 1: A full sequence (minimum 6 semester/8 quarter credits) of General Physics with labs as required for physics majors or pre-med students, *plus* a minimum of 4 semester/6 quarter credits of any chemistry with lab.

AU Students: PHYS141-142 & 4 semester credits of any chemistry course with lab

Option 2: A full sequence (minimum 6 semester/8 quarter credits) of General Chemistry with labs as required for chemistry majors or pre-med students, *plus* a minimum of 4 semester/6 quarter credits of any physics course with lab.

AU Students: CHEM131-132 & 4 semester credits of any physics course with lab

GENERAL EDUCATION COURSES—45

Computer Science—0-3

Documented competency in word processing and spreadsheets.

AU Students: Take competency exam: credits taken from INFS110 as needed

Statistics/Math—3

A basic statistics course.

AU Students: STAT285

General Psychology—3

An introductory psychology course.

AU Students: PSYC101

Human Development—3

A course which covers physical, social, and psychological development beginning with conception.

AU Students: EDPC301

? Behavioral/Social Science—3

One course from the following options: Sociology, Geography, Anthropology, Minority Groups, Economics, American Government

AU Students: One of BHSC220, BHSC235, IDSC237, SOCI119, GEOG110, ANTH124, ANTH200, PLSC104, or ECON225

? English—6

A full sequence of English Composition which includes writing components.

AU Students: ENGL115 & ENGL215

? Communication—2

A course on human communication, one-to-one, small group, and public speaking.

AU Students: COMM104

? Fine Arts—3

One course from the following options: appreciation, theory and/or history course in Music, Art, Photography, etc.; OR 2 semesters/3 quarters of group performance

activities. Private music lessons do not apply.

AU Students: One of IDSC211, PHTO210, MUHL214, ART220; or 2 semesters of Ensemble Music

? **Humanities—3**

One course from the following options: Ethics, Cultural Perspectives, Literature, Philosophy, Critical Thinking, Second Language, World History, Western Civilization, U.S. History, American History, Canadian History
AU Students: One of HIST117, HIST 118, HIST204, HIST205, ENGL255, PHIL224, or Second Language

? **Physical Education—2**

2 semester/3 quarter credits: All activity courses OR a minimum of ½ the required credits from activity courses and ½ the required credits from physical fitness theory course.
AU Students: HLED130 OR any 4 PEAC courses (.5 semester credits each)

? **Religion—0-6**

One 3 semester /4 quarter credits religion course per year is required only if attending a Seventh-day Adventist school.
AU Students: RELT100 and one of RELB210, RELT250, OR RELT340

? **Electives—0-9**

If electives are needed in order to fulfill the total 64 semester/96 quarter credits required, some suggested courses include service related courses, accounting, macro economics, or nutrition.
AU Students: Use PHTH120, BHSC100 whenever possible if elective is needed.

? These prerequisites are not required by applicants holding a US equivalent baccalaureate degree from an accredited school.

Total Requirements—64

PROGRAM: UNDERGRADUATE YEARS

The first 2 years of the 3-year professional education program are offered at the junior- and senior-year undergraduate level. Students successfully completing their prerequisites and the first 2 years of the professional program qualify for an interim Bachelor of Science degree with a major in Anatomy and Physiology.

Continued Undergraduate Enrollment Requirements

- Continued enrollment in the physical therapy professional program requires successful completion of all didactic PHTH course work listed for the previous academic term and maintenance of minimum cumulative GPA standards.
- Successful completion of PHTH321.

If the student does not successfully complete an academic term, Physical Therapy Faculty Council approval is required for the student to continue enrollment in the program. The Faculty Council may also assign additional or remedial course work to better assure the student's success upon their return to the program.

See *Physical Therapy Student Handbook* for more information regarding minimum GPAs for academic progression, Foundation Sciences, and other specific requirements.

BS: ANATOMY AND PHYSIOLOGY

(Interim Degree)

Prerequisites—64

MSPT Program Courses—68

PHTH317, 324, 326, 327, 329, 331, 332, 334, 341, 342, 346, 351, 352, 353, 354, 361, 362, 363, 364, 414, 421, 422, 426, 431, 432, 441, 442, 443, 446, 447, 448, 449, 456, 457, 458, 459, 466, 469, 470, 471, 472, 476, 486, 496, 498; RELG360-009, RELG360-014.

GRADUATE-YEAR PROGRAM

In addition to course work, components of the final year include a graduate research project and two clinical internships. Elective course work is also offered, allowing students to explore speciality areas of interest. Upon successful completion of the graduate year, students earn the Master of Science in Physical Therapy degree.

Graduate Admission Requirements. In addition to meeting the General Minimum Admission Requirements for graduate degree programs on p. 33, the following departmental requirements apply for transitioning from the undergraduate to the graduate phase of this program:

- Completion of a baccalaureate degree.
- Successful completion of all undergraduate physical therapist program courses with a minimum GPA of 2.75.

Continued Graduate Enrollment Requirements

- Progressive enrollment in the physical therapist education program requires successful completion of all PHTH course work listed for the previous academic term.
- Progressing to each clinical experience (PHTH414, 415, 551, 552, 553) is contingent on the successful completion of the previous clinical experience. To enter PHTH551 requires satisfactory completion of the *Pre-Clinical Comprehensive Examination*.
- A student whose cumulative graduate GPA falls below 3.00 in any given academic term is placed on academic probation. With advice from the student's academic adviser, the Physical Therapy Faculty Council's recommendation is referred to the dean of the School of Graduate Studies, for final approval.

The student normally is disqualified if they do not increase their graduate GPA to 3.0 during the academic term of probation. Research activity normally ceases during a probational academic term. Exceptions require approval by the Physical Therapy Faculty Council and the dean of the School of Graduate Studies.

MSPT DEGREE REQUIREMENTS

In addition to the General Minimum Requirements for graduate degree programs on p. 37, the following departmental/program requirements apply. These are subject to change by action of the Physical Therapy Degree Council.

- Satisfactory completion of the 42 credits in the MSPT curriculum including:
 - Basic Courses:** PHTH423, 433, 473, 483, 520, 525, 528, 534, 536, 544, 575, 588; BSAD556-034, EDPC622.
 - Electives—5**
A minimum of 5 additional credits of electives at the graduate level. A minimum of 2.5 of these elective credits must be

PHTH graduate-level electives. Selection of electives outside the department requires the approval of the chair of the Department of Physical Therapy.

• **Research—3**

Satisfactory completion of a written and oral report on an approved research project (PHTH698).

• **Clinical Education Experiences—24**

Satisfactory completion of clinical education experiences (PHTH415, 551, 552, 553).

- No grade lower than C (2.00) in any course in the graduate portion of the program.
- A minimum GPA of 3.00 for the graduate portion of the program.
- Satisfactory completion of the *Pre-Clinical Comprehensive Examination*.
- Satisfactory performance on the written and/or oral comprehensive examinations

See the *Physical Therapy Student Handbook* for additional requirements.

MPT PROGRAM

Dayton, OH Campus

ADMISSION REQUIREMENTS AND PREREQUISITES.

Applicants must meet the General Minimum Admission Requirements for graduate degree programs on p. 33, including the completion of the Graduate Record Examination (GRE).

- Undergraduate Degree.** Baccalaureate degree or its equivalent (as determined by the Academic Records Office) with a cumulative GPA of 3.00 or above.
- Computer Science.** One course or equivalent with competency in word processing and use of spreadsheets.
- Psychology.** One term of an introductory course and one human development or developmental psychology course.
- Basic Statistics.** One term of any statistics course.
- Natural/Physical Sciences** with labs.
24 semester/36 quarter credits.

Biological Sciences

Choose one option:

Option 1: A full sequence of Anatomy & Physiology with labs

Option 2: A term of Human or Animal Physiology **and** a term selected from one of the following courses: Human Anatomy with lab, Microbiology with lab, General Biology with lab, or Zoology with lab.

Physics and Chemistry

Choose one option:

Option 1: General Physics and any Chemistry. A full sequence (minimum 6 semester/8 quarter credits) of General Physics with labs as required for physics major or pre-med students, **plus** a minimum of 6 quarter/4 semester credits of any chemistry with lab.

Option 2: General Chemistry and any Physics. A full sequence (minimum 6 semester/8 quarter credits) of General Chemistry with labs as required for chemistry majors or pre-med students, **plus** a minimum of 6 quarter/4 semester credits of any physics with lab.

Additional science courses

If needed to achieve the required credits.

Exceptions to the above prerequisites are considered on an individual basis (e.g., licensed health-care professionals or special-life situations).

CONTINUED ENROLLMENT REQUIREMENTS

- Progressive enrollment in the physical therapist education program requires successful completion of all PHTH course work including clinical education listed for the previous academic term.
- A student whose cumulative GPA falls below 3.00 in any given academic term is placed on academic probation. Students who do not increase the cumulative GPA to 3.00 during the academic term of probation are normally asked to withdraw.

See the *Physical Therapy Student Handbook* for additional requirements.

MPT DEGREE REQUIREMENTS

In addition to the General Minimum Requirements for graduate-degree programs on p. 37, the following departmental/program requirements apply for graduation.

- Satisfactory completion of the 78.5 credits of the MPT curriculum:
 - Basic Courses**
PHTH505, 506, 508, 510, 515, 518, 540, 546, 606, 608, 661, 662, 663, 664, 665, 671, 672, 673, 674, 675, 681, 682, 683, 684, 685, 687, 688
 - Research**
Written and oral research proposal presentation and graduate project (PHTH 691, 692, 693).
 - Clinical Education Experiences**
PHTH651, 652, 653, 654.
- No grade lower than C (2.00) in any course.
- A minimum cumulative GPA of 3.00.
- Satisfactory performance on terminal written and clinical examinations.

PROFESSIONAL ADVANCEMENT PROGRAM

This program is designed to provide licensed physical therapists an opportunity to obtain graduate study in the discipline without the need to terminate or significantly change their regular employment or lifestyle. Classes are taught in a short-course format of 3-6 days per course. All courses may be taken to earn academic credit or continuing education units (CEUs). Options include:

- Academic credit to earn
 - Advanced Master of Physical Therapy
 - Advanced Certificate in Physical Therapy
- Continuing education to earn CEUs.

At the present time, this program has an orthopedic emphasis and enables the clinician to meet the academic and/or continuing education requirements to sit for the examinations offered by the American Physical Therapy Association (APTA) for the Orthopedic Certified Specialist (OCS), and/or the North American Institute for Orthopedic and Manual Therapy (NAIOMT) for the Certified Manual Therapist (CMT).

Admission Requirements. In addition to meeting the General Minimum Admission Requirements for graduate degree programs on p. 33, the following departmental requirements apply.

- Hold current licensure as a physical therapist.
- Submit official application. (Contact the Department of Physical Therapy for application package.)
- Pay required application fees.
- Submit a minimum of two satisfactory recommendations: one from a currently practicing physical therapist, and the other from a medical doctor.
- Submit a statement of purpose for post-graduate study.

Degree/Certificate Requirements. In addition to the General Minimum Requirements for graduate-degree programs on p. 37, the following departmental/program requirements apply to students graduating from the physical therapy professional advancement program:

- Satisfactory completion of the courses listed below:

AMPT

- Therapists beginning with a BSPT or MPT degree

Basic Sciences Core: PHTH507, 531

Clinical Orthopedic PT Core:

PHTH532, 533, 541, 542

Professional Role Core: PHTH529, 539, 549, 580

Elective Courses (minimum of 10 credits): PHTH543, 550, 561, 562, 571, 572, 577, 578, 587

- Therapists beginning with an MSPT degree

Basic Sciences Core: PHTH507, 531

Clinical Orthopedic PT Core:

PHTH532, 533, 541, 542

Elective Courses (minimum of 16 credits): PHTH543, 550, 561, 562, 571, 572, 577, 578, 587

ACPT

Basic Sciences Core: PHTH507, 531

Clinical Orthopedic PT Core:

PHTH532, 533, 541, 542

Elective Courses (minimum of 10 credits): PHTH543, 549, 550, 561, 562, 571, 572, 577, 578, 587

- No grade lower than C (2.00) in any course.
- A minimum cumulative GPA of 3.00.
- Satisfactory performance on terminal written examinations.

Courses

(Credits)

See inside front cover for symbol code.

Written permission from the chair of the Department of Physical Therapy is required for non-physical therapy students to enroll in PHTH courses.

PHTH120**Introduction to Physical Therapy**

An introduction to the profession of physical therapy with an overview of duties and responsibilities physical therapists perform. Partially fulfills the clinical observation prerequisites for admission to the professional program. Students must have their own transportation for the clinical observation.

**MSPT PROGRAM
Berrien Springs, Michigan****PHTH317**

(4)

Gross Anatomy

A comprehensive study of human anatomy with emphasis on the nervous, skeletal, muscle, and circulatory systems. Provides a solid morphological basis for a synthesis of anatomy, physiology, and the physical therapy clinical sciences. Corequisite: PHTH327.

PHTH324

(1)

Therapeutic Procedures

Principles and utilization of basic physical therapy care including patient positioning, transfer and transport techniques, selection and use of wheelchairs and other ambulatory aids, vital-sign determination, aseptic techniques, basic wound care, and blood-borne pathogens. Corequisite: PHTH334.

PHTH326

(1.5)

Lifestyle Problems in Physical Therapy

Introduces lifestyle factors that are related to health and disease and emphasizes preventive aspects of proper lifestyle. Topics include addictive substances, proper diet, exercise, and mental health, and the way these impact conditions treated in physical therapy practice.

PHTH327

(2.5)

Gross Anatomy Laboratory

Dissection and identification of structures in the cadaver, and the study of charts, models, and prosected materials. Corequisite: PHTH317.

PHTH329

(1.5)

Professional Orientation

Introduction to the physical therapist's professional role in various medical and community settings. Medical, legal, ethical, philosophical, and historical concerns of the practice. Introduction to medical documentation with emphasis in problem identification and solution.

PHTH331

(1.5)

Therapeutic Modalities I

Hydrotherapy, thermal agents, wound care, and massage: basic principles, physiologic effects, indications, and contraindications. Corequisite: PHTH341.

PHTH332

(1.5)

Therapeutic Modalities II

Electrotherapy and mechanotherapy (traction), physical principles, methodologies, physiological effects, indications and contraindications, application and usage of equipment, and treatment rationale. Corequisite: PHTH342.

PHTH332-50

(1.5)

Honors Therapeutic Modalities

Requires special project work.

PHTH334

(1)

Therapeutic Procedures Laboratory

Clinical application in utilizing basic physical therapy care including patient positioning, transfer and transport techniques, selection and use of wheelchairs and other ambulatory aids, vital sign determination, aseptic techniques, basic wound care, and blood-borne pathogens. Corequisite: PHTH324.

PHTH341 <i>Therapeutic Modalities I Laboratory</i> Techniques of hydrotherapy, thermal agents, wound care, and massage. Supervised practicum includes patient positioning and application of the therapy to obtain desired physiological response. Corequisite: PHTH331.	(1)	PHTH362 <i>Pediatrics I Laboratory</i> Practice in various specific tests used in the physical therapy evaluation of the infant/child that address different developmental domains. Corequisite: PHTH361.	(1)	disorders.
PHTH342 <i>Therapeutic Modalities II Laboratory</i> Specific electrotherapy and mechanotherapy treatment applications, use of equipment and assessment of physiological responses. Corequisite: PHTH332.	(1)	PHTH363 <i>Pediatrics II</i> Description of various pediatric pathologies encountered in physical therapy with appropriate corresponding evaluation and treatment approaches. Normal and abnormal motor development is contrasted. Prerequisite: PHTH361 and 362. Corequisite: PHTH364.	(1)	PHTH426-50 (1.5) <i>Honors Survey of Neurophysiology</i> Requires special project work.
PHTH342-50 <i>Honors Therapeutic Modalities Laboratory</i> Requires special project work.	(1)	PHTH364 <i>Pediatrics II Laboratory</i> Practice in the special techniques required in evaluation and treatment of pediatric patients diagnosed with selected pathologies. Introduces current treatment approaches, such as Neurodevelopmental Treatment (NDT) and others, with their effects on treatment goals. Prerequisites: PHTH361 and 362. Corequisite: PHTH363.	(1)	PHTH427 \$? (1) <i>Human Anatomy Laboratory</i> Study of the prosected extremity, head and neck anatomy, and dissection of the abdominal and thoracic organ systems. Prerequisites: same as for PHTH417.
PHTH346 <i>Medical Physiology</i> Medical approach to the study of normal human body functions as related to individual and combined activities of selected organs and systems. Prerequisites: PHTH317 and 327.	(2.5)	PHTH414, 415 (1.5, 1.5) <i>Clinical Practicum I, II</i> Practice of the knowledge and skills developed in the classroom and lab in a patient-care setting. Each practicum consists of 3 weeks full-time physical therapy experience in clinical facilities affiliated with the university. Repeatable.	(1.5, 1.5)	PHTH431 ? (1) <i>Orthopedic Procedures I Laboratory</i> Designed for practice of the special techniques to evaluate and treat acute and chronic orthopedic pathologies of the extremity joints.
PHTH351 <i>Kinesiology I</i> The study of human movement including an introduction to the basic concepts of biomechanics with an emphasis on human joint/muscle structures and functions. Prerequisites: PHTH317 and 327. Corequisite: PHTH352.	(1.5)	PHTH417 ? (3) <i>Human Anatomy</i> Comprehensive study of human anatomy covering all systems of head, neck, trunk, and extremities. A solid morphological basis for a synthesis of anatomy, physiology, and clinical sciences provided. Dissection and identification of structures in the cadaver, and the study of charts, models, and prosected materials. Prerequisites: BIOL111, 112 or BIOL165, 166 or equivalent. See instructor for additional requirements. Corequisite: PHTH427.	(1.5, 1.5)	PHTH432 ? (1) <i>Orthopedic Procedures II Laboratory</i> Designed for practice of the special techniques required to evaluate acute and chronic orthopedic pathologies of the cervical, thoracic, and lumbar spine. Prerequisites: PHTH421 and 431. Corequisite: PHTH422.
PHTH352 <i>Kinesiology I Laboratory</i> Surface location for specific underlying muscle and bone structures are identified. Basic evaluation procedures for joint motion and limb measurements including goniometry, volumetric measurements, girth, palpation, and introduction accessory to joint movement. Prerequisites: PHTH317 and PHTH327. Corequisite: PHTH351.	(1)	PHTH421 (1.5) <i>Orthopedic Procedures I</i> Presentation of fundamental physical therapy knowledge in evaluating and treating a patient with both acute and chronic conditions of the extremity joints. Corequisite: PHTH431.	(1.5)	PHTH433 ? (1) <i>Orthopedic Procedures III Laboratory</i> Designed for practice of the special techniques required to treat acute and chronic orthopedic pathologies of the cervical, thoracic, and lumbar spine. Prerequisites: PHTH422 and 432. Corequisite: PHTH423.
PHTH353 <i>Kinesiology II</i> A continuation of PHTH351 focusing on biomechanics, body mechanics, normal gait analysis, and introduction to pathological gait analysis. Prerequisites: PHTH351 and 352. Corequisite: PHTH354.	(1.5)	PHTH422 (1.5) <i>Orthopedic Procedures II</i> Presentation of fundamental physical-therapy knowledge and evaluation techniques in pathology of the cervical, thoracic, and lumbar spine. Prerequisites: PHTH421 and 431. Corequisite: PHTH432.	(1.5)	PHTH441, 442, 443 (1.5, 1.5, 1.5) <i>Medical Diseases</i> Sequence studying disease processes affecting major body systems and the resulting anatomical and pathophysiological changes. Clinical presentations and pharmacological treatment of patients with those disease processes considered.
PHTH354 <i>Kinesiology II Laboratory</i> A continuation of PHTH352 focusing on procedures for testing muscle strength, normal gait analysis, and an introduction to pathological gait analysis. Prerequisites: PHTH351 and 352. Corequisite: PHTH353.	(1)	PHTH423 (1.5) <i>Orthopedic Procedures III</i> Presentation of information regarding orthopedic pathology of the cervical, thoracic, and lumbar spine with emphasis on treatment techniques for the different pathologies from a physician and physical therapist's perspective. Prerequisites: PHTH422 and 432. Corequisite: PHTH433.	(1.5)	PHTH446 ? (1.5) <i>Applied Physiology</i> Discusses the anatomical, histologic, physiologic, and biochemical responses to exercise as related to specific conditions. Corequisite: PHTH456.
PHTH360 <i>Topics in _____</i> Selected topics in physical therapy. Permission of department chair required. Repeatable. Specific prerequisites may be required for some subject areas.	(1-4)	PHTH424 (1.5) <i>Survey of Neurophysiology</i> Readings in the recent neurophysiological research literature with reports on scientific findings. Application of the materials studied to the treatment of patients with neurological	(1.5)	PHTH446-50 ? (1.5) <i>Honors Applied Physiology (with lab)</i> Requires special project work.
PHTH361 <i>Pediatrics I</i> An overview of embryological development followed by normal infant/child development to 5 years of age with an emphasis on motor development. Students evaluate infants and children with commonly used tests that address various developmental domains. Corequisite: PHTH362.	(1.5)	PHTH447 ? (2) <i>Neuroanatomy</i> Basic anatomy and functions of the central and peripheral nervous systems and their related structures. Studies specific pathways of the central and peripheral nervous systems and takes a detailed look at each of the 12 pairs of cranial nerves. Prerequisite: PHTH317. Corequisite: PHTH457.	(1.5)	PHTH448 (1.5) <i>Neuroscience I</i> Basic physiological and neurophysiological mechanisms specific to nervous system dysfunction. Clinical concepts in appropriate treatment of conditions affecting the nervous system, such as spinal cord injury, head injury, stroke, and selected peripheral pathologies. Emphasis on comparing and contrasting facilitation techniques. Corequisite: PHTH458.

PHTH449 <i>Neuroscience II</i> Same as PHTH448 with an emphasis on clinical applications. Prerequisites: PHTH448 and 458. Corequisite: PHTH459.	? (1.5)	pulmonary medicine. PHTH473 requires concurrent enrollment in PHTH483.	influence of focus in both a static and dynamic environment. Corequisite: PHTH509.
PHTH456 <i>Applied Physiology Laboratory</i> Practical demonstration and experience with metabolic responses to exercise, testing procedures, exercise prescription, and experiment design. Corequisite: PHTH446.	? (1)	PHTH476 <i>General Medicine Laboratory</i> Practice in evaluations modified for the acute-care environment. Applications include home- and work-place evaluation for architectural barriers, functional evaluation tools, casting, and modification of treatments for acute care including goal setting and note writing. Corequisite: PHTH466.	(1) PHTH520 <i>Geriatrics</i> Study of the unique characteristics of the geriatric patient and special needs in evaluation, program design, and treatment.
PHTH456-50 <i>Honors Applied Physiology Laboratory</i> Requires special project work.	? (1)	PHTH483 <i>Clinical Medicine III Laboratory</i> Experience in cardiopulmonary medicine. Corequisite: PHTH473.	(2.5) PHTH525 <i>Health Administration</i> Application of management practices and theory to the modern acute-care facility. Study of the organizational structures, operations, and financing of health-care delivery institutions. Examination of the organization and interrelationship of professional and support elements in the health-care setting: regulation and accreditation, labor relations, community relations, and financial management.
PHTH457 <i>Neuroanatomy Laboratory</i> Study of prosected central and peripheral nervous tissues, models, and charts. Corequisite: PHTH447.	? (1)	PHTH486 <i>Therapeutic Appliances</i> Prosthetic management of upper- and lower-limb amputee, orthotic management of patients with upper-limb disabilities, and application/management of orthotic-traction devices. Corequisite: PHTH496.	(1) PHTH528 <i>Christian Finance Seminar</i> Basic principles of stewardship as taught in the Bible in contrast with those taught and practiced by the world. Includes elements of personal and family budgets and investments and how to create and use them.
PHTH458 <i>Neuroscience I Laboratory</i> Clinical application, rehabilitation practice, and techniques applied to basic physiological and neurophysiological mechanisms specific to nervous system dysfunction. Clinical treatment of conditions affecting the nervous system, such as spinal cord injury, head injury, stroke, and selected peripheral pathologies. Emphasis on comparing and contrasting facilitation techniques. Corequisite: PHTH448.	(1)	PHTH495 <i>Independent Study/Readings/Research/Projects</i> Permission of department chair required prior to registration for all independent work. Repeatable to 8 credits.	(1.5) PHTH534 <i>Research Methods and Statistics</i> Methods of research applied to medical science: critiquing scientific articles, defining and delineating a problem, writing hypotheses, designing the research to provide data to test hypotheses. Fundamental procedures in collecting, summarizing, presenting, analyzing, and interpreting statistical data. Statistical tests applicable to medical specialities. Repeatable. Corequisite: PHTH534.
PHTH459 <i>Neuroscience II Laboratory</i> Continuation of PHTH458. Prerequisites: PHTH448 and 458. Corequisite: PHTH449.	? (1)	PHTH496 <i>Therapeutic Appliances Laboratory</i> Designed for practice of the physical therapy techniques required in the application of orthotic and prosthetic devices. Special attention given to gait and function. Selected topics such as orthopedic traction, wheelchair modifications, miscellaneous ortho/rehab apparatus, and other assistive devices included. Corequisite: PHTH486.	(1.5) PHTH536 <i>Psychology of the Physically Impaired</i> Psychological responses to illness and disability. Interpersonal relationships between the therapist, the family, and the patient associated with incapacity, pain, grief, and dying. Methods for handling these responses in clinical situations. Common psychiatric disorders covered with their clinical diagnosis, treatment regimes, and projected outcomes. A seminar approach to professional responsibilities for health care.
PHTH466 <i>General Medicine</i> Clinical techniques applied to the evaluation, treatment, and discharge planning of patients in general medical and acute-care settings. Emphasis on physical therapy intervention with relevant factors, management of pain and physical complications during medical treatment, and evaluation and treatment of special populations including wound and burn care. Corequisite: PHTH476.	? (1.5)	PHTH498 <i>Research Design</i> Preparation and development of graduate research project proposal through exploration of a variety of approaches to research. Statement of the research problem, review of the literature, precise methodology, and ethical consideration in human subject research.	(2) PHTH538 <i>Advanced Neuro Techniques</i> Advanced education in theory and clinical practice in the treatment of neurological dysfunction. Theories and clinical areas covered may include Neuro Developmental Technique (NDT), Motor Relearning Program (MRP), and other selected approaches. Focuses primarily on helping the student achieve advanced skills in transition from theory to clinical practice. Corequisite: PHTH548.
PHTH469 <i>Applications of Educational Theory in Physical Therapy</i> Examines and applies educational theory to skills used by the physical therapist in the classroom, community, and clinical facility. Topics include the educational role of the physical therapist, the learning process, the taxonomies of learning, learning styles, modality strengths, multiple intelligences, literacy levels, instructional technology, and teaching strategies.	? (1.5)	PHTH509 <i>Applied Clinical Biomechanics</i> Advanced course to enhance the understanding of the role of biomechanics in orthopedic injury causation and rehabilitation, with particular focus on how anatomic structures react in an isolated and integrated fashion when placed under the influence of forces in both a static and dynamic environment. Corequisite: PHTH519.	(1.5) PHTH544 <i>Research Methods and Statistics Laboratory</i> Constructing research designs for specific hypotheses. Practice in the computation of statistical data using appropriate formulas. Practical applications of techniques in research and statistical computations including probability, normal distribution, chi square, correlations, and linear regressions. Repeatable. Corequisite: PHTH534.
PHTH470 <i>Clinical Decision Making</i> Applications of acquired physical therapy knowledge to patient situations. Assessment of all factors contributing to patient. Appropriate patient treatment and management protocols are designed and evaluated.	? (1)	PHTH514 <i>Clinical Practicum II</i> Practice of the knowledge and skills developed in the classroom and lab in a patient-care setting. Each practicum consists of 3 weeks full-time physical therapy experience in clinical facilities affiliated with the university. Repeatable.	(1) PHTH548 <i>Research Methods and Statistics</i> Constructing research designs for specific hypotheses. Practice in the computation of statistical data using appropriate formulas. Practical applications of techniques in research and statistical computations including probability, normal distribution, chi square, correlations, and linear regressions. Repeatable. Corequisite: PHTH534.
PHTH471, 472, 473 <i>Clinical Medicine I, II, III</i> Medical lectures covering selected topics in the fields of orthopedics, neurology, and cardio-	? (1.5, 1.5, 1.5)	PHTH519 <i>Applied Clinical Biomechanics Laboratory</i> Advanced practice and application of biomechanics principles in orthopedic injury causation and rehabilitation with particular focus on how anatomic structures react in an isolated and integrated fashion when placed under the	

- PHTH548** (1) **Advanced Neuro Techniques Laboratory**
Clinical application, rehabilitation practice, and techniques applied to advanced clinical practice in the treatment of neurological dysfunction. Theories and clinical areas covered may include Neuro Developmental Technique (NDT), Motor Relearning Program (MRP), and other selected approaches. Corequisite: PHTH538.
- PHTH551, 552, 553** (4,4,4) **Clinical Affiliation, I, II, III**
Advanced full-time clinical experience for 8 weeks each in a variety of professional practice settings. One of the 8-week affiliations must be in an inpatient setting. Thirty-six to forty hours per week.
- PHTH556** (1.5) **Pediatric Physical Therapy**
Evaluation and treatment of pediatric patients. Corequisite: PHTH566.
- PHTH559** (1.5) **Sports Medicine and Advanced Orthopedics**
Advanced understanding of orthopedic pathology of the spine and extremity joints, with attention to athletic injuries of these areas. Measures covered include the pre-participation physical exam, designing conditioning programs, taping, equipment fitting, advanced first aid for evaluating and treating field injuries, and other selected orthopedic pathology. Corequisite: PHTH569.
- PHTH566** (1) **Pediatric Physical Therapy Laboratory**
Practice and application of skills required in working with orthopedic and neurologically involved pediatric patients as well as pediatric patients that show developmental risk factors and/or delays. Corequisite: PHTH556.
- PHTH569** \$(1) **Sports Medicine and Advanced Orthopedics Laboratory**
Practice in advanced evaluation and treatment procedures for orthopedic pathology with special emphasis on athletic injuries. Practice of different exercise regimens and taping techniques. Corequisite: PHTH559.
- PHTH575** (1.5) **Biomedical Ethical Issues**
Contemporary ethical issues are examined, including the relationships between peers, superiors, subordinates, institutions, clients, and patients. Issues are illustrated with real-life cases and related to Christian biblical presuppositions.
- PHTH576** (1.5) **Advanced Human Anatomy/Neuroanatomy**
Advanced-level elective on human and neuroanatomy offered for physical therapy graduate students. Also available to practicing allied-health personnel in the community. Corequisite: PHTH586.
- PHTH585** (1.5) **Industrial Medicine**
Gives a broad overview of occupational medicine with emphasis on evaluation and treatment procedures for industrial rehabilitation. An instructional block included on the prevention of work-related injuries with an evaluation of the workplace and the development of appropriate job descriptions. Corequisite: PHTH595.
- PHTH586** (1) **Advanced Human Anatomy/ Neuroanatomy Laboratory**
Dissection and study of anatomical materials. Corequisite: PHTH576.
- PHTH588** (1) **Professional Compendium**
Summarization of previous or added learning experiences relative to contemporary issues in physical therapy. An overview of the new graduate's role and responsibility to his/her patients and their families, employer, and community in the expanding physical therapy profession.
- PHTH589** (1-2) **Professional Seminar**
Weekly sessions in which students present and discuss formal case studies from clinical education experiences, including one-day modules on various topics with contemporary relevance.
- PHTH590** (1-4) **Topics in _____**
Selected topics in physical therapy. Permission of department chair required. Repeatable. Specific prerequisites may be required for some subject areas.
- PHTH595** (1) **Industrial Medicine Laboratory**
Observation, demonstration, and practice in the evaluation, treatment, and patient instruction procedures relating to occupational medicine. Corequisite: PHTH585.
- PHTH648** (1-4) **Workshop**
- PHTH690** (1-4) **Independent Study**
Individualized study and/or research in a specialized area under the guidance of an instructor. Permission from the department chair required prior to registration. Repeatable to 8 credits.
- PHTH698** (1) **Research Project**
Development of a physical therapy related research topic, thesis, and oral presentation. *Summer*: Provides students with guidelines and supervision for data collection and identification of appropriate statistical analysis procedures. *Winter*: Provides students with guidelines and supervision for the oral research presentation and the completion of the written thesis.
- MPT PROGRAM (Dayton, Ohio)**
- PHTH505** (4) **Functional Physiology**
A small group problem-based learning course which focuses on the study of human physiological function of the major organ systems including clinical manifestations associated with pathophysiological conditions. Introduction of applied physiology concepts in musculoskeletal, cardiovascular, pulmonary, electro- and environmental-physiology.
- PHTH506** (1.5) **Professional Seminar I: Health Care**
- (1) Introductory course focusing on problem-based learning and an introduction to the physical therapy profession. Topics include: values, caregiving, professional behavior and attitudes; the APTA; the *Guide to Physical Therapist Practice* and current trends in healthcare.
- PHTH508** (1.5) **Professional Seminar II: Clinical Practice**
Designed to introduce the student to clinical practice. Students learn professional communication and documentation skills. Topics include the medical record, personnel supervision, scheduling, legal and ethical issues including sexual harassment and the cost of service delivery.
- PHTH510** (7) **Anatomy and Movement Science I**
Comprehensive course with lecture, clinical lab and dissection, emphasizing function of the appendicular musculoskeletal system in human movement. Students learn anatomy and biomechanics along with clinical examination skills which will facilitate clinical reasoning and decision making essential for the recognition and treatment of patients with movement dysfunction.
- PHTH515** (3) **Anatomy and Movement Science II**
Comprehensive course with lecture, clinical lab and dissection, which integrates anatomy, biomechanics and clinical examination of the spine and trunk into the evaluation of human movement dysfunction. Students learn basic gait and posture examination skills and develop clinical reasoning to facilitate the development of appropriate therapeutic exercise interventions.
- PHTH516** (4) **Neuroscience**
Comprehensive course including clinical lab which covers neuroanatomy and physiology of the central, peripheral and autonomic nervous systems as they pertain to normal somatic function. Basic disease families are introduced.
- PHTH540** (2.5) **Clinical Science**
Comprehensive course including lab principles and practice of thermotherapy and cryotherapy procedures. Problem-solving approach to clinical decision making is integrated into the application of hydrotherapy, aquatic therapy, superficial and deep heat modalities, and cold modalities, along with an introduction to electro-therapeutic interventions.
- PHTH546** (2) **Maturation Science**
Comprehensive course including clinical lab which is designed to examine human development and maturation. Maturation influences on therapeutic intervention are presented while students learn clinical examination and reasoning skills required for physical therapy intervention throughout the life span. Students are introduced to congenital developmental and age-related pathologies.
- PHTH606** (1) **Professional Seminar III: Business Management**
Utilizes small-group problem-based learning to teach principles of business, administration and marketing necessary to manage a physical therapy clinic or practice. Topics include management styles, policy-making, team-building,

financial issues, public relations and marketing strategies and continuous quality improvement.

PHTH608**Professional Seminar IV: Professional Assessment & Development**

Seminar course designed to help each student formulate strategies for professional assessment and development post-graduation. Topics include professional values and responsibilities, expanding your professional options, continuing education, specialty certification and advanced degrees. Each student participates in a comprehensive program evaluation and does a formal presentation of the graduate project.

PHTH651**Clinical Rotation I—General Medicine**

A 6-week clinical rotation in general medicine to provide full-time clinical exposure, allowing students to integrate current knowledge and training with supervised patient care. Emphasis on continued development of clinical reasoning along with identification and utilization of appropriate clinical resources.

PHTH652**Clinical Rotation II—Neuro Rehab**

A 7-week clinical rotation in rehab provides full-time clinical exposure, allowing students to integrate current knowledge and training with supervised patient care. Emphasis on the continued development of clinical skills and reasoning along with the development of interpersonal skills as a member of the health-care team.

PHTH653**Clinical Rotation III—Orthopedics /Sports Medicine**

An 8-week clinical rotation in orthopedics/ sports medicine providing full-time clinical exposure and allowing students to integrate current knowledge and training with supervised patient care. Emphasis on continued development of clinical skills and reasoning with increasing responsibility for independent decision making and clinical interaction.

PHTH654**Clinical Rotation IV**

The final 10-week clinical rotation allows students to continue developing clinical skills and reasoning in preparation for entry-level practice. Increasing independence in clinical practice expected with increased clinical responsibilities in areas of program development and implementation, administration, and clinical management including staff supervision.

PHTH661**Clinical Pathology—General Medicine**

Small-group, problem-based learning course utilizing patient-case scenarios of various general medical, acute care, and post-operative patient-case scenarios or pathologies to facilitate the integration of previous knowledge with new learning. Students review and apply basic and clinical science concepts to each case, formulating appropriate physical therapy assessment and treatment strategies. Corequisites: PHTH671 and 681.

PHTH662**Clinical Pathology—Neurology I**

Small-group, problem-based learning course utilizing patient-case scenarios of various neurological pathologies to facilitate the

integration of previous knowledge with new learning. Basic and clinical-science principles used to formulate appropriate assessment and treatment strategies for the patient with neurological deficits. Corequisites: PHTH672, 682, and 692.

PHTH663**Clinical Pathology—Neurology II**

Small-group, problem-based learning course utilizing patient-case scenarios of various pediatric pathologies to facilitate the integration of previous knowledge with new learning. Uses basic and clinical science principles to formulate appropriate assessment and treatment strategies for pediatric patients. Corequisites: PHTH673, 683, and 693.

PHTH664**Clinical Pathology—Orthopedics I**

Small-group, problem-based learning course utilizing patient-case scenarios of various orthopedic pathologies to facilitate the integration of previous knowledge with new learning. Development of clinical reasoning and decision making as they relate to orthopedic pathologies. Corequisites: PHTH674 and 684.

PHTH665**Clinical Pathology—Orthopedics II**

Small-group, problem-based learning course utilizing patient-case scenarios dealing with differential diagnosis and management of complex orthopedic pathologies to facilitate the integration of previous knowledge with new learning. Corequisites: PHTH675 and 685.

PHTH671**Clinical Skills Laboratory—General Medicine**

Designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of the patient with neurological pathology. Students learn physical examination tests and measures along with therapeutic interventions appropriate for this population. Corequisites: PHTH661 and 681.

PHTH672**Clinical Skills Laboratory—Neurology I**

Designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of the patient with neurological pathology. Students learn physical examination tests and measures along with therapeutic interventions appropriate for this population. Corequisites: PHTH662, 682, and 692.

PHTH673**Clinical Skills Laboratory—Neurology II**

Designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of the pediatric patient. Students learn physical examination tests and measures along with therapeutic interventions appropriate for this population. Therapeutic procedures and protocols appropriate for these patients are taught with special consideration for patient/ family needs and education. Corequisites: PHTH663, 683, and 693.

PHTH674**Clinical Skills Laboratory—Orthopedics I**

Designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and

management of the patient with orthopedic pathology. Students learn physical examination Corequisites: PHTH664 and 684.

PHTH675**Clinical Skills Laboratory—Orthopedics II**

Designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of orthopedic patients with complex musculo-skeletal pathology and dysfunction. Students learn physical examination tests and measures along with therapeutic interventions appropriate for this population. Corequisites: PHTH665 and 685.

PHTH681**Clinical Issues Seminar—General Medicine**

Presentation/discussion of comprehensive issues related to physical-therapy management of the general medical and post-operative patients. Topics include diabetes, wound care, universal precautions, medical diagnostics, amputees, arthroplasties, and durable medical equipment. Corequisites: PHTH661 and 671.

PHTH682**Clinical Issues Seminar—Neurology I**

Presentation/discussion of comprehensive issues related to physical therapy management of the patient with neurological dysfunction. Topics include: rehabilitation team interaction, psychosocial and socioeconomic issues relevant for this population; motor learning and motor control and neuro-plasty. Corequisites: PHTH662, 672, and 692.

PHTH683**Clinical Issues Seminar—Neurology II**

Presentation/discussion of comprehensive issues related to physical-therapy management of the pediatric patient. Topics include treatment within a variety of settings including school-based, hospital-based, private practice, and home care; psycho-social issues relating to the patient and family; funding; documentation; and pharmacological management. Corequisites: PHTH663, 683, and 693.

PHTH684**Clinical Issues Seminar—Orthopedics I**

Presentation/discussion of comprehensive issues related to physical-therapy management of the orthopedic patient. Topics include DME, instrumented ligament testing, differential diagnosis, physical principles and biomechanics applied to therapeutic exercise and function, medical diagnostics, surgery and post-operative care, and gait analysis. Corequisites: PHTH664 and 674.

PHTH685**Clinical Issues Seminar—Orthopedics II**

Seminar presenting/discussing comprehensive issues related to physical-therapy management of complex orthopedic patient with select axial musculoskeletal pathologies. Includes chronic pain management, medical diagnostics, surgical intervention for the spine, differential diagnosis, and age-related pathologies. Corequisites: PHTH665 and 675.

PHTH687**Clinical Education Workshop**

Concentrated instruction in selected advanced physical therapy patient-care topics including cardiopulmonary rehabilitation, women's health issues, manual therapy strategies, advanced

electrotherapeutics, advanced neurological treatment strategies, and regional evaluation/treatment strategies for TMJ and hand.

PHTH688 (2.5)
Clinical Enrichment Seminar
Seminar/discussion on issues related to physical therapy care and the profession. Includes preventive health-care programs, physical-therapy consultation, burn and wound-care management, industrial rehabilitation and sports medicine.

PHTH691 (2)
Research I
Introduction to research methods and design; students develop critical reasoning skills necessary to read and evaluate current research literature. Issues related to sampling, control, validity, and reliability. Several parametric statistical procedures and the research proposal process.

PHTH692 (1)
Research II
A continuation of PHTH691; focuses on student identification and selection of a research proposal topic. Advanced statistical analysis discussed; also informed consent, writing techniques, funding acquisition, and presentation of findings. Corequisites: PHTH662, 672, 682.

PHTH693 (1)
Research III
Research proposal review, revision, and presentation. Students work with the research coordinator and individual faculty research advisers in preparation for completion of the research proposal document.

PROFESSIONAL ADVANCEMENT PROGRAM

PHTH507 (2.5)
Functional Anatomy/Neuroanatomy
A review of cadaver anatomy with corresponding lectures on the main functional muscle groups of the extremities and back. The spine, upper and lower extremity joints and soft tissues are covered. In addition, neuroanatomy relevant to physical therapy and sports medicine are discussed.

PHTH529 (2.5)
Education Methods and Materials
Examines and applies education theory to skills used by the health care provider in the classroom, community, and clinical facility. Topics include the educational role of the health care provider, the learning process, the taxonomies of learning, learning styles, modality strengths, multiple intelligences, literacy levels, instructional technology, and teaching strategies.

PHTH531 (2.5)
NAIOMT Level I: Introduction to Fundamentals of Orthopedic Manual Therapy and Differential Diagnosis
Appropriate skills in basic and objective selective tissue examination necessary for generating a provisional differential diagnosis of spinal dysfunction. Signs, symptoms, pathology, and management of common spinal pathologies are reviewed. Selective tissue tensioning techniques for the peripheral joints are introduced. Cyriax's principles are presented.

PHTH532 (2.5)
NAIOMT Level II: Intermediate Upper Quadrant
A comprehensive biomechanical and anatomical review of the upper thoracic, upper and lower cervical spine, shoulder, elbow, wrist, and hand. Specific biomechanical assessment of each area is taught along with appropriate and effective treatment techniques for common injuries and mechanical dysfunctions.

PHTH533 (2.5)
NAIOMT Level II: Intermediate Lower Quadrant
A comprehensive biomechanical and anatomical review of the lower thoracic and lumbar spines, the hip, knee, ankle, and foot. Specific biomechanical assessment of each area is taught along with appropriate and effective treatment techniques for common injuries and mechanical dysfunctions.

PHTH539 (2.5)
Clinical Research
Presents basic research concepts in a format appropriate to both consumers of research literature and students planning to initiate research projects. Statistics are covered in a conceptual manner. Student activities include a literature review, critiquing research articles, and developing a research proposal ready for submission to the Human Subjects Review Board.

PHTH541 (2.5)
NAIOMT Level III: Advanced Upper Quadrant
Builds on the techniques learned in Level II and helps the student understand the kinetic chain interrelationships of the upper quadrant. Integrates information generated in the assessment to understand how remote dysfunctions can be causal or contributory. Advanced techniques are demonstrated along with new material on temporomandibular-joint material and peripheral manipulation skills. Prerequisite: PHTH532.

PHTH542 (2.5)
NAIOMT Level III: Advanced Lower Quadrant
Builds on the techniques learned in Level II and helps the student understand the kinetic chain interrelationships in the lower quadrant. Presents advanced biomechanical tests and treatment and includes the sacroiliac and pubic joints. Discusses the integration of examination and treatment techniques. Prerequisite: PHTH553.

PHTH543 (2.5)
NAIOMT Level IV: High Velocity Manipulation
Instructs the student on the indications and contraindications, as well as the safe and effective application of spinal, pelvic, and costal manipulation techniques. Prerequisites: PHTH542 and 543.

PHTH549 (2.5)
Principles of Contemporary Leadership
Theory and application of complexity sciences to organizational management; exploration of key leadership roles and changing paradigms; presentation of methods to maximize personal and professional life.

PHTH550 (2.5)
Clinical Application of Biomechanics
An advanced course, including practice and application, to enhance the understanding of the role of biomechanics in orthopedic injury causation and rehabilitation. Focuses on how

anatomic structures react in an isolated and integrated fashion when placed under the influence of forces in both a static and dynamic environment.

PHTH561 (1.5)
Myofascial Manipulation: Level I
Introduces osteopathic concepts/terminology, myofascial anatomy, theories regarding the neurophysiology and biomechanics of release techniques, the difference between direct and indirect techniques, with focus on direct shearing and deep direct techniques. Skills include total body gait analysis, palpation for myofascial binds/restrictions, and osteopathic shearing and rolling structural integration techniques.

PHTH562 (1.5)
Myofascial Manipulation: Level II
Builds on Level I, progressing into higher level myofascial loading to treat joint dysfunctions; introduction to craniosacral therapy concepts of transverse diaphragms and dural tube treatment, localized joint unwinding, and how to initiate the release response with both tri-planar loading or unloading. Total body dynamic assessment is reinforced. Prerequisite: PHTH561.

PHTH571 (1.5)
Soft Tissue Management: Level I
Introduces the theory and clinical application of indirect techniques, with emphasis on practical use of strain-counterstrain (SCS) in combination with neuromotor re-education techniques. SCS includes spinal, rib, pelvic, shoulder, and knee points, and home program material for patients. Neuromotor re-education concepts and options will be experienced for each region.

PHTH572 (1.5)
Soft Tissue Management: Level II
Builds on concepts and techniques introduced in Level I. Adds SCS for distal extremity joints, full body motion analysis and SCS screen from which a plan for point release and neuromotor re-education is developed. More neuromotor re-education exercises and options, and identifying and correcting vector(s) of traumatic injury. Prerequisite: PHTH571.

PHTH577 (2)
Sports Physical Therapy
Understanding physical therapy management of athletes: topics unique to sports medicine include pre-preparation screening exams, field management of athletic injuries, designing comprehensive rehabilitation and conditioning programs, taping techniques, equipment fitting, biomechanics of the upper extremity and lower extremity in sports, specifically related to evaluation and treatment of common athletic injuries.

PHTH578 (2)
Industrial Physical Therapy
Investigates orthopedic and sports physical therapy principles applied to the industrial setting. Includes applied ergonomics, work conditioning and hardening, pre-employment and pre-placement screening, industrial injury prevention, objective functional capacity testing, inappropriate illness behavior, the industrial medico legal system, industrial spinal patient rehabilitation, and a practical ergonomic/lifting lab session. Develops clinical competence in evaluation techniques and intervention procedures.

PHTH580**Professional Ethics**

Basic ethical theory and methods and their place in the study of human behavior. Medical professional context and challenges of ethical behavior are examined including the relationships between peers, superiors, subordinates, and patients. Contemporary medical ethical issues are discussed and illustrated with actual cases and related to Christian biblical presuppositions.

PHTH587**Applied Movement Science: Norwegian Concepts**

The metabolic activity level of different tissue types described, compared, and contrasted. Sources of fuel for energy production described and related to the specificity of exercise training, tissue remodeling, and regeneration. Concepts used to plan a physiologically correct rehab program for differing pathologies.

PHTH648**Workshop**

(2)

(2.5)

(1-4)

PHYSICS

Haughey Hall, Room 212
(616) 471-3430
physics-info@andrews.edu
<http://www.andrews.edu/PHYS/>

Faculty

Robert E. Kingman, *Chair*
Gary W. Burdick
Mickey D. Kutzner
Margarita C. K. Mattingly
S. Clark Rowland

Academic Programs	Credits
BS: Physics	40
BS: Biophysics	42
Minor in Physics	20

Physics describes the world in terms of matter and energy and relates the many facets of its phenomena in terms of fundamental law. Its scope includes systems that range in size from sub-nuclear to the entire cosmos. A major in physics supports and enhances professional careers in engineering, the life sciences, the physical sciences, and similar areas.

A major in biophysics prepares the graduate for advanced studies in medical and bioengineering fields. Both physics programs prepare the graduate for a career in secondary teaching.

Undergraduate Programs

BS: Physics—40

Major Requirements: PHYS241, 242, 271, 272, 377, 411, 430, 431, 477, 481, 495 plus an additional 12 credits numbered 300 and above.

Cognate Courses: MATH141, 142, 240, 281, 286; CHEM131, 132; and CPTR125 (FORTRAN) or CPTR151.

Physics majors desiring secondary-teaching certification should consult with the department and with the School of Education.

Recommended Electives: ELCT141, 142, TCED250.

BS: Biophysics—42

Offered by the biology and physics departments

BIOL165, 166, 371; 372 or BCHM421*; BIOL348; PHYS241, 242, 271, 272, 377, 411, 416, 430 or CHEM431 and 441, PHYS377, 431, 495

* A student may earn a minor in chemistry by selecting the biochemistry option.

Cognate Courses—27

CHEM131, 132, 231, 232; MATH141, 142, 286.

Recommended Electives: BCHM421, 430; CHEM432, 442; ELCT141, 142; MATH240, 281.

Students electing to take a BS: Biophysics should consult with the chair of the Physics Department. Biophysics majors who are interested in secondary teaching need to select electives in the sciences to meet certification requirements.

Such persons should consult with the biophysics adviser and the School of Education early in their programs.

Minor in Physics—20

Chosen in consultation with the department including PHYS241, 242, and 271, 272.

PHYS110, 115, 131, 132, 405 are not applicable to a major or minor in Physics.

Graduate Program

The Physics Department collaborates in the MS: Interdisciplinary Studies (Mathematics and Physical Sciences). See the Interdisciplinary Studies section, p. 96.

Courses

(Credits)

See inside front cover for symbol code.

PHYS110 \$ (3)**Astronomy**

Explores the cosmic environment. Topics include the solar system, stars and their development star clusters, the interstellar medium, galaxies, and the large-scale features of the universe. Meets the natural science elective course requirement.

Weekly: 2 lectures, 1 recitation, and a 2-hour lab. Prerequisite: MATH 165 or its equivalent.

PHYS110 V (3)**Astronomy**

Distance education—see content above.

PHYS115 Alt \$ (3)**Concepts of Physics**

A conceptual approach to physics for the non-science student. Explores matter, energy, motion, waves, electricity, and magnetism and quantum physics. Meets the natural science elective course requirement. Weekly: 2 lectures, 1 recitation, and a 2-hour lab. Prerequisite: MATH 165 or equivalent.

PHYS130 \$ (4)**Applied Physics for Health Professions**

Mechanics, waves, electricity, magnetism, acoustics and optics as applied to health professions such as Physical Therapy, but not acceptable for admission to dental, medical or veterinary schools. Weekly: 3 lectures, 1 recitation, and one 3-hr lab. Prerequisite: MATH 165.

PHYS141, 142 \$ (4, 4)**General Physics**

Algebra based introduction to mechanics, relativity, heat, electricity, magnetism, wave motion, physical and geometric optics, and modern physics. Weekly: 3 lectures, 1 recitation, 1 laboratory briefing lecture, and one 3-hour lab. Prerequisite: MATH165.

PHYS241, 242 (4, 4)**Physics for Scientists and Engineers**

An introduction to mechanics, relativity, heat, electricity, magnetism, wave motion, physical and geometrical optics, and modern physics emphasizing the mathematical formulation and the physical significance of the fundamental